SLR-FM-50

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE RESISTANT NON ENGINEERED CONSTRUCTION

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume suitable data if necessary and mention it clearly.
3) Solve any five questions.

Q.1	Explain the effects of an Earthquake.	**10**
Q.2	What are the causes of an Earthquake?	**10**
Q.3	Explain the different magnitude scales to measure an earthquake.	**10**
Q.4	What are causes of damages due to earthquake in the stone masonry construction?	**10**
Q.5	What is meant by Restoration of strength? What are techniques for restoration?	**10**
Q.6	Explain the soil liquefaction as an effect of earthquake.	**10**

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data wherever necessary and mention it clearly
3) Use of non-programmable calculator is allowed
4) Figure to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The biodegradable organics deposited at the bed of stream undergoes _____ decomposition in self-purification of stream process.
   a) aerobic b) anaerobic
   c) inorganic d) photosynthesis

2) Biological treatment units are operated in _____ growth phase of Microorganism.
   a) log b) lag
   c) declining d) all of above

3) Incineration drastically reduces the _____ of dried sludge.
   a) Moisture b) Volume
   c) Appearance d) All of above

4) _____ wastes are highly corrosive for metals, concrete structures and also harmful to aquatic life
   a) organic b) acidic
   c) alkaline d) oil and grease

5) In a running pollutes stream if Deoxygenation is more than reareation then _____ in Do curve results.
   a) Sag b) Lag
   c) Hog d) None of these

6) _____ constant varies with temperature in case of effluent waste and river water respectively.
   a) Deoxygenation b) Ultimate BOD
   c) Reoxygenation d) Both a and c

7) The final end products of anaerobic digestion can be used for _____.
   a) Electricity generation b) Cooking
   c) Composting and as a manure d) All of above

8) _____ is a process of aeration used for removal of gases from wastewater.
   a) Thermal reduction b) Air stripping
   c) Adsorption d) Chemical oxidation

9) _____ and _____ industries are always located in same premises.
   a) Dairy and textile
   b) Paper pulp and fertilizer
   c) Sugar and distillery
   d) All of above

10) Beater and Jordan is one of the steps in manufacturing process of _____ industry.
   a) Textile
   b) Sugar
   c) Pulp and paper
   d) Tannery

11) Dyeing is the one of manufacturing process of _____ industry.
   a) Textile
   b) Sugar
   c) Pulp and paper
   d) Tannery

12) Concept of CEPT is most suited for _____.
   a) Large scale industries
   b) Small scale industries
   c) Power plants
   d) None of these

13) _____ sludge is non-hazardous compared to industrial sludge.
   a) Sewage
   b) Chemical industry
   c) Both a and b
   d) None of these

14) Oil and grease is commonly found in _____ effluent.
   a) Textile
   b) Sugar
   c) Pulp and paper
   d) Tannery

Seat No.	

Set | P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 3 and Q. No. 7 are compulsory.
2) Answer any two questions from each section.
2) Figures to the right indicate full marks.

Section - I

Q.2 **a)** Explain in detail pollutant characteristics of industrial wastes compared to sewage. **05**

b) Explain the process of Ion-Exchange method for removal of dissolved inorganic materials. **04**

Q.3 **a**) Explain any one method of waste strength reduction. **05**

b) A waste stream saturated with DO has a flow of 1.4 m^3/sec, BOD of 5 mg/Lit and rate constant of 0.3 /day. It receives an effluent discharge of 0.29 m^3/sec having BOD 25 mg/lit and DO 6 mg/Lit and rate constant 0.12 /day. The average velocity of flow of the stream is 0.20 m/sec. Calculate DO deficit at point 20 km and 50 km downstream. Assume that the temperature is 20^oC throughout and BOD is measured at 5 days. Take saturation DO at 20^o C as 9.17 mg/Lit. **05**

Q.4 **a)** Explain how the volume of waste generated from industry can be reduced by any two techniques. **05**

b) Explain Streeter Phelps equation with meaning of each and every term in it. **04**

Q.5 **Write short note on:** **09**

a) Reverse Osmosis
b) Electrodialysis
c) Equalization tanks

Section - II

Q.6 **a)** Mention pollution characteristics of industrial waste and suggest treatment methods for any two agro based industries. **05**

b) What are the sources of wastes in sugar industry? Discuss in detail. **04**

Q.7 Give the characteristics of wastewater, draw the wastewater treatment flow diagram and explain in detail.

a) Textile **05**
b) Tannery **05**

Q.8 Draw manufacturing process flow diagram, indicate the sources wastes and explain in detail.

a) Paper and pulp **05**
b) Distillery **04**

Q.9 Write short note on: **09**

a) Function of state pollution control board
b) Massive lime treatment
c) By Product recovery

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data wherever necessary and mention it clearly
3) Use of non-programmable calculator is allowed
4) Figure to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) _____ is a process of aeration used for removal of gases from wastewater.
a) Thermal reduction b) Air stripping
c) Adsorption d) Chemical oxidation

2) _____ and _____ industries are always located in same premises.
a) Dairy and textile b) Paper pulp and fertilizer
c) Sugar and distillery d) All of above

3) Beater and Jordan is one of the steps in manufacturing process of _____ industry.
a) Textile b) Sugar
c) Pulp and paper d) Tannery

4) Dyeing is the one of manufacturing process of _____ industry.
a) Textile b) Sugar
c) Pulp and paper d) Tannery

5) Concept of CEPT is most suited for _____.
a) Large scale industries b) Small scale industries
c) Power plants d) None of these

6) _____ sludge is non-hazardous compared to industrial sludge.
a) Sewage b) Chemical industry
c) Both a and b d) None of these

7) Oil and grease is commonly found in _____ effluent.
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c) Pulp and paper d) Tannery

8) The biodegradable organics deposited at the bed of stream undergoes _____ decomposition in self-purification of stream process.
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c) inorganic d) photosynthesis

9) Biological treatment units are operated in _____ growth phase of Microorganism.
a) log b) lag
c) declining d) all of above

10) Incineration drastically reduces the _____ of dried sludge.
   a) Moisture b) Volume
   c) Appearance d) All of above

11) _____ wastes are highly corrosive for metals, concrete structures and also harmful to aquatic life
   a) organic b) acidic
   c) alkaline d) oil and grease

12) In a running pollutes stream if Deoxygenation is more than reareation then _____ in Do curve results.
   a) Sag b) Lag
   c) Hog d) None of these

13) _____ constant varies with temperature in case of effluent waste and river water respectively.
   a) Deoxygenation b) Ultimate BOD
   c) Reoxygenation d) Both a and c

14) The final end products of anaerobic digestion can be used for _____.
   a) Electricity generation b) Cooking
   c) Composting and as a manure d) All of above

Seat No.	

Set | Q

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 3 and Q. No. 7 are compulsory.
2) Answer any two questions from each section.
2) Figures to the right indicate full marks.

Section - I

Q.2 **a)** Explain in detail pollutant characteristics of industrial wastes compared to sewage. **05**

b) Explain the process of Ion-Exchange method for removal of dissolved inorganic materials. **04**

Q.3 **a**) Explain any one method of waste strength reduction. **05**

b) A waste stream saturated with DO has a flow of 1.4 m^3/sec, BOD of 5 mg/Lit and rate constant of 0.3 /day. It receives an effluent discharge of 0.29 m^3/sec having BOD 25 mg/lit and DO 6 mg/Lit and rate constant 0.12 /day. The average velocity of flow of the stream is 0.20 m/sec. Calculate DO deficit at point 20 km and 50 km downstream. Assume that the temperature is 20^{o}C throughout and BOD is measured at 5 days. Take saturation DO at 20^o C as 9.17 mg/Lit. **05**

Q.4 **a)** Explain how the volume of waste generated from industry can be reduced by any two techniques. **05**

b) Explain Streeter Phelps equation with meaning of each and every term in it. **04**

Q.5 **Write short note on:** **09**

a) Reverse Osmosis
b) Electrodialysis
c) Equalization tanks

Section - II

Q.6 **a)** Mention pollution characteristics of industrial waste and suggest treatment methods for any two agro based industries. **05**

b) What are the sources of wastes in sugar industry? Discuss in detail. **04**

Q.7 Give the characteristics of wastewater, draw the wastewater treatment flow diagram and explain in detail.

a) Textile **05**
b) Tannery **05**

Q.8 Draw manufacturing process flow diagram, indicate the sources wastes and explain in detail.

a) Paper and pulp **05**
b) Distillery **04**

Q.9 Write short note on: **09**

a) Function of state pollution control board
b) Massive lime treatment
c) By Product recovery

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data wherever necessary and mention it clearly
3) Use of non-programmable calculator is allowed
4) Figure to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) In a running pollutes stream if Deoxygenation is more than reareation then _____ in Do curve results.
   a) Sag b) Lag
   c) Hog d) None of these

2) _____ constant varies with temperature in case of effluent waste and river water respectively.
   a) Deoxygenation b) Ultimate BOD
   c) Reoxygenation d) Both a and c

3) The final end products of anaerobic digestion can be used for _____.
   a) Electricity generation b) Cooking
   c) Composting and as a manure d) All of above

4) _____ is a process of aeration used for removal of gases from wastewater.
   a) Thermal reduction b) Air stripping
   c) Adsorption d) Chemical oxidation

5) _____ and _____ industries are always located in same premises.
   a) Dairy and textile b) Paper pulp and fertilizer
   c) Sugar and distillery d) All of above

6) Beater and Jordan is one of the steps in manufacturing process of _____ industry.
   a) Textile b) Sugar
   c) Pulp and paper d) Tannery

7) Dyeing is the one of manufacturing process of _____ industry.
   a) Textile b) Sugar
   c) Pulp and paper d) Tannery

8) Concept of CEPT is most suited for _____.
   a) Large scale industries b) Small scale industries
   c) Power plants d) None of these

9) _____ sludge is non-hazardous compared to industrial sludge.
   a) Sewage b) Chemical industry
   c) Both a and b d) None of these

10) Oil and grease is commonly found in _____ effluent.
   a) Textile b) Sugar
   c) Pulp and paper d) Tannery

11) The biodegradable organics deposited at the bed of stream undergoes _____ decomposition in self-purification of stream process.
   a) aerobic b) anaerobic
   c) inorganic d) photosynthesis

12) Biological treatment units are operated in _____ growth phase of Microorganism.
   a) log b) lag
   c) declining d) all of above

13) Incineration drastically reduces the _____ of dried sludge.
   a) Moisture b) Volume
   c) Appearance d) All of above

14) _____ wastes are highly corrosive for metals, concrete structures and also harmful to aquatic life
   a) organic b) acidic
   c) alkaline d) oil and grease

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 3 and Q. No. 7 are compulsory.
2) Answer any two questions from each section.
2) Figures to the right indicate full marks.

Section - I

Q.2 **a)** Explain in detail pollutant characteristics of industrial wastes compared to sewage. **05**

b) Explain the process of Ion-Exchange method for removal of dissolved inorganic materials. **04**

Q.3 **a**) Explain any one method of waste strength reduction. **05**

b) A waste stream saturated with DO has a flow of 1.4 m^3/sec, BOD of 5 mg/Lit and rate constant of 0.3 /day. It receives an effluent discharge of 0.29 m^3/sec having BOD 25 mg/lit and DO 6 mg/Lit and rate constant 0.12 /day. The average velocity of flow of the stream is 0.20 m/sec. Calculate DO deficit at point 20 km and 50 km downstream. Assume that the temperature is 20^oC throughout and BOD is measured at 5 days. Take saturation DO at 20^o C as 9.17 mg/Lit. **05**

Q.4 **a)** Explain how the volume of waste generated from industry can be reduced by any two techniques. **05**

b) Explain Streeter Phelps equation with meaning of each and every term in it. **04**

Q.5 **Write short note on:** **09**

a) Reverse Osmosis
b) Electrodialysis
c) Equalization tanks

Section - II

Q.6 **a)** Mention pollution characteristics of industrial waste and suggest treatment methods for any two agro based industries. **05**

b) What are the sources of wastes in sugar industry? Discuss in detail. **04**

Q.7 Give the characteristics of wastewater, draw the wastewater treatment flow diagram and explain in detail.

a) Textile **05**
b) Tannery **05**

Q.8 Draw manufacturing process flow diagram, indicate the sources wastes and explain in detail.

a) Paper and pulp **05**
b) Distillery **04**

Q.9 Write short note on: **09**

a) Function of state pollution control board
b) Massive lime treatment
c) By Product recovery

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data wherever necessary and mention it clearly
3) Use of non-programmable calculator is allowed
4) Figure to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Beater and Jordan is one of the steps in manufacturing process of _____ industry.
   a) Textile b) Sugar
   c) Pulp and paper d) Tannery

2) Dyeing is the one of manufacturing process of _____ industry.
   a) Textile b) Sugar
   c) Pulp and paper d) Tannery

3) Concept of CEPT is most suited for _____.
   a) Large scale industries b) Small scale industries
   c) Power plants d) None of these

4) _____ sludge is non-hazardous compared to industrial sludge.
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7) Biological treatment units are operated in _____ growth phase of Microorganism.
   a) log b) lag
   c) declining d) all of above

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   a) Moisture b) Volume
   c) Appearance d) All of above

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10) In a running pollutes stream if Deoxygenation is more than reareation then _____ in Do curve results.
a) Sag b) Lag
c) Hog d) None of these

11) _____ constant varies with temperature in case of effluent waste and river water respectively.
a) Deoxygenation b) Ultimate BOD
c) Reoxygenation d) Both a and c

12) The final end products of anaerobic digestion can be used for _____.
a) Electricity generation b) Cooking
c) Composting and as a manure d) All of above

13) _____ is a process of aeration used for removal of gases from wastewater.
a) Thermal reduction b) Air stripping
c) Adsorption d) Chemical oxidation

14) _____ and _____ industries are always located in same premises.
a) Dairy and textile b) Paper pulp and fertilizer
c) Sugar and distillery d) All of above

Seat No.	

Set | S

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 3 and Q. No. 7 are compulsory.
2) Answer any two questions from each section.
2) Figures to the right indicate full marks.

Section - I

Q.2 **a)** Explain in detail pollutant characteristics of industrial wastes compared to sewage. **05**

b) Explain the process of Ion-Exchange method for removal of dissolved inorganic materials. **04**

Q.3 **a**) Explain any one method of waste strength reduction. **05**

b) A waste stream saturated with DO has a flow of 1.4 m^3/sec, BOD of 5 mg/Lit and rate constant of 0.3 /day. It receives an effluent discharge of 0.29 m^3/sec having BOD 25 mg/lit and DO 6 mg/Lit and rate constant 0.12 /day. The average velocity of flow of the stream is 0.20 m/sec. Calculate DO deficit at point 20 km and 50 km downstream. Assume that the temperature is 20^oC throughout and BOD is measured at 5 days. Take saturation DO at 20^o C as 9.17 mg/Lit. **05**

Q.4 **a)** Explain how the volume of waste generated from industry can be reduced by any two techniques. **05**

b) Explain Streeter Phelps equation with meaning of each and every term in it. **04**

Q.5 **Write short note on:** **09**

a) Reverse Osmosis
b) Electrodialysis
c) Equalization tanks

Section - II

Q.6 **a)** Mention pollution characteristics of industrial waste and suggest treatment methods for any two agro based industries. **05**

b) What are the sources of wastes in sugar industry? Discuss in detail. **04**

Q.7 Give the characteristics of wastewater, draw the wastewater treatment flow diagram and explain in detail.

a) Textile **05**
b) Tannery **05**

Q.8 Draw manufacturing process flow diagram, indicate the sources wastes and explain in detail.

a) Paper and pulp **05**
b) Distillery **04**

Q.9 Write short note on: **09**

a) Function of state pollution control board
b) Massive lime treatment
c) By Product recovery

SLR-FM-101

Seat No.	

Set P

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data wherever necessary.
3) Use of only non programmable calculator is allowed.
4) Draw neat labeled diagrams whenever necessary.
5) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Which of the following is not a requirement for site selection of hydroelectric power plant?
   a) Availability of water b) Large catchment area
   c) Rocky land d) Sedimentation

2) A hydrograph is a graph for the hydroelectric power plants, what information does this provide?
   a) The discharge at any time during the period of consideration
   b) Total volume of flow upto any time given by the area under the curve upto that time.
   c) The mean run off during the period.
   d) All of these

3) The load factor for the peak day of the year determines the required _____.
   a) Water storage b) Pondage
   c) Generating capacity d) None

4) Minimum pressure occurs in fall flowing power tunnel at the time _____.
   a) load rejection b) load acceptance
   c) head race d) Tail race

5) The pumped storage power plant in India _____
   a) Bhakra Nangal (Punjab) b) Kadamparai (Tamilnadu)
   c) Koyna (Maharashtra) d) Does not exist

6) Unit power in a turbine is _____.
   a) $pH^{1/2}$ b) P/H
   c) $P/H^{3/2}$ d) $P/H^{3/4}$

7) The hydroelectric power plants are_____
   a) Operating cost is high and initial cost is high
   b) Operating cost is low and initial cost is high
   c) Operating cost is low and initial cost is low
   d) Operating cost is high and initial cost is low

8) Pelton turbines are mostly _____.
   a) Horizontal b) Vertical
   c) Inclined d) None of the above

9) In francis turbine runner, the number of blades is generally of the order of _____.
   a) 1-2 b) 4-6
   c) 6-8 d) 12-16

10) Which of following power plant has highest depreciation charges?
   a) Nuclear plant b) Thermal plant
   c) Diesel plant d) Hydroelectric plant

11) In hydro electric power station what is an enlarge body of water just above the intake and used as a regulating reservoir called _____.
   a) Penstock b) Spillways
   c) Reservoir d) Fore bay

12) The draft tube is provided to _____.
   a) reduce the effect of water hammer
   b) raise the water surface of the stream to create an artificial head
   c) increase the acting head on the water wheel
   d) none of the above

13) What is time period for one tide to occur in a day?
   a) 6h, 12.5 min b) 6h, 40.5 min
   c) 6h, 0 min d) 6h, 25.6 min

14) Difference between water height at high tide and water height at low tide is called_____
   a) Tidal Variation b) Tidal Volume
   c) Tidal Range d) Tidal Current

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Use of only non programmable calculator is allowed.
4) Draw neat labeled diagrams whenever necessary.
5) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four of the following questions. **16**

a) What do you understand by non-conventional sources of power generation? What is the scope of these sources in India?

b) What are the different salient factors to be considered in deciding the alignment of a tunnel in a hydroelectric project?

c) What do you understand by mass curve of runoff? How can you determine the storage capacity of a reservoir with its help if a constant of a variable demand is known?

d) Common load shared by two stations base load plant with 60 MW capacity and other being standby plant with 50 MW capacity. The yearly output for base load station is 220×10^6 KWh, and for standby station is 24×10^6 KWh. The peak load taken by standby station is 17 MW which works for 2300 hrs during the year. The base load station takes peak load as 32 MW. Calculate annual load factor, pant use factor, and capacity factor for both the stations.

e) The 95% dependable discharge of a river (discharge which would be approximately available 95% of the time) is $22m^3$/sec. If the utilized head is 22 m calculate
1) The theoretical hp and kw
2) Actual amount of power output
3) Total yearly developable energy
4) The actual capacity that may be installed to utilize all average flow and the corresponding energy

Q.3 Attempt any two of the following questions. **12**

a) A penstock pipe, 800 m long, takes off from a reservoir and feeds water to turbine, the level of which is 220 m below the reservoir water level. The first 300 m length of the penstock has a cross section area of 6 m^2 and the rest has an area of 4 m^2. The steady state discharge is $10m^3$/sec. If the turbine gates are closed completely in 5 seconds at a uniform rate, what would be the water hammer pressure developed?
(from Allieri chart= Z^2=1.32)

b) What do you understand by water hammer in a pipe line? Derive the expression for the water hammer pressure in case of rigid pipe and elastic pipe.

c) What is a surge tank? What are its types? Explain any one with sketch. Also write what are the different loading conditions to determine the height of surge tank.

Section – II

Q.4 Attempt any four of the following questions. **16**

a) What are the important types of turbines? Enlist the factors on which choice of turbine depends.

b) What do you understand by 'pumped storage' plant? What are the advantages and disadvantages of this power plant?

c) What are the advantages of reaction turbine over the pelton wheel in respect of efficiency, size cost and maintenance?

d) Power house is equipped with 4 units of vertical shaft pelton turbines to be coupled with 60000 kVA, 3 phase. 40 hertz generators. The generation are provided with 10 pairs of poles. The gross design head is 500 m and transmission efficiency of head race tunnel and penstocks together is to be 90 percent. The four units together will provide for a power of 340000 hp at a guaranteed efficiency of 90 percent. The nozzle efficiency is 0.98.
Find -:
1) the design discharge for the turbine,
2) jet dia. and no. of jets,
3) the nozzle tip diameter
4) the pitch circle dia. of the wheel
5) the specific speed and
6) number of buckets on the wheel

e) What are the types of intake structures? Explain any one with neat sketch.

Q.5 Attempt any two of the following questions. **12**

a) Describe how ocean tides one generated? With tidal cycle in view describe how hydropower can be generated? Also state the limitations of tidal power generation.

b) At a hydroelectric power station Kaplan turbine is used which has following data ,
Operating head = 22.5m
output power at this head = 126 MW,
discharge = 615 m^3/sec
speed = 68.2 rpm,
Runner tiop tp tip diameter = 9.3 m
Hub diameter = 4.3m
Number of blades = 6, calculate the speed ratio, flow ratio, and the overall efficiency.

c) Write short notes on
1) Draft tube
2) Anchor block

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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3) Use of only non programmable calculator is allowed.
4) Draw neat labeled diagrams whenever necessary.
5) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Pelton turbines are mostly _____.
   a) Horizontal b) Vertical
   c) Inclined d) None of the above

2) In francis turbine runner, the number of blades is generally of the order of _____.
   a) 1-2 b) 4-6
   c) 6-8 d) 12-16

3) Which of following power plant has highest depreciation charges?
   a) Nuclear plant b) Thermal plant
   c) Diesel plant d) Hydroelectric plant

4) In hydro electric power station what is an enlarge body of water just above the intake and used as a regulating reservoir called _____.
   a) Penstock b) Spillways
   c) Reservoir d) Fore bay

5) The draft tube is provided to _____.
   a) reduce the effect of water hammer
   b) raise the water surface of the stream to create an artificial head
   c) increase the acting head on the water wheel
   d) none of the above

6) What is time period for one tide to occur in a day?
   a) 6h, 12.5 min b) 6h, 40.5 min
   c) 6h, 0 min d) 6h, 25.6 min

7) Difference between water height at high tide and water height at low tide is called_____
   a) Tidal Variation b) Tidal Volume
   c) Tidal Range d) Tidal Current

8) Which of the following is not a requirement for site selection of hydroelectric power plant?
   a) Availability of water
   b) Large catchment area
   c) Rocky land
   d) Sedimentation

9) A hydrograph is a graph for the hydroelectric power plants, what information does this provide?
   a) The discharge at any time during the period of consideration
   b) Total volume of flow upto any time given by the area under the curve upto that time.
   c) The mean run off during the period.
   d) All of these

10) The load factor for the peak day of the year determines the required _____.
   a) Water storage
   b) Pondage
   c) Generating capacity
   d) None

11) Minimum pressure occurs in fall flowing power tunnel at the time _____.
   a) load rejection
   b) load acceptance
   c) head race
   d) Tail race

12) The pumped storage power plant in India _____
   a) Bhakra Nangal (Punjab)
   b) Kadamparai (Tamilnadu)
   c) Koyna (Maharashtra)
   d) Does not exist

13) Unit power in a turbine is _____.
   a) $pH^{1/2}$
   b) P/H
   c) $P/H^{3/2}$
   d) $P/H^{3/4}$

14) The hydroelectric power plants are_____
   a) Operating cost is high and initial cost is high
   b) Operating cost is low and initial cost is high
   c) Operating cost is low and initial cost is low
   d) Operating cost is high and initial cost is low

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Use of only non programmable calculator is allowed.
4) Draw neat labeled diagrams whenever necessary.
5) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four of the following questions. **16**

a) What do you understand by non-conventional sources of power generation? What is the scope of these sources in India?

b) What are the different salient factors to be considered in deciding the alignment of a tunnel in a hydroelectric project?

c) What do you understand by mass curve of runoff? How can you determine the storage capacity of a reservoir with its help if a constant of a variable demand is known?

d) Common load shared by two stations base load plant with 60 MW capacity and other being standby plant with 50 MW capacity. The yearly output for base load station is 220×10^6 KWh, and for standby station is 24×10^6 KWh. The peak load taken by standby station is 17 MW which works for 2300 hrs during the year. The base load station takes peak load as 32 MW. Calculate annual load factor, pant use factor, and capacity factor for both the stations.

e) The 95% dependable discharge of a river (discharge which would be approximately available 95% of the time) is $22m^3$/sec. If the utilized head is 22 m calculate
1) The theoretical hp and kw
2) Actual amount of power output
3) Total yearly developable energy
4) The actual capacity that may be installed to utilize all average flow and the corresponding energy

Q.3 Attempt any two of the following questions. **12**

a) A penstock pipe, 800 m long, takes off from a reservoir and feeds water to turbine, the level of which is 220 m below the reservoir water level. The first 300 m length of the penstock has a cross section area of 6 m^2 and the rest has an area of 4 m^2. The steady state discharge is $10m^3$/sec. If the turbine gates are closed completely in 5 seconds at a uniform rate, what would be the water hammer pressure developed?
(from Allieri chart= Z^2=1.32)

b) What do you understand by water hammer in a pipe line? Derive the expression for the water hammer pressure in case of rigid pipe and elastic pipe.

c) What is a surge tank? What are its types? Explain any one with sketch. Also write what are the different loading conditions to determine the height of surge tank.

Section – II

Q.4 Attempt any four of the following questions. **16**

a) What are the important types of turbines? Enlist the factors on which choice of turbine depends.

b) What do you understand by 'pumped storage' plant? What are the advantages and disadvantages of this power plant?

c) What are the advantages of reaction turbine over the pelton wheel in respect of efficiency, size cost and maintenance?

d) Power house is equipped with 4 units of vertical shaft pelton turbines to be coupled with 60000 kVA, 3 phase. 40 hertz generators. The generation are provided with 10 pairs of poles. The gross design head is 500 m and transmission efficiency of head race tunnel and penstocks together is to be 90 percent. The four units together will provide for a power of 340000 hp at a guaranteed efficiency of 90 percent. The nozzle efficiency is 0.98.
Find -:
1) the design discharge for the turbine,
2) jet dia. and no. of jets,
3) the nozzle tip diameter
4) the pitch circle dia. of the wheel
5) the specific speed and
6) number of buckets on the wheel

e) What are the types of intake structures? Explain any one with neat sketch.

Q.5 Attempt any two of the following questions. **12**

a) Describe how ocean tides one generated? With tidal cycle in view describe how hydropower can be generated? Also state the limitations of tidal power generation.

b) At a hydroelectric power station Kaplan turbine is used which has following data ,
Operating head = 22.5m
output power at this head = 126 MW,
discharge = 615 m^3/sec
speed = 68.2 rpm,
Runner tiop tp tip diameter = 9.3 m
Hub diameter = 4.3m
Number of blades = 6, calculate the speed ratio, flow ratio, and the overall efficiency.

c) Write short notes on
1) Draft tube
2) Anchor block

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data wherever necessary.
3) Use of only non programmable calculator is allowed.
4) Draw neat labeled diagrams whenever necessary.
5) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The pumped storage power plant in India _____
   a) Bhakra Nangal (Punjab) b) Kadamparai (Tamilnadu)
   c) Koyna (Maharashtra) d) Does not exist

2) Unit power in a turbine is _____.
   a) $pH^{1/2}$ b) P/H
   c) $P/H^{3/2}$ d) $P/H^{3/4}$

3) The hydroelectric power plants are_____
   a) Operating cost is high and initial cost is high
   b) Operating cost is low and initial cost is high
   c) Operating cost is low and initial cost is low
   d) Operating cost is high and initial cost is low

4) Pelton turbines are mostly _____.
   a) Horizontal b) Vertical
   c) Inclined d) None of the above

5) In francis turbine runner, the number of blades is generally of the order of _____.
   a) 1-2 b) 4-6
   c) 6-8 d) 12-16

6) Which of following power plant has highest depreciation charges?
   a) Nuclear plant b) Thermal plant
   c) Diesel plant d) Hydroelectric plant

7) In hydro electric power station what is an enlarge body of water just above the intake and used as a regulating reservoir called _____.
   a) Penstock b) Spillways
   c) Reservoir d) Fore bay

8) The draft tube is provided to _____.
   a) reduce the effect of water hammer
   b) raise the water surface of the stream to create an artificial head
   c) increase the acting head on the water wheel
   d) none of the above

9) What is time period for one tide to occur in a day?
   a) 6h, 12.5 min
   b) 6h, 40.5 min
   c) 6h, 0 min
   d) 6h, 25.6 min

10) Difference between water height at high tide and water height at low tide is called_____
   a) Tidal Variation
   b) Tidal Volume
   c) Tidal Range
   d) Tidal Current

11) Which of the following is not a requirement for site selection of hydroelectric power plant?
   a) Availability of water
   b) Large catchment area
   c) Rocky land
   d) Sedimentation

12) A hydrograph is a graph for the hydroelectric power plants, what information does this provide?
   a) The discharge at any time during the period of consideration
   b) Total volume of flow upto any time given by the area under the curve upto that time.
   c) The mean run off during the period.
   d) All of these

13) The load factor for the peak day of the year determines the required _____.
   a) Water storage
   b) Pondage
   c) Generating capacity
   d) None

14) Minimum pressure occurs in fall flowing power tunnel at the time _____.
   a) load rejection
   b) load acceptance
   c) head race
   d) Tail race

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Use of only non programmable calculator is allowed.
4) Draw neat labeled diagrams whenever necessary.
5) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four of the following questions. **16**

a) What do you understand by non-conventional sources of power generation? What is the scope of these sources in India?

b) What are the different salient factors to be considered in deciding the alignment of a tunnel in a hydroelectric project?

c) What do you understand by mass curve of runoff? How can you determine the storage capacity of a reservoir with its help if a constant of a variable demand is known?

d) Common load shared by two stations base load plant with 60 MW capacity and other being standby plant with 50 MW capacity. The yearly output for base load station is 220×10^6 KWh, and for standby station is 24×10^6 KWh. The peak load taken by standby station is 17 MW which works for 2300 hrs during the year. The base load station takes peak load as 32 MW. Calculate annual load factor, pant use factor, and capacity factor for both the stations.

e) The 95% dependable discharge of a river (discharge which would be approximately available 95% of the time) is $22m^3$/sec. If the utilized head is 22 m calculate
1) The theoretical hp and kw
2) Actual amount of power output
3) Total yearly developable energy
4) The actual capacity that may be installed to utilize all average flow and the corresponding energy

Q.3 Attempt any two of the following questions. **12**

a) A penstock pipe, 800 m long, takes off from a reservoir and feeds water to turbine, the level of which is 220 m below the reservoir water level. The first 300 m length of the penstock has a cross section area of 6 m^2 and the rest has an area of 4 m^2. The steady state discharge is $10m^3$/sec. If the turbine gates are closed completely in 5 seconds at a uniform rate, what would be the water hammer pressure developed?
(from Allieri chart= Z^2=1.32)

b) What do you understand by water hammer in a pipe line? Derive the expression for the water hammer pressure in case of rigid pipe and elastic pipe.

c) What is a surge tank? What are its types? Explain any one with sketch. Also write what are the different loading conditions to determine the height of surge tank.

Section – II

Q.4 Attempt any four of the following questions. **16**

a) What are the important types of turbines? Enlist the factors on which choice of turbine depends.

b) What do you understand by 'pumped storage' plant? What are the advantages and disadvantages of this power plant?

c) What are the advantages of reaction turbine over the pelton wheel in respect of efficiency, size cost and maintenance?

d) Power house is equipped with 4 units of vertical shaft pelton turbines to be coupled with 60000 kVA, 3 phase. 40 hertz generators. The generation are provided with 10 pairs of poles. The gross design head is 500 m and transmission efficiency of head race tunnel and penstocks together is to be 90 percent. The four units together will provide for a power of 340000 hp at a guaranteed efficiency of 90 percent. The nozzle efficiency is 0.98.
Find -:
1) the design discharge for the turbine,
2) jet dia. and no. of jets,
3) the nozzle tip diameter
4) the pitch circle dia. of the wheel
5) the specific speed and
6) number of buckets on the wheel

e) What are the types of intake structures? Explain any one with neat sketch.

Q.5 Attempt any two of the following questions. **12**

a) Describe how ocean tides one generated? With tidal cycle in view describe how hydropower can be generated? Also state the limitations of tidal power generation.

b) At a hydroelectric power station Kaplan turbine is used which has following data ,
Operating head = 22.5m
output power at this head = 126 MW,
discharge = 615 m^3/sec
speed = 68.2 rpm,
Runner tiop tp tip diameter = 9.3 m
Hub diameter = 4.3m
Number of blades = 6, calculate the speed ratio, flow ratio, and the overall efficiency.

c) Write short notes on
1) Draft tube
2) Anchor block

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data wherever necessary.
3) Use of only non programmable calculator is allowed.
4) Draw neat labeled diagrams whenever necessary.
5) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Which of following power plant has highest depreciation charges?
   a) Nuclear plant b) Thermal plant
   c) Diesel plant d) Hydroelectric plant

2) In hydro electric power station what is an enlarge body of water just above the intake and used as a regulating reservoir called _____.
   a) Penstock b) Spillways
   c) Reservoir d) Fore bay

3) The draft tube is provided to _____.
   a) reduce the effect of water hammer
   b) raise the water surface of the stream to create an artificial head
   c) increase the acting head on the water wheel
   d) none of the above

4) What is time period for one tide to occur in a day?
   a) 6h, 12.5 min b) 6h, 40.5 min
   c) 6h, 0 min d) 6h, 25.6 min

5) Difference between water height at high tide and water height at low tide is called_____
   a) Tidal Variation b) Tidal Volume
   c) Tidal Range d) Tidal Current

6) Which of the following is not a requirement for site selection of hydroelectric power plant?
   a) Availability of water b) Large catchment area
   c) Rocky land d) Sedimentation

7) A hydrograph is a graph for the hydroelectric power plants, what information does this provide?
   a) The discharge at any time during the period of consideration
   b) Total volume of flow upto any time given by the area under the curve upto that time.
   c) The mean run off during the period.
   d) All of these

8) The load factor for the peak day of the year determines the required _____.
   a) Water storage b) Pondage
   c) Generating capacity d) None

9) Minimum pressure occurs in fall flowing power tunnel at the time _____.
   a) load rejection b) load acceptance
   c) head race d) Tail race

10) The pumped storage power plant in India _____
   a) Bhakra Nangal (Punjab) b) Kadamparai (Tamilnadu)
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11) Unit power in a turbine is _____.
   a) $pH^{1/2}$ b) P/H
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12) The hydroelectric power plants are_____
   a) Operating cost is high and initial cost is high
   b) Operating cost is low and initial cost is high
   c) Operating cost is low and initial cost is low
   d) Operating cost is high and initial cost is low

13) Pelton turbines are mostly _____.
   a) Horizontal b) Vertical
   c) Inclined d) None of the above

14) In francis turbine runner, the number of blades is generally of the order of _____.
   a) 1-2 b) 4-6
   c) 6-8 d) 12-16

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data if necessary.
3) Use of only non programmable calculator is allowed.
4) Draw neat labeled diagrams whenever necessary.
5) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four of the following questions. **16**

a) What do you understand by non-conventional sources of power generation? What is the scope of these sources in India?

b) What are the different salient factors to be considered in deciding the alignment of a tunnel in a hydroelectric project?

c) What do you understand by mass curve of runoff? How can you determine the storage capacity of a reservoir with its help if a constant of a variable demand is known?

d) Common load shared by two stations base load plant with 60 MW capacity and other being standby plant with 50 MW capacity. The yearly output for base load station is 220×10^6 KWh, and for standby station is 24×10^6 KWh. The peak load taken by standby station is 17 MW which works for 2300 hrs during the year. The base load station takes peak load as 32 MW. Calculate annual load factor, pant use factor, and capacity factor for both the stations.

e) The 95% dependable discharge of a river (discharge which would be approximately available 95% of the time) is $22m^3$/sec. If the utilized head is 22 m calculate
1) The theoretical hp and kw
2) Actual amount of power output
3) Total yearly developable energy
4) The actual capacity that may be installed to utilize all average flow and the corresponding energy

Q.3 Attempt any two of the following questions. **12**

a) A penstock pipe, 800 m long, takes off from a reservoir and feeds water to turbine, the level of which is 220 m below the reservoir water level. The first 300 m length of the penstock has a cross section area of 6 m^2 and the rest has an area of 4 m^2. The steady state discharge is $10m^3$/sec. If the turbine gates are closed completely in 5 seconds at a uniform rate, what would be the water hammer pressure developed?
(from Allieri chart= Z^2=1.32)

b) What do you understand by water hammer in a pipe line? Derive the expression for the water hammer pressure in case of rigid pipe and elastic pipe.

c) What is a surge tank? What are its types? Explain any one with sketch. Also write what are the different loading conditions to determine the height of surge tank.

Section – II

Q.4 Attempt any four of the following questions. **16**

a) What are the important types of turbines? Enlist the factors on which choice of turbine depends.

b) What do you understand by 'pumped storage' plant? What are the advantages and disadvantages of this power plant?

c) What are the advantages of reaction turbine over the pelton wheel in respect of efficiency, size cost and maintenance?

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Find -:
1) the design discharge for the turbine,
2) jet dia. and no. of jets,
3) the nozzle tip diameter
4) the pitch circle dia. of the wheel
5) the specific speed and
6) number of buckets on the wheel

e) What are the types of intake structures? Explain any one with neat sketch.

Q.5 Attempt any two of the following questions. **12**

a) Describe how ocean tides one generated? With tidal cycle in view describe how hydropower can be generated? Also state the limitations of tidal power generation.

b) At a hydroelectric power station Kaplan turbine is used which has following data ,
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output power at this head = 126 MW,
discharge = 615 m^3/sec
speed = 68.2 rpm,
Runner tiop tp tip diameter = 9.3 m
Hub diameter = 4.3m
Number of blades = 6, calculate the speed ratio, flow ratio, and the overall efficiency.

c) Write short notes on
1) Draft tube
2) Anchor block

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. (Each MCQ carries two marks) **14**

1) For RCC slab the slump of the concrete should be _____.
   a) 0-25 mm b) 25-50 mm
   c) 25-100 mm d) 50-100 mm

2) The workability of the concrete by slump test is expressed as _____.
   a) Mm^3/h b) Mm^2/h
   c) Mm/h d) Mm

3) Grading of aggregate _____.
   a) Affects the workability
   b) Affects the strength of concrete
   c) Is depends on the shape & texture of the particles of the aggregates
   d) All the above is true

4) In case the concrete is to be transported by pumping, the slump should be _____.
   a) More than 100mm b) Between 50mm to 70mm
   c) Between 25mm to 50mm d) More than 25mm

5) Initial setting time is maximum for _____.
   a) Protland-pozzolona cement b) Protland-slag cement
   c) Low-heat portland cement d) High strength Portland Cement

6) For concrete mix pH value of water shall not be less than _____.
   a) 7 b) 6
   c) 8 d) 9

7) The standard consistency of a cement paste is define as _____.

i) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the top of the mould.

ii) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the top of the mould.

iii) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the bottom of the mould.

iv) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the bottom of the mould.

a) Only i) b) Only ii)

c) Only iv) d) i) & iv) both

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 & Q. No. 6 is compulsory. Solve any two questions from each section.
2) Figures to right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.2 Write in detail how the mineral admixtures are classified. **10**

Q.3 Write in brief about relationship between strength and density of concrete. **09**

Q.4 Explain specific differentiation between High performance concrete and High strength concrete. **09**

Q.5 What is self compacting concrete? Explain why vibrator is not needed for self compacting concrete. **09**

Section – II

Q.6 Explain the design considerations of roller-compacted concrete. **10**

Q.7 How is the ready mixed concrete specified to satisfy the requirement in the fresh & hardened state? **09**

Q.8 In mix proportioning, why is it desirable to use the minimum quantity of water. **09**

Q.9 What are the advantages and disadvantages of revibration of concrete? **09**

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. (Each MCQ carries two marks) **14**

1) Initial setting time is maximum for _____.
   a) Protland-pozzolona cement b) Protland-slag cement
   c) Low-heat portland cement d) High strength Portland Cement

2) For concrete mix pH value of water shall not be less than _____.
   a) 7 b) 6
   c) 8 d) 9

3) The standard consistency of a cement paste is define as _____.
   i) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the top of the mould.
   ii) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the top of the mould.
   iii) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the bottom of the mould.
   iv) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the bottom of the mould.
   a) Only i) b) Only ii)
   c) Only iv) d) i) & iv) both

4) For RCC slab the slump of the concrete should be _____.
   a) 0-25 mm b) 25-50 mm
   c) 25-100 mm d) 50-100 mm

5) The workability of the concrete by slump test is expressed as _____.
   a) Mm^3/h b) Mm^2/h
   c) Mm/h d) Mm

6) Grading of aggregate _____.
   a) Affects the workability
   b) Affects the strength of concrete
   c) Is depends on the shape & texture of the particles of the aggregates
   d) All the above is true

7) In case the concrete is to be transported by pumping, the slump should be _____.

a) More than 100mm
b) Between 50mm to 70mm
c) Between 25mm to 50mm
d) More than 25mm

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 & Q. No. 6 is compulsory. Solve any two questions from each section.
2) Figures to right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.2 Write in detail how the mineral admixtures are classified. **10**

Q.3 Write in brief about relationship between strength and density of concrete. **09**

Q.4 Explain specific differentiation between High performance concrete and High strength concrete. **09**

Q.5 What is self compacting concrete? Explain why vibrator is not needed for self compacting concrete. **09**

Section – II

Q.6 Explain the design considerations of roller-compacted concrete. **10**

Q.7 How is the ready mixed concrete specified to satisfy the requirement in the fresh & hardened state? **09**

Q.8 In mix proportioning, why is it desirable to use the minimum quantity of water. **09**

Q.9 What are the advantages and disadvantages of revibration of concrete? **09**

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. (Each MCQ carries two marks) **14**

1) Grading of aggregate _____.
   a) Affects the workability
   b) Affects the strength of concrete
   c) Is depends on the shape & texture of the particles of the aggregates
   d) All the above is true

2) In case the concrete is to be transported by pumping, the slump should be _____.
   a) More than 100mm b) Between 50mm to 70mm
   c) Between 25mm to 50mm d) More than 25mm

3) Initial setting time is maximum for _____.
   a) Protland-pozzolona cement b) Protland-slag cement
   c) Low-heat portland cement d) High strength Portland Cement

4) For concrete mix pH value of water shall not be less than _____.
   a) 7 b) 6
   c) 8 d) 9

5) The standard consistency of a cement paste is define as _____.
   i) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the top of the mould.
   ii) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the top of the mould.
   iii) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the bottom of the mould.
   iv) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the bottom of the mould.
   a) Only i) b) Only ii)
   c) Only iv) d) i) & iv) both

6) For RCC slab the slump of the concrete should be _____.
   a) 0-25 mm b) 25-50 mm
   c) 25-100 mm d) 50-100 mm

7) The workability of the concrete by slump test is expressed as _____.

a) Mm^3/h b) Mm^2/h

c) Mm/h d) Mm

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 & Q. No. 6 is compulsory. Solve any two questions from each section.
2) Figures to right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.2 Write in detail how the mineral admixtures are classified. **10**

Q.3 Write in brief about relationship between strength and density of concrete. **09**

Q.4 Explain specific differentiation between High performance concrete and High strength concrete. **09**

Q.5 What is self compacting concrete? Explain why vibrator is not needed for self compacting concrete. **09**

Section – II

Q.6 Explain the design considerations of roller-compacted concrete. **10**

Q.7 How is the ready mixed concrete specified to satisfy the requirement in the fresh & hardened state? **09**

Q.8 In mix proportioning, why is it desirable to use the minimum quantity of water. **09**

Q.9 What are the advantages and disadvantages of revibration of concrete? **09**

Seat No.	

Set | S

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. (Each MCQ carries two marks) **14**

1) For concrete mix pH value of water shall not be less than _____.
   a) 7 b) 6
   c) 8 d) 9

2) The standard consistency of a cement paste is define as _____.
   i) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the top of the mould.
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   a) Only i) b) Only ii)
   c) Only iv) d) i) & iv) both

3) For RCC slab the slump of the concrete should be _____.
   a) 0-25 mm b) 25-50 mm
   c) 25-100 mm d) 50-100 mm

4) The workability of the concrete by slump test is expressed as _____.
   a) Mm^3/h b) Mm^2/h
   c) Mm/h d) Mm

5) Grading of aggregate _____.
   a) Affects the workability
   b) Affects the strength of concrete
   c) Is depends on the shape & texture of the particles of the aggregates
   d) All the above is true

6) In case the concrete is to be transported by pumping, the slump should be _____.
   a) More than 100mm b) Between 50mm to 70mm
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Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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Q.6 Explain the design considerations of roller-compacted concrete. **10**

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Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question no. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one marks.
2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget To mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Constraints in an LP model represents _____.
   a) Limitations
   b) Requirements
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2) Simple linear programming problem with _____ variables can be easily solved by the graphical method.
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4) What is also defined as the non-negative variables which are added in the LHS of the constraint to convert the inequality '≤' into an equation?
   a) Slack Variable b) Simplex Algorithm
   c) Key Element d) None of the above

5) Which variables are fictitious and cannot have any physical meaning?
   a) Optimal Variable b) Decision Variable
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6) A basic solution which also satisfies the condition in which all basic variables are non-negative is called _____.
   a) Basic feasible solution b) Feasible solution
   c) Optimal solution d) None of the above

7) To find the optimal solution, we apply _____.
   a) LPP b) VAM
   c) MODI method d) Rim

8) VAM stands for _____.
   a) Vogeal's Approximation method
   b) Vegeal's Approximate method
   c) Vangel's Approximation method
   d) Vodel's Approximation method

9) Games with saddle point are _____ in the nature.
   a) Deterministic
   b) Probabilistic
   c) Stochastic
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11) Which of the following criteria for decision making uses pessimistic decisions?
   a) Minimax
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12) Neural Networks are complex _____ with many parameters.
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   b) Non-linear functions
   c) Discrete Functions
   d) Exponential Functions

13) EOQ is a (an) _____ inventory system.
   a) Periodic
   b) Continuous
   c) Optimal
   d) Economic

14) The inventory carrying costs are also called as _____.
   a) Procurement costs
   b) Set-up costs
   c) Storage costs
   d) None of above

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

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Section I

Q.2 **a)** What is linear programming model? Write General form of linear programming model. **04**

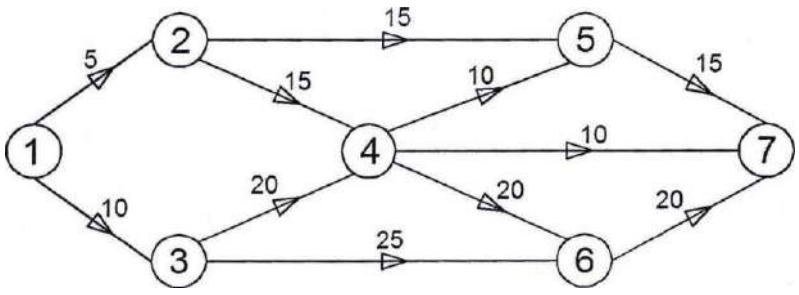
b) A company manufactures two types of chairs types A and types B. Both types of chairs pass through three processes. Shaping, setting and finishing. The standard manhours for each process per unit and available manhours for each department are given in the table below. **08**

Chairs	Departments		
	Shaping	Setting	Finishing
	Processing time per unit (hrs)		
A	6	2	3.6
B	4	4	4
Available Manhours	3600	2000	3600

The availability of wood is sufficient to produce 500 nos. of chairs of types A and 400 nos. of chairs of type B. Each chair of type A gives a profit of Rs. 25/- While each chair of type B gives a profit of Rs. 20/-.

Formulate the L.P. Model and find graphically the quantity of each type of chairs to be produced to maximize the profit

Q.3 Find the shortest distance between node (1) & node (7) **08**



Q.4 Solve the following transportation model using least cost method & whether further optimization using "MODI" is possible? If further optimizations possible then optimize it further. **08**

Supply Points	Distribution Centres				Supply Capacity
	D_1	D_2	D_3	D_4	
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
Requirement	20	40	30	10	

Q.5 Analyse the function $f(x) = x^2 + 5x + 6$ and classify the stationary point as maxima / minina /point of inflection. **08**

Section – II

Q.6 **a)** What is decision tree? How it is to be used in decision making process. **04**

b) Solve the game graphically. **08**

	Player B			
Player A	2	2	3	-2
	4	3	2	6

Q.7 A particular item has a demand 15000 units per year. The cost of one procurements is Rs. 200 and holding cost per unit is Rs.4 per year. The replacement is instantaneous and no shortages are allowed. **08**

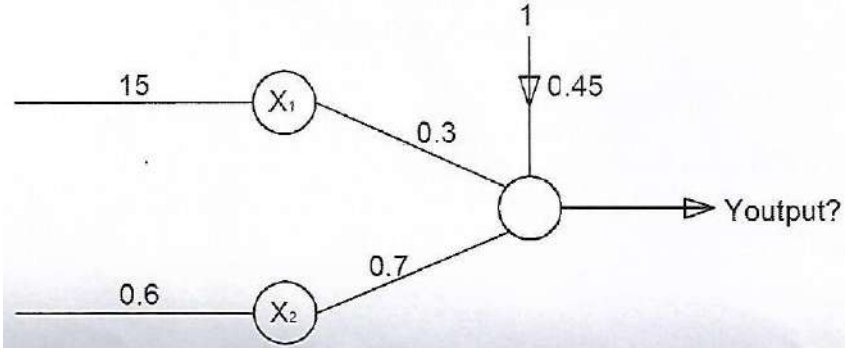
Determine.

1) The economic lot size.
2) The number of orders per year.
3) The time between two orders.
4) The total cost per year of the cost of one unit is Rs. 2.

Q.8 **a)** What is integer programming? What are its types? **03**

b) Write general form of integer programming model. **05**

Q.9 Using artificial neural network technique find out output for following network using binary (0,1) and bipolar (-1,1) activation function. **08**



Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question no. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one marks.
2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget To mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) VAM stands for _____.
   a) Vogeal's Approximation method
   b) Vegeal's Approximate method
   c) Vangel's Approximation method
   d) Vodel's Approximation method

2) Games with saddle point are _____ in the nature.
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3) In Vogel's Approximation Method, the opportunity cost associated with a row is determined by _____.
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4) Which of the following criteria for decision making uses pessimistic decisions?
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   c) Laplace d) Hurwicz

5) Neural Networks are complex _____ with many parameters.
   a) Linear functions b) Non-linear functions
   c) Discrete Functions d) Exponential Functions

6) EOQ is a (an) _____ inventory system.
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   c) Optimal d) Economic

7) The inventory carrying costs are also called as _____.
   a) Procurement costs b) Set-up costs
   c) Storage costs d) None of above

8) Constraints in an LP model represents _____.
   a) Limitations
   b) Requirements
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9) Simple linear programming problem with _____ variables can be easily solved by the graphical method.
   a) One Decision
   b) Four Decision
   c) Three Decision
   d) Two Decision

10) For a maximization problem the objective function coefficient for an artificial variable _____.
   a) + M
   b) - M
   c) Zero
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11) What is also defined as the non-negative variables which are added in the LHS of the constraint to convert the inequality '≤' into an equation?
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   c) Key Element
   d) None of the above

12) Which variables are fictitious and cannot have any physical meaning?
   a) Optimal Variable
   b) Decision Variable
   c) Artificial Variable
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13) A basic solution which also satisfies the condition in which all basic variables are non-negative is called _____.
   a) Basic feasible solution
   b) Feasible solution
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   d) None of the above

14) To find the optimal solution, we apply _____.
   a) LPP
   b) VAM
   c) MODI method
   d) Rim

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and Question No. 6 are compulsory.
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Section I

Q.2 **a)** What is linear programming model? Write General form of linear programming model. **04**

b) A company manufactures two types of chairs types A and types B. Both types of chairs pass through three processes. Shaping, setting and finishing. The standard manhours for each process per unit and available manhours for each department are given in the table below. **08**

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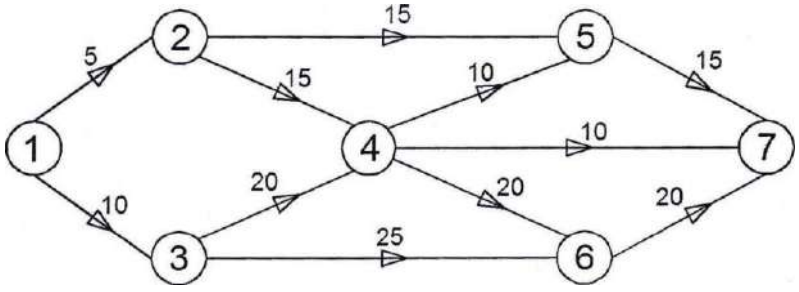
Formulate the L.P. Model and find graphically the quantity of each type of chairs to be produced to maximize the profit

Q.3 Find the shortest distance between node (1) & node (7) **08**



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Supply Points	Distribution Centres				Supply Capacity
	D_1	D_2	D_3	D_4	
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O_3	4	2	5	9	20
Requirement	20	40	30	10	

Q.5 Analyse the function $f(x) = x^2 + 5x + 6$ and classify the stationary point as maxima / minina /point of inflection. **08**

Section – II

Q.6 **a)** What is decision tree? How it is to be used in decision making process. **04**

b) Solve the game graphically. **08**

	Player B			
Player A	2	2	3	-2
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Q.7 A particular item has a demand 15000 units per year. The cost of one procurements is Rs. 200 and holding cost per unit is Rs.4 per year. The replacement is instantaneous and no shortages are allowed. **08**

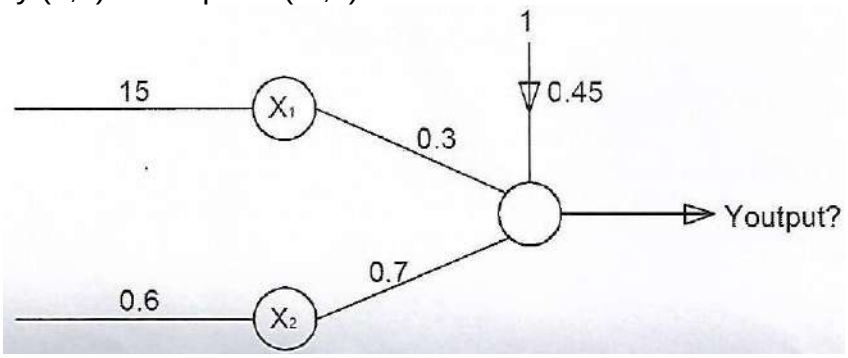
Determine.

1) The economic lot size.
2) The number of orders per year.
3) The time between two orders.
4) The total cost per year of the cost of one unit is Rs. 2.

Q.8 **a)** What is integer programming? What are its types? **03**

b) Write general form of integer programming model. **05**

Q.9 Using artificial neural network technique find out output for following network using binary (0,1) and bipolar (-1,1) activation function. **08**



Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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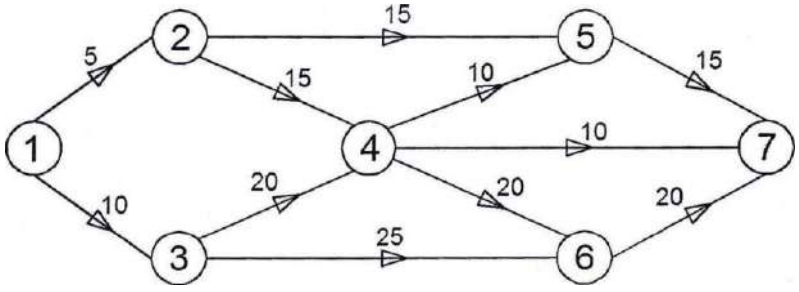

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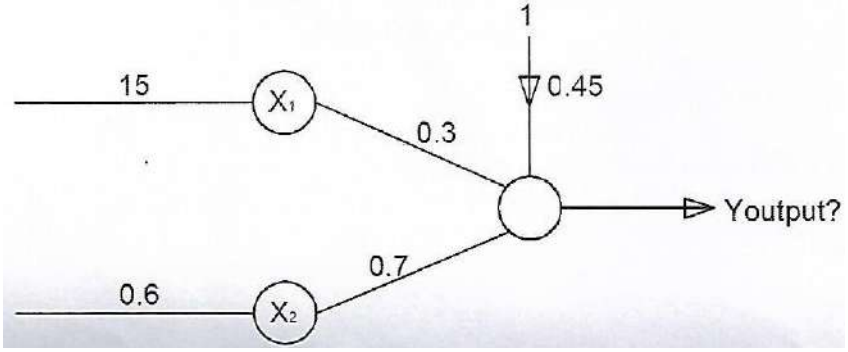

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
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MCQ/Objective Type Questions

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   c) Laplace d) Hurwicz

3) Neural Networks are complex _____ with many parameters.
   a) Linear functions b) Non-linear functions
   c) Discrete Functions d) Exponential Functions

4) EOQ is a (an) _____ inventory system.
   a) Periodic b) Continuous
   c) Optimal d) Economic

5) The inventory carrying costs are also called as _____.
   a) Procurement costs b) Set-up costs
   c) Storage costs d) None of above

6) Constraints in an LP model represents _____.
   a) Limitations
   b) Requirements
   c) Balancing limitations and requirement
   d) All of these

7) Simple linear programming problem with _____ variables can be easily solved by the graphical method.
   a) One Decision b) Four Decision
   c) Three Decision d) Two Decision

8) For a maximization problem the objective function coefficient for an artificial variable _____.
   a) + M
   b) - M
   c) Zero
   d) None of the options

9) What is also defined as the non-negative variables which are added in the LHS of the constraint to convert the inequality '≤' into an equation?
   a) Slack Variable
   b) Simplex Algorithm
   c) Key Element
   d) None of the above

10) Which variables are fictitious and cannot have any physical meaning?
   a) Optimal Variable
   b) Decision Variable
   c) Artificial Variable
   d) None of the above

11) A basic solution which also satisfies the condition in which all basic variables are non-negative is called _____.
   a) Basic feasible solution
   b) Feasible solution
   c) Optimal solution
   d) None of the above

12) To find the optimal solution, we apply _____.
   a) LPP
   b) VAM
   c) MODI method
   d) Rim

13) VAM stands for _____.
   a) Vogeal's Approximation method
   b) Vegeal's Approximate method
   c) Vangel's Approximation method
   d) Vodel's Approximation method

14) Games with saddle point are _____ in the nature.
   a) Deterministic
   b) Probabilistic
   c) Stochastic
   d) Normative

SLR-FM-105

Seat No.	

Set S

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and Question No. 6 are compulsory.
2) Attempt any two questions out of Q. 3, 4, 5.
3) Attempt any two questions out of Q. 7, 8, 9.
4) Assume suitable data whenever required.
5) Use of non-programmable calculator is allowed.

Section I

Q.2 **a)** What is linear programming model? Write General form of linear programming model. **04**

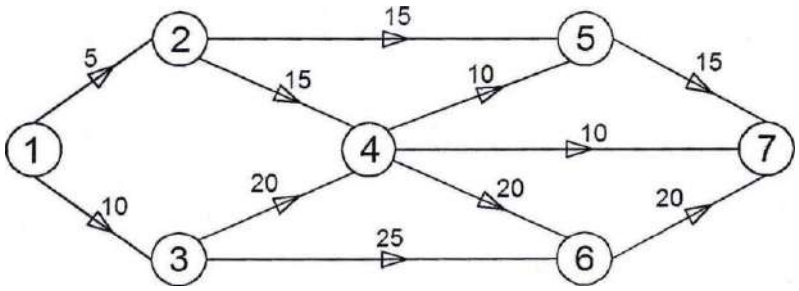
b) A company manufactures two types of chairs types A and types B. Both types of chairs pass through three processes. Shaping, setting and finishing. The standard manhours for each process per unit and available manhours for each department are given in the table below. **08**

Chairs	Departments		
	Shaping	Setting	Finishing
	Processing time per unit (hrs)		
A	6	2	3.6
B	4	4	4
Available Manhours	3600	2000	3600

The availability of wood is sufficient to produce 500 nos. of chairs of types A and 400 nos. of chairs of type B. Each chair of type A gives a profit of Rs. 25/- While each chair of type B gives a profit of Rs. 20/-.

Formulate the L.P. Model and find graphically the quantity of each type of chairs to be produced to maximize the profit

Q.3 Find the shortest distance between node (1) & node (7) **08**



Q.4 Solve the following transportation model using least cost method & whether further optimization using "MODI" is possible? If further optimizations possible then optimize it further. **08**

Supply Points	Distribution Centres				Supply Capacity
	D_1	D_2	D_3	D_4	
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
Requirement	20	40	30	10	

Q.5 Analyse the function $f(x) = x^2 + 5x + 6$ and classify the stationary point as maxima / minina /point of inflection. **08**

Section – II

Q.6 **a)** What is decision tree? How it is to be used in decision making process. **04**

b) Solve the game graphically. **08**

		Player B			
Player A		2	2	3	-2
		4	3	2	6

Q.7 A particular item has a demand 15000 units per year. The cost of one procurements is Rs. 200 and holding cost per unit is Rs.4 per year. The replacement is instantaneous and no shortages are allowed. **08**

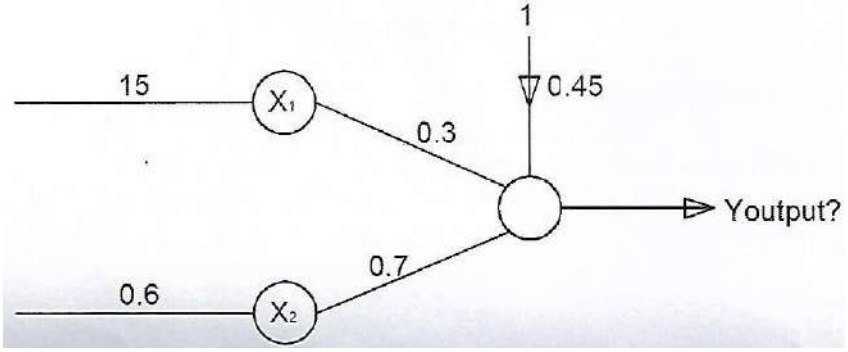
Determine.

1) The economic lot size.
2) The number of orders per year.
3) The time between two orders.
4) The total cost per year of the cost of one unit is Rs. 2.

Q.8 **a)** What is integer programming? What are its types? **03**

b) Write general form of integer programming model. **05**

Q.9 Using artificial neural network technique find out output for following network using binary (0,1) and bipolar (-1,1) activation function. **08**



SLR-FM-106

Seat No.	

Set P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Landslides occurs due to _____.
   a) Intensity of Rainfall
   b) Steep Slopes
   c) Deforestation leading it soil erosion
   d) All of the above

2) The National Institute of Disaster Management (NIDM) is at _____.
   a) New Delhi b) Mumbai
   c) Chennai d) Kolkata

3) Tsunami is classified as _____.
   a) Water Hazard b) Environmental hazard
   c) Biological hazard d) Geological hazard

4) The nodal department for wind detection IMD refers to_____.
   a) Indian meteorological department
   b) Indian metrological department
   c) Indian metallurgical department
   d) None of these

5) For good land use planning, buildings should be built_____.
   a) above the 1 in 100 year flood level
   b) above the level of the Probable Maximum Flood
   c) based on the chance and consequences of a flood for that particular building.
   d) above the level of the largest historical flood

6) _____ drought correlates the supply and demand of goods with the all other droughts.
   a) Meteorological drought b) Hydrological drought
   c) Agricultural drought d) Socio-economic drought

7) _____ is ash from a volcanic mixer with water to form a thick river of mud.
   a) Lahars b) Solification
   c) Debris flow d) Creep

8) Richter scale is a _____.
   a) logarithmic scale b) calculus scale
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9) The first step in preparedness planning is _____.
   a) Analysis of data collected
   b) Determination of objectives
   c) Development of implementing device
   d) Determination of strategy

10) Disaster Management act was enforceable since_____.
   a) 2001 b) 2003
   c) 2005 d) 2007

11) Responsibility for securing the scene, preserving life and treating the wounded is the responsibility of _____.
   a) first responders
   b) district disaster management department
   c) state government
   d) none of these

12) Which of the followings is categorized under a natural meteorological disaster?
   a) Earthquake b) Tsunamis
   c) Tornadoes d) Landslides

13) Who heads the National Crisis Management Committee?
   a) Prime Minister b) President
   c) Cabinet Secretary d) Ministry of Environment

14) Which of the following statements is/are correct about National disaster response force?
   i) The parent agency of National Disaster Management Authority is Ministry of Home Affairs.
   ii) The Chairman of the NDMA is Home Minister.
   a) Only I b) Only II
   c) Both I & II d) None

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No.5 from Section - I is Compulsory. Solve any two Questions from Remaining questions.
2) Question No.9 from Section – II is Compulsory. Solve any two questions From remaining questions.
3) Figures to right indicate full marks.

Section - I

Q.2 **a)** Define: **04**
1) Risk 2) Vulnerability
3) Hazards 4) Disasters

b) How will you define environmental hazards and Environmental disasters? Explain both in brief. **05**

Q.3 **a**) Define Volcanic Eruptions? Also discuss causes of volcanic eruptions. **04**

b) What are the causes of Landslides? Discuss its damage assessment process in brief. **05**

Q.4 **a)** Discuss the mechanism and forms of soil erosion? **04**

b) Write a note on: Wars and Chemical Disasters. **05**

Q.5 **a)** What do you mean by land use map? How it is helpful in disaster management activities? **04**

b) Define a disaster management cycle? Describe its phases in short. **06**

Section – II

Q.6 **a)** Discuss the role of seismological observatories in disaster mitigation activities? **04**

b) Write a note on : Forecasting and warning systems of disasters. **05**

Q.7 **a)** Discuss the importance of information and communication in disaster mitigation? **04**

b) “Social Media plays a vital role in disaster management process”. Give your comment on his statement with justification? **05**

Q.8 Consider a drought disaster circumstances in certain region of your state, being a disaster manager. how will you manage this disaster? Discuss with reference to the Disaster Management Cycle. **09**

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b) What are the roles and responsibilities of District Magistrate in disaster management? **06**

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Richter scale is a _____.
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   c) volumetric scale d) area to vibration ratio scale

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Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No.5 from Section - I is Compulsory. Solve any two Questions from Remaining questions.
2) Question No.9 from Section – II is Compulsory. Solve any two questions From remaining questions.
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b) Define a disaster management cycle? Describe its phases in short. **06**

Section – II

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b) What are the roles and responsibilities of District Magistrate in disaster management? **06**

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No.5 from Section - I is Compulsory. Solve any two Questions from Remaining questions.
2) Question No.9 from Section – II is Compulsory. Solve any two questions From remaining questions.
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Seat No.	

Set | S

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No.5 from Section - I is Compulsory. Solve any two Questions from Remaining questions.
2) Question No.9 from Section – II is Compulsory. Solve any two questions From remaining questions.
3) Figures to right indicate full marks.

Section - I

Q.2 **a)** Define: **04**
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Q.9 **a)** What is the role of NDMA disaster management activities? **04**

b) What are the roles and responsibilities of District Magistrate in disaster management? **06**

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory should be solved in first 30 minutes in answer book
2) Answer MCQ Objective type questions on page no. 3 only. Don't forget to mention, QP. Set (P/Q/R/S) on Top of Page.
3) Use of Non – programmable scientific calculator is allowed.
4) Assume suitable data if necessary and mention clearly.
5) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The compressive strength of concrete after 7 days of curing (Shall not be less than) _____ times.
   a) $\frac{1}{2}$ b) $\frac{3}{2}$
   c) $\frac{2}{3}$ d) $\frac{1}{3}$

2) The choice of mix proportion of a concrete is independent of _____.
   a) grade designation
   b) maximum size of aggregate
   c) minimum water content ratio
   d) batching, mixing, placing and compaction techniques

3) The setting and hardening of cement after addition of water is due to _____.
   a) The presence of gypsum
   b) Binding action of water
   c) Hydration of some of constituent compounds of cement
   d) Evaporation of water
   e) None of the above

4) Permeability of concrete reduces with _____.
   a) Decrease in water cement ratio
   b) Decrease in porosity
   c) Increase in strength of cement
   d) All of the above

5) IS provision of concrete mix is given in _____.
   a) IS- 10262-2009 b) IS-383-1970
   c) IS- 456-2000 d) IS-4031-1968

6) Air entraining agents _____.
   a) Are used for entraining air in concrete
   b) Contain wood resins, fats and lignosalfonates
   c) Increase durability of concrete to frost action
   d) All of the above

7) Bleeding of concrete is said to occurs when _____.
   a) Finer particles settle down at the bottom
   b) Coarser particles get separated
   c) Cement paste rises to the surface of concrete
   d) Finer particles collect in isolated pockets
   e) None of the above

8) Recommended slump value as per IS 456-2000 for high degree of workability of concrete is between _____ mm.
   a) 100-150 b) 25-75
   c) 50-100 d) less than 50

9) The compressive strength of 43 Grade OPC after three days is expected to be more than _____.
   a) 16Mpa b) 23Mpa
   c) 27.5Mpa d) 33Mpa

10) The Standard size of concrete cube for compressive strength is _____.
   a) 50 mm b) 150 mm
   c) 70.07 mm d) 175 mm

11) Tensile strength of concrete can be expressed as _____.
   a) $500\sqrt{fck}$ b) $5000\sqrt{fck}$
   c) $0.7\sqrt{fck}$ d) $7\sqrt{fck}$

12) The workability of concrete by slump test is expressed as _____.
   a) mm^3/h b) mm^2/h
   c) mm/h d) mm

13) The fineness modulus _____.
   a) Is a numerical index of fineness
   b) Gives some idea of the mean size of particles present in the entire body of aggregate
   c) Is a sum of the cumulative percentages retained on the set of specified sieves divided by 100
   d) All of the above

14) The nominal mix corresponding to M20 grade concrete is _____.
   a) 1:2:4 b) 1:3:6
   c) 1:1.5:3 d) 1:1:2

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
3) Use of Non – programmable scientific calculator is allowed.
4) Assume suitable data if necessary and mention clearly.
5) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any two questions from the following. **12**

a) What are IS specification for water to be used for making concrete?
b) Explain effect of water cement ratio on strength of concrete.
c) Explain various admixtures in concrete and their necessity.

Q.3 Attempt any four questions from the following. **16**

a) Write a note on initial and final setting time of cement.
b) Draw detailed flow chart of cement manufacturing by dry process.
c) Explain compaction factor test for measuring workability.
d) Write a note on segregation and bleeding.
e) Explain high strength concrete.

Section - II

Q.2 Write a note on any Four of following. **12**

a) Durability concrete
b) Light weight concrete
c) High performance concrete
d) Quality control of concrete
e) Nominal Mix and Design Mix

Q.3 Design a concrete mix of grade M25 as per ACI method. **16**
Using the following data:
Concrete is to be used for Elevated water tank
Exposure condition - Moderate.
Standard deviation = 4
K Himsworth Constant = 1.65
Cement to be used - O.P.C. 43 grade
Workability required - 50 mm Slump
Method of concrete placing - Manual (Pumping is not required)
Maximum size of aggregate - 20 mm (Crushed angular)
Test data for material:-

a) Specific gravity of materials are cement= 3.15, F.A. = 2.65 and C. A. = 2.80
b) The dry rodded bulk densities of C. A. = 1600 Kg/ m^3
c) Water absorption of FA = 2% and CA = 1%.
d) Fineness modulus of FA = 2.8.

Refer the Table no. 1 to 6 given below.

OR

Write a step by step procedure of designing concrete mix by IS method. **16**

Table – 1

: Relation between water/cement ratio and average compressive strength of concrete, according to ACI 211.1-91

Table 11.5. Relation between water/cement ratio and average compressive strength of concrete, according to ACI 211.1-91		
Average Compressive strength at 28 day	Effective water/cement ratio (by mass)	
(MPa)	Non-air entrained concrete	Air entrained concrete
45	0.38	-
40	0.43	-
35	0.48	0.40
30	0.55	0.46
25	0.62	0.53
20	0.70	0.61
15	0.80	0.71

Table – 2

: Requirements of ACI 318-89 for W/C ratio and Strength for Special Exposure conditions

Table 11.6. Requirements of ACI 318-89 for W/C ratio and Strength for Special Exposure conditions		
Exposure Condition	Maximum W/C ratio, normal density aggregate concrete	Minimum design strength, low density aggregate concrete
i. Concrete Intended to be Watertight		(MPa)
(a) Exposed to fresh water	0.50	25
(b) Exposed to brackish or sea water	0.45	30
ii. Concrete exposed to freezing and thawing		
(a) Kerbs, Gutters, Guard rails or thin sections	0.45	30
(b) Other elements	0.50	25
(c) in presence of de-icing chemicals	0.45	30
iii. For corrosion protection of reinforced concrete exposed to de-icing salts, brackish water, sea water or spray from these sources	0.40	33

Table - 3

: Recommended Values of Slump for Various Type of Construction as given by ACI 211.1-91

Table 11.7. Recommended Values of Slump for Various Type of Construction as given by ACI 211.1-91	
Types of Construction	Range of Slump (mm)
Reinforced foundation walls and footings	20-80
Plain footings, Caissons and substructure walls	20-80
Beams and reinforced walls	20-100
Building columns	20-100
Pavements and slabs	20-80
Mass Concrete	20-80

Table – 4

: Approximate requirement for mixing water and air content for different workability and nominal maximum size of Aggregate according to ACI 211.1-91

Table 11.8. Approximate requirement for mixing water and air content for different workability and nominal maximum size of Aggregate according to ACI 211.1-91

Workability or content	water content, Kg/m³ of concrete for indicated maximum aggregate size (mm)							
mm	10	12.5	20	25	40	50	70	150
Slump (mm)	Non-air entrained concrete							
30-50	205	200	185	180	160	155	145	125
80-100	225	215	200	195	175	170	160	140
150-180	240	230	210	205	185	180	170	-
Approximate entrapped air content %	3	2.5	2	1.5	1	0.5	0.3	0.2
	Air entrained concrete							
30-50	180	175	165	160	145	140	135	120
80-100	200	190	180	175	160	155	150	135
150-180	215	205	190	185	170	165	160	-
Recommended avg. total air content % Mild Exposure	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00
Moderate Exposure	6.00	5.50	5.00	4.50	4.50	4.00	3.50	3.00
Extreme Exposure	7.50	7.00	6.00	6.00	5.50	5.00	4.50	4.00

Table – 5

Dry Bulk volume of coarse aggregate per unit volume of concrete as given by ACI 211.1-91

Maximum Size of Aggregate	*Bulk volume of dry rodded coarse aggregate per unit volume of concrete for fineness modulus of sand of*			
F.M.	2.40	2.60	2.80	3.00
10	0.50	0.48	0.46	0.44
12.5	0.59	0.57	0.55	0.53
20	0.66	0.64	0.62	0.60
25	0.71	0.69	0.67	0.65
40	0.75	0.73	0.71	0.69
50	0.78	0.76	0.74	0.72
70	0.82	0.80	0.78	0.76
150	0.87	0.85	0.83	0.81

Table – 6

: First Estimate of density (unit weight) of fresh concrete as given by ACI 211.1-91

Table 11.9. First estimate of density (unit weight) of fresh concrete as given by ACI 211.1-91

Maximum size of Aggregate (mm)	First Estimate of density (unit weight) of fresh concrete	
	Non air-entrained (kg/m3)	Air-entrained (kg/m3)
10	2285	2190
12.5	2315	2235
20	2355	2280
25	2375	2315
40	2420	2355
50	2445	2375
70	2465	2400
150	2505	2435

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory should be solved in first 30 minutes in answer book
2) Answer MCQ Objective type questions on page no. 3 only. Don't forget to mention, QP. Set (P/Q/R/S) on Top of Page.
3) Use of Non – programmable scientific calculator is allowed.
4) Assume suitable data if necessary and mention clearly.
5) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Recommended slump value as per IS 456-2000 for high degree of workability of concrete is between _____ mm.
   a) 100-150 b) 25-75
   c) 50-100 d) less than 50

2) The compressive strength of 43 Grade OPC after three days is expected to be more than _____.
   a) 16Mpa b) 23Mpa
   c) 27.5Mpa d) 33Mpa

3) The Standard size of concrete cube for compressive strength is _____.
   a) 50 mm b) 150 mm
   c) 70.07 mm d) 175 mm

4) Tensile strength of concrete can be expressed as _____.
   a) $500\sqrt{fck}$ b) $5000\sqrt{fck}$
   c) $0.7\sqrt{fck}$ d) $7\sqrt{fck}$

5) The workability of concrete by slump test is expressed as _____.
   a) mm^3/h b) mm^2/h
   c) mm/h d) mm

6) The fineness modulus _____.
   a) Is a numerical index of fineness
   b) Gives some idea of the mean size of particles present in the entire body of aggregate
   c) Is a sum of the cumulative percentages retained on the set of specified sieves divided by 100
   d) All of the above

7) The nominal mix corresponding to M20 grade concrete is _____.
   a) 1:2:4 b) 1:3:6
   c) 1:1.5:3 d) 1:1:2

8) The compressive strength of concrete after 7 days of curing (Shall not be less than) _____ times.
   a) $\frac{1}{2}$ b) $\frac{3}{2}$
   c) $\frac{2}{3}$ d) $\frac{1}{3}$

9) The choice of mix proportion of a concrete is independent of _____.
   a) grade designation
   b) maximum size of aggregate
   c) minimum water content ratio
   d) batching, mixing, placing and compaction techniques

10) The setting and hardening of cement after addition of water is due to _____.
   a) The presence of gypsum
   b) Binding action of water
   c) Hydration of some of constituent compounds of cement
   d) Evaporation of water
   e) None of the above

11) Permeability of concrete reduces with _____.
   a) Decrease in water cement ratio
   b) Decrease in porosity
   c) Increase in strength of cement
   d) All of the above

12) IS provision of concrete mix is given in _____.
   a) IS- 10262-2009 b) IS-383-1970
   c) IS- 456-2000 d) IS-4031-1968

13) Air entraining agents _____.
   a) Are used for entraining air in concrete
   b) Contain wood resins, fats and lignosalfonates
   c) Increase durability of concrete to frost action
   d) All of the above

14) Bleeding of concrete is said to occurs when _____.
   a) Finer particles settle down at the bottom
   b) Coarser particles get separated
   c) Cement paste rises to the surface of concrete
   d) Finer particles collect in isolated pockets
   e) None of the above

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
3) Use of Non – programmable scientific calculator is allowed.
4) Assume suitable data if necessary and mention clearly.
5) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any two questions from the following. **12**

a) What are IS specification for water to be used for making concrete?
b) Explain effect of water cement ratio on strength of concrete.
c) Explain various admixtures in concrete and their necessity.

Q.3 Attempt any four questions from the following. **16**

a) Write a note on initial and final setting time of cement.
b) Draw detailed flow chart of cement manufacturing by dry process.
c) Explain compaction factor test for measuring workability.
d) Write a note on segregation and bleeding.
e) Explain high strength concrete.

Section - II

Q.2 Write a note on any Four of following. **12**

a) Durability concrete
b) Light weight concrete
c) High performance concrete
d) Quality control of concrete
e) Nominal Mix and Design Mix

Q.3 Design a concrete mix of grade M25 as per ACI method. **16**
Using the following data:
Concrete is to be used for Elevated water tank
Exposure condition - Moderate.
Standard deviation = 4
K Himsworth Constant = 1.65
Cement to be used - O.P.C. 43 grade
Workability required - 50 mm Slump
Method of concrete placing - Manual (Pumping is not required)
Maximum size of aggregate - 20 mm (Crushed angular)
Test data for material:-

a) Specific gravity of materials are cement= 3.15, F.A. = 2.65 and C. A. = 2.80
b) The dry rodded bulk densities of C. A. = 1600 Kg/ m^3
c) Water absorption of FA = 2% and CA = 1%.
d) Fineness modulus of FA = 2.8.

Refer the Table no. 1 to 6 given below.

OR

Write a step by step procedure of designing concrete mix by IS method. **16**

Table – 1

: Relation between water/cement ratio and average compressive strength of concrete, according to ACI 211.1-91

Table 11.5. Relation between water/cement ratio and average compressive strength of concrete, according to ACI 211.1-91		
Average Compressive strength at 28 day	Effective water/cement ratio (by mass)	
(MPa)	Non-air entrained concrete	Air entrained concrete
45	0.38	-
40	0.43	-
35	0.48	0.40
30	0.55	0.46
25	0.62	0.53
20	0.70	0.61
15	0.80	0.71

Table – 2

: Requirements of ACI 318-89 for W/C ratio and Strength for Special Exposure conditions

Table 11.6. Requirements of ACI 318-89 for W/C ratio and Strength for Special Exposure conditions		
Exposure Condition	Maximum W/C ratio, normal density aggregate concrete	Minimum design strength, low density aggregate concrete
i. Concrete Intended to be Watertight		(MPa)
(a) Exposed to fresh water	0.50	25
(b) Exposed to brackish or sea water	0.45	30
ii. Concrete exposed to freezing and thawing		
(a) Kerbs, Gutters, Guard rails or thin sections	0.45	30
(b) Other elements	0.50	25
(c) in presence of de-icing chemicals	0.45	30
iii. For corrosion protection of reinforced concrete exposed to de-icing salts, brackish water, sea water or spray from these sources	0.40	33

Table - 3

: Recommended Values of Slump for Various Type of Construction as given by ACI 211.1-91

Table 11.7. Recommended Values of Slump for Various Type of Construction as given by ACI 211.1-91	
Types of Construction	Range of Slump (mm)
Reinforced foundation walls and footings	20-80
Plain footings, Caissons and substructure walls	20-80
Beams and reinforced walls	20-100
Building columns	20-100
Pavements and slabs	20-80
Mass Concrete	20-80

Table – 4

: Approximate requirement for mixing water and air content for different workability and nominal maximum size of Aggregate according to ACI 211.1-91

Table 11.8. Approximate requirement for mixing water and air content for different workability and nominal maximum size of Aggregate according to ACI 211.1-91

Workability or content	water content, Kg/m³ of concrete for indicated maximum aggregate size (mm)							
mm	10	12.5	20	25	40	50	70	150
Slump (mm)	Non-air entrained concrete							
30-50	205	200	185	180	160	155	145	125
80-100	225	215	200	195	175	170	160	140
150-180	240	230	210	205	185	180	170	-
Approximate entrapped air content %	3	2.5	2	1.5	1	0.5	0.3	0.2
	Air entrained concrete							
30-50	180	175	165	160	145	140	135	120
80-100	200	190	180	175	160	155	150	135
150-180	215	205	190	185	170	165	160	-
Recommended avg. total air content % Mild Exposure	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00
Moderate Exposure	6.00	5.50	5.00	4.50	4.50	4.00	3.50	3.00
Extreme Exposure	7.50	7.00	6.00	6.00	5.50	5.00	4.50	4.00

Table – 5

Dry Bulk volume of coarse aggregate per unit volume of concrete as given by ACI 211.1-91

Maximum Size of Aggregate	*Bulk volume of dry rodded coarse aggregate per unit volume of concrete for fineness modulus of sand of*			
F.M.	2.40	2.60	2.80	3.00
10	0.50	0.48	0.46	0.44
12.5	0.59	0.57	0.55	0.53
20	0.66	0.64	0.62	0.60
25	0.71	0.69	0.67	0.65
40	0.75	0.73	0.71	0.69
50	0.78	0.76	0.74	0.72
70	0.82	0.80	0.78	0.76
150	0.87	0.85	0.83	0.81

Table – 6

: First Estimate of density (unit weight) of fresh concrete as given by ACI 211.1-91

Table 11.9. First estimate of density (unit weight) of fresh concrete as given by ACI 211.1-91

Maximum size of Aggregate (mm)	First Estimate of density (unit weight) of fresh concrete	
	Non air-entrained (kg/m3)	Air-entrained (kg/m3)
10	2285	2190
12.5	2315	2235
20	2355	2280
25	2375	2315
40	2420	2355
50	2445	2375
70	2465	2400
150	2505	2435

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory should be solved in first 30 minutes in answer book
2) Answer MCQ Objective type questions on page no. 3 only. Don't forget to mention, QP. Set (P/Q/R/S) on Top of Page.
3) Use of Non – programmable scientific calculator is allowed.
4) Assume suitable data if necessary and mention clearly.
5) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) IS provision of concrete mix is given in _____.
   a) IS- 10262-2009 b) IS-383-1970
   c) IS- 456-2000 d) IS-4031-1968

2) Air entraining agents _____.
   a) Are used for entraining air in concrete
   b) Contain wood resins, fats and lignosalfonates
   c) Increase durability of concrete to frost action
   d) All of the above

3) Bleeding of concrete is said to occurs when _____.
   a) Finer particles settle down at the bottom
   b) Coarser particles get separated
   c) Cement paste rises to the surface of concrete
   d) Finer particles collect in isolated pockets
   e) None of the above

4) Recommended slump value as per IS 456-2000 for high degree of workability of concrete is between _____ mm.
   a) 100-150 b) 25-75
   c) 50-100 d) less than 50

5) The compressive strength of 43 Grade OPC after three days is expected to be more than _____.
   a) 16Mpa b) 23Mpa
   c) 27.5Mpa d) 33Mpa

6) The Standard size of concrete cube for compressive strength is _____.
   a) 50 mm b) 150 mm
   c) 70.07 mm d) 175 mm

7) Tensile strength of concrete can be expressed as _____.
   a) $500\sqrt{fck}$ b) $5000\sqrt{fck}$
   c) $0.7\sqrt{fck}$ d) $7\sqrt{fck}$

8) The workability of concrete by slump test is expressed as _____.
   a) mm^3/h b) mm^2/h
   c) mm/h d) mm

9) The fineness modulus _____.
   a) Is a numerical index of fineness
   b) Gives some idea of the mean size of particles present in the entire body of aggregate
   c) Is a sum of the cumulative percentages retained on the set of specified sieves divided by 100
   d) All of the above

10) The nominal mix corresponding to M20 grade concrete is _____.
   a) 1:2:4 b) 1:3:6
   c) 1:1.5:3 d) 1:1:2

11) The compressive strength of concrete after 7 days of curing (Shall not be less than) _____ times.
   a) $\frac{1}{2}$ b) $\frac{3}{2}$
   c) $\frac{2}{3}$ d) $\frac{1}{3}$

12) The choice of mix proportion of a concrete is independent of _____.
   a) grade designation
   b) maximum size of aggregate
   c) minimum water content ratio
   d) batching, mixing, placing and compaction techniques

13) The setting and hardening of cement after addition of water is due to _____.
   a) The presence of gypsum
   b) Binding action of water
   c) Hydration of some of constituent compounds of cement
   d) Evaporation of water
   e) None of the above

14) Permeability of concrete reduces with _____.
   a) Decrease in water cement ratio
   b) Decrease in porosity
   c) Increase in strength of cement
   d) All of the above

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
3) Use of Non – programmable scientific calculator is allowed.
4) Assume suitable data if necessary and mention clearly.
5) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any two questions from the following. **12**

a) What are IS specification for water to be used for making concrete?
b) Explain effect of water cement ratio on strength of concrete.
c) Explain various admixtures in concrete and their necessity.

Q.3 Attempt any four questions from the following. **16**

a) Write a note on initial and final setting time of cement.
b) Draw detailed flow chart of cement manufacturing by dry process.
c) Explain compaction factor test for measuring workability.
d) Write a note on segregation and bleeding.
e) Explain high strength concrete.

Section - II

Q.2 Write a note on any Four of following. **12**

a) Durability concrete
b) Light weight concrete
c) High performance concrete
d) Quality control of concrete
e) Nominal Mix and Design Mix

Q.3 Design a concrete mix of grade M25 as per ACI method. **16**
Using the following data:
Concrete is to be used for Elevated water tank
Exposure condition - Moderate.
Standard deviation = 4
K Himsworth Constant = 1.65
Cement to be used - O.P.C. 43 grade
Workability required - 50 mm Slump
Method of concrete placing - Manual (Pumping is not required)
Maximum size of aggregate - 20 mm (Crushed angular)
Test data for material:-

a) Specific gravity of materials are cement= 3.15, F.A. = 2.65 and C. A. = 2.80
b) The dry rodded bulk densities of C. A. = 1600 Kg/ m^3
c) Water absorption of FA = 2% and CA = 1%.
d) Fineness modulus of FA = 2.8.

Refer the Table no. 1 to 6 given below.

OR

Write a step by step procedure of designing concrete mix by IS method. **16**

Table – 1

: Relation between water/cement ratio and average compressive strength of concrete, according to ACI 211.1-91

Table 11.5. Relation between water/cement ratio and average compressive strength of concrete, according to ACI 211.1-91		
Average Compressive strength at 28 day	Effective water/cement ratio (by mass)	
(MPa)	Non-air entrained concrete	Air entrained concrete
45	0.38	-
40	0.43	-
35	0.48	0.40
30	0.55	0.46
25	0.62	0.53
20	0.70	0.61
15	0.80	0.71

Table – 2

: Requirements of ACI 318-89 for W/C ratio and Strength for Special Exposure conditions

Table 11.6. Requirements of ACI 318-89 for W/C ratio and Strength for Special Exposure conditions		
Exposure Condition	Maximum W/C ratio, normal density aggregate concrete	Minimum design strength, low density aggregate concrete
i. Concrete Intended to be Watertight		(MPa)
(a) Exposed to fresh water	0.50	25
(b) Exposed to brackish or sea water	0.45	30
ii. Concrete exposed to freezing and thawing		
(a) Kerbs, Gutters, Guard rails or thin sections	0.45	30
(b) Other elements	0.50	25
(c) in presence of de-icing chemicals	0.45	30
iii. For corrosion protection of reinforced concrete exposed to de-icing salts, brackish water, sea water or spray from these sources	0.40	33

Table - 3

: Recommended Values of Slump for Various Type of Construction as given by ACI 211.1-91

Table 11.7. Recommended Values of Slump for Various Type of Construction as given by ACI 211.1-91	
Types of Construction	Range of Slump (mm)
Reinforced foundation walls and footings	20-80
Plain footings, Caissons and substructure walls	20-80
Beams and reinforced walls	20-100
Building columns	20-100
Pavements and slabs	20-80
Mass Concrete	20-80

Table – 4

: Approximate requirement for mixing water and air content for different workability and nominal maximum size of Aggregate according to ACI 211.1-91

Table 11.8. Approximate requirement for mixing water and air content for different workability and nominal maximum size of Aggregate according to ACI 211.1-91

Workability or content	water content, Kg/m³ of concrete for indicated maximum aggregate size (mm)							
mm	10	12.5	20	25	40	50	70	150
Slump (mm)	Non-air entrained concrete							
30-50	205	200	185	180	160	155	145	125
80-100	225	215	200	195	175	170	160	140
150-180	240	230	210	205	185	180	170	-
Approximate entrapped air content %	3	2.5	2	1.5	1	0.5	0.3	0.2
	Air entrained concrete							
30-50	180	175	165	160	145	140	135	120
80-100	200	190	180	175	160	155	150	135
150-180	215	205	190	185	170	165	160	-
Recommended avg. total air content % Mild Exposure	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00
Moderate Exposure	6.00	5.50	5.00	4.50	4.50	4.00	3.50	3.00
Extreme Exposure	7.50	7.00	6.00	6.00	5.50	5.00	4.50	4.00

Table – 5

Dry Bulk volume of coarse aggregate per unit volume of concrete as given by ACI 211.1-91

Maximum Size of Aggregate	*Bulk volume of dry rodded coarse aggregate per unit volume of concrete for fineness modulus of sand of*			
F.M.	2.40	2.60	2.80	3.00
10	0.50	0.48	0.46	0.44
12.5	0.59	0.57	0.55	0.53
20	0.66	0.64	0.62	0.60
25	0.71	0.69	0.67	0.65
40	0.75	0.73	0.71	0.69
50	0.78	0.76	0.74	0.72
70	0.82	0.80	0.78	0.76
150	0.87	0.85	0.83	0.81

Table – 6

: First Estimate of density (unit weight) of fresh concrete as given by ACI 211.1-91

Table 11.9. First estimate of density (unit weight) of fresh concrete as given by ACI 211.1-91

Maximum size of Aggregate (mm)	First Estimate of density (unit weight) of fresh concrete	
	Non air-entrained (kg/m3)	Air-entrained (kg/m3)
10	2285	2190
12.5	2315	2235
20	2355	2280
25	2375	2315
40	2420	2355
50	2445	2375
70	2465	2400
150	2505	2435

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory should be solved in first 30 minutes in answer book
2) Answer MCQ Objective type questions on page no. 3 only. Don't forget to mention, QP. Set (P/Q/R/S) on Top of Page.
3) Use of Non – programmable scientific calculator is allowed.
4) Assume suitable data if necessary and mention clearly.
5) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The Standard size of concrete cube for compressive strength is _____.
   a) 50 mm b) 150 mm
   c) 70.07 mm d) 175 mm

2) Tensile strength of concrete can be expressed as _____.
   a) $500\sqrt{fck}$ b) $5000\sqrt{fck}$
   c) $0.7\sqrt{fck}$ d) $7\sqrt{fck}$

3) The workability of concrete by slump test is expressed as _____.
   a) mm^3/h b) mm^2/h
   c) mm/h d) mm

4) The fineness modulus _____.
   a) Is a numerical index of fineness
   b) Gives some idea of the mean size of particles present in the entire body of aggregate
   c) Is a sum of the cumulative percentages retained on the set of specified sieves divided by 100
   d) All of the above

5) The nominal mix corresponding to M20 grade concrete is _____.
   a) 1:2:4 b) 1:3:6
   c) 1:1.5:3 d) 1:1:2

6) The compressive strength of concrete after 7 days of curing (Shall not be less than) _____ times.
   a) $\frac{1}{2}$ b) $\frac{3}{2}$
   c) $\frac{2}{3}$ d) $\frac{1}{3}$

7) The choice of mix proportion of a concrete is independent of _____.
   a) grade designation
   b) maximum size of aggregate
   c) minimum water content ratio
   d) batching, mixing, placing and compaction techniques

8) The setting and hardening of cement after addition of water is due to _____.
   a) The presence of gypsum
   b) Binding action of water
   c) Hydration of some of constituent compounds of cement
   d) Evaporation of water
   e) None of the above

9) Permeability of concrete reduces with _____.
   a) Decrease in water cement ratio
   b) Decrease in porosity
   c) Increase in strength of cement
   d) All of the above

10) IS provision of concrete mix is given in _____.
   a) IS- 10262-2009 b) IS-383-1970
   c) IS- 456-2000 d) IS-4031-1968

11) Air entraining agents _____.
   a) Are used for entraining air in concrete
   b) Contain wood resins, fats and lignosalfonates
   c) Increase durability of concrete to frost action
   d) All of the above

12) Bleeding of concrete is said to occurs when _____.
   a) Finer particles settle down at the bottom
   b) Coarser particles get separated
   c) Cement paste rises to the surface of concrete
   d) Finer particles collect in isolated pockets
   e) None of the above

13) Recommended slump value as per IS 456-2000 for high degree of workability of concrete is between _____ mm.
   a) 100-150 b) 25-75
   c) 50-100 d) less than 50

14) The compressive strength of 43 Grade OPC after three days is expected to be more than _____.
   a) 16Mpa b) 23Mpa
   c) 27.5Mpa d) 33Mpa

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
3) Use of Non – programmable scientific calculator is allowed.
4) Assume suitable data if necessary and mention clearly.
5) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any two questions from the following. **12**

a) What are IS specification for water to be used for making concrete?
b) Explain effect of water cement ratio on strength of concrete.
c) Explain various admixtures in concrete and their necessity.

Q.3 Attempt any four questions from the following. **16**

a) Write a note on initial and final setting time of cement.
b) Draw detailed flow chart of cement manufacturing by dry process.
c) Explain compaction factor test for measuring workability.
d) Write a note on segregation and bleeding.
e) Explain high strength concrete.

Section - II

Q.2 Write a note on any Four of following. **12**

a) Durability concrete
b) Light weight concrete
c) High performance concrete
d) Quality control of concrete
e) Nominal Mix and Design Mix

Q.3 Design a concrete mix of grade M25 as per ACI method. **16**

Using the following data:
Concrete is to be used for Elevated water tank
Exposure condition - Moderate.
Standard deviation = 4
K Himsworth Constant = 1.65
Cement to be used - O.P.C. 43 grade
Workability required - 50 mm Slump
Method of concrete placing - Manual (Pumping is not required)
Maximum size of aggregate - 20 mm (Crushed angular)

Test data for material:-

a) Specific gravity of materials are cement= 3.15, F.A. = 2.65 and C. A. = 2.80
b) The dry rodded bulk densities of C. A. = 1600 Kg/ m^3
c) Water absorption of FA = 2% and CA = 1%.
d) Fineness modulus of FA = 2.8.

Refer the Table no. 1 to 6 given below.

OR

Write a step by step procedure of designing concrete mix by IS method. **16**

Table – 1

: Relation between water/cement ratio and average compressive strength of concrete, according to ACI 211.1-91

Table 11.5. Relation between water/cement ratio and average compressive strength of concrete, according to ACI 211.1-91		
Average Compressive strength at 28 day	Effective water/cement ratio (by mass)	
(MPa)	Non-air entrained concrete	Air entrained concrete
45	0.38	-
40	0.43	-
35	0.48	0.40
30	0.55	0.46
25	0.62	0.53
20	0.70	0.61
15	0.80	0.71

Table – 2

: Requirements of ACI 318-89 for W/C ratio and Strength for Special Exposure conditions

Table 11.6. Requirements of ACI 318-89 for W/C ratio and Strength for Special Exposure conditions		
Exposure Condition	Maximum W/C ratio, normal density aggregate concrete	Minimum design strength, low density aggregate concrete
i. Concrete Intended to be Watertight		(MPa)
(a) Exposed to fresh water	0.50	25
(b) Exposed to brackish or sea water	0.45	30
ii. Concrete exposed to freezing and thawing		
(a) Kerbs, Gutters, Guard rails or thin sections	0.45	30
(b) Other elements	0.50	25
(c) in presence of de-icing chemicals	0.45	30
iii. For corrosion protection of reinforced concrete exposed to de-icing salts, brackish water, sea water or spray from these sources	0.40	33

Table - 3

: Recommended Values of Slump for Various Type of Construction as given by ACI 211.1-91

Table 11.7. Recommended Values of Slump for Various Type of Construction as given by ACI 211.1-91	
Types of Construction	Range of Slump (mm)
Reinforced foundation walls and footings	20-80
Plain footings, Caissons and substructure walls	20-80
Beams and reinforced walls	20-100
Building columns	20-100
Pavements and slabs	20-80
Mass Concrete	20-80

Table – 4

: Approximate requirement for mixing water and air content for different workability and nominal maximum size of Aggregate according to ACI 211.1-91

Table 11.8. Approximate requirement for mixing water and air content for different workability and nominal maximum size of Aggregate according to ACI 211.1-91

Workability or content	water content, Kg/m³ of concrete for indicated maximum aggregate size (mm)							
mm	10	12.5	20	25	40	50	70	150
Slump (mm)	Non-air entrained concrete							
30-50	205	200	185	180	160	155	145	125
80-100	225	215	200	195	175	170	160	140
150-180	240	230	210	205	185	180	170	-
Approximate entrapped air content %	3	2.5	2	1.5	1	0.5	0.3	0.2
	Air entrained concrete							
30-50	180	175	165	160	145	140	135	120
80-100	200	190	180	175	160	155	150	135
150-180	215	205	190	185	170	165	160	-
Recommended avg. total air content % Mild Exposure	4.50	4.00	3.50	3.00	2.50	2.00	1.50	1.00
Moderate Exposure	6.00	5.50	5.00	4.50	4.50	4.00	3.50	3.00
Extreme Exposure	7.50	7.00	6.00	6.00	5.50	5.00	4.50	4.00

Table – 5

Dry Bulk volume of coarse aggregate per unit volume of concrete as given by ACI 211.1-91

Maximum Size of Aggregate	*Bulk volume of dry rodded coarse aggregate per unit volume of concrete for fineness modulus of sand of*			
F.M.	2.40	2.60	2.80	3.00
10	0.50	0.48	0.46	0.44
12.5	0.59	0.57	0.55	0.53
20	0.66	0.64	0.62	0.60
25	0.71	0.69	0.67	0.65
40	0.75	0.73	0.71	0.69
50	0.78	0.76	0.74	0.72
70	0.82	0.80	0.78	0.76
150	0.87	0.85	0.83	0.81

Table – 6

: First Estimate of density (unit weight) of fresh concrete as given by ACI 211.1-91

Table 11.9. First estimate of density (unit weight) of fresh concrete as given by ACI 211.1-91

Maximum size of Aggregate (mm)	First Estimate of density (unit weight) of fresh concrete	
	Non air-entrained (kg/m3)	Air-entrained (kg/m3)
10	2285	2190
12.5	2315	2235
20	2355	2280
25	2375	2315
40	2420	2355
50	2445	2375
70	2465	2400
150	2505	2435

SLR-FM-12

Seat No.	

Set P

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The bending equation is _____.
   a) $M/I = F/Y = E/R$ b) $I/M = F/Y = E/R$
   c) $M/I = R/E = F/Y$ d) $M/I = Y/E = E/R$

2) The strength of beams mainly depends on _____.
   a) bending moment b) c.g. of the section
   c) section modulus d) its weight

3) The Eccentric Vertical Load generates _____.
   a) Only Direct Stress
   b) Only Bending Stress
   c) Combined Bending and Direct Stress
   d) Shear Stress

4) For no tension in the section, the eccentricity must not exceed _____.
   a) k^2/d b) $2k^2/d$
   c) 4k2/d d) k^2/d^2
   d= depth of section, k= radius of gyration

5) When thin cylindrical shell is subjected to internal fluid pressure, which of the following stress is developed in its wall?
   a) Circumferential stress b) Longitudinal stress
   c) Both a & b d) None of the above

6) The angle of twist is _____ proportional to twisting moment.
   a) directly b) inversely
   c) both a & b d) none of the above

7) The strain energy stored by the body with in elastic limit when loaded externally is called as _____.
   a) resilience b) proof resilience
   c) modulus of resilience d) none of the above

8) In the case of an I-section beam maximum shear stress is at _____.
   a) the junction of the top flange and web
   b) at neutral axis
   c) either a or b
   d) none of the above

9) In flitched beam at same level strains in wood and steel should be kept _____.
   a) equal
   b) unequal
   c) both a and b
   d) can't say anything

10) The Internal resistance which the body offers to meet the external force or load is called as _____.
   a) stress
   b) strain
   c) pressure
   d) none of the above

11) The ratio of lateral strain to linear strain is known as _____.
   a) modulus of elasticity
   b) modulus of rigidity
   c) poisson's ratio
   d) elastic limit

12) The relation between E (modulus of elasticity) & C (modulus of rigidity) is given _____.
   a) $\mathrm{E} = \mathrm{C}(1 + 1/\mathrm{m})$
   b) $\mathrm{E} = 2\mathrm{C}\,(1 + 1/\mathrm{m})$
   c) $\mathrm{E} = \mathrm{C}(1 + 2/\mathrm{m})$
   d) None of these

13) The point of contra flexure is also called _____.
   a) the point of inflexion
   b) a virtual hinge
   c) both a and b
   d) none of the above

14) In a cantilever beam with uniformly distributed load shear force varies along the span with following relation _____.
   a) linear
   b) parabolic
   c) either of a and b
   d) cubic

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 and Q.No.6 are compulsory.
2) Solve any two question of each section.
2) Figures to the right indicate full marks.
3) Assume suitable data is necessary and mention it clearly

Section – I

Q.2 A rigid bar ABCD is supported and loaded as shown in Figure 1. The suspender rod PB is 3m long with 300mm^2 cross sectional area whereas suspender rod QC is 5 long with cross sectional area of 400mm^2. Find the stresses induced in the suspender rods. Assume that suspender rods are of same materials. **10**

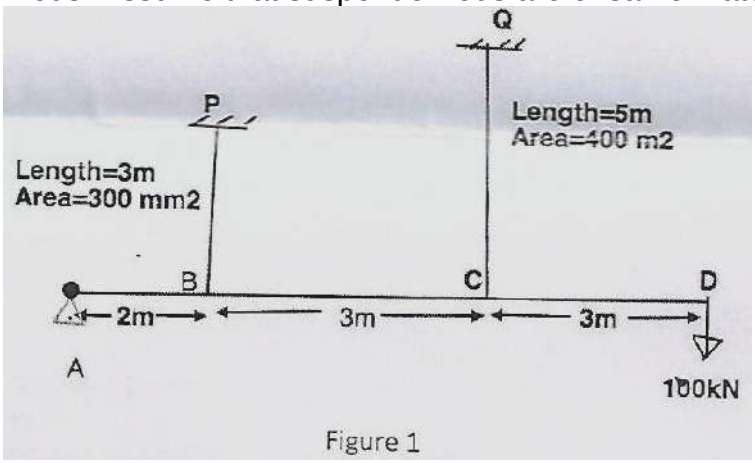

Figure 1

Q.3 Draw Shear Force and Bending Moment diagram for the Beam shown in Figure 2 below. Show all the Calculations. **09**

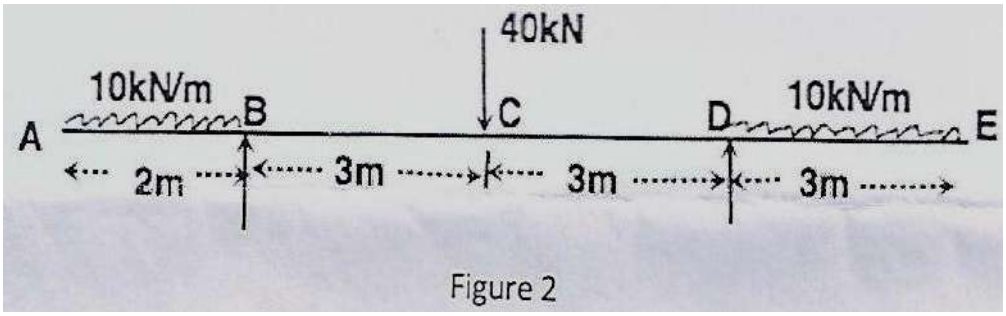

Figure 2

Q.4 If maximum permissible stress in the material is 30N/mm^2, Find the maximum UDL on a Simply Supported Beam of 5m long for the T-Section cross sectional details of beam given in Figure 3 below. **09**

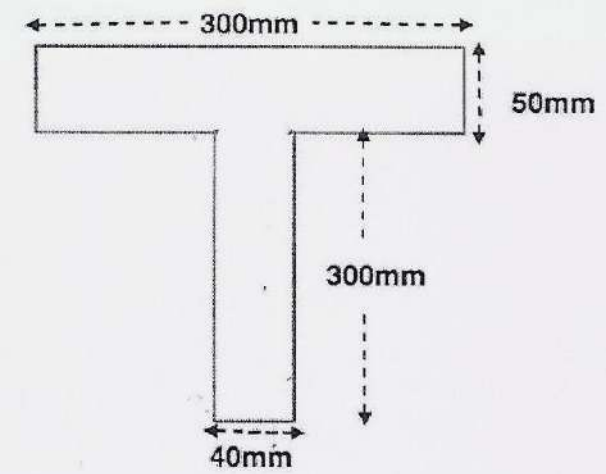

Figure 3

Q.5 Determine the maximum and minimum stresses at the base of dam. The masonry trapezoidal dam retains water on vertical face. The height of the dam is 5m and dam water level is upto 4.5m. Top width of the dam is 1m whereas bottom width is 3m. Take weight of water as 10kN/m^3 and masonry as 20kN/m^3. **09**

Section – II

Q.6 Answer the following questions. **10**

a) Flitched beam
b) Define terms proof resilience & modulus of resilience.
c) Explain the term equivalent section.
d) Circumferential and Longitudinal Stress in Thin Cylinders.
e) Expression for Strain Energy due to bending.

Q.7 A steel beam of I section shown in Figure 4 is 600 mm deep. Each flange is 250 mm wide & 25 mm thick. The web is 15 mm thick. The beam section is subjected to a shear force of 500 KN. Determine shear stress distribution for the beam section at various levels. **09**

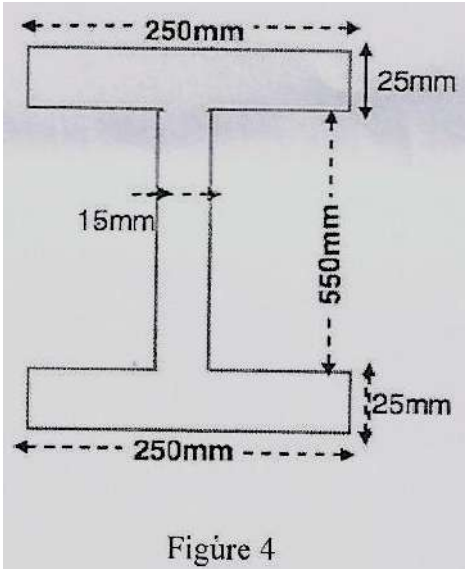

Figure 4

Q.8 A solid circular shaft transmits 75 KW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^0 in 2 meters length of the shaft & shear stress is limited to 50 N/mm^2, Take $C=100 \times 10^3 N/mm^2$ **09**

Q.9 Find the moment of resistance of a flitched beam with a Timber part of 200mm wide and 250mm deep reinforced with two flitches each side by 200mm by 15mm in section. Horizontal CG of timber and steel part passes through same line. Consider allowable stress in timber is 6.5 N/mm^2 and also find allowable stress in steel. Take $E_{steel}=20E_{timber}$ **09**

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In the case of an I-section beam maximum shear stress is at _____.
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   c) either a or b
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2) In flitched beam at same level strains in wood and steel should be kept _____.
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   c) both a and b d) can't say anything

3) The Internal resistance which the body offers to meet the external force or load is called as _____.
   a) stress b) strain
   c) pressure d) none of the above

4) The ratio of lateral strain to linear strain is known as _____.
   a) modulus of elasticity b) modulus of rigidity
   c) poisson's ratio d) elastic limit

5) The relation between E (modulus of elasticity) & C (modulus of rigidity) is given _____.
   a) $E = C(1 + 1/m)$ b) $E = 2C\,(1 + 1/m)$
   c) $E = C(1 + 2/m)$ d) None of these

6) The point of contra flexure is also called _____.
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14) The strain energy stored by the body with in elastic limit when loaded externally is called as _____.
   a) resilience b) proof resilience
   c) modulus of resilience d) none of the above

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

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Section – I

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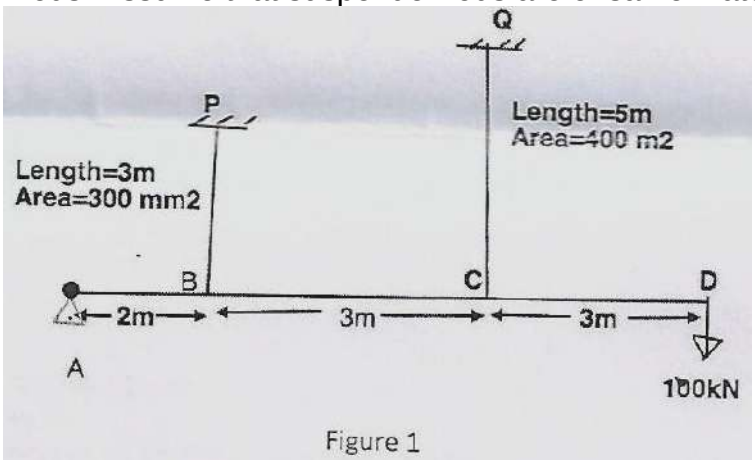

Figure 1

Q.3 Draw Shear Force and Bending Moment diagram for the Beam shown in Figure 2 below. Show all the Calculations. **09**

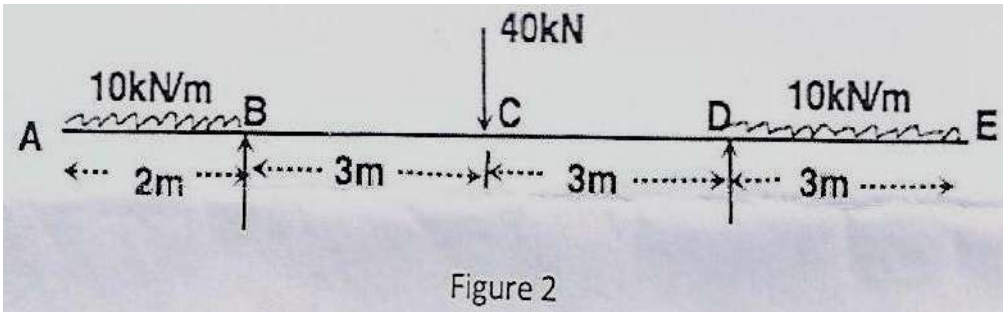

Figure 2

Q.4 If maximum permissible stress in the material is 30N/mm^2, Find the maximum UDL on a Simply Supported Beam of 5m long for the T-Section cross sectional details of beam given in Figure 3 below. **09**

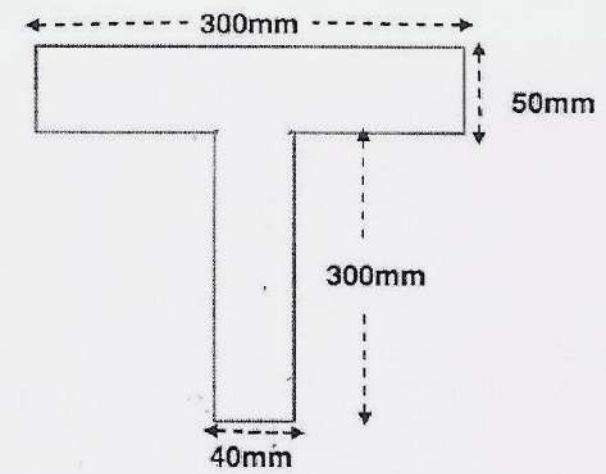

Figure 3

Q.5 Determine the maximum and minimum stresses at the base of dam. The masonry trapezoidal dam retains water on vertical face. The height of the dam is 5m and dam water level is upto 4.5m. Top width of the dam is 1m whereas bottom width is 3m. Take weight of water as 10kN/m^3 and masonry as 20kN/m^3. **09**

Section – II

Q.6 Answer the following questions. **10**

a) Flitched beam
b) Define terms proof resilience & modulus of resilience.
c) Explain the term equivalent section.
d) Circumferential and Longitudinal Stress in Thin Cylinders.
e) Expression for Strain Energy due to bending.

Q.7 A steel beam of I section shown in Figure 4 is 600 mm deep. Each flange is 250 mm wide & 25 mm thick. The web is 15 mm thick. The beam section is subjected to a shear force of 500 KN. Determine shear stress distribution for the beam section at various levels. **09**

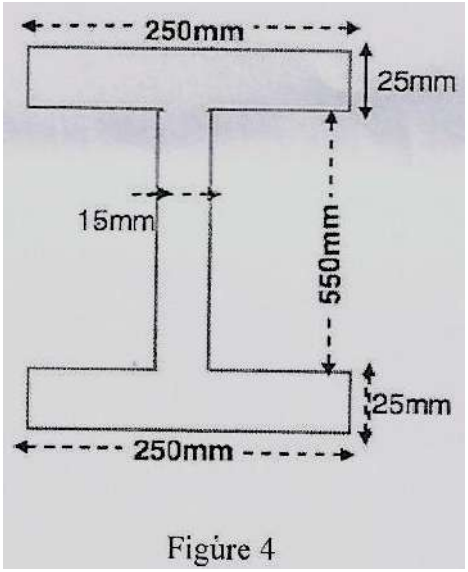

Figure 4

Q.8 A solid circular shaft transmits 75 KW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^0 in 2 meters length of the shaft & shear stress is limited to 50 N/mm^2, Take $C=100 \times 10^3 N/mm^2$ **09**

Q.9 Find the moment of resistance of a flitched beam with a Timber part of 200mm wide and 250mm deep reinforced with two flitches each side by 200mm by 15mm in section. Horizontal CG of timber and steel part passes through same line. Consider allowable stress in timber is 6.5 N/mm^2 and also find allowable stress in steel. Take $E_{steel}=20E_{timber}$ **09**

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) When thin cylindrical shell is subjected to internal fluid pressure, which of the following stress is developed in its wall?
   a) Circumferential stress b) Longitudinal stress
   c) Both a & b d) None of the above

2) The angle of twist is _____ proportional to twisting moment.
   a) directly b) inversely
   c) both a & b d) none of the above

3) The strain energy stored by the body with in elastic limit when loaded externally is called as _____.
   a) resilience b) proof resilience
   c) modulus of resilience d) none of the above

4) In the case of an I-section beam maximum shear stress is at _____.
   a) the junction of the top flange and web
   b) at neutral axis
   c) either a or b
   d) none of the above

5) In flitched beam at same level strains in wood and steel should be kept _____.
   a) equal b) unequal
   c) both a and b d) can't say anything

6) The Internal resistance which the body offers to meet the external force or load is called as _____.
   a) stress b) strain
   c) pressure d) none of the above

7) The ratio of lateral strain to linear strain is known as _____.
   a) modulus of elasticity b) modulus of rigidity
   c) poisson's ratio d) elastic limit

8) The relation between E (modulus of elasticity) & C (modulus of rigidity) is given _____.
   a) $\mathrm{E} = \mathrm{C}(1 + 1/\mathrm{m})$ b) $\mathrm{E} = 2\mathrm{C}\,(1 + 1/\mathrm{m})$
   c) $\mathrm{E} = \mathrm{C}(1 + 2/\mathrm{m})$ d) None of these

9) The point of contra flexure is also called _____.
   a) the point of inflexion
   b) a virtual hinge
   c) both a and b
   d) none of the above

10) In a cantilever beam with uniformly distributed load shear force varies along the span with following relation _____.
   a) linear
   b) parabolic
   c) either of a and b
   d) cubic

11) The bending equation is _____.
   a) $M/I = F/Y = E/R$
   b) $I/M = F/Y = E/R$
   c) $M/I = R/E = F/Y$
   d) $M/I = Y/E = E/R$

12) The strength of beams mainly depends on _____.
   a) bending moment
   b) c.g. of the section
   c) section modulus
   d) its weight

13) The Eccentric Vertical Load generates _____.
   a) Only Direct Stress
   b) Only Bending Stress
   c) Combined Bending and Direct Stress
   d) Shear Stress

14) For no tension in the section, the eccentricity must not exceed _____.
   a) k^2/d
   b) $2k^2/d$
   c) 4k2/d
   d) k^2/d^2

   d= depth of section, k= radius of gyration

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 and Q.No.6 are compulsory.
2) Solve any two question of each section.
2) Figures to the right indicate full marks.
3) Assume suitable data is necessary and mention it clearly

Section – I

Q.2 A rigid bar ABCD is supported and loaded as shown in Figure 1. The suspender rod PB is 3m long with 300mm^2 cross sectional area whereas suspender rod QC is 5 long with cross sectional area of 400mm^2. Find the stresses induced in the suspender rods. Assume that suspender rods are of same materials. **10**

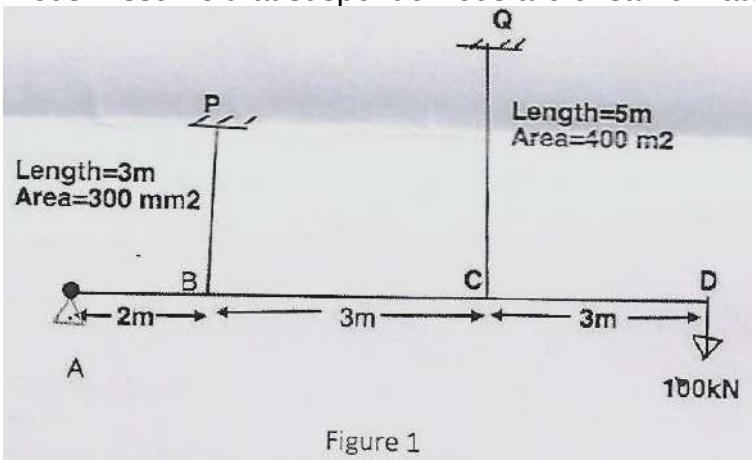

Figure 1

Q.3 Draw Shear Force and Bending Moment diagram for the Beam shown in Figure 2 below. Show all the Calculations. **09**

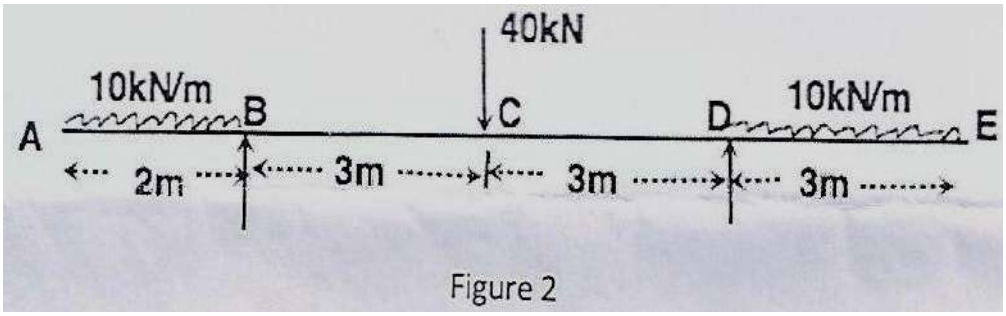

Figure 2

Q.4 If maximum permissible stress in the material is 30N/mm^2, Find the maximum UDL on a Simply Supported Beam of 5m long for the T-Section cross sectional details of beam given in Figure 3 below. **09**

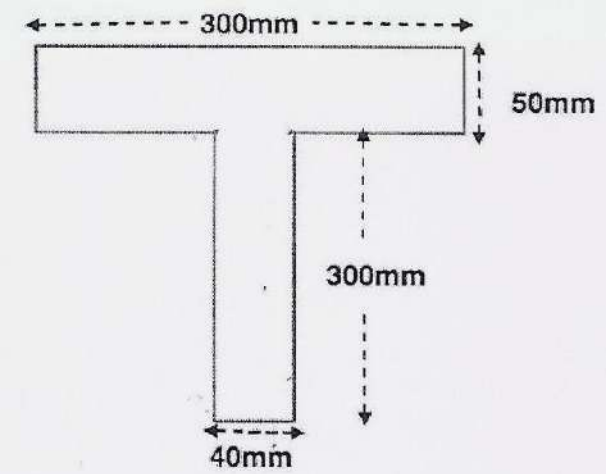

Figure 3

Q.5 Determine the maximum and minimum stresses at the base of dam. The masonry trapezoidal dam retains water on vertical face. The height of the dam is 5m and dam water level is upto 4.5m. Top width of the dam is 1m whereas bottom width is 3m. Take weight of water as 10kN/m^3 and masonry as 20kN/m^3. **09**

Section – II

Q.6 Answer the following questions. **10**

a) Flitched beam
b) Define terms proof resilience & modulus of resilience.
c) Explain the term equivalent section.
d) Circumferential and Longitudinal Stress in Thin Cylinders.
e) Expression for Strain Energy due to bending.

Q.7 A steel beam of I section shown in Figure 4 is 600 mm deep. Each flange is 250 mm wide & 25 mm thick. The web is 15 mm thick. The beam section is subjected to a shear force of 500 KN. Determine shear stress distribution for the beam section at various levels. **09**

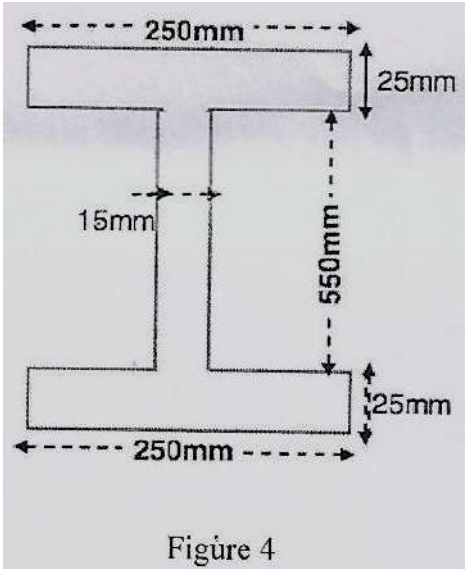

Figure 4

Q.8 A solid circular shaft transmits 75 KW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^0 in 2 meters length of the shaft & shear stress is limited to 50 N/mm^2, Take $C=100 \times 10^3 N/mm^2$ **09**

Q.9 Find the moment of resistance of a flitched beam with a Timber part of 200mm wide and 250mm deep reinforced with two flitches each side by 200mm by 15mm in section. Horizontal CG of timber and steel part passes through same line. Consider allowable stress in timber is 6.5 N/mm^2 and also find allowable stress in steel. Take $E_{steel}=20E_{timber}$ **09**

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The Internal resistance which the body offers to meet the external force or load is called as _____.
   a) stress b) strain
   c) pressure d) none of the above

2) The ratio of lateral strain to linear strain is known as _____.
   a) modulus of elasticity b) modulus of rigidity
   c) poisson's ratio d) elastic limit

3) The relation between E (modulus of elasticity) & C (modulus of rigidity) is given _____.
   a) $\mathrm{E = C(1 + 1/m)}$ b) $\mathrm{E = 2C\ (1 + 1/m)}$
   c) $\mathrm{E = C(1 + 2/m)}$ d) None of these

4) The point of contra flexure is also called _____.
   a) the point of inflexion b) a virtual hinge
   c) both a and b d) none of the above

5) In a cantilever beam with uniformly distributed load shear force varies along the span with following relation _____.
   a) linear b) parabolic
   c) either of a and b d) cubic

6) The bending equation is _____.
   a) $\mathrm{M/I = F/Y = E/R}$ b) $\mathrm{I/M = F/Y = E/R}$
   c) $\mathrm{M/I = R/E = F/Y}$ d) $\mathrm{M/I = Y/E = E/R}$

7) The strength of beams mainly depends on _____.
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8) The Eccentric Vertical Load generates _____.
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9) For no tension in the section, the eccentricity must not exceed _____.
   a) k^2/d b) $2k^2/d$
   c) 4k2/d d) k^2/d^2
   d= depth of section, k= radius of gyration

10) When thin cylindrical shell is subjected to internal fluid pressure, which of the following stress is developed in its wall?
   a) Circumferential stress b) Longitudinal stress
   c) Both a & b d) None of the above

11) The angle of twist is _____ proportional to twisting moment.
   a) directly b) inversely
   c) both a & b d) none of the above

12) The strain energy stored by the body with in elastic limit when loaded externally is called as _____.
   a) resilience b) proof resilience
   c) modulus of resilience d) none of the above

13) In the case of an I-section beam maximum shear stress is at _____.
   a) the junction of the top flange and web
   b) at neutral axis
   c) either a or b
   d) none of the above

14) In flitched beam at same level strains in wood and steel should be kept _____.
   a) equal b) unequal
   c) both a and b d) can't say anything

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 and Q.No.6 are compulsory.
2) Solve any two question of each section.
2) Figures to the right indicate full marks.
3) Assume suitable data is necessary and mention it clearly

Section – I

Q.2 A rigid bar ABCD is supported and loaded as shown in Figure 1. The suspender rod PB is 3m long with 300mm^2 cross sectional area whereas suspender rod QC is 5 long with cross sectional area of 400mm^2. Find the stresses induced in the suspender rods. Assume that suspender rods are of same materials. **10**

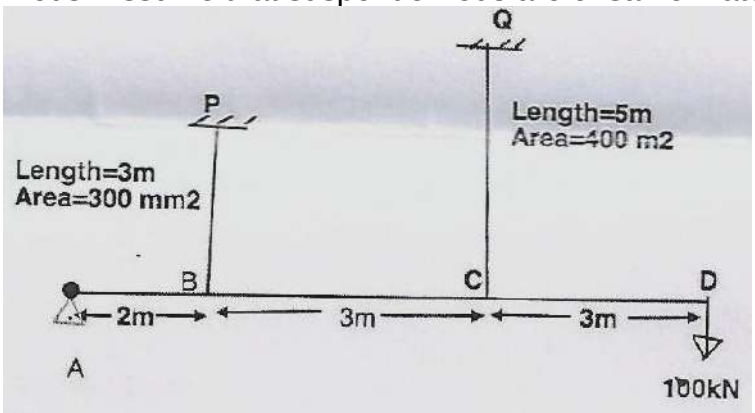

Figure 1

Q.3 Draw Shear Force and Bending Moment diagram for the Beam shown in Figure 2 below. Show all the Calculations. **09**

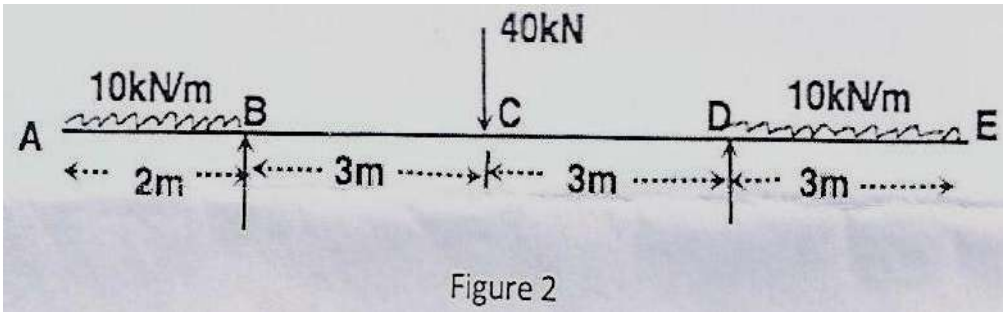

Figure 2

Q.4 If maximum permissible stress in the material is 30N/mm^2, Find the maximum UDL on a Simply Supported Beam of 5m long for the T-Section cross sectional details of beam given in Figure 3 below. **09**

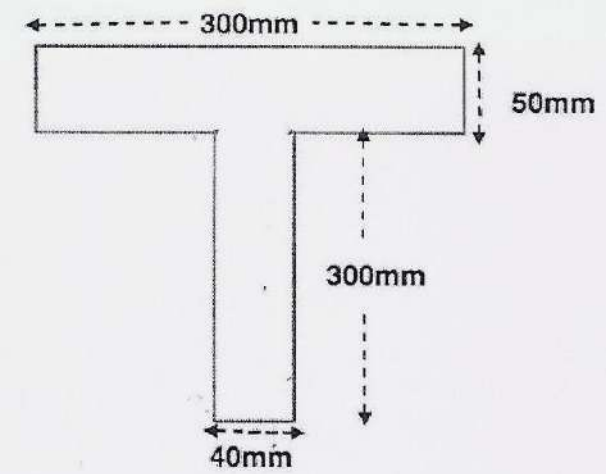

Figure 3

Q.5 Determine the maximum and minimum stresses at the base of dam. The masonry trapezoidal dam retains water on vertical face. The height of the dam is 5m and dam water level is upto 4.5m. Top width of the dam is 1m whereas bottom width is 3m. Take weight of water as 10kN/m^3 and masonry as 20kN/m^3. **09**

Section – II

Q.6 **Answer the following questions.** **10**

a) Flitched beam
b) Define terms proof resilience & modulus of resilience.
c) Explain the term equivalent section.
d) Circumferential and Longitudinal Stress in Thin Cylinders.
e) Expression for Strain Energy due to bending.

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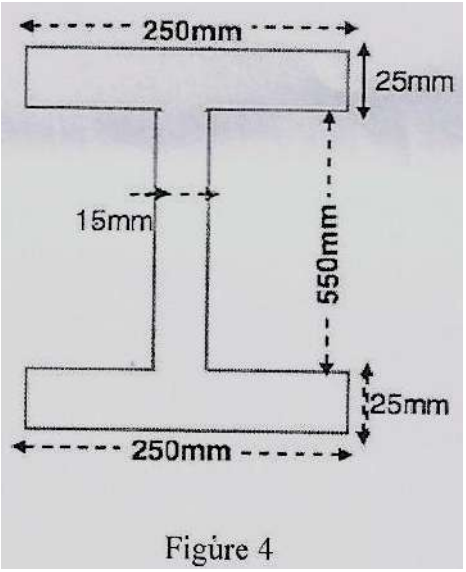

Figure 4

Q.8 A solid circular shaft transmits 75 KW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^0 in 2 meters length of the shaft & shear stress is limited to 50 N/mm^2, Take $C=100 \times 10^3 N/mm^2$ **09**

Q.9 Find the moment of resistance of a flitched beam with a Timber part of 200mm wide and 250mm deep reinforced with two flitches each side by 200mm by 15mm in section. Horizontal CG of timber and steel part passes through same line. Consider allowable stress in timber is 6.5 N/mm^2 and also find allowable stress in steel. Take $E_{steel}=20E_{timber}$ **09**

SLR-FM-13

Seat No.	

Set P

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to right indicates in full marks.
2) Assume suitable data if necessary but mention it clearly**.**
3) Q. No. 1 is compulsory and should be solved in first 30 minutes in Answer Book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Line of collimation need not be truly perpendicular to vertical axis in ____.
   a) dumpy level b) tilting level
   c) auto level d) all the above

2) Vernier is a device for measuring fractional part of the smallest division on _____.
   a) Horizontal plate b) Vertical plate
   c) Both a and b d) None of these

3) Which one of the following statement is correct?
   a) The axis of plate level should be parallel to the vertical axis
   b) The axis of telescope must be parallel to the horizontal axis
   c) The line of collimation must be perpendicular to horizontal axis
   d) The line of collimation must be perpendicular to the plate level axis

4) Third rule is applied to _____.
   a) an open traverse for graphical adjustment
   b) determine the effect of local attraction
   c) a closed traverse for adjustment of closing error
   d) none of the error

5) Proportional compass is used for measurement of _____.
   a) Included angle b) Magnetic Bearing
   c) Redrawing with other scale d) none of these

6) Telescopic alidade can measure _____.
   a) Horizontal angle b) Vertical angle
   c) Magnetic bearing d) All of these

7) Abney level is used for measurement of _____.
   a) Horizontal angle b) Vertical angle of slope
   c) Difference in level d) Horizontal distance

8) Most accurate estimate of volume, is given by _____.
   a) Mean Area formula b) End Area formula
   c) Prismoidal formula d) Trapezoidal rule

9) Total station can be used for _____.
   a) Missing line measurement
   b) Remote elevation measurement
   c) Stake out
   d) All of these

10) Determination of Plotted position of station occupied by plane table is called _____.
   a) Traversing
   b) Resection
   c) Intersection
   d) Radiation

11) The method of orientation a plane table with two already plotted points is known as _____.
   a) Intersection
   b) Traversing
   c) Back sighting
   d) two-point problem

12) Irregular area of a closed figure may be computed by an instrument known as _____.
   a) Pantograph
   b) Planimeter
   c) Passometer
   d) None of above

13) Area of zero circle comes into account in _____.
   a) Anchor pt. outside case
   b) Anchor pt. inside case
   c) Both of these
   d) None of these

14) Curvature correction to a staff reading in a differential leveling survey is _____.
   a) always subtractive
   b) always zero
   c) always additive
   d) depend on latitude

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section

Section – I

Q.2 A) In two peg test of dumpy level, the following observations were made. **06**

Instrument Station	Staff station A	Staff station B
Mid-way	2.356	1.733
Station O	3.235	3.152

The distance between A and B is 80 m. the station O is situated on line BA produced at a distance of 16 m from station A. Is the line of collimation is adjusted? if not, state whether the line of collimation is inclined upwards or downwards also calculate the collimation error and find out correct readings on A and B to give a horizontal line of sight, when the instrument is at station O.

B) When Reciprocal levelling done? Describe the method along with sketch. **04**

Q.3 A) The table below gives the lengths and bearings of the lines of a traverse ABCDE. Determine the length and bearing of the fifth line. **05**

Line	Length (m)	Reduced Bearing
AB	194.1	N $85^{o}30'$ E
BC	201.2	N $15^{o}00'$ E
CD	165.4	N $74^{o}30'$ W
DE	172.6	S $15^{o}30'$ W
EA	?	?

B) How can the height of tower be determined when it is not accessible in trigonometric leveling? **04**

Q.4 A) A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities: **06**

Line	Length (m)	WCB
AB	298.7	$0^{o}0'$
BC	205.7	$334^{o}48'$
CD	L1	$255^{o}6'$
DE	L2	$123^{o}36'$
EA	231.4	$35^{o}36'$

B) Describe how you would measure vertical angle using theodolite? **03**

Q.5 A) What is Nautical Sextant? Explain in detail working of it. **06**

B) Write short note **03**

i) Hand Level

ii) Abney level

Section – II

Q.6 A) Explain in detail Electromagnetic Spectrum. **04**

B) Explain the construction and working of Geodimeter. **06**

Q.7 A) Define: **03**

i) Principle of plane table surveying

ii) Orientation

B) What are the methods of plane tabling? Describe of them with neat sketch. **06**

Q.8 A) Describe methods of interpolation of contours. **04**

B) Explain characteristics of contour lines with neat sketch. **05**

Q.9 A) The following offsets were taken from a chain line to a hedge **05**

Distance (m)	0	20	40	60	80	120	160	220	280
Offset (m)	9.4	10.8	13.6	11.2	9.6	8.4	7.5	6.3	4.6

Determine the area included between the chain line and hedge and offsets by Simpsons rule.

B) Explain working of planimeter (Mechanical) and state its various parts. **04**

SLR-FM-13

Seat No.	

Set Q

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to right indicates in full marks.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Most accurate estimate of volume, is given by _____.
   a) Mean Area formula b) End Area formula
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3) Determination of Plotted position of station occupied by plane table is called _____.
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   c) Intersection d) Radiation

4) The method of orientation a plane table with two already plotted points is known as _____.
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5) Irregular area of a closed figure may be computed by an instrument known as _____.
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6) Area of zero circle comes into account in _____.
   a) Anchor pt. outside case b) Anchor pt. inside case
   c) Both of these d) None of these

7) Curvature correction to a staff reading in a differential leveling survey is _____.
   a) always subtractive b) always zero
   c) always additive d) depend on latitude

8) Line of collimation need not be truly perpendicular to vertical axis in ____.
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Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

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B) Explain working of planimeter (Mechanical) and state its various parts. **04**

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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   d) None of these

13) Which one of the following statement is correct?
   a) The axis of plate level should be parallel to the vertical axis
   b) The axis of telescope must be parallel to the horizontal axis
   c) The line of collimation must be perpendicular to horizontal axis
   d) The line of collimation must be perpendicular to the plate level axis

14) Third rule is applied to _____.
   a) an open traverse for graphical adjustment
   b) determine the effect of local attraction
   c) a closed traverse for adjustment of closing error
   d) none of the error

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section

Section – I

Q.2 A) In two peg test of dumpy level, the following observations were made. **06**

Instrument Station	Staff station A	Staff station B
Mid-way	2.356	1.733
Station O	3.235	3.152

The distance between A and B is 80 m. the station O is situated on line BA produced at a distance of 16 m from station A. Is the line of collimation is adjusted? if not, state whether the line of collimation is inclined upwards or downwards also calculate the collimation error and find out correct readings on A and B to give a horizontal line of sight, when the instrument is at station O.

B) When Reciprocal levelling done? Describe the method along with sketch. **04**

Q.3 A) The table below gives the lengths and bearings of the lines of a traverse ABCDE. Determine the length and bearing of the fifth line. **05**

Line	Length (m)	Reduced Bearing
AB	194.1	N $85^{o}30'$ E
BC	201.2	N $15^{o}00'$ E
CD	165.4	N $74^{o}30'$ W
DE	172.6	S $15^{o}30'$ W
EA	?	?

B) How can the height of tower be determined when it is not accessible in trigonometric leveling? **04**

Q.4 A) A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities: **06**

Line	Length (m)	WCB
AB	298.7	$0^{o}0'$
BC	205.7	$334^{o}48'$
CD	L1	$255^{o}6'$
DE	L2	$123^{o}36'$
EA	231.4	$35^{o}36'$

B) Describe how you would measure vertical angle using theodolite? **03**

Q.5 A) What is Nautical Sextant? Explain in detail working of it. **06**

B) Write short note **03**

i) Hand Level

ii) Abney level

Section – II

Q.6 A) Explain in detail Electromagnetic Spectrum. **04**

B) Explain the construction and working of Geodimeter. **06**

Q.7 A) Define: **03**

i) Principle of plane table surveying

ii) Orientation

B) What are the methods of plane tabling? Describe of them with neat sketch. **06**

Q.8 A) Describe methods of interpolation of contours. **04**

B) Explain characteristics of contour lines with neat sketch. **05**

Q.9 A) The following offsets were taken from a chain line to a hedge **05**

Distance (m)	0	20	40	60	80	120	160	220	280
Offset (m)	9.4	10.8	13.6	11.2	9.6	8.4	7.5	6.3	4.6

Determine the area included between the chain line and hedge and offsets by Simpsons rule.

B) Explain working of planimeter (Mechanical) and state its various parts. **04**

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to right indicates in full marks.
2) Assume suitable data if necessary but mention it clearly**.**
3) Q. No. 1 is compulsory and should be solved in first 30 minutes in Answer Book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Determination of Plotted position of station occupied by plane table is called _____.
   a) Traversing b) Resection
   c) Intersection d) Radiation

2) The method of orientation a plane table with two already plotted points is known as _____.
   a) Intersection b) Traversing
   c) Back sighting d) two-point problem

3) Irregular area of a closed figure may be computed by an instrument known as _____.
   a) Pantograph b) Planimeter
   c) Passometer d) None of above

4) Area of zero circle comes into account in _____.
   a) Anchor pt. outside case b) Anchor pt. inside case
   c) Both of these d) None of these

5) Curvature correction to a staff reading in a differential leveling survey is _____.
   a) always subtractive b) always zero
   c) always additive d) depend on latitude

6) Line of collimation need not be truly perpendicular to vertical axis in ____.
   a) dumpy level b) tilting level
   c) auto level d) all the above

7) Vernier is a device for measuring fractional part of the smallest division on _____.
   a) Horizontal plate b) Vertical plate
   c) Both a and b d) None of these

8) Which one of the following statement is correct?
   a) The axis of plate level should be parallel to the vertical axis
   b) The axis of telescope must be parallel to the horizontal axis
   c) The line of collimation must be perpendicular to horizontal axis
   d) The line of collimation must be perpendicular to the plate level axis

9) Third rule is applied to _____.
   a) an open traverse for graphical adjustment
   b) determine the effect of local attraction
   c) a closed traverse for adjustment of closing error
   d) none of the error

10) Proportional compass is used for measurement of _____.
   a) Included angle
   b) Magnetic Bearing
   c) Redrawing with other scale
   d) none of these

11) Telescopic alidade can measure _____.
   a) Horizontal angle
   b) Vertical angle
   c) Magnetic bearing
   d) All of these

12) Abney level is used for measurement of _____.
   a) Horizontal angle
   b) Vertical angle of slope
   c) Difference in level
   d) Horizontal distance

13) Most accurate estimate of volume, is given by _____.
   a) Mean Area formula
   b) End Area formula
   c) Prismoidal formula
   d) Trapezoidal rule

14) Total station can be used for _____.
   a) Missing line measurement
   b) Remote elevation measurement
   c) Stake out
   d) All of these

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section

Section – I

Q.2 A) In two peg test of dumpy level, the following observations were made. **06**

Instrument Station	Staff station A	Staff station B
Mid-way	2.356	1.733
Station O	3.235	3.152

The distance between A and B is 80 m. the station O is situated on line BA produced at a distance of 16 m from station A. Is the line of collimation is adjusted? if not, state whether the line of collimation is inclined upwards or downwards also calculate the collimation error and find out correct readings on A and B to give a horizontal line of sight, when the instrument is at station O.

B) When Reciprocal levelling done? Describe the method along with sketch. **04**

Q.3 A) The table below gives the lengths and bearings of the lines of a traverse ABCDE. Determine the length and bearing of the fifth line. **05**

Line	Length (m)	Reduced Bearing
AB	194.1	N $85^{o}30'$ E
BC	201.2	N $15^{o}00'$ E
CD	165.4	N $74^{o}30'$ W
DE	172.6	S $15^{o}30'$ W
EA	?	?

B) How can the height of tower be determined when it is not accessible in trigonometric leveling? **04**

Q.4 A) A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities: **06**

Line	Length (m)	WCB
AB	298.7	$0^{o}0'$
BC	205.7	$334^{o}48'$
CD	L1	$255^{o}6'$
DE	L2	$123^{o}36'$
EA	231.4	$35^{o}36'$

B) Describe how you would measure vertical angle using theodolite? **03**

Q.5 A) What is Nautical Sextant? Explain in detail working of it. **06**

B) Write short note **03**

i) Hand Level

ii) Abney level

Section – II

Q.6 A) Explain in detail Electromagnetic Spectrum. **04**

B) Explain the construction and working of Geodimeter. **06**

Q.7 A) Define: **03**

i) Principle of plane table surveying

ii) Orientation

B) What are the methods of plane tabling? Describe of them with neat sketch. **06**

Q.8 A) Describe methods of interpolation of contours. **04**

B) Explain characteristics of contour lines with neat sketch. **05**

Q.9 A) The following offsets were taken from a chain line to a hedge **05**

Distance (m)	0	20	40	60	80	120	160	220	280
Offset (m)	9.4	10.8	13.6	11.2	9.6	8.4	7.5	6.3	4.6

Determine the area included between the chain line and hedge and offsets by Simpsons rule.

B) Explain working of planimeter (Mechanical) and state its various parts. **04**

SLR-FM-14

Seat No.	

Set P

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume correct data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statements are correct or incorrect. **7**

1) Extrados is inner curve of an arch.
2) Casing and capping is type of closed wiring.
3) Spouts are provided for transportation of bathroom waste water.
4) Normally for plastering mortar of CM 1:4 is used.
5) Plumbing systems involves installation of Telephone cables.
6) In case of load bearing structures, less carpet area is available.
7) The switch boards are fixed at sill height in residential buildings.

State whether the following statement is true or false. 7

8) Combined footing is used for single column.
9) If a modular brick is cut along width in half size then it is called as Queen Closer
10) Through stone is a stone stretcher.
11) Flemish bond has greater strength as compared to English bond.
12) Mullion divides door and window vertically.
13) Landing is a biggest tread or going of half turn staircase.
14) Voussoirs of an arch remains in tension.

SLR-FM-14

Seat No.	

Set P

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use half imperial sheet for section - II and answer book for section - I.
4) Assume correct data wherever necessary.

Section – I

Q.2 Write the answers for followings. (any Seven) **28**

a) What is through stone? Explain its importance in masonry work.
b) Compare Load bearing structure with framed structure.
c) Draw neat sketches for any two of door hinges.
d) Explain system of Air - Conditioning in winter?
e) Write a note on various defects in plastering?
f) Write a note on: Thermal Insulation of Building.
g) Draw a neat sketch of Gully Trap and Intercepting Trap.
h) Define following terms:
1) Queen Closer
2) King Closer
3) Closer
4) Beveled closer
i) Enlist various types of roofs? Discuss any two types of roof with their suitability.
j) What is concept of earthing? Also explain procedure of earthing in brief?

Section - II

Q.3 Draw to scale 1:10 Elevation and Plan for alternate courses of STRETCHER Bond and HEADER Bond for L shaped wall. **14**

OR

Draw to scale 1:20 Plan and Sectional Elevation for a RCC Rectangular Combined Footing of size (1200mm X 2400mm) with two columns of size (350mm X 350mm) symmetrically placed on both sides. Centre to Centre distance between two columns is 1500mm **14**
Depth of Footing = 600 mm
150mm Projection on all sides of footing for PCC
Depth of PCC bed = 150mm
Depth of excavation pit below Ground Level = 1200mm

Q.4 Draw to scale 1:10 Front Elevation, Sectional Elevation and Sectional Plan of a framed Teakwood Single Leaf Fully Glazed Window. Use following data: **14**
Clear opening = 800mm X 1200mm
Wooden section for frame = 100mm X 60mm
Wooden section for style and rail = 100mm X 35mm
Glass Panel = 8mm thick (2 numbers per shutter)
Sash bar = 20mm thick
Show various fixtures at proper locations

OR

Draw to scale 1: 20 Plan and Sectional Elevation of a Quarter Turn RCC Staircase. Use following data: **14**

Height to be climbed = 3150mm
Winders are not allowed
Width of stair flights = 1000mm
Riser = 150mm to 180mm
Tread = 230mm to 300mm
Railing = 80mm Stainless Steel Pipe Railing
Waist slab = 150mm thick
Reinforcement details not expected
Write step by step calculation on sheet with pencil only.

SLR-FM-14

Seat No.	

Set Q

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume correct data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statements are correct or incorrect. **7**

1) Normally for plastering mortar of CM 1:4 is used.
2) Plumbing systems involves installation of Telephone cables.
3) In case of load bearing structures, less carpet area is available.
4) The switch boards are fixed at sill height in residential buildings.
5) Extrados is inner curve of an arch.
6) Casing and capping is type of closed wiring.
7) Spouts are provided for transportation of bathroom waste water.

State whether the following statement is true or false. 7

8) Flemish bond has greater strength as compared to English bond.
9) Mullion divides door and window vertically.
10) Landing is a biggest tread or going of half turn staircase.
11) Voussoirs of an arch remains in tension.
12) Combined footing is used for single column.
13) If a modular brick is cut along width in half size then it is called as Queen Closer
14) Through stone is a stone stretcher.

SLR-FM-14

Seat No.	

Set Q

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use half imperial sheet for section - II and answer book for section - I.
4) Assume correct data wherever necessary.

Section – I

Q.2 **Write the answers for followings. (any Seven)** **28**

a) What is through stone? Explain its importance in masonry work.
b) Compare Load bearing structure with framed structure.
c) Draw neat sketches for any two of door hinges.
d) Explain system of Air - Conditioning in winter?
e) Write a note on various defects in plastering?
f) Write a note on: Thermal Insulation of Building.
g) Draw a neat sketch of Gully Trap and Intercepting Trap.
h) Define following terms:
1) Queen Closer
2) King Closer
3) Closer
4) Beveled closer
i) Enlist various types of roofs? Discuss any two types of roof with their suitability.
j) What is concept of earthing? Also explain procedure of earthing in brief?

Section - II

Q.3 Draw to scale 1:10 Elevation and Plan for alternate courses of STRETCHER Bond and HEADER Bond for L shaped wall. **14**

OR

Draw to scale 1:20 Plan and Sectional Elevation for a RCC Rectangular Combined Footing of size (1200mm X 2400mm) with two columns of size (350mm X 350mm) symmetrically placed on both sides. Centre to Centre distance between two columns is 1500mm **14**
Depth of Footing = 600 mm
150mm Projection on all sides of footing for PCC
Depth of PCC bed = 150mm
Depth of excavation pit below Ground Level = 1200mm

Q.4 Draw to scale 1:10 Front Elevation, Sectional Elevation and Sectional Plan of a framed Teakwood Single Leaf Fully Glazed Window. Use following data: **14**
Clear opening = 800mm X 1200mm
Wooden section for frame = 100mm X 60mm
Wooden section for style and rail = 100mm X 35mm
Glass Panel = 8mm thick (2 numbers per shutter)
Sash bar = 20mm thick
Show various fixtures at proper locations

OR

Draw to scale 1: 20 Plan and Sectional Elevation of a Quarter Turn RCC Staircase. Use following data: **14**

Height to be climbed = 3150mm
Winders are not allowed
Width of stair flights = 1000mm
Riser = 150mm to 180mm
Tread = 230mm to 300mm
Railing = 80mm Stainless Steel Pipe Railing
Waist slab = 150mm thick
Reinforcement details not expected
Write step by step calculation on sheet with pencil only.

Seat No.	

Set **R**

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume correct data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statements are correct or incorrect. **7**

1) In case of load bearing structures, less carpet area is available.
2) The switch boards are fixed at sill height in residential buildings.
3) Extrados is inner curve of an arch.
4) Casing and capping is type of closed wiring.
5) Spouts are provided for transportation of bathroom waste water.
6) Normally for plastering mortar of CM 1:4 is used.
7) Plumbing systems involves installation of Telephone cables.

State whether the following statement is true or false. 7

8) Landing is a biggest tread or going of half turn staircase.
9) Voussoirs of an arch remains in tension.
10) Combined footing is used for single column.
11) If a modular brick is cut along width in half size then it is called as Queen Closer
12) Through stone is a stone stretcher.
13) Flemish bond has greater strength as compared to English bond.
14) Mullion divides door and window vertically.

SLR-FM-14

Seat No.	

Set R

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use half imperial sheet for section - II and answer book for section - I.
4) Assume correct data wherever necessary.

Section – I

Q.2 Write the answers for followings. (any Seven) **28**

a) What is through stone? Explain its importance in masonry work.
b) Compare Load bearing structure with framed structure.
c) Draw neat sketches for any two of door hinges.
d) Explain system of Air - Conditioning in winter?
e) Write a note on various defects in plastering?
f) Write a note on: Thermal Insulation of Building.
g) Draw a neat sketch of Gully Trap and Intercepting Trap.
h) Define following terms:
1) Queen Closer
2) King Closer
3) Closer
4) Beveled closer
i) Enlist various types of roofs? Discuss any two types of roof with their suitability.
j) What is concept of earthing? Also explain procedure of earthing in brief?

Section - II

Q.3 Draw to scale 1:10 Elevation and Plan for alternate courses of STRETCHER Bond and HEADER Bond for L shaped wall. **14**

OR

Draw to scale 1:20 Plan and Sectional Elevation for a RCC Rectangular Combined Footing of size (1200mm X 2400mm) with two columns of size (350mm X 350mm) symmetrically placed on both sides. Centre to Centre distance between two columns is 1500mm **14**
Depth of Footing = 600 mm
150mm Projection on all sides of footing for PCC
Depth of PCC bed = 150mm
Depth of excavation pit below Ground Level = 1200mm

Q.4 Draw to scale 1:10 Front Elevation, Sectional Elevation and Sectional Plan of a framed Teakwood Single Leaf Fully Glazed Window. Use following data: **14**
Clear opening = 800mm X 1200mm
Wooden section for frame = 100mm X 60mm
Wooden section for style and rail = 100mm X 35mm
Glass Panel = 8mm thick (2 numbers per shutter)
Sash bar = 20mm thick
Show various fixtures at proper locations

OR

Draw to scale 1: 20 Plan and Sectional Elevation of a Quarter Turn RCC Staircase. Use following data: **14**

Height to be climbed = 3150mm
Winders are not allowed
Width of stair flights = 1000mm
Riser = 150mm to 180mm
Tread = 230mm to 300mm
Railing = 80mm Stainless Steel Pipe Railing
Waist slab = 150mm thick
Reinforcement details not expected
Write step by step calculation on sheet with pencil only.

SLR-FM-14

Seat No.	

Set S

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume correct data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statements are correct or incorrect. **7**

1) Casing and capping is type of closed wiring.
2) Spouts are provided for transportation of bathroom waste water.
3) Normally for plastering mortar of CM 1:4 is used.
4) Plumbing systems involves installation of Telephone cables.
5) In case of load bearing structures, less carpet area is available.
6) The switch boards are fixed at sill height in residential buildings.
7) Extrados is inner curve of an arch.

State whether the following statement is true or false. 7

8) If a modular brick is cut along width in half size then it is called as Queen Closer
9) Through stone is a stone stretcher.
10) Flemish bond has greater strength as compared to English bond.
11) Mullion divides door and window vertically.
12) Landing is a biggest tread or going of half turn staircase.
13) Voussoirs of an arch remains in tension.
14) Combined footing is used for single column.

SLR-FM-14

Seat No.		Set	S

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use half imperial sheet for section - II and answer book for section - I.
4) Assume correct data wherever necessary.

Section – I

Q.2 Write the answers for followings. (any Seven) **28**

a) What is through stone? Explain its importance in masonry work.
b) Compare Load bearing structure with framed structure.
c) Draw neat sketches for any two of door hinges.
d) Explain system of Air - Conditioning in winter?
e) Write a note on various defects in plastering?
f) Write a note on: Thermal Insulation of Building.
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h) Define following terms:
1) Queen Closer
2) King Closer
3) Closer
4) Beveled closer
i) Enlist various types of roofs? Discuss any two types of roof with their suitability.
j) What is concept of earthing? Also explain procedure of earthing in brief?

Section - II

Q.3 Draw to scale 1:10 Elevation and Plan for alternate courses of STRETCHER Bond and HEADER Bond for L shaped wall. **14**

OR

Draw to scale 1:20 Plan and Sectional Elevation for a RCC Rectangular Combined Footing of size (1200mm X 2400mm) with two columns of size (350mm X 350mm) symmetrically placed on both sides. Centre to Centre distance between two columns is 1500mm **14**
Depth of Footing = 600 mm
150mm Projection on all sides of footing for PCC
Depth of PCC bed = 150mm
Depth of excavation pit below Ground Level = 1200mm

Q.4 Draw to scale 1:10 Front Elevation, Sectional Elevation and Sectional Plan of a framed Teakwood Single Leaf Fully Glazed Window. Use following data: **14**
Clear opening = 800mm X 1200mm
Wooden section for frame = 100mm X 60mm
Wooden section for style and rail = 100mm X 35mm
Glass Panel = 8mm thick (2 numbers per shutter)
Sash bar = 20mm thick
Show various fixtures at proper locations

OR

Draw to scale 1: 20 Plan and Sectional Elevation of a Quarter Turn RCC Staircase. Use following data: **14**

Height to be climbed = 3150mm
Winders are not allowed
Width of stair flights = 1000mm
Riser = 150mm to 180mm
Tread = 230mm to 300mm
Railing = 80mm Stainless Steel Pipe Railing
Waist slab = 150mm thick
Reinforcement details not expected
Write step by step calculation on sheet with pencil only.

SLR-FM-15

Seat No.	

Set P

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS –I

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume correct data wherever necessary.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) A _____ line is an imaginary line within the flow so that the tangent at any point on It indicates velocity at that point. **01**
   a) streak line b) stream line
   c) path line d) none of the above

2) The flow in a pipe whose valve being opened or closed gradually is an example of _____. 01
   a) steady flow b) unsteady flow
   c) rotational flow d) compressible flow

3) A real practical fluid possesses which of the following?
   a) viscosity b) surface tension
   c) density d) all the above

4) For a submerged body, if centre of buoyancy is above than C.G. of the body, the body will remain in the state of _____. 01
   a) stable equilibrium b) neutral equilibrium
   c) unstable equilibrium d) any of the above

5) The continuity equation is based on the principle of _____. 01
   a) conservation of momentum b) conservation of mass
   c) conservation of energy d) none of the above

6) The height of free surface above point is known as _____. 01
   a) static head b) intensity of pressure
   c) either of the above d) none of the above

7) If the Reynold's no. is 3200, the flow in a pipe is _____. 01
   a) laminar b) turbulent
   c) transitional d) none of the above

8) Darcy-Weisbach equation is used to find loss of head due to _____. 01
   a) Sudden enlargement b) Friction
   c) Sudden contraction d) None of the above

9) Loss of head due to entrance in pipe is given as _____. 01
   a) $V^2/2g$ b) V/g
   c) $0.5v^2/2g$ d) $V^3/2g$

10) Due to which phenomenon water hammer is caused? 01

a) Incompressibility
b) Sudden opening of valve
c) The material of pipe being elastic
d) Sudden closure of valve

11) In which of the devices, Bernoulli's equation is used? 01

a) Venturimeter b) Orificemeter
c) Pitot tube d) All the above

12) The co-efficient of discharge (C_d) of venturimeter lies within the limit ____. 01

a) 0.95 to 0.99 b) 0.7 to 0.8
c) 0.8 to 0.85 d) 0.6 to 0.7

13) In a pipe of 90 mm diameter water is flowing with mean velocity of 2 m/s and at a gauge pressure of 350 kN/m^2, what will be its total head if the pipe is 10 m above the datum lines _____. 02

a) 40.88 m b) 45.88 m
c) 43.88 m d) 47.88 m

SLR-FM-15

Seat No.	

Set P

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS –I

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figure to right indicate full marks.
3) Assume correct data wherever necessary.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 Solve any four of the following: **16**

a) Define and Write the Units.
1) Viscosity
2) Specific Gravity
3) Compressibility
4) Capillarity

b) Explain the different types of pressures.

c) Calculate the capillary rise in a glass tube of 2.5 mm diameter when immersed vertically in
1) Water
2) mercury
Take σ=0.0725N/m for water and σ=0.52N/m for mercury. The angle of contact for water is zero and for mercury 130^{o}.

d) A uniform body of size 3m long, 2m wide and 1m deep floats in water. What is the weight of body if depth of immersion is 0.8m? Determine the metacentric height also.

e) Write a note on Flow net and its applications.

f) A rectangular plate 3 m long and 1 m wide is immersed vertically in water in such a way that 3 m side is parallel to water surface and 1 m below it. Determine;
1) Total pressure on the plate
2) Centre of plate

Q.3 Solve any two of the following: **12**

a) Derive an expression for depth of centre of pressure from the free surface of water of an inclined Plane Surface submerged in the liquid.

b) Explain:
1) Steady and Unsteady flow
2) Rotational and Irrotational flow
3) Laminar and Turbulent flow

c) The stream function is given by $\Psi = 5x - 6y$ Calculate the velocity components. Also find magnitude and direction of the resultant velocity at any point.

Section –II

Q.4 Solve any four of the following: **12**

a) Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch).

b) Explain the phenomenon of drag and lift.

c) Using Hazen Poisulle's equation obtain the expression for friction factor in terms of Reynold's number.

d) Explain Syphon with neat sketch.

e) The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is 0.05 m^3/s.The intensity of pressure at 150 mm pipe is 110 kN/m^2. Calculate Loss of head due to Sudden enlargement.

f) The difference in water surface level in two tanks which are connected by three pipes in series having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18mts.Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, considering Minro Losses.

Q.5 Solve any two of the following **16**

a) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation.

b) Derive Darcy-Weisbach equation for calculating loss of head due to friction.

c) Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$, where u is the velocity at a distance y from the plate and u = U at $y=\delta$ and δ= boundary layer thickness also calculate $\frac{\delta^*}{\theta}$

SLR-FM-15

Seat No.	

Set Q

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS –I

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume correct data wherever necessary.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Darcy-Weisbach equation is used to find loss of head due to _____. 01
   a) Sudden enlargement b) Friction
   c) Sudden contraction d) None of the above

2) Loss of head due to entrance in pipe is given as _____. 01
   a) $V^2/2g$ b) V/g
   c) $0.5v^2/2g$ d) $V^3/2g$

3) Due to which phenomenon water hammer is caused? 01
   a) Incompressibility
   b) Sudden opening of valve
   c) The material of pipe being elastic
   d) Sudden closure of valve

4) In which of the devices, Bernoulli's equation is used? 01
   a) Venturimeter b) Orificemeter
   c) Pitot tube d) All the above

5) The co-efficient of discharge (C_d) of venturimeter lies within the limit ____. 01
   a) 0.95 to 0.99 b) 0.7 to 0.8
   c) 0.8 to 0.85 d) 0.6 to 0.7

6) A _____ line is an imaginary line within the flow so that the tangent at any point on It indicates velocity at that point. **01**
   a) streak line b) stream line
   c) path line d) none of the above

7) The flow in a pipe whose valve being opened or closed gradually is an example of _____. 01
   a) steady flow b) unsteady flow
   c) rotational flow d) compressible flow

8) A real practical fluid possesses which of the following?
   a) viscosity b) surface tension
   c) density d) all the above

9) For a submerged body, if centre of buoyancy is above than C.G. of the body, the body will remain in the state of _____. 01

a) stable equilibrium b) neutral equilibrium
c) unstable equilibrium d) any of the above

10) The continuity equation is based on the principle of _____. 01

a) conservation of momentum b) conservation of mass
c) conservation of energy d) none of the above

11) The height of free surface above point is known as _____. 01

a) static head b) intensity of pressure
c) either of the above d) none of the above

12) If the Reynold's no. is 3200, the flow in a pipe is _____. 01

a) laminar b) turbulent
c) transitional d) none of the above

13) In a pipe of 90 mm diameter water is flowing with mean velocity of 2 m/s and at a gauge pressure of 350 kN/m^2, what will be its total head if the pipe is 10 m above the datum lines _____. 02

a) 40.88 m b) 45.88 m
c) 43.88 m d) 47.88 m

SLR-FM-15

Seat No.	

Set Q

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS –I

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
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3) Assume correct data wherever necessary.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 Solve any four of the following: **16**

a) Define and Write the Units.
1) Viscosity
2) Specific Gravity
3) Compressibility
4) Capillarity

b) Explain the different types of pressures.

c) Calculate the capillary rise in a glass tube of 2.5 mm diameter when immersed vertically in
1) Water
2) mercury
Take σ=0.0725N/m for water and σ=0.52N/m for mercury. The angle of contact for water is zero and for mercury 130^{o}.

d) A uniform body of size 3m long, 2m wide and 1m deep floats in water. What is the weight of body if depth of immersion is 0.8m? Determine the metacentric height also.

e) Write a note on Flow net and its applications.

f) A rectangular plate 3 m long and 1 m wide is immersed vertically in water in such a way that 3 m side is parallel to water surface and 1 m below it. Determine;
1) Total pressure on the plate
2) Centre of plate

Q.3 Solve any two of the following: **12**

a) Derive an expression for depth of centre of pressure from the free surface of water of an inclined Plane Surface submerged in the liquid.

b) Explain:
1) Steady and Unsteady flow
2) Rotational and Irrotational flow
3) Laminar and Turbulent flow

c) The stream function is given by $\Psi = 5x - 6y$ Calculate the velocity components. Also find magnitude and direction of the resultant velocity at any point.

Section –II

Q.4 Solve any four of the following: **12**

a) Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch).

b) Explain the phenomenon of drag and lift.

c) Using Hazen Poisulle's equation obtain the expression for friction factor in terms of Reynold's number.

d) Explain Syphon with neat sketch.

e) The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is 0.05 m^3/s.The intensity of pressure at 150 mm pipe is 110 kN/m^2. Calculate Loss of head due to Sudden enlargement.

f) The difference in water surface level in two tanks which are connected by three pipes in series having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18mts.Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, considering Minro Losses.

Q.5 Solve any two of the following **16**

a) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation.

b) Derive Darcy-Weisbach equation for calculating loss of head due to friction.

c) Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$, where u is the velocity at a distance y from the plate and u = U at y=δ and δ= boundary layer thickness also calculate $\frac{\delta^*}{\theta}$

SLR-FM-15

Seat No.	

Set R

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS –I

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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3) Assume correct data wherever necessary.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) In which of the devices, Bernoulli's equation is used? 01
   a) Venturimeter b) Orificemeter
   c) Pitot tube d) All the above

2) The co-efficient of discharge (C_d) of venturimeter lies within the limit ____. 01
   a) 0.95 to 0.99 b) 0.7 to 0.8
   c) 0.8 to 0.85 d) 0.6 to 0.7

3) A _____ line is an imaginary line within the flow so that the tangent at any point on It indicates velocity at that point. **01**
   a) streak line b) stream line
   c) path line d) none of the above

4) The flow in a pipe whose valve being opened or closed gradually is an example of _____. 01
   a) steady flow b) unsteady flow
   c) rotational flow d) compressible flow

5) A real practical fluid possesses which of the following?
   a) viscosity b) surface tension
   c) density d) all the above

6) For a submerged body, if centre of buoyancy is above than C.G. of the body, the body will remain in the state of _____. 01
   a) stable equilibrium b) neutral equilibrium
   c) unstable equilibrium d) any of the above

7) The continuity equation is based on the principle of _____. 01
   a) conservation of momentum b) conservation of mass
   c) conservation of energy d) none of the above

8) The height of free surface above point is known as _____. 01
   a) static head b) intensity of pressure
   c) either of the above d) none of the above

9) If the Reynold's no. is 3200, the flow in a pipe is _____. 01
   a) laminar b) turbulent
   c) transitional d) none of the above

10) Darcy-Weisbach equation is used to find loss of head due to _____. 01

a) Sudden enlargement b) Friction

c) Sudden contraction d) None of the above

11) Loss of head due to entrance in pipe is given as _____. 01

a) $V^2/2g$ b) V/g

c) $0.5v^2/2g$ d) $V^3/2g$

12) Due to which phenomenon water hammer is caused? 01

a) Incompressibility

b) Sudden opening of valve

c) The material of pipe being elastic

d) Sudden closure of valve

13) In a pipe of 90 mm diameter water is flowing with mean velocity of 2 m/s and at a gauge pressure of 350 kN/m^2, what will be its total head if the pipe is 10 m above the datum lines _____. 02

a) 40.88 m b) 45.88 m

c) 43.88 m d) 47.88 m

SLR-FM-15

Seat No.	

Set R

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS –I

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figure to right indicate full marks.
3) Assume correct data wherever necessary.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 Solve any four of the following: **16**

a) Define and Write the Units.
1) Viscosity
2) Specific Gravity
3) Compressibility
4) Capillarity

b) Explain the different types of pressures.

c) Calculate the capillary rise in a glass tube of 2.5 mm diameter when immersed vertically in
1) Water
2) mercury
Take σ=0.0725N/m for water and σ=0.52N/m for mercury. The angle of contact for water is zero and for mercury 130^{o}.

d) A uniform body of size 3m long, 2m wide and 1m deep floats in water. What is the weight of body if depth of immersion is 0.8m? Determine the metacentric height also.

e) Write a note on Flow net and its applications.

f) A rectangular plate 3 m long and 1 m wide is immersed vertically in water in such a way that 3 m side is parallel to water surface and 1 m below it. Determine;
1) Total pressure on the plate
2) Centre of plate

Q.3 Solve any two of the following: **12**

a) Derive an expression for depth of centre of pressure from the free surface of water of an inclined Plane Surface submerged in the liquid.

b) Explain:
1) Steady and Unsteady flow
2) Rotational and Irrotational flow
3) Laminar and Turbulent flow

c) The stream function is given by $\Psi = 5x - 6y$ Calculate the velocity components. Also find magnitude and direction of the resultant velocity at any point.

Section –II

Q.4 Solve any four of the following: **12**

a) Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch).

b) Explain the phenomenon of drag and lift.

c) Using Hazen Poisulle's equation obtain the expression for friction factor in terms of Reynold's number.

d) Explain Syphon with neat sketch.

e) The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is 0.05 m^3/s.The intensity of pressure at 150 mm pipe is 110 kN/m^2. Calculate Loss of head due to Sudden enlargement.

f) The difference in water surface level in two tanks which are connected by three pipes in series having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18mts.Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, considering Minro Losses.

Q.5 Solve any two of the following **16**

a) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation.

b) Derive Darcy-Weisbach equation for calculating loss of head due to friction.

c) Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$, where u is the velocity at a distance y from the plate and u = U at y=δ and δ= boundary layer thickness also calculate $\frac{\delta^*}{\theta}$

SLR-FM-15

Seat No.		Set	S

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS –I

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume correct data wherever necessary.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) The height of free surface above point is known as _____. 01
   a) static head b) intensity of pressure
   c) either of the above d) none of the above

2) If the Reynold's no. is 3200, the flow in a pipe is _____. 01
   a) laminar b) turbulent
   c) transitional d) none of the above

3) Darcy-Weisbach equation is used to find loss of head due to _____. 01
   a) Sudden enlargement b) Friction
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4) Loss of head due to entrance in pipe is given as _____. 01
   a) $V^2/2g$ b) V/g
   c) $0.5v^2/2g$ d) $V^3/2g$

5) Due to which phenomenon water hammer is caused? 01
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6) In which of the devices, Bernoulli's equation is used? 01
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8) A _____ line is an imaginary line within the flow so that the tangent at any point on It indicates velocity at that point. **01**
   a) streak line b) stream line
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12) The continuity equation is based on the principle of _____. 01
   a) conservation of momentum b) conservation of mass
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13) In a pipe of 90 mm diameter water is flowing with mean velocity of 2 m/s and at a gauge pressure of 350 kN/m^2, what will be its total head if the pipe is 10 m above the datum lines _____. 02
   a) 40.88 m b) 45.88 m
   c) 43.88 m d) 47.88 m

SLR-FM-15

Seat No.	

Set S

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS –I

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figure to right indicate full marks.
3) Assume correct data wherever necessary.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 Solve any four of the following: **16**

a) Define and Write the Units.
1) Viscosity
2) Specific Gravity
3) Compressibility
4) Capillarity

b) Explain the different types of pressures.

c) Calculate the capillary rise in a glass tube of 2.5 mm diameter when immersed vertically in
1) Water
2) mercury
Take σ=0.0725N/m for water and σ=0.52N/m for mercury. The angle of contact for water is zero and for mercury 130^{o}.

d) A uniform body of size 3m long, 2m wide and 1m deep floats in water. What is the weight of body if depth of immersion is 0.8m? Determine the metacentric height also.

e) Write a note on Flow net and its applications.

f) A rectangular plate 3 m long and 1 m wide is immersed vertically in water in such a way that 3 m side is parallel to water surface and 1 m below it. Determine;
1) Total pressure on the plate
2) Centre of plate

Q.3 Solve any two of the following: **12**

a) Derive an expression for depth of centre of pressure from the free surface of water of an inclined Plane Surface submerged in the liquid.

b) Explain:
1) Steady and Unsteady flow
2) Rotational and Irrotational flow
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c) The stream function is given by $\Psi = 5x - 6y$ Calculate the velocity components. Also find magnitude and direction of the resultant velocity at any point.

Section –II

Q.4 Solve any four of the following: **12**

a) Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch).

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Q.5 Solve any two of the following **16**

a) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation.

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c) Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$, where u is the velocity at a distance y from the plate and u = U at y=δ and δ= boundary layer thickness also calculate $\frac{\delta^*}{\theta}$

SLR-FM-16

Seat No.	

Set P

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Draw neat and labeled diagram wherever necessary.
3) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Gabbro, dolerite and basalt have same _____.
   a) Texture b) Composition
   c) Cooling history d) Structural deformation

2) Which of the following statement is true?
   a) In non-conformity older bed is made up of sedimentary rock
   b) In non-conformity older bed is made up of plutonic igneous rock
   c) In non-conformity older bed is made up of metamorphic rock
   d) In non-conformity older bed is made up of volcanic igneous rock

3) The crystalline variety of silica is _____.
   a) Chalcedony b) Amethyst
   c) Opal d) Flint

4) Which one of the following is not part of volcano?
   a) Crater b) Conduit
   c) Calderas d) Delta

5) Feldspar group of minerals are characterized by _____.
   a) 7 hardness b) 6 hardness
   c) 5 hardness d) 8 hardness

6) Cross bedding is commonly found in _____.
   a) Shale b) Gypsum
   c) Sandstone d) Rock salt

7) A foliated metamorphic rock with alternating layers of light and dark mineral is _____.
   a) Schist b) Slate
   c) Gneisos d) Marble

8) Sloping surface of valley upon which dam rests is known as _____.
   a) Heel b) Abutment
   c) Toe d) Pier

9) The length of the core obtained is called as _____.
   a) Core run b) Core recovery
   c) Core draw d) Core loss

10) A tunnel should not be constructed along _____.
   a) Dip direction b) Strike direction
   c) Oblique to the bed attitude d) Both along a & b

11) The capacity of rock to withstand bending loads is termed as _____.
   a) Compressive strength b) Shear strength
   c) Tensile strength d) Crushing strength

12) Which rock is not suitable for dam foundation _____.
   a) Siliceous sandstone b) Shale
   c) Massive limestone d) None of these

13) For the safe and stable construction of dam the correct geological condition would be _____.
   a) At crest of fold limbs dipping upstream
   b) At trough of fold
   c) At limb of fold
   d) None of these

14) Nature of river at bridge site should be _____.
   a) Be scouring and erosive
   b) Be non-scouring and low velocity of current
   c) Have high velocity of current
   d) Have high silt

Seat No.	

Set **P**

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram wherever necessary.

Section I

Q.2 **a)** Define joint and explain classification of joints based on origin. **06**
b) Define igneous rock and explain classification of igneous rock based on. **06**
i) colour index
ii) depth of formation
iii) Silica percentage

OR

Q.3 **a)** Define metamorphic rock and explain structures of metamorphic rock. **06**
b) Define fault and explain civil engineering significance of fault. **06**

Q.4 What is an earthquake? Describe causes and effect of earthquake. **07**

OR

Q.5 Define landslide. Explain in detail causes and preventive measures of land slide. **07**

Q.6 **Write a note on any three.** **09**
a) Hornblend mineral
b) Lithification and digenesis
c) Disconformities
d) Dip slip and strike slip fault
e) Residual mountains

Section –II

Q.7 **a)** What is building stone? Describe geological and strength properties of good Building stone. **06**
b) Explain in detail subsurface investigation. **06**

OR

Q.8 **a)** What is exploratory drilling? Explain diamond and calyx drilling. **06**
b) Define reservoir and explain water tightness and influencing factor of reservoir. **06**

Q.9 Define tunnel. Explain tunneling through horizontal bed and folded strata. **07**

OR

Q.10 Explain in detail crushing strength of the rock. **07**

Q.11 Write a note on (any three) **09**

a) Earth fill dam and rock fill dam
b) Siltation of reservoir
c) Dams on carbonate rock
d) Modulus of elasticity of rock
e) Single span bridge

Seat No.	

Set **Q**

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Sloping surface of valley upon which dam rests is known as _____.
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2) The length of the core obtained is called as _____.
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3) A tunnel should not be constructed along _____.
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4) The capacity of rock to withstand bending loads is termed as _____.
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5) Which rock is not suitable for dam foundation _____.
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6) For the safe and stable construction of dam the correct geological condition would be _____.
   a) At crest of fold limbs dipping upstream
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   c) At limb of fold
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7) Nature of river at bridge site should be _____.
   a) Be scouring and erosive
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   c) Have high velocity of current
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8) Gabbro, dolerite and basalt have same _____.
   a) Texture b) Composition
   c) Cooling history d) Structural deformation

9) Which of the following statement is true?
   a) In non-conformity older bed is made up of sedimentary rock
   b) In non-conformity older bed is made up of plutonic igneous rock
   c) In non-conformity older bed is made up of metamorphic rock
   d) In non-conformity older bed is made up of volcanic igneous rock

10) The crystalline variety of silica is _____.
   a) Chalcedony b) Amethyst
   c) Opal d) Flint

11) Which one of the following is not part of volcano?
   a) Crater b) Conduit
   c) Calderas d) Delta

12) Feldspar group of minerals are characterized by _____.
   a) 7 hardness b) 6 hardness
   c) 5 hardness d) 8 hardness

13) Cross bedding is commonly found in _____.
   a) Shale b) Gypsum
   c) Sandstone d) Rock salt

14) A foliated metamorphic rock with alternating layers of light and dark mineral is _____.
   a) Schist b) Slate
   c) Gneisos d) Marble

SLR-FM-16

Seat No.	

Set Q

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram wherever necessary.

Section I

Q.2 **a)** Define joint and explain classification of joints based on origin. **06**
b) Define igneous rock and explain classification of igneous rock based on. **06**
i) colour index
ii) depth of formation
iii) Silica percentage

OR

Q.3 **a)** Define metamorphic rock and explain structures of metamorphic rock. **06**
b) Define fault and explain civil engineering significance of fault. **06**

Q.4 What is an earthquake? Describe causes and effect of earthquake. **07**

OR

Q.5 Define landslide. Explain in detail causes and preventive measures of land slide. **07**

Q.6 **Write a note on any three.** **09**
a) Hornblend mineral
b) Lithification and digenesis
c) Disconformities
d) Dip slip and strike slip fault
e) Residual mountains

Section –II

Q.7 **a)** What is building stone? Describe geological and strength properties of good Building stone. **06**
b) Explain in detail subsurface investigation. **06**

OR

Q.8 **a)** What is exploratory drilling? Explain diamond and calyx drilling. **06**
b) Define reservoir and explain water tightness and influencing factor of reservoir. **06**

Q.9 Define tunnel. Explain tunneling through horizontal bed and folded strata. **07**

OR

Q.10 Explain in detail crushing strength of the rock. **07**

Q.11 Write a note on (any three) **09**

a) Earth fill dam and rock fill dam
b) Siltation of reservoir
c) Dams on carbonate rock
d) Modulus of elasticity of rock
e) Single span bridge

Seat No.	

Set **R**

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Draw neat and labeled diagram wherever necessary.
3) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Feldspar group of minerals are characterized by _____.
   a) 7 hardness b) 6 hardness
   c) 5 hardness d) 8 hardness

2) Cross bedding is commonly found in _____.
   a) Shale b) Gypsum
   c) Sandstone d) Rock salt

3) A foliated metamorphic rock with alternating layers of light and dark mineral is _____.
   a) Schist b) Slate
   c) Gneisos d) Marble

4) Sloping surface of valley upon which dam rests is known as _____.
   a) Heel b) Abutment
   c) Toe d) Pier

5) The length of the core obtained is called as _____.
   a) Core run b) Core recovery
   c) Core draw d) Core loss

6) A tunnel should not be constructed along _____.
   a) Dip direction b) Strike direction
   c) Oblique to the bed attitude d) Both along a & b

7) The capacity of rock to withstand bending loads is termed as _____.
   a) Compressive strength b) Shear strength
   c) Tensile strength d) Crushing strength

8) Which rock is not suitable for dam foundation _____.
   a) Siliceous sandstone b) Shale
   c) Massive limestone d) None of these

9) For the safe and stable construction of dam the correct geological condition would be _____.
   a) At crest of fold limbs dipping upstream
   b) At trough of fold
   c) At limb of fold
   d) None of these

10) Nature of river at bridge site should be _____.
   a) Be scouring and erosive
   b) Be non-scouring and low velocity of current
   c) Have high velocity of current
   d) Have high silt

11) Gabbro, dolerite and basalt have same _____.
   a) Texture b) Composition
   c) Cooling history d) Structural deformation

12) Which of the following statement is true?
   a) In non-conformity older bed is made up of sedimentary rock
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13) The crystalline variety of silica is _____.
   a) Chalcedony b) Amethyst
   c) Opal d) Flint

14) Which one of the following is not part of volcano?
   a) Crater b) Conduit
   c) Calderas d) Delta

Seat No.	

Set **R**

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram wherever necessary.

Section I

Q.2 **a)** Define joint and explain classification of joints based on origin. **06**
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OR

Q.3 **a)** Define metamorphic rock and explain structures of metamorphic rock. **06**
b) Define fault and explain civil engineering significance of fault. **06**

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OR

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Q.6 **Write a note on any three.** **09**
a) Hornblend mineral
b) Lithification and digenesis
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d) Dip slip and strike slip fault
e) Residual mountains

Section –II

Q.7 **a)** What is building stone? Describe geological and strength properties of good Building stone. **06**
b) Explain in detail subsurface investigation. **06**

OR

Q.8 **a)** What is exploratory drilling? Explain diamond and calyx drilling. **06**
b) Define reservoir and explain water tightness and influencing factor of reservoir. **06**

Q.9 Define tunnel. Explain tunneling through horizontal bed and folded strata. **07**

OR

Q.10 Explain in detail crushing strength of the rock. **07**

Q.11 Write a note on (any three) **09**

a) Earth fill dam and rock fill dam
b) Siltation of reservoir
c) Dams on carbonate rock
d) Modulus of elasticity of rock
e) Single span bridge

Seat No.	

Set **S**

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Draw neat and labeled diagram wherever necessary.
3) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) A tunnel should not be constructed along _____.
   a) Dip direction b) Strike direction
   c) Oblique to the bed attitude d) Both along a & b

2) The capacity of rock to withstand bending loads is termed as _____.
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3) Which rock is not suitable for dam foundation _____.
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   c) Massive limestone d) None of these

4) For the safe and stable construction of dam the correct geological condition would be _____.
   a) At crest of fold limbs dipping upstream
   b) At trough of fold
   c) At limb of fold
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5) Nature of river at bridge site should be _____.
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   b) Be non-scouring and low velocity of current
   c) Have high velocity of current
   d) Have high silt

6) Gabbro, dolerite and basalt have same _____.
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   c) 5 hardness d) 8 hardness

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   c) Sandstone d) Rock salt

12) A foliated metamorphic rock with alternating layers of light and dark mineral is _____.
   a) Schist b) Slate
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13) Sloping surface of valley upon which dam rests is known as _____.
   a) Heel b) Abutment
   c) Toe d) Pier

14) The length of the core obtained is called as _____.
   a) Core run b) Core recovery
   c) Core draw d) Core loss

Seat No.	

Set **S**

S.E. (Part - I) (Old) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram wherever necessary.

Section I

Q.2 **a)** Define joint and explain classification of joints based on origin. **06**
b) Define igneous rock and explain classification of igneous rock based on. **06**
i) colour index
ii) depth of formation
iii) Silica percentage

OR

Q.3 **a)** Define metamorphic rock and explain structures of metamorphic rock. **06**
b) Define fault and explain civil engineering significance of fault. **06**

Q.4 What is an earthquake? Describe causes and effect of earthquake. **07**

OR

Q.5 Define landslide. Explain in detail causes and preventive measures of land slide. **07**

Q.6 **Write a note on any three.** **09**
a) Hornblend mineral
b) Lithification and digenesis
c) Disconformities
d) Dip slip and strike slip fault
e) Residual mountains

Section –II

Q.7 **a)** What is building stone? Describe geological and strength properties of good Building stone. **06**
b) Explain in detail subsurface investigation. **06**

OR

Q.8 **a)** What is exploratory drilling? Explain diamond and calyx drilling. **06**
b) Define reservoir and explain water tightness and influencing factor of reservoir. **06**

Q.9 Define tunnel. Explain tunneling through horizontal bed and folded strata. **07**

OR

Q.10 Explain in detail crushing strength of the rock. **07**

Q.11 Write a note on (any three) **09**

a) Earth fill dam and rock fill dam
b) Siltation of reservoir
c) Dams on carbonate rock
d) Modulus of elasticity of rock
e) Single span bridge

SLR-FM-17

Seat No.	

Set P

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Buckling of long column occurs under _____.
   a) Axial load b) Transverse load
   c) Direct load d) None

2) The equivalent length is equal to half the actual length of a column with _____
   a) One end fixed other end free
   b) Both ends fixed
   c) Both ends hinged
   d) One end fixed other end hinged

3) The maximum shear stress on principal plane is _____.
   a) Twice of minimum principal stress
   b) Zero
   c) Twice of maximum principal stress
   d) One

4) Mohr's circle is graphical method to find _____.
   a) Bending stresses
   b) Buckling Stresses
   c) Maximum Shear Stresses
   d) None

5) The equivalent Twisting moment under combined action of bending moment M and Torque T is _____.
   a) $\sqrt{M^2 + T^2}$ b) $\frac{1}{2}\sqrt{M^2 - T^2}$
   c) $\frac{1}{2}M\sqrt{M^2 + T^2}$ d) $\frac{1}{2}\left(M + \sqrt{M^2 + T^2}\right)$

6) Every cross section of the shaft, which is subjected to a twisting moment is under _____.
   a) Compressive stress b) Tensile stress
   c) Bending stress d) Shear stress

7) Maximum principal stress theory was postulated by _____.
   a) Rankine b) St. Venant
   c) Mohr d) Tresca

8) The simply supported beam of span 1, is carrying point load W at mid span. What is the deflection at centre of the beam?
   a) $Wl^2 / 48\ EI$ b) $Wl^3/48\ EI$
   c) $5Wl^3/348\ EI$ d) $\frac{11}{120}\frac{Wl^3}{EI}$

9) The simply supported beam of span 1, is carrying uniformly distributed load of w per unit run over the whole span. What is the maximum deflection of the beam?
   a) $Wl^4/48\ EI$ b) $Wl^3/30\ EI$
   c) $\frac{5Wl^4}{384EI}$ d) $Wl^4/384\ EI$

10) Maximum bending moment due to moving load on simply supported beam occurs _____.
   a) At the mid span b) at the supports
   c) under the load d) anywhere on the beam

11) Castigliano's theorem is valid for _____.
   a) any structure b) nonlinear structure
   c) linear structure d) any of the above

12) A curve or graph that represents a function like, reaction at supports, the shear force at the section, the bending moment at a section of structure etc, for various positions of unit load of the span of the structure is called _____.
   a) influence line diagram b) radial stress diagram
   c) shear stress diagram d) None of these

13) The beam subjected to bending, amount of strain energy stored in the beam _____.
   a) $\int M^2 /2EI\ dx$ b) $\int M^2 /EI\ dx$
   c) $\int M^2 /3EI\ dx$ d) $\int M^3 /2EI\ dx$

14) Conjugate beam method or method of elastic weight is useful for the beam of _____.
   a) uniform EI b) non uniform EI
   c) both a & b d) none of the above

Seat No.	

Set **P**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Questions No.2 is Compulsory. and attempt any two questions from remaining to Q.3 to Q.5 section I.
1) Questions No.8 is Compulsory. and attempt any two questions from remaining to Q.6, Q.7 and Q.9 section II.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.2 State the assumptions in Euler's Theory. Derive the formula for crippling load in case of long column having both the ends hinged. **10**

Q.3 **a)** Define Principal stresses and Principal Plane. **02**
b) Two wooden pieces 10 cm x 10 cm in cross section are glued together along line BC as shown in figure 1 what axial force "P" can be applied if the allowable shearing stress along BC is 1.4 N/mm^2. **07**

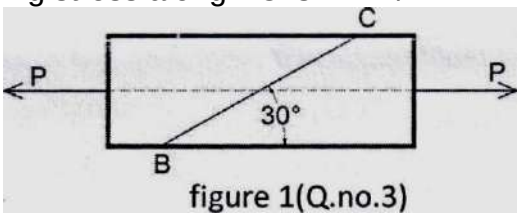


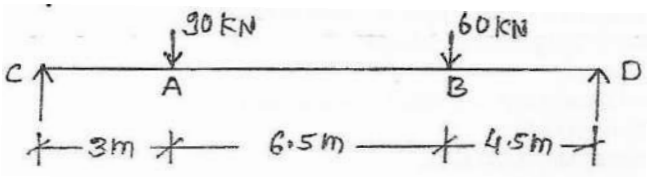
figure 1(Q.no.3)

Q.4 A circular shaft transmits 60 kw at 2 Hz it is supported in bearings 3 m apart and at 1 m from one bearing, it carries a pulley exerting a transverse load of 36 kN on the shaft. Determine a suitable diameter for the shaft if, **09**
a) The maximum direct stress is not to exceed 100 N/mm^2.
b) The maximum shear stress is not to exceed 50 N/mm^2.

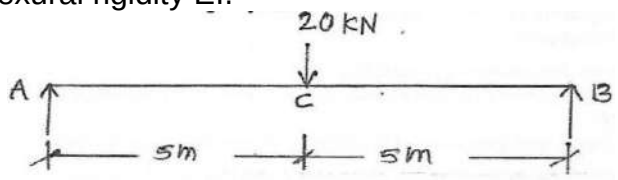
Q.5 Determine the diameter of a bolt which is subjected to an axial pull of 9 kN together with a transverse shear force of 4.5 kN using **09**
a) Maximum principal stress theory.
b) Maximum principal strain theory.
Given the Elastic limit in tension is 225 N/mm^2, factor of safety is 3 and Poisson's ratio is 0.3

Section – II

Q.6 **a)** What is deflection of beam? **02**
b) A steel girder of uniform cross section, 14 meters long is simply supported at its ends. It carries Concentrated loads as shown in figure find deflection under point loads A and B. **07**
Use Macaulay's method. Take E =210 x 10^6 KN/m^2,I = 64 x 10^{-4} m^4

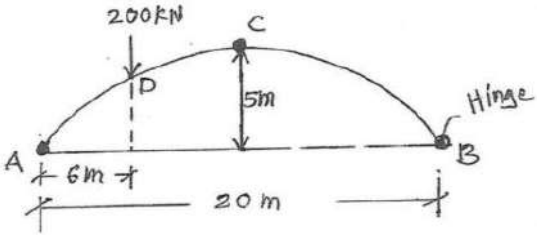


Q.7 A beam of span 10 m carries concentrated load of 20 KN at mid span. Find the central deflection. Use strain energy method (first theorem of Castigliano). Assume uniform flexural rigidity EI. **09**

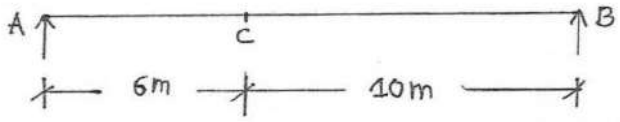


Q.8 **a)** Castigliano's first theorem. **03**

b) A three hinged parabolic arch of span 20 meters and central rise of 5 meters carries a point load of 200 KN at 6 meters from the left hand support as shown in figure. Find horizontal thrust and support reactions at A and B. **07**



Q.9 Two wheel loads 80 KN and 200 KN, spaced 2m apart move on a girder of span 16 m. Find maximum bending moment at a section 6 m from the left end. Use influence line method. Any load can lead the other. **09**



Seat No.	

Set **Q**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The simply supported beam of span 1, is carrying point load W at mid span. What is the deflection at centre of the beam?
   a) $Wl^2 / 48\ EI$ b) $Wl^3/48\ EI$
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2) The simply supported beam of span 1, is carrying uniformly distributed load of w per unit run over the whole span. What is the maximum deflection of the beam?
   a) $Wl^4/48\ EI$ b) $Wl^3/30\ EI$
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3) Maximum bending moment due to moving load on simply supported beam occurs _____.
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4) Castigliano's theorem is valid for _____.
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5) A curve or graph that represents a function like, reaction at supports, the shear force at the section, the bending moment at a section of structure etc, for various positions of unit load of the span of the structure is called _____.
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Seat No.	

Set **Q**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Questions No.2 is Compulsory. and attempt any two questions from remaining to Q.3 to Q.5 section I.
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Section – I

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b) Two wooden pieces 10 cm x 10 cm in cross section are glued together along line BC as shown in figure 1 what axial force "P" can be applied if the allowable shearing stress along BC is 1.4 N/mm^2. **07**

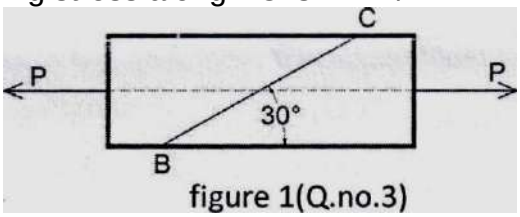

figure 1(Q.no.3)

Q.4 A circular shaft transmits 60 kw at 2 Hz it is supported in bearings 3 m apart and at 1 m from one bearing, it carries a pulley exerting a transverse load of 36 kN on the shaft. Determine a suitable diameter for the shaft if, **09**
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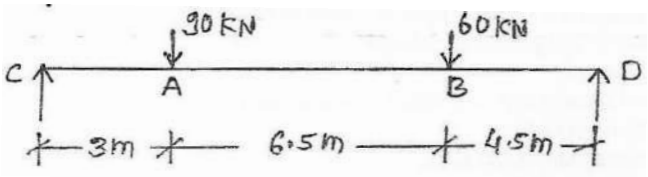
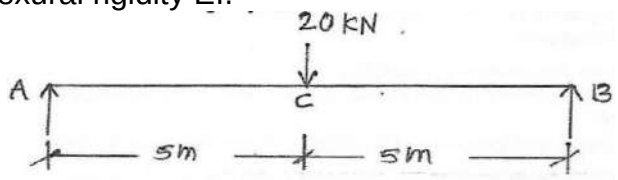
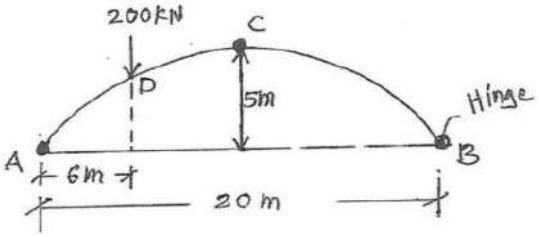


Q.7 A beam of span 10 m carries concentrated load of 20 KN at mid span. Find the central deflection. Use strain energy method (first theorem of Castigliano). Assume uniform flexural rigidity EI. **09**

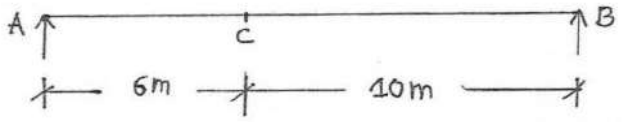


Q.8 **a)** Castigliano's first theorem. **03**

b) A three hinged parabolic arch of span 20 meters and central rise of 5 meters carries a point load of 200 KN at 6 meters from the left hand support as shown in figure. Find horizontal thrust and support reactions at A and B. **07**



Q.9 Two wheel loads 80 KN and 200 KN, spaced 2m apart move on a girder of span 16 m. Find maximum bending moment at a section 6 m from the left end. Use influence line method. Any load can lead the other. **09**



Seat No.	

Set **R**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The equivalent Twisting moment under combined action of bending moment M and Torque T is _____.
   a) $\sqrt{M^2+T^2}$ b) $\frac{1}{2}\sqrt{M^2-T^2}$
   c) $\frac{1}{2}M\sqrt{M^2+T^2}$ d) $\frac{1}{2}\left(M+\sqrt{M^2+T^2}\right)$

2) Every cross section of the shaft, which is subjected to a twisting moment is under _____.
   a) Compressive stress b) Tensile stress
   c) Bending stress d) Shear stress

3) Maximum principal stress theory was postulated by _____.
   a) Rankine b) St. Venant
   c) Mohr d) Tresca

4) The simply supported beam of span 1, is carrying point load W at mid span. What is the deflection at centre of the beam?
   a) $Wl^2 / 48\ EI$ b) $Wl^3/48\ EI$
   c) $5Wl^3/348\ EI$ d) $\frac{11}{120}\frac{Wl^3}{EI}$

5) The simply supported beam of span 1, is carrying uniformly distributed load of w per unit run over the whole span. What is the maximum deflection of the beam?
   a) $Wl^4/48\ EI$ b) $Wl^3/30\ EI$
   c) $\frac{5Wl^4}{384EI}$ d) $Wl^4/384\ EI$

6) Maximum bending moment due to moving load on simply supported beam occurs _____.
   a) At the mid span b) at the supports
   c) under the load d) anywhere on the beam

7) Castigliano's theorem is valid for _____.
   a) any structure
   b) nonlinear structure
   c) linear structure
   d) any of the above

8) A curve or graph that represents a function like, reaction at supports, the shear force at the section, the bending moment at a section of structure etc, for various positions of unit load of the span of the structure is called _____.
   a) influence line diagram
   b) radial stress diagram
   c) shear stress diagram
   d) None of these

9) The beam subjected to bending, amount of strain energy stored in the beam _____.
   a) $\int M^2 /2EI\, dx$
   b) $\int M^2 /EI\, dx$
   c) $\int M^2 /3EI\, dx$
   d) $\int M^3 /2EI\, dx$

10) Conjugate beam method or method of elastic weight is useful for the beam of _____.
   a) uniform EI
   b) non uniform EI
   c) both a & b
   d) none of the above

11) Buckling of long column occurs under _____.
   a) Axial load
   b) Transverse load
   c) Direct load
   d) None

12) The equivalent length is equal to half the actual length of a column with _____
   a) One end fixed other end free
   b) Both ends fixed
   c) Both ends hinged
   d) One end fixed other end hinged

13) The maximum shear stress on principal plane is _____.
   a) Twice of minimum principal stress
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   c) Twice of maximum principal stress
   d) One

14) Mohr's circle is graphical method to find _____.
   a) Bending stresses
   b) Buckling Stresses
   c) Maximum Shear Stresses
   d) None

Seat No.	

Set **R**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Questions No.2 is Compulsory. and attempt any two questions from remaining to Q.3 to Q.5 section I.
1) Questions No.8 is Compulsory. and attempt any two questions from remaining to Q.6, Q.7 and Q.9 section II.
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Section – I

Q.2 State the assumptions in Euler's Theory. Derive the formula for crippling load in case of long column having both the ends hinged. **10**

Q.3 **a)** Define Principal stresses and Principal Plane. **02**
b) Two wooden pieces 10 cm x 10 cm in cross section are glued together along line BC as shown in figure 1 what axial force "P" can be applied if the allowable shearing stress along BC is 1.4 N/mm^2. **07**

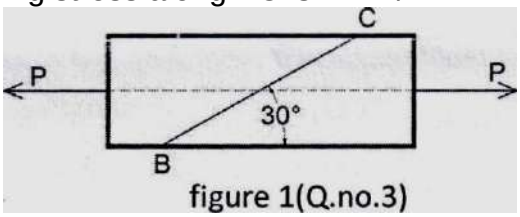


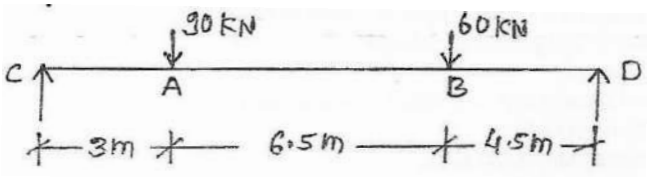
figure 1(Q.no.3)

Q.4 A circular shaft transmits 60 kw at 2 Hz it is supported in bearings 3 m apart and at 1 m from one bearing, it carries a pulley exerting a transverse load of 36 kN on the shaft. Determine a suitable diameter for the shaft if, **09**
a) The maximum direct stress is not to exceed 100 N/mm^2.
b) The maximum shear stress is not to exceed 50 N/mm^2.

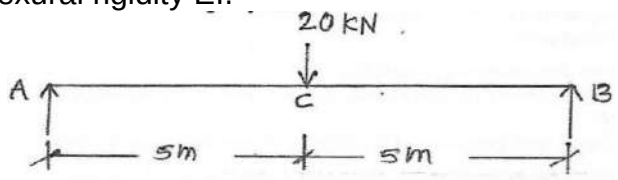
Q.5 Determine the diameter of a bolt which is subjected to an axial pull of 9 kN together with a transverse shear force of 4.5 kN using **09**
a) Maximum principal stress theory.
b) Maximum principal strain theory.
Given the Elastic limit in tension is 225 N/mm^2, factor of safety is 3 and Poisson's ratio is 0.3

Section – II

Q.6 **a)** What is deflection of beam? **02**
b) A steel girder of uniform cross section, 14 meters long is simply supported at its ends. It carries Concentrated loads as shown in figure find deflection under point loads A and B. **07**
Use Macaulay's method. Take E =210 x 10^6 KN/m^2,I = 64 x 10^{-4} m^4



Q.7 A beam of span 10 m carries concentrated load of 20 KN at mid span. Find the central deflection. Use strain energy method (first theorem of Castigliano). Assume uniform flexural rigidity EI. **09**



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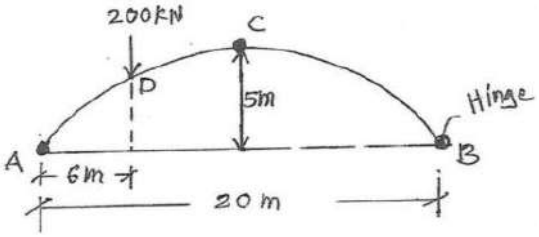
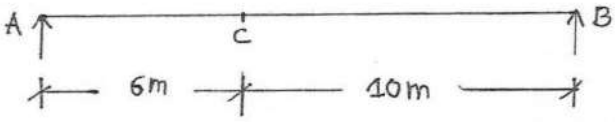


Q.9 Two wheel loads 80 KN and 200 KN, spaced 2m apart move on a girder of span 16 m. Find maximum bending moment at a section 6 m from the left end. Use influence line method. Any load can lead the other. **09**



SLR-FM-17

Seat No.	

Set S

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Maximum bending moment due to moving load on simply supported beam occurs _____.
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SLR-FM-17

Seat No.	

Set S

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Questions No.2 is Compulsory. and attempt any two questions from remaining to Q.3 to Q.5 section I.
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Section – I

Q.2 State the assumptions in Euler's Theory. Derive the formula for crippling load in case of long column having both the ends hinged. **10**

Q.3 **a)** Define Principal stresses and Principal Plane. **02**
b) Two wooden pieces 10 cm x 10 cm in cross section are glued together along line BC as shown in figure 1 what axial force "P" can be applied if the allowable shearing stress along BC is 1.4 N/mm^2. **07**

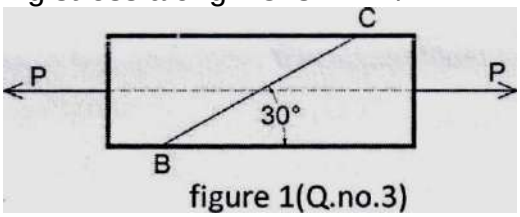

figure 1(Q.no.3)

Q.4 A circular shaft transmits 60 kw at 2 Hz it is supported in bearings 3 m apart and at 1 m from one bearing, it carries a pulley exerting a transverse load of 36 kN on the shaft. Determine a suitable diameter for the shaft if, **09**
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Section – II

Q.6 **a)** What is deflection of beam? **02**
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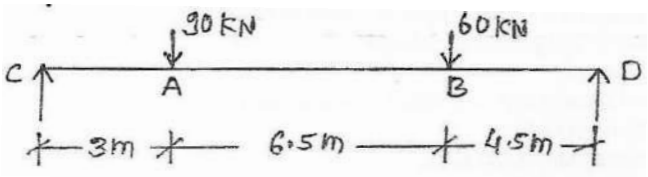

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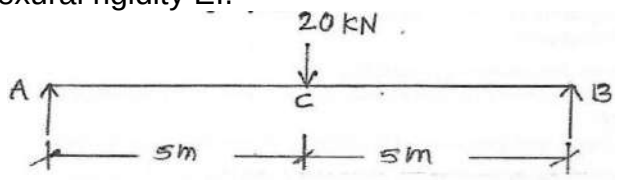

Q.8 **a)** Castigliano's first theorem. **03**

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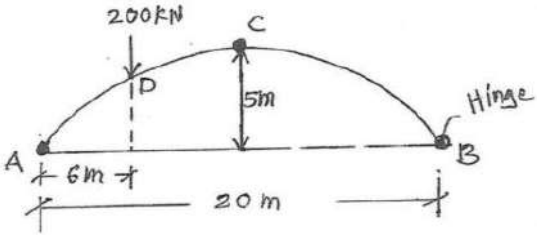

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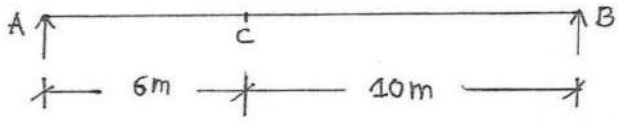

SLR-FM-18

Seat No.	

Set P

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) What will be the length of long chord for a simple circular curve of R radius and deflection angle of D^0?
   a) $(R^*\mathrm{D}^*\pi)/180$ b) $2R^*sin(D/2)$
   c) $Rtan(D/2)$ d) None of these

2) Parabola is preferred as vertical curve because_____.
   a) the rate of change in slope of a parabola is constant
   b) the rate of change in slope of a parabola is variable
   c) It is easier to set on field
   d) Its length is minimum

3) Civil signal which provides least accurate position is _____.
   a) C/A b) L1
   c) L2C d) L5

4) Principle of GPS positioning is _____.
   a) Intersection b) Analytical Resection
   c) Radiation d) Resection

5) Any GPS positioning requires processing of at least _____.
   a) C/A code b) L1 with C/A code
   c) L2C d) L5

6) Estimation of three components of a vector between the reference and rover stations is known as _____.
   a) Baseline Solution b) Ranging
   c) GPS Positioning d) GPS timing.

7) A and B are two towers of equal height diametrically opposite on either side of the nadir point, at 3 km and 5 km distances. Which one of the following statements is correct?
   a) Height displacement of A will be less than that of B
   b) Height displacement of B will be less than that of A
   c) Height displacement of A and B is equal
   d) Height displacement of A and B will be towards each other

8) Which form of scattering in the atmosphere is NOT dependent on wavelength?
   a) Rayleigh b) Non-Selective
   c) Mie d) Both Rayleigh and Mie

9) Global Positioning Service (GPS) uses 24 satellites in _____.
   a) 9 Orbits b) 8 Orbits
   c) 7 Orbits d) 6 Orbits

10) Three basic kinds of vector entities are _____.
   a) Point, Raster, Attributes b) Image, Raster, Polygon
   c) Point, Line/Polyline, Polygon d) Polyline, Polygon, Raster

11) Which of the following are true?
   a) Digitizing is defined as converting aerial photographs into maps
   b) A keyboard cannot be used to digitize maps, only to enter attribute information
   c) Digitizing from a tablet involves using a template.
   d) Digitizing involves tracing map features into a computer
   e) Polygons showing the area occupied by a particular land use or variable.

12) How many attributes, vector data unit can have?
   a) 1 b) 2
   c) 3 d) Infinite

13) 10 m spatial resolution is _____ over 20 m spatial resolution data.
   a) Better b) Inferior
   c) No change d) Lesser

14) Buffering technique results in area _____.
   a) Reduction b) Deduction
   c) Expansion d) No change

SLR-FM-18

Seat No.	

Set P

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Assume suitable data wherever necessary but mention it clearly.
2) Q. no. 2 and Q.no.6 is compulsory.
3) Solve any two questions out of Q. no. 3, 4 & 5.
4) Solve any two questions out of Q. no. 7, 8 & 9.

Section - I

Q.2 **a)** Calculate the data for setting the simple circular curve between two straights AB and BC having a deflection angle of $25^0 15'$. Assume radius of curve as 150m and peg interval as 20m. Chainage of B (point of intersection) = 1522m. Assume least count of theodolite = 10". Use Rankines method of deflection angles. **05**

b) A 180-meter equal tangent parabolic vertical curve is to be placed to negotiate a upward grade of 1.50% followed by a downward grade at 2.5% intersecting at a station having elevation 185.795 m above mean sea level. Calculate elevations at every 30 m stations on the vertical curve and determine the station and elevation of the highest point on the vertical curve. **05**

Q.3 **a**) What are the various methods of calculating the length of transition curve? Explain any one method. **03**

b) Explain the architecture of GPS system along with a line diagram. **03**

c) Explain with figure the method for absolute positioning of GPS control point. **03**

Q.4 **a)** Explain in detail the contents of GPS signal. **03**

b) Write a note on navigation data. How navigation data is useful for GPS surveying? **03**

c) Name and explain the different surfaces of the earth along with a diagram. Define the following terms along with their significance in surveying: ellipsoidal height, Orthometric height and Geoid height. **03**

Q.5 **a)** A vertical photo was taken with a 150.00 mm focal length camera at a flying height of 1400 m above the datum. The following were the results; **06**

Point	x	y	Elevation
a	-52.35 mm	-48.27 mm	204 m
b	40.64 mm	43.88 mm	148 m

From the ground coordinates of the points a and b, determine the horizontal length of AB.

b) The relief displacement for a tower is 2.01 mm, and the radial distance from the center of the photo to the top of the tower is 56.43mm. If the flying height is 1220m above the base of the tower, find the height of the tower. **03**

Section – II

Q.6	**a)**	State and explain spatial and non-spatial Information.	**04**
	b)	Explain any one GIS software with tool boxes available in it.	**04**
	c)	What are the advantages of GIS?	**04**
Q.7	**a)**	Differentiate between digitizer and scanners.	**04**
	b)	Explain preprocessing of GIS data set.	**04**
Q.8		Explain the Project Survey for	**08**
	a)	Highway	
	b)	Tunnel	
Q.9		Explain the Project Survey for	**08**
	a)	Mine	
	b)	Building	

Seat No.	

Set **Q**

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

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8) What will be the length of long chord for a simple circular curve of R radius and deflection angle of D^0?
   a) $(R^* \mathrm{D}^* \pi)/180$ b) $2R^* sin(D/2)$
   c) $Rtan(D/2)$ d) None of these

9) Parabola is preferred as vertical curve because_____.
   a) the rate of change in slope of a parabola is constant
   b) the rate of change in slope of a parabola is variable
   c) It is easier to set on field
   d) Its length is minimum

10) Civil signal which provides least accurate position is _____.
   a) C/A b) L1
   c) L2C d) L5

11) Principle of GPS positioning is _____.
   a) Intersection b) Analytical Resection
   c) Radiation d) Resection

12) Any GPS positioning requires processing of at least _____.
   a) C/A code b) L1 with C/A code
   c) L2C d) L5

13) Estimation of three components of a vector between the reference and rover stations is known as _____.
   a) Baseline Solution b) Ranging
   c) GPS Positioning d) GPS timing.

14) A and B are two towers of equal height diametrically opposite on either side of the nadir point, at 3 km and 5 km distances. Which one of the following statements is correct?
   a) Height displacement of A will be less than that of B
   b) Height displacement of B will be less than that of A
   c) Height displacement of A and B is equal
   d) Height displacement of A and B will be towards each other

SLR-FM-18

Seat No.	

Set Q

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Assume suitable data wherever necessary but mention it clearly.
2) Q. no. 2 and Q.no.6 is compulsory.
3) Solve any two questions out of Q. no. 3, 4 & 5.
4) Solve any two questions out of Q. no. 7, 8 & 9.

Section - I

Q.2 **a)** Calculate the data for setting the simple circular curve between two straights AB and BC having a deflection angle of $25^0 15'$. Assume radius of curve as 150m and peg interval as 20m. Chainage of B (point of intersection) = 1522m. Assume least count of theodolite = 10". Use Rankines method of deflection angles. **05**

b) A 180-meter equal tangent parabolic vertical curve is to be placed to negotiate a upward grade of 1.50% followed by a downward grade at 2.5% intersecting at a station having elevation 185.795 m above mean sea level. Calculate elevations at every 30 m stations on the vertical curve and determine the station and elevation of the highest point on the vertical curve. **05**

Q.3 **a**) What are the various methods of calculating the length of transition curve? Explain any one method. **03**

b) Explain the architecture of GPS system along with a line diagram. **03**

c) Explain with figure the method for absolute positioning of GPS control point. **03**

Q.4 **a)** Explain in detail the contents of GPS signal. **03**

b) Write a note on navigation data. How navigation data is useful for GPS surveying? **03**

c) Name and explain the different surfaces of the earth along with a diagram. Define the following terms along with their significance in surveying: ellipsoidal height, Orthometric height and Geoid height. **03**

Q.5 **a)** A vertical photo was taken with a 150.00 mm focal length camera at a flying height of 1400 m above the datum. The following were the results; **06**

Point	x	y	Elevation
a	-52.35 mm	-48.27 mm	204 m
b	40.64 mm	43.88 mm	148 m

From the ground coordinates of the points a and b, determine the horizontal length of AB.

b) The relief displacement for a tower is 2.01 mm, and the radial distance from the center of the photo to the top of the tower is 56.43mm. If the flying height is 1220m above the base of the tower, find the height of the tower. **03**

Section – II

Q.6	**a)**	State and explain spatial and non-spatial Information.	**04**
	b)	Explain any one GIS software with tool boxes available in it.	**04**
	c)	What are the advantages of GIS?	**04**
Q.7	**a)**	Differentiate between digitizer and scanners.	**04**
	b)	Explain preprocessing of GIS data set.	**04**
Q.8		Explain the Project Survey for	**08**
	a)	Highway	
	b)	Tunnel	
Q.9		Explain the Project Survey for	**08**
	a)	Mine	
	b)	Building	

SLR-FM-18

Seat No.	

Set R

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Any GPS positioning requires processing of at least _____.
   a) C/A code b) L1 with C/A code
   c) L2C d) L5

2) Estimation of three components of a vector between the reference and rover stations is known as _____.
   a) Baseline Solution b) Ranging
   c) GPS Positioning d) GPS timing.

3) A and B are two towers of equal height diametrically opposite on either side of the nadir point, at 3 km and 5 km distances. Which one of the following statements is correct?
   a) Height displacement of A will be less than that of B
   b) Height displacement of B will be less than that of A
   c) Height displacement of A and B is equal
   d) Height displacement of A and B will be towards each other

4) Which form of scattering in the atmosphere is NOT dependent on wavelength?
   a) Rayleigh b) Non-Selective
   c) Mie d) Both Rayleigh and Mie

5) Global Positioning Service (GPS) uses 24 satellites in _____.
   a) 9 Orbits b) 8 Orbits
   c) 7 Orbits d) 6 Orbits

6) Three basic kinds of vector entities are _____.
   a) Point, Raster, Attributes b) Image, Raster, Polygon
   c) Point, Line/Polyline, Polygon d) Polyline, Polygon, Raster

7) Which of the following are true?
   a) Digitizing is defined as converting aerial photographs into maps
   b) A keyboard cannot be used to digitize maps, only to enter attribute information
   c) Digitizing from a tablet involves using a template.
   d) Digitizing involves tracing map features into a computer
   e) Polygons showing the area occupied by a particular land use or variable.

8) How many attributes, vector data unit can have?
   a) 1 b) 2
   c) 3 d) Infinite

9) 10 m spatial resolution is _____ over 20 m spatial resolution data.
   a) Better b) Inferior
   c) No change d) Lesser

10) Buffering technique results in area _____.
   a) Reduction b) Deduction
   c) Expansion d) No change

11) What will be the length of long chord for a simple circular curve of R radius and deflection angle of D^0?
   a) $(R^*\mathrm{D}^*\pi)/180$ b) $2R^*sin(D/2)$
   c) $Rtan(D/2)$ d) None of these

12) Parabola is preferred as vertical curve because_____.
   a) the rate of change in slope of a parabola is constant
   b) the rate of change in slope of a parabola is variable
   c) It is easier to set on field
   d) Its length is minimum

13) Civil signal which provides least accurate position is _____.
   a) C/A b) L1
   c) L2C d) L5

14) Principle of GPS positioning is _____.
   a) Intersection b) Analytical Resection
   c) Radiation d) Resection

SLR-FM-18

Seat No.	

Set R

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Assume suitable data wherever necessary but mention it clearly.
2) Q. no. 2 and Q.no.6 is compulsory.
3) Solve any two questions out of Q. no. 3, 4 & 5.
4) Solve any two questions out of Q. no. 7, 8 & 9.

Section - I

Q.2 **a)** Calculate the data for setting the simple circular curve between two straights AB and BC having a deflection angle of $25^0 15'$. Assume radius of curve as 150m and peg interval as 20m. Chainage of B (point of intersection) = 1522m. Assume least count of theodolite = 10". Use Rankines method of deflection angles. **05**

b) A 180-meter equal tangent parabolic vertical curve is to be placed to negotiate a upward grade of 1.50% followed by a downward grade at 2.5% intersecting at a station having elevation 185.795 m above mean sea level. Calculate elevations at every 30 m stations on the vertical curve and determine the station and elevation of the highest point on the vertical curve. **05**

Q.3 **a**) What are the various methods of calculating the length of transition curve? Explain any one method. **03**

b) Explain the architecture of GPS system along with a line diagram. **03**

c) Explain with figure the method for absolute positioning of GPS control point. **03**

Q.4 **a)** Explain in detail the contents of GPS signal. **03**

b) Write a note on navigation data. How navigation data is useful for GPS surveying? **03**

c) Name and explain the different surfaces of the earth along with a diagram. Define the following terms along with their significance in surveying: ellipsoidal height, Orthometric height and Geoid height. **03**

Q.5 **a)** A vertical photo was taken with a 150.00 mm focal length camera at a flying height of 1400 m above the datum. The following were the results; **06**

Point	x	y	Elevation
a	-52.35 mm	-48.27 mm	204 m
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From the ground coordinates of the points a and b, determine the horizontal length of AB.

b) The relief displacement for a tower is 2.01 mm, and the radial distance from the center of the photo to the top of the tower is 56.43mm. If the flying height is 1220m above the base of the tower, find the height of the tower. **03**

Section – II

Q.6	**a)**	State and explain spatial and non-spatial Information.	**04**
	b)	Explain any one GIS software with tool boxes available in it.	**04**
	c)	What are the advantages of GIS?	**04**
Q.7	**a)**	Differentiate between digitizer and scanners.	**04**
	b)	Explain preprocessing of GIS data set.	**04**
Q.8		Explain the Project Survey for	**08**
	a)	Highway	
	b)	Tunnel	
Q.9		Explain the Project Survey for	**08**
	a)	Mine	
	b)	Building	

SLR-FM-18

Seat No.	

Set S

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Three basic kinds of vector entities are _____.
   a) Point, Raster, Attributes b) Image, Raster, Polygon
   c) Point, Line/Polyline, Polygon d) Polyline, Polygon, Raster

2) Which of the following are true?
   a) Digitizing is defined as converting aerial photographs into maps
   b) A keyboard cannot be used to digitize maps, only to enter attribute information
   c) Digitizing from a tablet involves using a template.
   d) Digitizing involves tracing map features into a computer
   e) Polygons showing the area occupied by a particular land use or variable.

3) How many attributes, vector data unit can have?
   a) 1 b) 2
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4) 10 m spatial resolution is _____ over 20 m spatial resolution data.
   a) Better b) Inferior
   c) No change d) Lesser

5) Buffering technique results in area _____.
   a) Reduction b) Deduction
   c) Expansion d) No change

6) What will be the length of long chord for a simple circular curve of R radius and deflection angle of D^0?
   a) $(R^* \mathrm{D}^* \pi)/180$ b) $2R^* sin(D/2)$
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   c) Radiation d) Resection

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   a) C/A code b) L1 with C/A code
   c) L2C d) L5

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13) Which form of scattering in the atmosphere is NOT dependent on wavelength?
   a) Rayleigh b) Non-Selective
   c) Mie d) Both Rayleigh and Mie

14) Global Positioning Service (GPS) uses 24 satellites in _____.
   a) 9 Orbits b) 8 Orbits
   c) 7 Orbits d) 6 Orbits

Seat No.	

Set **S**

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Assume suitable data wherever necessary but mention it clearly.
2) Q. no. 2 and Q.no.6 is compulsory.
3) Solve any two questions out of Q. no. 3, 4 & 5.
4) Solve any two questions out of Q. no. 7, 8 & 9.

Section - I

Q.2 **a)** Calculate the data for setting the simple circular curve between two straights AB and BC having a deflection angle of $25^0 15'$. Assume radius of curve as 150m and peg interval as 20m. Chainage of B (point of intersection) = 1522m. Assume least count of theodolite = 10". Use Rankines method of deflection angles. **05**

b) A 180-meter equal tangent parabolic vertical curve is to be placed to negotiate a upward grade of 1.50% followed by a downward grade at 2.5% intersecting at a station having elevation 185.795 m above mean sea level. Calculate elevations at every 30 m stations on the vertical curve and determine the station and elevation of the highest point on the vertical curve. **05**

Q.3 **a**) What are the various methods of calculating the length of transition curve? Explain any one method. **03**

b) Explain the architecture of GPS system along with a line diagram. **03**

c) Explain with figure the method for absolute positioning of GPS control point. **03**

Q.4 **a)** Explain in detail the contents of GPS signal. **03**

b) Write a note on navigation data. How navigation data is useful for GPS surveying? **03**

c) Name and explain the different surfaces of the earth along with a diagram. Define the following terms along with their significance in surveying: ellipsoidal height, Orthometric height and Geoid height. **03**

Q.5 **a)** A vertical photo was taken with a 150.00 mm focal length camera at a flying height of 1400 m above the datum. The following were the results; **06**

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b	40.64 mm	43.88 mm	148 m

From the ground coordinates of the points a and b, determine the horizontal length of AB.

b) The relief displacement for a tower is 2.01 mm, and the radial distance from the center of the photo to the top of the tower is 56.43mm. If the flying height is 1220m above the base of the tower, find the height of the tower. **03**

Section – II

Q.6	**a)**	State and explain spatial and non-spatial Information.	**04**
	b)	Explain any one GIS software with tool boxes available in it.	**04**
	c)	What are the advantages of GIS?	**04**
Q.7	**a)**	Differentiate between digitizer and scanners.	**04**
	b)	Explain preprocessing of GIS data set.	**04**
Q.8		Explain the Project Survey for	**08**
	a)	Highway	
	b)	Tunnel	
Q.9		Explain the Project Survey for	**08**
	a)	Mine	
	b)	Building	

SLR-FM-19

Seat No.	

Set P

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING AND DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book
2) Figures to the right indicate full marks.
3) Assume suitable data wherever necessary and mention it clearly.
4) Retain all projection/construction lines on drawing sheet.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 A) Choose the correct alternatives from the options and rewrite the sentence. **07**

1) For kitchen cum dining room the minimum area should be _____.
   a) 5 sq. m b) 9.5 sq. m
   c) 6 sq. m d) 15 sq. m

2) Which of the following does not affect FAR.?
   a) Type of construction b) Locality of density
   c) Colour of building d) Parking facilities

3) For built-up area calculations _____ is drawn on the building permission drawing.
   a) Terrace plan b) Plan
   c) Site plan d) Block plan

4) The minimum heights for bath-rooms or water closets as specified by NBC of India are _____.
   a) 2.4 m. b) 3.2 m.
   c) 2.2 m. d) 2.6 m.

5) For Bedroom Aspect it needs at _____.
   a) E-aspect. b) S-aspect
   c) SW-aspect. d) W-aspect

6) If object is on picture plane, then the size perspective will be _____.
   a) Enlarged b) Reduced
   c) Remains same d) All of the above

7) Which of the followings is a component of aesthetic?
   a) Brightness b) Uniqueness
   c) Balance d) None of these

Q.1 B) Fill in the blanks. **07**

1) In perspective drawing, H.P means _____.
2) Minimum area of habitable room is _____.
3) For better roominess the desirable ratio of length to breadth of room is ___.
4) Dressing table is furniture which is to be provided in _____.
5) In bank building, the area of waiting hall depends on _____.
6) For good acoustical considerations, the reverberation time should not be more than _____.
7) The unit of fire load is _____.

Seat No.	

Set **P**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING AND DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Section – I to be written in answer book.
4) Section – II to be drawn on FULL imperial drawing sheet. Use both sides of the sheet.
5) Assume suitable data wherever necessary and mention it clearly.
6) Retain all projection/construction lines on drawing sheet.

Section – I

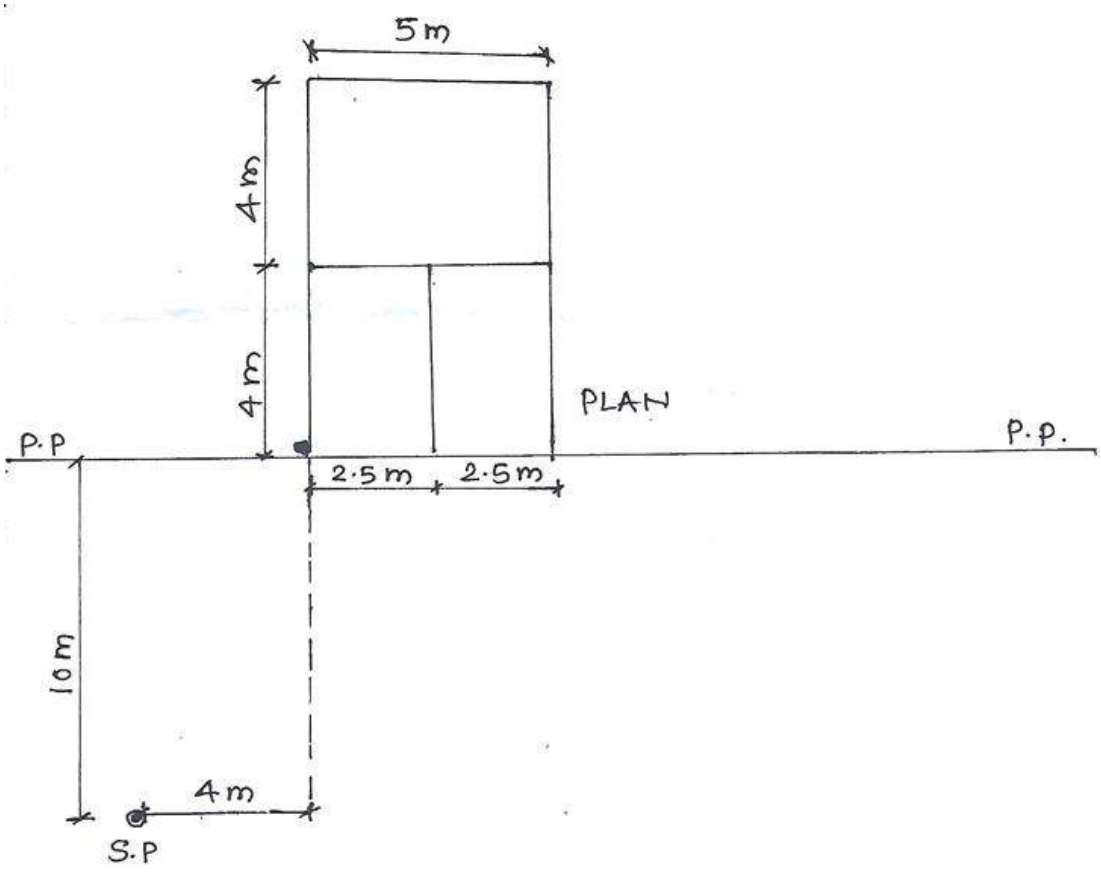
Q.2 Write the answers for followings. (Any FOUR) **28**

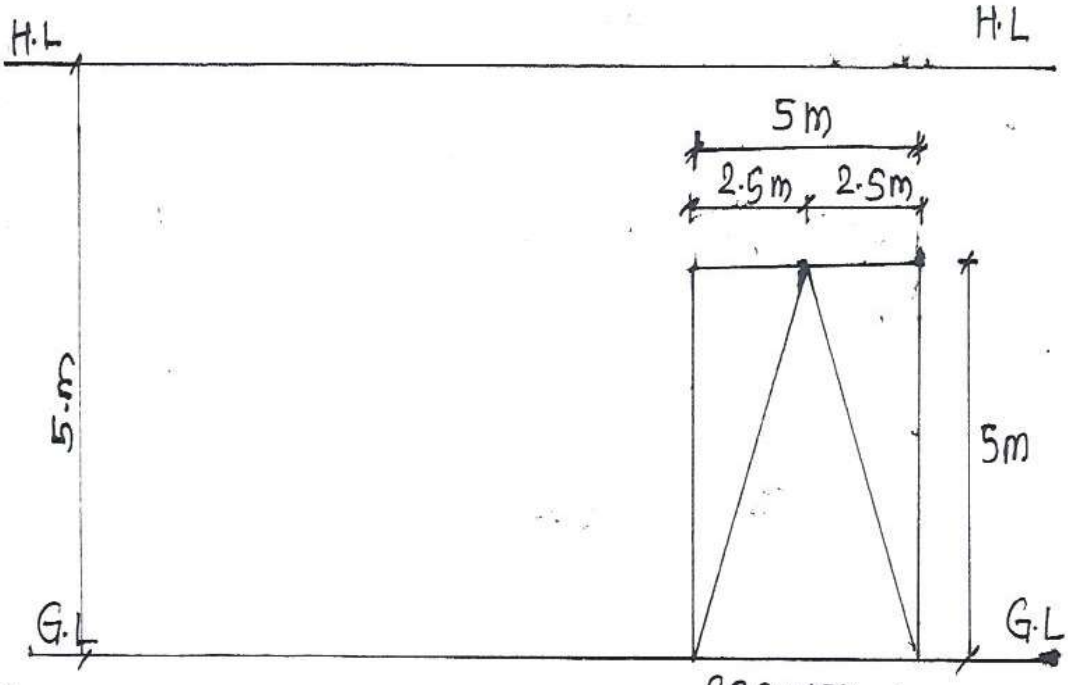
a) What do you building bye-laws? What are its objectives? Discuss any two building bye-laws in brief.
b) Write the procedure of building permission? Also discuss documents required for building permission.
c) State various defects in acoustics? Explain in brief.
d) How do you classify noises? Explain the modes of transmission of these noises?
e) What do you mean by fire resisting buildings? Also explain fire safety measures?
f) Write a note on:
1) Low-cost housing
2) Green building
g) Write a note on:
1) Scope of architecture
2) Interior design of residential building

Section – II

Q.3 Design and Draw to scale of 1:50 a bungalow for a Civil Engineer. Provide for the following areas/rooms.
a) A living room
b) A Kitchen
c) Two Bed room
d) Toilet block
e) Staircase
f) Consulting Room
1) Draw typical plan, 1:50 & show all details. **10**
2) Draw sectional elevation for above mentioned plan, scale 1:50 & show all details. **10**

Q.4 Draw perspective view of the following object, consider following data: **08**
a) Use scale 1:100
b) Symbols have usual meaning
c) Preserve all ray lines





ELEVATION

(Figure Not to Scale)

SLR-FM-19

Seat No.	

Set Q

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING AND DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book
2) Figures to the right indicate full marks.
3) Assume suitable data wherever necessary and mention it clearly.
4) Retain all projection/construction lines on drawing sheet.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 A) Choose the correct alternatives from the options and rewrite the sentence. **07**

1) For Bedroom Aspect it needs at _____.
   a) E-aspect. b) S-aspect
   c) SW-aspect. d) W-aspect

2) If object is on picture plane, then the size perspective will be _____.
   a) Enlarged b) Reduced
   c) Remains same d) All of the above

3) Which of the followings is a component of aesthetic?
   a) Brightness b) Uniqueness
   c) Balance d) None of these

4) For kitchen cum dining room the minimum area should be _____.
   a) 5 sq. m b) 9.5 sq. m
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5) Which of the following does not affect FAR.?
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6) For built-up area calculations _____ is drawn on the building permission drawing.
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7) The minimum heights for bath-rooms or water closets as specified by NBC of India are _____.
   a) 2.4 m. b) 3.2 m.
   c) 2.2 m. d) 2.6 m.

Q.1 B) Fill in the blanks. **07**

1) In bank building, the area of waiting hall depends on _____.
2) For good acoustical considerations, the reverberation time should not be more than _____.
3) The unit of fire load is _____.
4) In perspective drawing, H.P means _____.
5) Minimum area of habitable room is _____.
6) For better roominess the desirable ratio of length to breadth of room is ___.
7) Dressing table is furniture which is to be provided in _____.

Seat No.	

Set **Q**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING AND DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Section – I to be written in answer book.
4) Section – II to be drawn on FULL imperial drawing sheet. Use both sides of the sheet.
5) Assume suitable data wherever necessary and mention it clearly.
6) Retain all projection/construction lines on drawing sheet.

Section – I

Q.2 Write the answers for followings. (Any FOUR) **28**

a) What do you building bye-laws? What are its objectives? Discuss any two building bye-laws in brief.
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e) What do you mean by fire resisting buildings? Also explain fire safety measures?
f) Write a note on:
1) Low-cost housing
2) Green building
g) Write a note on:
1) Scope of architecture
2) Interior design of residential building

Section – II

Q.3 Design and Draw to scale of 1:50 a bungalow for a Civil Engineer. Provide for the following areas/rooms.
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Q.4 Draw perspective view of the following object, consider following data: **08**
a) Use scale 1:100
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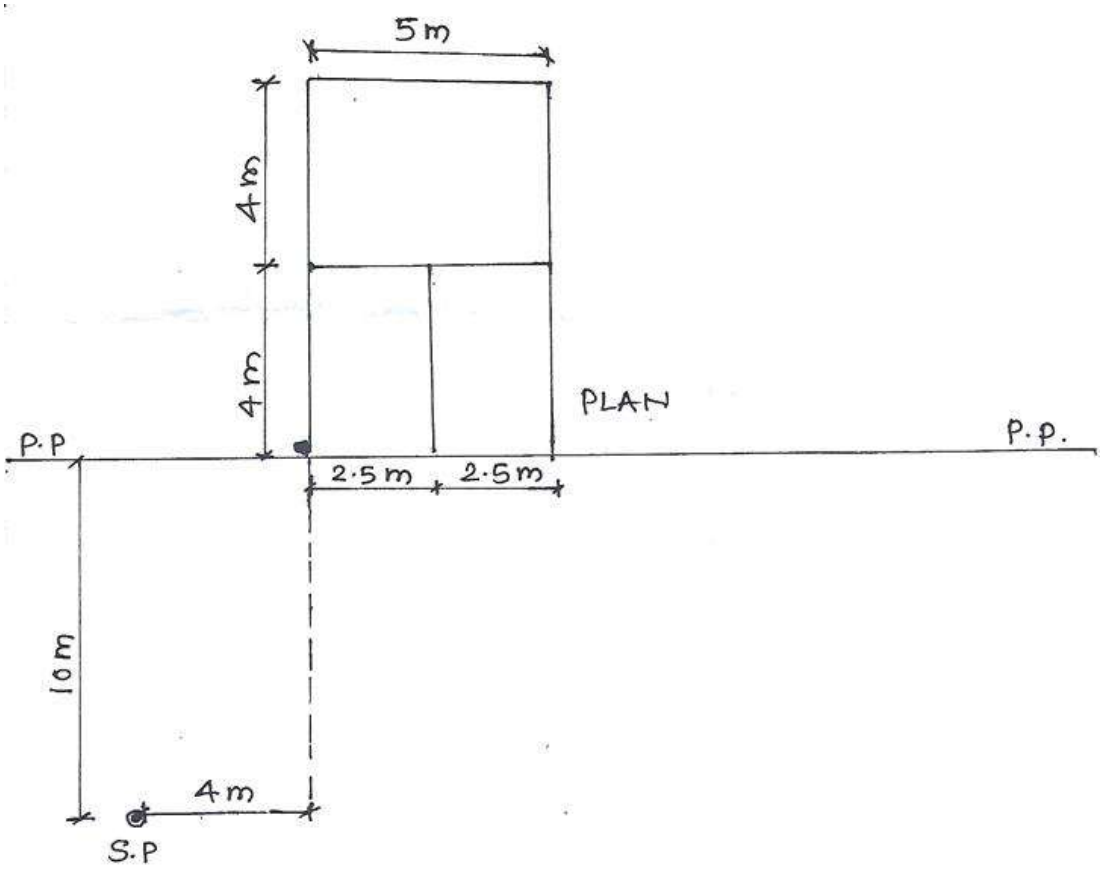

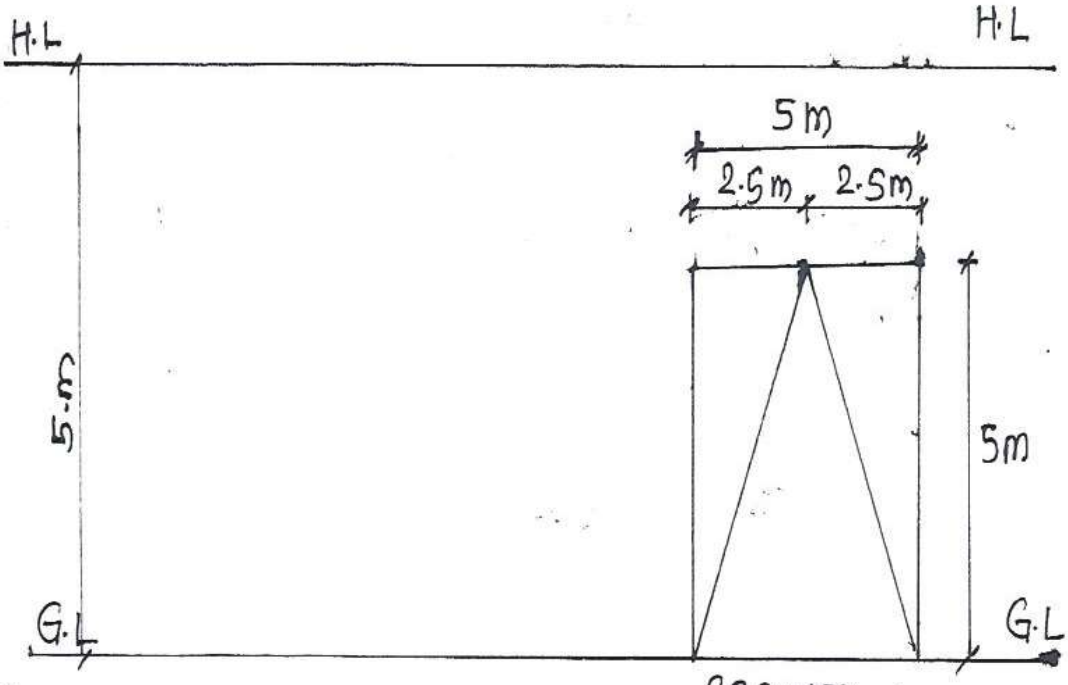

ELEVATION

(Figure Not to scale.)

Seat No.	

Set **R**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING AND DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book
2) Figures to the right indicate full marks.
3) Assume suitable data wherever necessary and mention it clearly.
4) Retain all projection/construction lines on drawing sheet.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 A) Choose the correct alternatives from the options and rewrite the sentence. **07**

1) For built-up area calculations _____ is drawn on the building permission drawing.
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4) If object is on picture plane, then the size perspective will be _____.
   a) Enlarged b) Reduced
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5) Which of the followings is a component of aesthetic?
   a) Brightness b) Uniqueness
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   a) 5 sq. m b) 9.5 sq. m
   c) 6 sq. m d) 15 sq. m

7) Which of the following does not affect FAR.?
   a) Type of construction b) Locality of density
   c) Colour of building d) Parking facilities

Q.1 B) Fill in the blanks. **07**

1) For better roominess the desirable ratio of length to breadth of room is ___.
2) Dressing table is furniture which is to be provided in _____.
3) In bank building, the area of waiting hall depends on _____.
4) For good acoustical considerations, the reverberation time should not be more than _____.
5) The unit of fire load is _____.
6) In perspective drawing, H.P means _____.
7) Minimum area of habitable room is _____.

Seat No.	

Set **R**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING AND DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Section – I to be written in answer book.
4) Section – II to be drawn on FULL imperial drawing sheet. Use both sides of the sheet.
5) Assume suitable data wherever necessary and mention it clearly.
6) Retain all projection/construction lines on drawing sheet.

Section – I

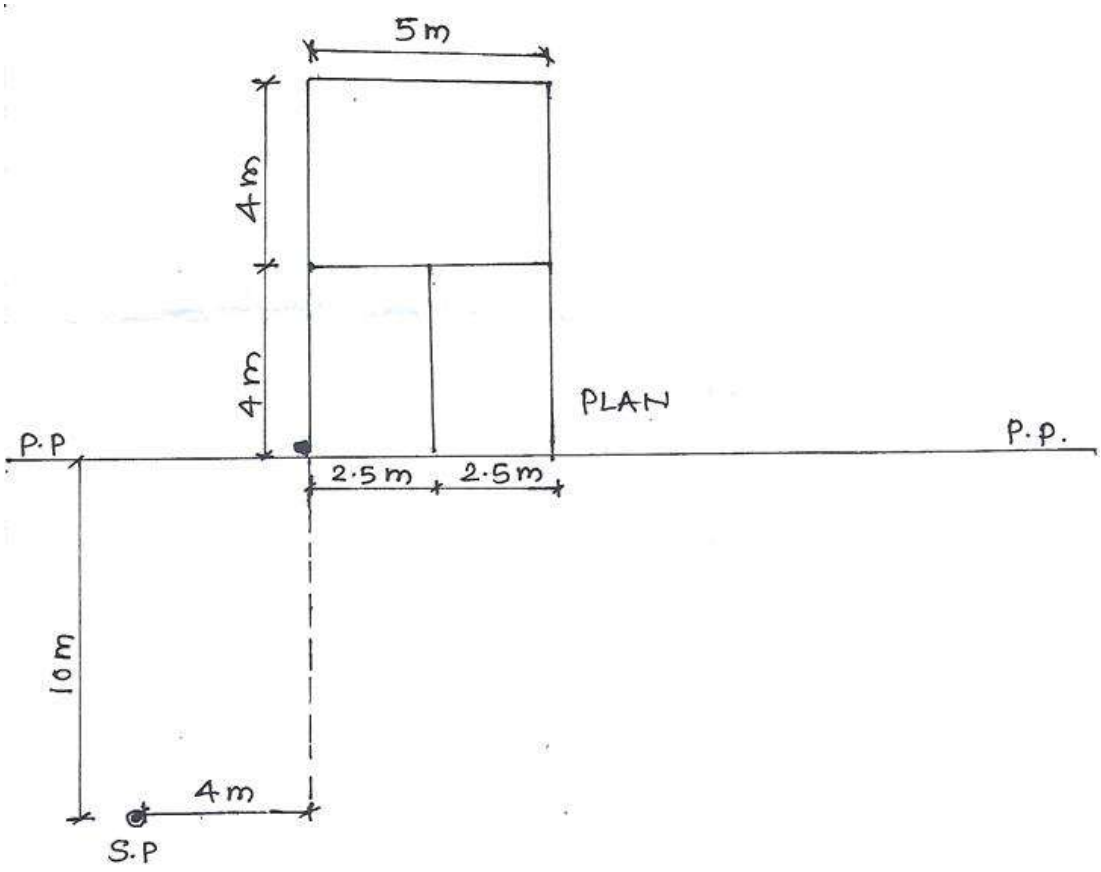
Q.2 Write the answers for followings. (Any FOUR) **28**

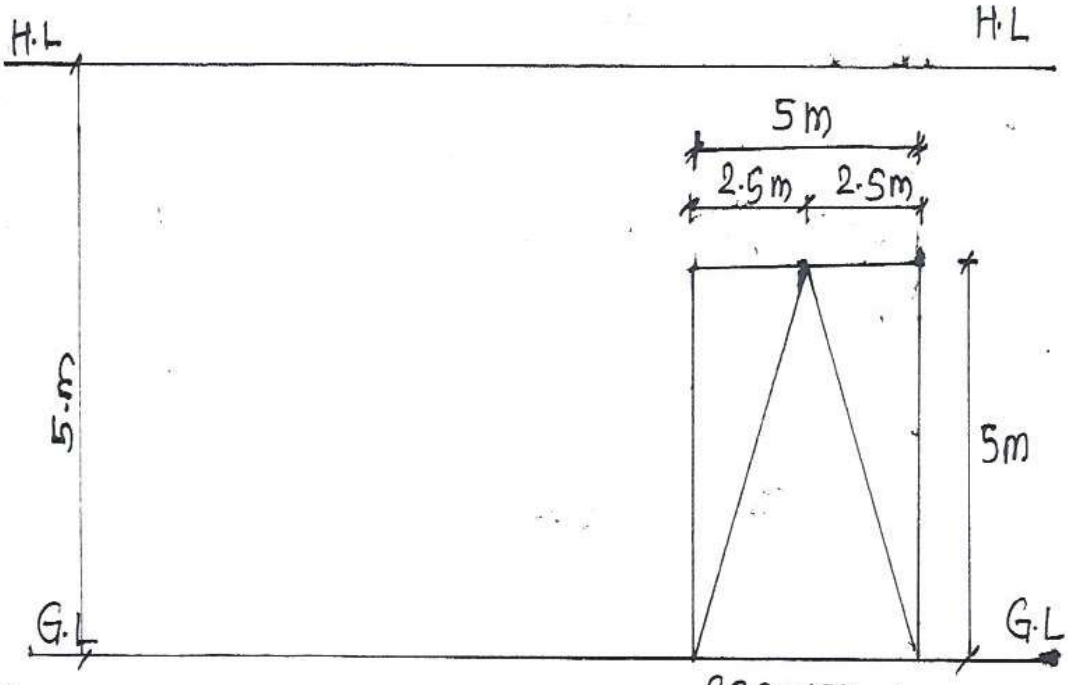
a) What do you building bye-laws? What are its objectives? Discuss any two building bye-laws in brief.
b) Write the procedure of building permission? Also discuss documents required for building permission.
c) State various defects in acoustics? Explain in brief.
d) How do you classify noises? Explain the modes of transmission of these noises?
e) What do you mean by fire resisting buildings? Also explain fire safety measures?
f) Write a note on:
1) Low-cost housing
2) Green building
g) Write a note on:
1) Scope of architecture
2) Interior design of residential building

Section – II

Q.3 Design and Draw to scale of 1:50 a bungalow for a Civil Engineer. Provide for the following areas/rooms.
a) A living room
b) A Kitchen
c) Two Bed room
d) Toilet block
e) Staircase
f) Consulting Room
1) Draw typical plan, 1:50 & show all details. **10**
2) Draw sectional elevation for above mentioned plan, scale 1:50 & show all details. **10**

Q.4 Draw perspective view of the following object, consider following data: **08**
a) Use scale 1:100
b) Symbols have usual meaning
c) Preserve all ray lines





ELEVATION

(figure Not to scale)

Seat No.	

Set **S**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING AND DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book
2) Figures to the right indicate full marks.
3) Assume suitable data wherever necessary and mention it clearly.
4) Retain all projection/construction lines on drawing sheet.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 A) Choose the correct alternatives from the options and rewrite the sentence. **07**

1) If object is on picture plane, then the size perspective will be _____.
   a) Enlarged b) Reduced
   c) Remains same d) All of the above
2) Which of the followings is a component of aesthetic?
   a) Brightness b) Uniqueness
   c) Balance d) None of these
3) For kitchen cum dining room the minimum area should be _____.
   a) 5 sq. m b) 9.5 sq. m
   c) 6 sq. m d) 15 sq. m
4) Which of the following does not affect FAR.?
   a) Type of construction b) Locality of density
   c) Colour of building d) Parking facilities
5) For built-up area calculations _____ is drawn on the building permission drawing.
   a) Terrace plan b) Plan
   c) Site plan d) Block plan
6) The minimum heights for bath-rooms or water closets as specified by NBC of India are _____.
   a) 2.4 m. b) 3.2 m.
   c) 2.2 m. d) 2.6 m.
7) For Bedroom Aspect it needs at _____.
   a) E-aspect. b) S-aspect
   c) SW-aspect. d) W-aspect

Q.1 B) Fill in the blanks. **07**

1) For good acoustical considerations, the reverberation time should not be more than _____.
2) The unit of fire load is _____.
3) In perspective drawing, H.P means _____.
4) Minimum area of habitable room is _____.
5) For better roominess the desirable ratio of length to breadth of room is ___.
6) Dressing table is furniture which is to be provided in _____.
7) In bank building, the area of waiting hall depends on _____.

SLR-FM-19

Seat No.	

Set S

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING AND DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Section – I to be written in answer book.
4) Section – II to be drawn on FULL imperial drawing sheet. Use both sides of the sheet.
5) Assume suitable data wherever necessary and mention it clearly.
6) Retain all projection/construction lines on drawing sheet.

Section – I

Q.2 Write the answers for followings. (Any FOUR) **28**

a) What do you building bye-laws? What are its objectives? Discuss any two building bye-laws in brief.

b) Write the procedure of building permission? Also discuss documents required for building permission.

c) State various defects in acoustics? Explain in brief.

d) How do you classify noises? Explain the modes of transmission of these noises?

e) What do you mean by fire resisting buildings? Also explain fire safety measures?

f) Write a note on:
1) Low-cost housing
2) Green building

g) Write a note on:
1) Scope of architecture
2) Interior design of residential building

Section – II

Q.3 Design and Draw to scale of 1:50 a bungalow for a Civil Engineer. Provide for the following areas/rooms.

a) A living room
b) A Kitchen
c) Two Bed room
d) Toilet block
e) Staircase
f) Consulting Room
1) Draw typical plan, 1:50 & show all details. **10**
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Q.4 Draw perspective view of the following object, consider following data: **08**

a) Use scale 1:100
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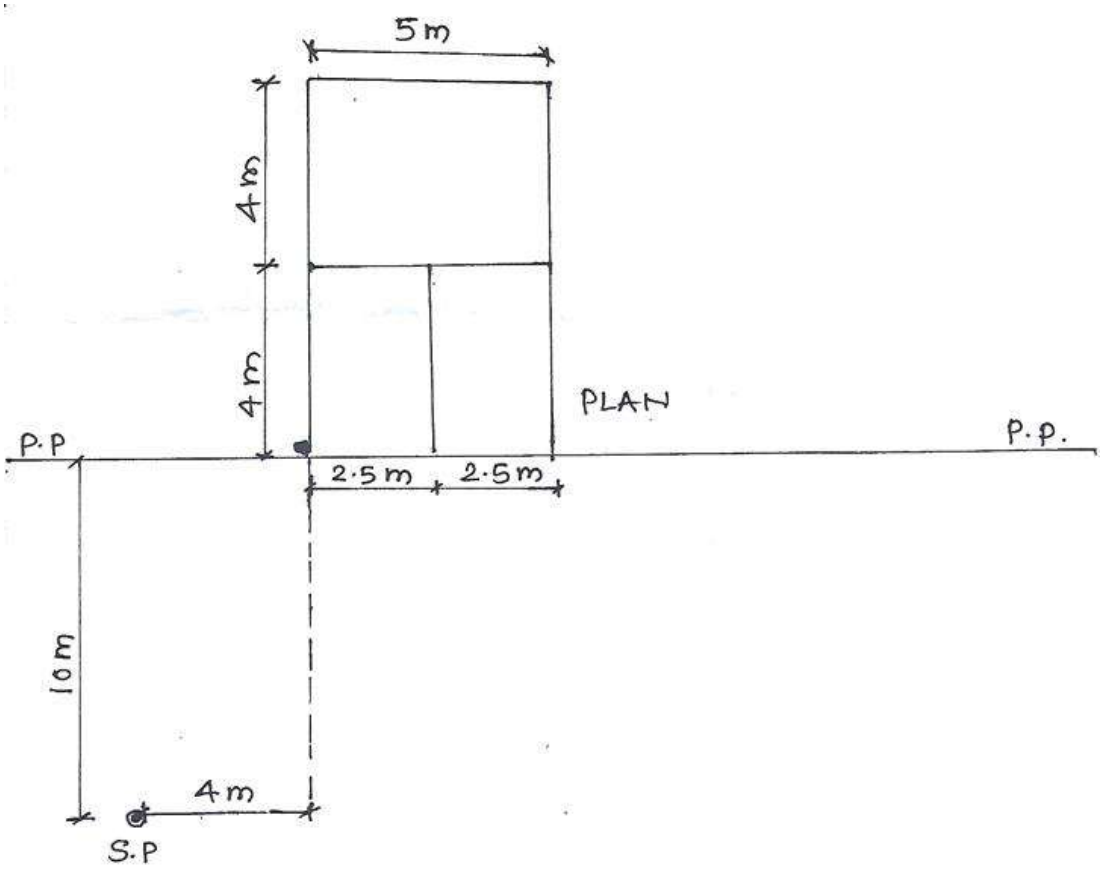
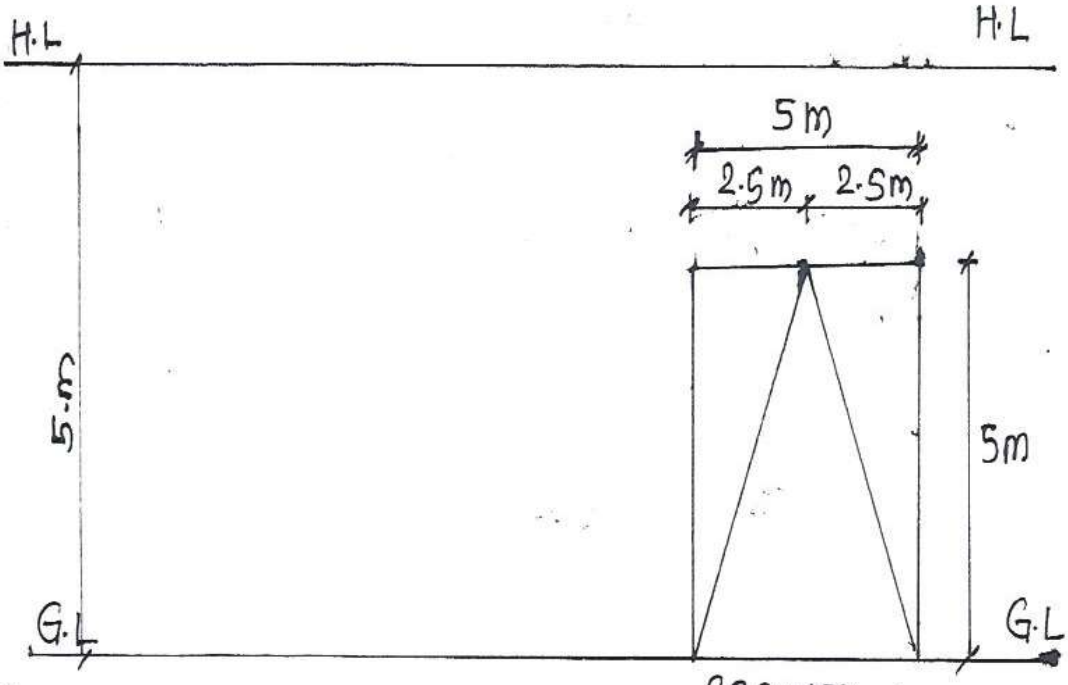
c) Preserve all ray lines





ELEVATION

(figure Not to scale)

SLR-FM-20

Seat No.	

Set P

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS - II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The energy correction factor for uniform velocity distribution is _____.
   a) one b) more than one
   c) 1.02 to 1.5 d) 2

2) The second hydraulic exponent of channel is usually slowly varying function of _____.
   a) Aspect ratio of channel b) Critical flow depth
   c) Normal flow depth d) Velocity of flow

3) The term alternate depthsis used in open channel flow to denote the depths _____.
   a) having same kinetic energy for given discharge
   b) having same specific energy for a given discharge
   c) having same specific force for a given discharge
   d) having same total energy for given discharge

4) At transitional depth _____.
   a) $\frac{dy}{dx} = \infty$
   b) $\frac{dy}{dx} = -S_o$
   c) The slope of G.V.F. profile is zero
   d) The slope of G.V.F. profile is horizontal

5) In an open channel flow, shooting flow _____.
   a) Occur just after a hydraulic jump
   b) Be a gradually varied flow
   c) Follow a tranquil flow
   d) both b and c

6) As per Francis formula for discharge over rectangular weir value of C_d is _____.
   a) 0.86 b) 0.68
   c) 0.623 d) 1.84

7) The discharge of water flowing over a rectangular weir or notch when the velocity of approach is considered the head (H + ha) is usually known as ____.
   a) Net datum head b) Net pressure head
   c) Still water head d) Net velocity head

8) Which of the following turbine is suitable for Specific speed ranging from 300 to 1000 and head below 30 m
   a) Francis
   b) Kaplan
   c) Pelton
   d) Propeller

9) The power which appears in expression of specific speed of turbine is _____.
   a) Shaft power
   b) Water power
   c) Runner power
   d) Power in to the turbine

10) When a steady jet impinges on a fixed inclined surface then _____.
   a) The flow is divided into parts proportional to the angle of inclination of the surface
   b) No force gets exerted on Plate
   c) The momentum component remains unchanged parallel to surface
   d) None of the above

11) The main advantage of double suction arrangement in centrifugal pump is _____.
   a) Increase in Axial thrust on impeller
   b) Reduction in Axial thrust on impeller
   c) Neutralisation of axial thrust on impeller
   d) None of these

12) Chances of occurrence of cavitation are high if the _____.
   a) Local pressure becomes very
   b) Local temperature becomes low
   c) Thomson's cavitations parameter exceeds a certain limit
   d) Local pressure falls below the vapour pressure

13) The dimensional form of any quantity is _____.
   a) Dependent on system of units
   b) Sometimes dependent on systems of unit
   c) Independent on system of unit
   d) Sometimes independent on systems of unit

14) The variables those don't have any effect on phenomenon are called as _____.
   a) Superfluous variables
   b) Repeating variables
   c) Non repeating variables
   d) Dependent variables

SLR-FM-20

Seat No.	

Set P

S.E. (Part - II) (CBCS) Examination Nov/Dec -2019
Civil Engineering
FLUID MECHANICS - II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Answer any two questions from each section
3) Figures to the right indicate full marks.

Section - I

Q.2 **a)** Explain the terms with neat sketches. **04**
1) Specific energy and
2) Specific force

b) Draw the neat sketches of M_2 and H_3 water surface profiles and give there conditions of formation. **02**

c) Derive equation for time required to empty the tank by rectangular weir or notch. **04**

Q.3 **a**) State the conditions under which the triangular section of an open channel will be most economical. Derive these conditions. **04**

b) Calculate the bottom width of cannel required to carry a discharge of 15.0 m^3/s as a critical flow at a depth of 1.2 meter, if the channel section is **05**
1) Rectangular and
2) Trapezoidal
with side slope of 1.5 horizontal to 1 vertical

Q.4 **a)** Enumerate the assumptions made in derivation of gradually varied flow and explain broad crested weir neat sketch. **04**

b) Water flows through a rectangular channel 1 m wide and 0.5 m deep, and then over a sharp crested Cipolletti weir of crest length 0.6 m. If the water level in the channel is 0.225 m above the weir crest, calculate the discharge over the weir. Take $C_d = 0.6$ and make correction for velocity of approach. **05**

Q.5 **a)** Show that, for broad crested weir, maximum discharge can occur when flow depth over crest is critical. **04**

b) What are the conditions of formation of hydraulic jump? Explain types and uses of hydraulic jump. **05**

Section - II

Q.6 **a)** Derive an expression for force exerted by a jet on stationary curved plate, when jet strikes at centre of symmetrical curved plate. **03**

b) Define pump and turbine. What is difference in working principles of them? **04**

c) What is mean by distorted model? What are the purposes of constructing distorted models? **03**

Q.7 **a)** Explain with neat sketch constant speed characteristic curve of turbine. **03**

b) What should be the velocity of jet when it strikes a flat plate, normal of which is inclined by 45^0 to axis of jet, The diameter of jet is 75 mm and normal pressure on plate is 2811.6 N **06**

1) When plate is stationary
2) What should be the velocity of plate moving in direction of jet and away from jet, if normal pressure exerted by jet is 702.9 N. Also find the efficiency of jet when plate is moving

Q.8 **a)** Define Net positive suction head and explain the basic criterions for selection of centrifugal pump. **03**

b) A centrifugal pump has an impeller of external and internal diameters as 480 mm and 240 mm respectively, is running at a 100 r.p.m. the rate of flow through pump is 0.0576 m^3/s, velocity of flow is constant and equal to 2.4 m/s. The diameter of suction and delivery pipes are 180 mm and 120 mm respectively, suction and delivery heads are 6.2 m and 30.2 m of water respectively. If the power required to drive the pump is 23.3 kW and outlet vane angle is 45^0. Determine **06**

1) Inlet vane angle
2) Overall efficiency of pump
3) Manometric efficiency of pump

Q.9 **a)** Explain the Buckingham's π - theorem of dimensional analysis. **04**

b) A geometrical similar model of an air duct is built to 1:25 scale and tested with water, which is 50 times more viscous and 800 times more denser than air. When tested under dynamically similar conditions, the pressure drop is 2 bars in model. Find corresponding pressure drop in prototype and express in water column. **05**

SLR-FM-20

Seat No.	

Set Q

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS - II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Which of the following turbine is suitable for Specific speed ranging from 300 to 1000 and head below 30 m
   a) Francis b) Kaplan
   c) Pelton d) Propeller

2) The power which appears in expression of specific speed of turbine is _____.
   a) Shaft power b) Water power
   c) Runner power d) Power in to the turbine

3) When a steady jet impinges on a fixed inclined surface then _____.
   a) The flow is divided into parts proportional to the angle of inclination of the surface
   b) No force gets exerted on Plate
   c) The momentum component remains unchanged parallel to surface
   d) None of the above

4) The main advantage of double suction arrangement in centrifugal pump is _____.
   a) Increase in Axial thrust on impeller
   b) Reduction in Axial thrust on impeller
   c) Neutralisation of axial thrust on impeller
   d) None of these

5) Chances of occurrence of cavitation are high if the _____.
   a) Local pressure becomes very
   b) Local temperature becomes low
   c) Thomson's cavitations parameter exceeds a certain limit
   d) Local pressure falls below the vapour pressure

6) The dimensional form of any quantity is _____.
   a) Dependent on system of units
   b) Sometimes dependent on systems of unit
   c) Independent on system of unit
   d) Sometimes independent on systems of unit

7) The variables those don't have any effect on phenomenon are called as _____.
   a) Superfluous variables b) Repeating variables
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8) The energy correction factor for uniform velocity distribution is _____.
   a) one
   b) more than one
   c) 1.02 to 1.5
   d) 2

9) The second hydraulic exponent of channel is usually slowly varying function of _____.
   a) Aspect ratio of channel
   b) Critical flow depth
   c) Normal flow depth
   d) Velocity of flow

10) The term alternate depthsis used in open channel flow to denote the depths _____.
   a) having same kinetic energy for given discharge
   b) having same specific energy for a given discharge
   c) having same specific force for a given discharge
   d) having same total energy for given discharge

11) At transitional depth _____.
   a) $\frac{dy}{dx} = \infty$
   b) $\frac{dy}{dx} = -S_o$
   c) The slope of G.V.F. profile is zero
   d) The slope of G.V.F. profile is horizontal

12) In an open channel flow, shooting flow _____.
   a) Occur just after a hydraulic jump
   b) Be a gradually varied flow
   c) Follow a tranquil flow
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13) As per Francis formula for discharge over rectangular weir value of C_d is _____.
   a) 0.86
   b) 0.68
   c) 0.623
   d) 1.84

14) The discharge of water flowing over a rectangular weir or notch when the velocity of approach is considered the head (H + ha) is usually known as ____.
   a) Net datum head
   b) Net pressure head
   c) Still water head
   d) Net velocity head

SLR-FM-20

Seat No.	

Set Q

S.E. (Part - II) (CBCS) Examination Nov/Dec -2019
Civil Engineering
FLUID MECHANICS - II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Answer any two questions from each section
3) Figures to the right indicate full marks.

Section - I

Q.2 **a)** Explain the terms with neat sketches. **04**
1) Specific energy and
2) Specific force

b) Draw the neat sketches of M_2 and H_3 water surface profiles and give there conditions of formation. **02**

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Q.3 **a**) State the conditions under which the triangular section of an open channel will be most economical. Derive these conditions. **04**

b) Calculate the bottom width of cannel required to carry a discharge of 15.0 m^3/s as a critical flow at a depth of 1.2 meter, if the channel section is **05**
1) Rectangular and
2) Trapezoidal
with side slope of 1.5 horizontal to 1 vertical

Q.4 **a)** Enumerate the assumptions made in derivation of gradually varied flow and explain broad crested weir neat sketch. **04**

b) Water flows through a rectangular channel 1 m wide and 0.5 m deep, and then over a sharp crested Cipolletti weir of crest length 0.6 m. If the water level in the channel is 0.225 m above the weir crest, calculate the discharge over the weir. Take $C_d = 0.6$ and make correction for velocity of approach. **05**

Q.5 **a)** Show that, for broad crested weir, maximum discharge can occur when flow depth over crest is critical. **04**

b) What are the conditions of formation of hydraulic jump? Explain types and uses of hydraulic jump. **05**

Section - II

Q.6 **a)** Derive an expression for force exerted by a jet on stationary curved plate, when jet strikes at centre of symmetrical curved plate. **03**

b) Define pump and turbine. What is difference in working principles of them? **04**

c) What is mean by distorted model? What are the purposes of constructing distorted models? **03**

Q.7 **a)** Explain with neat sketch constant speed characteristic curve of turbine. **03**

b) What should be the velocity of jet when it strikes a flat plate, normal of which is inclined by 45^0 to axis of jet, The diameter of jet is 75 mm and normal pressure on plate is 2811.6 N **06**

1) When plate is stationary
2) What should be the velocity of plate moving in direction of jet and away from jet, if normal pressure exerted by jet is 702.9 N.
   Also find the efficiency of jet when plate is moving

Q.8 **a)** Define Net positive suction head and explain the basic criterions for selection of centrifugal pump. **03**

b) A centrifugal pump has an impeller of external and internal diameters as 480 mm and 240 mm respectively, is running at a 100 r.p.m. the rate of flow through pump is 0.0576 m^3/s, velocity of flow is constant and equal to 2.4 m/s. The diameter of suction and delivery pipes are 180 mm and 120 mm respectively, suction and delivery heads are 6.2 m and 30.2 m of water respectively. If the power required to drive the pump is 23.3 kW and outlet vane angle is 45^0. Determine **06**

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Q.9 **a)** Explain the Buckingham's π - theorem of dimensional analysis. **04**

b) A geometrical similar model of an air duct is built to 1:25 scale and tested with water, which is 50 times more viscous and 800 times more denser than air. When tested under dynamically similar conditions, the pressure drop is 2 bars in model. Find corresponding pressure drop in prototype and express in water column. **05**

SLR-FM-20

Seat No.	

Set R

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS - II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In an open channel flow, shooting flow _____.
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   b) Be a gradually varied flow
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7) The main advantage of double suction arrangement in centrifugal pump is _____.
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   c) Neutralisation of axial thrust on impeller
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   c) having same specific force for a given discharge
   d) having same total energy for given discharge

14) At transitional depth _____.
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   b) $\frac{dy}{dx} = -S_o$
   c) The slope of G.V.F. profile is zero
   d) The slope of G.V.F. profile is horizontal

SLR-FM-20

Seat No.	

Set R

S.E. (Part - II) (CBCS) Examination Nov/Dec -2019
Civil Engineering
FLUID MECHANICS - II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Answer any two questions from each section
3) Figures to the right indicate full marks.

Section - I

Q.2 **a)** Explain the terms with neat sketches. **04**
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2) Specific force

b) Draw the neat sketches of M_2 and H_3 water surface profiles and give there conditions of formation. **02**

c) Derive equation for time required to empty the tank by rectangular weir or notch. **04**

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2) Trapezoidal
with side slope of 1.5 horizontal to 1 vertical

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Q.5 **a)** Show that, for broad crested weir, maximum discharge can occur when flow depth over crest is critical. **04**

b) What are the conditions of formation of hydraulic jump? Explain types and uses of hydraulic jump. **05**

Section - II

Q.6 **a)** Derive an expression for force exerted by a jet on stationary curved plate, when jet strikes at centre of symmetrical curved plate. **03**

b) Define pump and turbine. What is difference in working principles of them? **04**

c) What is mean by distorted model? What are the purposes of constructing distorted models? **03**

Q.7 **a)** Explain with neat sketch constant speed characteristic curve of turbine. **03**

b) What should be the velocity of jet when it strikes a flat plate, normal of which is inclined by 45^0 to axis of jet, The diameter of jet is 75 mm and normal pressure on plate is 2811.6 N **06**

1) When plate is stationary
2) What should be the velocity of plate moving in direction of jet and away from jet, if normal pressure exerted by jet is 702.9 N.
   Also find the efficiency of jet when plate is moving

Q.8 **a)** Define Net positive suction head and explain the basic criterions for selection of centrifugal pump. **03**

b) A centrifugal pump has an impeller of external and internal diameters as 480 mm and 240 mm respectively, is running at a 100 r.p.m. the rate of flow through pump is 0.0576 m^3/s, velocity of flow is constant and equal to 2.4 m/s. The diameter of suction and delivery pipes are 180 mm and 120 mm respectively, suction and delivery heads are 6.2 m and 30.2 m of water respectively. If the power required to drive the pump is 23.3 kW and outlet vane angle is 45^0. Determine **06**

1) Inlet vane angle
2) Overall efficiency of pump
3) Manometric efficiency of pump

Q.9 **a)** Explain the Buckingham's π - theorem of dimensional analysis. **04**

b) A geometrical similar model of an air duct is built to 1:25 scale and tested with water, which is 50 times more viscous and 800 times more denser than air. When tested under dynamically similar conditions, the pressure drop is 2 bars in model. Find corresponding pressure drop in prototype and express in water column. **05**

SLR-FM-20

Seat No.	

Set S

S.E. (Part - II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS - II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) When a steady jet impinges on a fixed inclined surface then _____.
   a) The flow is divided into parts proportional to the angle of inclination of the surface
   b) No force gets exerted on Plate
   c) The momentum component remains unchanged parallel to surface
   d) None of the above

2) The main advantage of double suction arrangement in centrifugal pump is _____.
   a) Increase in Axial thrust on impeller
   b) Reduction in Axial thrust on impeller
   c) Neutralisation of axial thrust on impeller
   d) None of these

3) Chances of occurrence of cavitation are high if the _____.
   a) Local pressure becomes very
   b) Local temperature becomes low
   c) Thomson's cavitations parameter exceeds a certain limit
   d) Local pressure falls below the vapour pressure

4) The dimensional form of any quantity is _____.
   a) Dependent on system of units
   b) Sometimes dependent on systems of unit
   c) Independent on system of unit
   d) Sometimes independent on systems of unit

5) The variables those don't have any effect on phenomenon are called as _____.
   a) Superfluous variables b) Repeating variables
   c) Non repeating variables d) Dependent variables

6) The energy correction factor for uniform velocity distribution is _____.
   a) one b) more than one
   c) 1.02 to 1.5 d) 2

7) The second hydraulic exponent of channel is usually slowly varying function of _____.
   a) Aspect ratio of channel b) Critical flow depth
   c) Normal flow depth d) Velocity of flow

8) The term alternate depthsis used in open channel flow to denote the depths _____.
   a) having same kinetic energy for given discharge
   b) having same specific energy for a given discharge
   c) having same specific force for a given discharge
   d) having same total energy for given discharge

9) At transitional depth _____.
   a) $\frac{dy}{dx} = \infty$
   b) $\frac{dy}{dx} = -S_o$
   c) The slope of G.V.F. profile is zero
   d) The slope of G.V.F. profile is horizontal

10) In an open channel flow, shooting flow _____.
   a) Occur just after a hydraulic jump
   b) Be a gradually varied flow
   c) Follow a tranquil flow
   d) both b and c

11) As per Francis formula for discharge over rectangular weir value of C_d is _____.
   a) 0.86 b) 0.68
   c) 0.623 d) 1.84

12) The discharge of water flowing over a rectangular weir or notch when the velocity of approach is considered the head (H + ha) is usually known as ____.
   a) Net datum head b) Net pressure head
   c) Still water head d) Net velocity head

13) Which of the following turbine is suitable for Specific speed ranging from 300 to 1000 and head below 30 m
   a) Francis b) Kaplan
   c) Pelton d) Propeller

14) The power which appears in expression of specific speed of turbine is _____.
   a) Shaft power b) Water power
   c) Runner power d) Power in to the turbine

SLR-FM-20

Seat No.		Set	S

S.E. (Part - II) (CBCS) Examination Nov/Dec -2019
Civil Engineering
FLUID MECHANICS - II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Answer any two questions from each section
3) Figures to the right indicate full marks.

Section - I

Q.2 **a)** Explain the terms with neat sketches. **04**
1) Specific energy and
2) Specific force

b) Draw the neat sketches of M_2 and H_3 water surface profiles and give there conditions of formation. **02**

c) Derive equation for time required to empty the tank by rectangular weir or notch. **04**

Q.3 **a**) State the conditions under which the triangular section of an open channel will be most economical. Derive these conditions. **04**

b) Calculate the bottom width of cannel required to carry a discharge of 15.0 m^3/s as a critical flow at a depth of 1.2 meter, if the channel section is **05**
1) Rectangular and
2) Trapezoidal
with side slope of 1.5 horizontal to 1 vertical

Q.4 **a)** Enumerate the assumptions made in derivation of gradually varied flow and explain broad crested weir neat sketch. **04**

b) Water flows through a rectangular channel 1 m wide and 0.5 m deep, and then over a sharp crested Cipolletti weir of crest length 0.6 m. If the water level in the channel is 0.225 m above the weir crest, calculate the discharge over the weir. Take $C_d = 0.6$ and make correction for velocity of approach. **05**

Q.5 **a)** Show that, for broad crested weir, maximum discharge can occur when flow depth over crest is critical. **04**

b) What are the conditions of formation of hydraulic jump? Explain types and uses of hydraulic jump. **05**

Section - II

Q.6 **a)** Derive an expression for force exerted by a jet on stationary curved plate, when jet strikes at centre of symmetrical curved plate. **03**

b) Define pump and turbine. What is difference in working principles of them? **04**

c) What is mean by distorted model? What are the purposes of constructing distorted models? **03**

Q.7 **a)** Explain with neat sketch constant speed characteristic curve of turbine. **03**

b) What should be the velocity of jet when it strikes a flat plate, normal of which is inclined by 45^0 to axis of jet, The diameter of jet is 75 mm and normal pressure on plate is 2811.6 N **06**

1) When plate is stationary
2) What should be the velocity of plate moving in direction of jet and away from jet, if normal pressure exerted by jet is 702.9 N. Also find the efficiency of jet when plate is moving

Q.8 **a)** Define Net positive suction head and explain the basic criterions for selection of centrifugal pump. **03**

b) A centrifugal pump has an impeller of external and internal diameters as 480 mm and 240 mm respectively, is running at a 100 r.p.m. the rate of flow through pump is 0.0576 m^3/s, velocity of flow is constant and equal to 2.4 m/s. The diameter of suction and delivery pipes are 180 mm and 120 mm respectively, suction and delivery heads are 6.2 m and 30.2 m of water respectively. If the power required to drive the pump is 23.3 kW and outlet vane angle is 45^0. Determine **06**

1) Inlet vane angle
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Q.9 **a)** Explain the Buckingham's π - theorem of dimensional analysis. **04**

b) A geometrical similar model of an air duct is built to 1:25 scale and tested with water, which is 50 times more viscous and 800 times more denser than air. When tested under dynamically similar conditions, the pressure drop is 2 bars in model. Find corresponding pressure drop in prototype and express in water column. **05**

SLR-FM-21

Seat No.	

Set P

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 02:30 PM To 5:30 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Rainfall mass cure is variation of _____.
   a) Rainfall intensity with time
   b) Rainfall intensity with cumulative rainfall
   c) Rainfall excess with time
   d) Cumulative rainfall with time

2) Flow duration cure is plot of _____.
   a) Accumulated flow against time
   b) Discharge against time in chronological order
   c) The base flow against the percentage of times the flow exceeded
   d) The stream discharge against the percentage of times the flow is equaled or exceeded

3) Which of the following formations neither contains water nor transmits it?
   a) Aquiclude b) Aquifer
   c) Aquifuge d) Aquitard

4) If e_w and e_a are the saturated vapour pressure of the water surface and air respectively, the Daltons law for evaporation EL in unit time is given by EL= _____.
   a) $(e_w - e_a)$ b) $K\ e_w e_a$
   c) $K\ (e_w - e_a)$ d) $K(e_w + e_a)$

5) Interception losses _____.
   a) Includes evaporation through flow and stream flow
   b) Consists only evaporation loss
   c) Includes evaporation and transpiration losses
   d) Consists only stream flow

6) The percentage of total quantity of fresh water in the world available in the liquid form _____.
   a) 30% b) 70%
   c) 11 % d) 51%

7) The dilution method of stream gauging is ideally suited for measuring discharge in _____.
   a) A large alluvial rivers
   b) Flood flow in mountain stream
   c) Steady flow in a small turbulent stream
   d) A stretch of river having heavy industrial pollution load

8) The most economical method of soil conservation is to _____.
   a) construct check dams
   b) construct contour bunds
   c) Drain the soil
   d) Aforest the soil

9) Consumptive use of water for a crop represents _____.
   a) Transpiration needs of the crop
   b) Evaporation needs of the cropped area
   c) Evapotranspiration needs of the cropped area plus the minor quantity required in plant metabolism.
   d) None of the above

10) The method of growing crops on ridges, running on the sides of water ditches is known as _____.
   a) Flood irrigation
   b) Furrow irrigation
   c) Check irrigation
   d) None of them

11) If the depth is 8.64cm on a field over a base period of 10 days, then the duty is _____.
   a) 10 ha/cumec
   b) 100 ha/cumec
   c) 864 ha/cumec
   d) 1000 ha/cumec

12) Irrigation potential of the country is about _____.
   a) 87 Mha
   b) 100 Mha
   c) 113 Mha
   d) 125 Mha

13) Lift irrigation is flow _____.
   a) by gravity
   b) from lower level to higher level
   c) in delta region
   d) through sprinkler heads

14) The best method of applying water to sandy undulating area is _____.
   a) Free flooding
   b) Furrow method
   c) Subsurface irrigation
   d) Sprinkler irrigation

Seat No.	

Set **P**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 5:30 PM

Instructions: 1) Q. No. 3 and 8 compulsory. Attempt any two question out of Q.No.2,4, and 5 from Section I and Attempt any two question out of Q.No.6,7,and 9 from section II
2) Assume suitable data wherever necessary and mention it clearly**.**
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 A) Briefly discuss the factors affecting evaporation. What are the methods used to control evaporation from reservoir. **05**

B) A precipitation station 'X' was inoperative for some time during which a storm occurred. The storm totals at three stations A, B, C surrounding station 'X' were respectively 6.60, 4.80 & 3.70 cm. The normal annual precipitation amounts at stations X, A, B, & C are 65.60, 72.60, 51.80 & 38.20 cm respectively. Estimate the storm precipitation for station 'X'. **04**

Q.3 A) What is meant by runoff? Explain methods of separation of base flow. **05**

B) The ordinates of 3-hr unit hydrograph are given as below. Using this data derive the ordinates of 6-hr unit hydrograph for the same basin analytically. What is peak value of discharge in this unit hydrograph? **05**

Time in Hrs	0	3	6	9	12	15	18	21	24	27	30
Ordinates(m^3/sec)	0	10	25	20	16	12	9	7	5	3	0

Q.4 A) What is flood and discuss the various factors affecting flood? **04**

B) Estimate the stream flow for the measurement data as given. **05**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m/s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m/s)	0	0.2	0.3	0.35	0.4	0.45	0.4	0.5	0.4	0.2	0

Q.5 A) Enlist, classify and discuss in brief geological formation where round water occurs. **05**

B) A tube well of 30 cm diameter penetrates fully in an artesion aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters. **04**

Section – II

Q.6 A) Write a detailed note on "National Perspective Plan" of National Water Development Academy for inter-basin transfer of water in India. **04**

B) The following data pertains to the healthy growth of a crop. **05**

i) Field capacity of soil = 30%
ii) Permanent Wilting point = 11%
iii) Density of soil = 1300 kg/m^3
iv) Effective depth of root zone = 700mm
v) Daily consumptive use of water = 12mm

For healthy growth, moisture content must not fall below 25% of the water holding capacity and the permanent wilting point. Determine the watering interval in days.

Q.7 A) Define the following terms: **05**

i) Gross command area
ii) Crop period and base period
iii) Capacity factor
iv) Kor- watering and Kor-depth

B) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given in the following table. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **04**

Crop	Base period (days)	Duty at field (ha/cumec)	Area under the crop (ha)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

Q.8 A) Classify Indian soils according to their origin and their suitability for various crops. **04**

B) Discuss economic feasibility of Lift irrigation schemes. Compare lift irrigation and canal irrigation from various aspects. **06**

Q.9 A) Write a short note on - Kolhapur type Weir **05**

B) Discuss various methods of assessment of irrigation water. Discuss in specific the shortcomings of volumetric assessment methods. **04**

SLR-FM-21

Seat No.	

Set Q

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 02:30 PM To 5:30 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
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4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The most economical method of soil conservation is to _____.
   a) construct check dams b) construct contour bunds
   c) Drain the soil d) Aforest the soil

2) Consumptive use of water for a crop represents _____.
   a) Transpiration needs of the crop
   b) Evaporation needs of the cropped area
   c) Evapotranspiration needs of the cropped area plus the minor quantity required in plant metabolism.
   d) None of the above

3) The method of growing crops on ridges, running on the sides of water ditches is known as _____.
   a) Flood irrigation b) Furrow irrigation
   c) Check irrigation d) None of them

4) If the depth is 8.64cm on a field over a base period of 10 days, then the duty is _____.
   a) 10 ha/cumec b) 100 ha/cumec
   c) 864 ha/cumec d) 1000 ha/cumec

5) Irrigation potential of the country is about _____.
   a) 87 Mha b) 100 Mha
   c) 113 Mha d) 125 Mha

6) Lift irrigation is flow _____.
   a) by gravity b) from lower level to higher level
   c) in delta region d) through sprinkler heads

7) The best method of applying water to sandy undulating area is _____.
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14) The dilution method of stream gauging is ideally suited for measuring discharge in _____.
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   b) Flood flow in mountain stream
   c) Steady flow in a small turbulent stream
   d) A stretch of river having heavy industrial pollution load

Seat No.	

Set **Q**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 5:30 PM

Instructions: 1) Q. No. 3 and 8 compulsory. Attempt any two question out of Q.No.2,4, and 5 from Section I and Attempt any two question out of Q.No.6,7,and 9 from section II
2) Assume suitable data wherever necessary and mention it clearly**.**
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 A) Briefly discuss the factors affecting evaporation. What are the methods used to control evaporation from reservoir. **05**

B) A precipitation station 'X' was inoperative for some time during which a storm occurred. The storm totals at three stations A, B, C surrounding station 'X' were respectively 6.60, 4.80 & 3.70 cm. The normal annual precipitation amounts at stations X, A, B, & C are 65.60, 72.60, 51.80 & 38.20 cm respectively. Estimate the storm precipitation for station 'X'. **04**

Q.3 A) What is meant by runoff? Explain methods of separation of base flow. **05**

B) The ordinates of 3-hr unit hydrograph are given as below. Using this data derive the ordinates of 6-hr unit hydrograph for the same basin analytically. What is peak value of discharge in this unit hydrograph? **05**

Time in Hrs	0	3	6	9	12	15	18	21	24	27	30
Ordinates(m^3/sec)	0	10	25	20	16	12	9	7	5	3	0

Q.4 A) What is flood and discuss the various factors affecting flood? **04**

B) Estimate the stream flow for the measurement data as given. **05**

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Velocity at 0.8d (m/s)	0	0.2	0.3	0.35	0.4	0.45	0.4	0.5	0.4	0.2	0

Q.5 A) Enlist, classify and discuss in brief geological formation where round water occurs. **05**

B) A tube well of 30 cm diameter penetrates fully in an artesion aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters. **04**

Section – II

Q.6 **A)** Write a detailed note on "National Perspective Plan" of National Water Development Academy for inter-basin transfer of water in India. **04**

B) The following data pertains to the healthy growth of a crop. **05**

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For healthy growth, moisture content must not fall below 25% of the water holding capacity and the permanent wilting point. Determine the watering interval in days.

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Q.8 **A)** Classify Indian soils according to their origin and their suitability for various crops. **04**

B) Discuss economic feasibility of Lift irrigation schemes. Compare lift irrigation and canal irrigation from various aspects. **06**

Q.9 **A)** Write a short note on - Kolhapur type Weir **05**

B) Discuss various methods of assessment of irrigation water. Discuss in specific the shortcomings of volumetric assessment methods. **04**

Seat No.	

Set **R**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 02:30 PM To 5:30 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
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4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Interception losses _____.
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2) The percentage of total quantity of fresh water in the world available in the liquid form _____.
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3) The dilution method of stream gauging is ideally suited for measuring discharge in _____.
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   a) Accumulated flow against time
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   c) $K\ (e_w - e_a)$ d) $K(e_w + e_a)$

Seat No.	

Set **R**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 5:30 PM

Instructions: 1) Q. No. 3 and 8 compulsory. Attempt any two question out of Q.No.2,4, and 5 from Section I and Attempt any two question out of Q.No.6,7,and 9 from section II
2) Assume suitable data wherever necessary and mention it clearly**.**
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 A) Briefly discuss the factors affecting evaporation. What are the methods used to control evaporation from reservoir. **05**

B) A precipitation station 'X' was inoperative for some time during which a storm occurred. The storm totals at three stations A, B, C surrounding station 'X' were respectively 6.60, 4.80 & 3.70 cm. The normal annual precipitation amounts at stations X, A, B, & C are 65.60, 72.60, 51.80 & 38.20 cm respectively. Estimate the storm precipitation for station 'X'. **04**

Q.3 A) What is meant by runoff? Explain methods of separation of base flow. **05**

B) The ordinates of 3-hr unit hydrograph are given as below. Using this data derive the ordinates of 6-hr unit hydrograph for the same basin analytically. What is peak value of discharge in this unit hydrograph? **05**

Time in Hrs	0	3	6	9	12	15	18	21	24	27	30
Ordinates(m^3/sec)	0	10	25	20	16	12	9	7	5	3	0

Q.4 A) What is flood and discuss the various factors affecting flood? **04**

B) Estimate the stream flow for the measurement data as given. **05**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m/s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m/s)	0	0.2	0.3	0.35	0.4	0.45	0.4	0.5	0.4	0.2	0

Q.5 A) Enlist, classify and discuss in brief geological formation where round water occurs. **05**

B) A tube well of 30 cm diameter penetrates fully in an artesion aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters. **04**

Section – II

Q.6 A) Write a detailed note on "National Perspective Plan" of National Water Development Academy for inter-basin transfer of water in India. **04**

B) The following data pertains to the healthy growth of a crop. **05**

i) Field capacity of soil = 30%
ii) Permanent Wilting point = 11%
iii) Density of soil = 1300 kg/m^3
iv) Effective depth of root zone = 700mm
v) Daily consumptive use of water = 12mm

For healthy growth, moisture content must not fall below 25% of the water holding capacity and the permanent wilting point. Determine the watering interval in days.

Q.7 A) Define the following terms: **05**

i) Gross command area
ii) Crop period and base period
iii) Capacity factor
iv) Kor- watering and Kor-depth

B) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given in the following table. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **04**

Crop	Base period (days)	Duty at field (ha/cumec)	Area under the crop (ha)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

Q.8 A) Classify Indian soils according to their origin and their suitability for various crops. **04**

B) Discuss economic feasibility of Lift irrigation schemes. Compare lift irrigation and canal irrigation from various aspects. **06**

Q.9 A) Write a short note on - Kolhapur type Weir **05**

B) Discuss various methods of assessment of irrigation water. Discuss in specific the shortcomings of volumetric assessment methods. **04**

SLR-FM-21

Seat No.	

Set S

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 02:30 PM To 5:30 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The method of growing crops on ridges, running on the sides of water ditches is known as _____.
   a) Flood irrigation b) Furrow irrigation
   c) Check irrigation d) None of them

2) If the depth is 8.64cm on a field over a base period of 10 days, then the duty is _____.
   a) 10 ha/cumec b) 100 ha/cumec
   c) 864 ha/cumec d) 1000 ha/cumec

3) Irrigation potential of the country is about _____.
   a) 87 Mha b) 100 Mha
   c) 113 Mha d) 125 Mha

4) Lift irrigation is flow _____.
   a) by gravity b) from lower level to higher level
   c) in delta region d) through sprinkler heads

5) The best method of applying water to sandy undulating area is _____.
   a) Free flooding b) Furrow method
   c) Subsurface irrigation d) Sprinkler irrigation

6) Rainfall mass cure is variation of _____.
   a) Rainfall intensity with time
   b) Rainfall intensity with cumulative rainfall
   c) Rainfall excess with time
   d) Cumulative rainfall with time

7) Flow duration cure is plot of _____.
   a) Accumulated flow against time
   b) Discharge against time in chronological order
   c) The base flow against the percentage of times the flow exceeded
   d) The stream discharge against the percentage of times the flow is equaled or exceeded

8) Which of the following formations neither contains water nor transmits it?
   a) Aquiclude b) Aquifer
   c) Aquifuge d) Aquitard

9) If e_w and e_a are the saturated vapour pressure of the water surface and air respectively, the Daltons law for evaporation EL in unit time is given by EL= _____.
   a) $(e_w - e_a)$ b) $K\ e_w e_a$
   c) $K\ (e_w - e_a)$ d) $K(e_w + e_a)$

10) Interception losses _____.
   a) Includes evaporation through flow and stream flow
   b) Consists only evaporation loss
   c) Includes evaporation and transpiration losses
   d) Consists only stream flow

11) The percentage of total quantity of fresh water in the world available in the liquid form _____.
   a) 30% b) 70%
   c) 11 % d) 51%

12) The dilution method of stream gauging is ideally suited for measuring discharge in _____.
   a) A large alluvial rivers
   b) Flood flow in mountain stream
   c) Steady flow in a small turbulent stream
   d) A stretch of river having heavy industrial pollution load

13) The most economical method of soil conservation is to _____.
   a) construct check dams b) construct contour bunds
   c) Drain the soil d) Aforest the soil

14) Consumptive use of water for a crop represents _____.
   a) Transpiration needs of the crop
   b) Evaporation needs of the cropped area
   c) Evapotranspiration needs of the cropped area plus the minor quantity required in plant metabolism.
   d) None of the above

Seat No.	

Set **S**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 5:30 PM

Instructions: 1) Q. No. 3 and 8 compulsory. Attempt any two question out of Q.No.2,4, and 5 from Section I and Attempt any two question out of Q.No.6,7,and 9 from section II
2) Assume suitable data wherever necessary and mention it clearly**.**
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 A) Briefly discuss the factors affecting evaporation. What are the methods used to control evaporation from reservoir. **05**

B) A precipitation station 'X' was inoperative for some time during which a storm occurred. The storm totals at three stations A, B, C surrounding station 'X' were respectively 6.60, 4.80 & 3.70 cm. The normal annual precipitation amounts at stations X, A, B, & C are 65.60, 72.60, 51.80 & 38.20 cm respectively. Estimate the storm precipitation for station 'X'. **04**

Q.3 A) What is meant by runoff? Explain methods of separation of base flow. **05**

B) The ordinates of 3-hr unit hydrograph are given as below. Using this data derive the ordinates of 6-hr unit hydrograph for the same basin analytically. What is peak value of discharge in this unit hydrograph? **05**

Time in Hrs	0	3	6	9	12	15	18	21	24	27	30
Ordinates(m^3/sec)	0	10	25	20	16	12	9	7	5	3	0

Q.4 A) What is flood and discuss the various factors affecting flood? **04**

B) Estimate the stream flow for the measurement data as given. **05**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m/s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m/s)	0	0.2	0.3	0.35	0.4	0.45	0.4	0.5	0.4	0.2	0

Q.5 A) Enlist, classify and discuss in brief geological formation where round water occurs. **05**

B) A tube well of 30 cm diameter penetrates fully in an artesion aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters. **04**

Section – II

Q.6 A) Write a detailed note on "National Perspective Plan" of National Water Development Academy for inter-basin transfer of water in India. **04**

B) The following data pertains to the healthy growth of a crop. **05**

i) Field capacity of soil = 30%
ii) Permanent Wilting point = 11%
iii) Density of soil = 1300 kg/m^3
iv) Effective depth of root zone = 700mm
v) Daily consumptive use of water = 12mm

For healthy growth, moisture content must not fall below 25% of the water holding capacity and the permanent wilting point. Determine the watering interval in days.

Q.7 A) Define the following terms: **05**

i) Gross command area
ii) Crop period and base period
iii) Capacity factor
iv) Kor- watering and Kor-depth

B) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given in the following table. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **04**

Crop	Base period (days)	Duty at field (ha/cumec)	Area under the crop (ha)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

Q.8 A) Classify Indian soils according to their origin and their suitability for various crops. **04**

B) Discuss economic feasibility of Lift irrigation schemes. Compare lift irrigation and canal irrigation from various aspects. **06**

Q.9 A) Write a short note on - Kolhapur type Weir **05**

B) Discuss various methods of assessment of irrigation water. Discuss in specific the shortcomings of volumetric assessment methods. **04**

SLR-FM-22

Seat No.	

Set P

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday,28-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Answer Book page No.3. Each questions carries one mark.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The P.I. of $X = x.V$, where V is a function of x is _____.
   a) $\left[x + \frac{f^1(D)}{f(D)}\right]\frac{1}{f(D)}V$ b) $\left[x - \frac{1}{f(D)}f^1(D)\right]\frac{1}{f(D)}V$
   c) $\left[x - \frac{f(D)}{f^1(D)}\right]\frac{1}{f(D)}V$ d) $\left[x + \frac{1}{f^1(D)}f(D)\right]\frac{1}{f(D)}V$

2) The general solution of $(D^4 + 6D^2 + 9)y = 0$ is _____.
   a) $y = (C_1 + C_2x)\cos\sqrt{3}x + (C_3 + C_4x)\sin\sqrt{3}x$
   b) $y = (C_1 + C_2x)e^x + (C_3 + C_{4x})e^{-x}$
   c) $y = (C_1 + C_2)e^{-x} + (C_3 + C_4x)e^x$
   d) $y = (C_1 + C_2\cos x)e^x + (C_3 + C_4\sin x)e^x$

3) On putting $\log(5 + 2x) = Z$ the differential equation $(5 + 2x)\frac{d^2y}{dx^2} - 6(5 + 2x)\frac{dy}{dx} + 8y = 6x$ is transformed to _____.
   a) $(D^2 + 4D + 2)y = \frac{3}{4}(e^z - 5)$ b) $(D^2 + 4D + 4)y = \frac{3}{4}(e^z - 5)$
   c) $(D^2 - 4D + 2)y = \frac{3}{4}(e^z - 5)$ d) $(D^2 - 4D + 2)y = 3(e^z - 5)$

4) The solution of equation $p + q = pq$ is _____.
   a) $z = ax + (a + 1)y + c$
   b) $z = (a + 1)x + a(a - 1)y + c$
   c) $z = (a - 1)x + a(a + 1)y + c$
   d) $z(a - 1) = a(a - 1)x + ay + c$

5) The solution of the equation $(mz - ny)p + (nx - lz)q = ly - mx$ is _____.
   a) $\phi\,(\ell x + my + nz,\ x^2 + y^2 + z^2) = 0$
   b) $\phi\,(\ell x - my + nz,\ x^2 + y^2 + z^2) = 0$
   c) $\phi\,(\ell x + my + nz,\ x^2 + y^2 - z^2) = 0$
   d) $\phi\,(\ell x + my + nz,\ x^2 - y^2 + z^2) = 0$

6) If $L\{f_1(t)\} = \phi_1(s)$ and $L\{f_2(t)\} = \phi_2(s)$, then $L^{-1}\{\phi_1(s)^*\phi_2(s)\} =$ _____.

a) $\int_0^1 f_1(u)f_2(t-u)du$ b) $\int_0^t f_1(t)f_2(t-u)du$

c) $\int_0^t f_1(u)f_2(t-u)du$ d) None of these

7) The value of integral $\int_0^\infty t^5 e^{-3t}dt$ is _____.

a) $\frac{1}{243}$ b) $\frac{40}{243}$

c) $\frac{4}{243}$ d) $\frac{80}{243}$

8) Polar form of C-R equation are _____.

a) $\frac{\partial u}{\partial \theta} = \frac{1}{r}\frac{\partial v}{\partial r}, \frac{\partial u}{\partial r} = r\frac{\partial v}{\partial \theta}$ b) $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}, \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$

c) $\frac{\partial u}{\partial r} = r\frac{\partial v}{\partial r}, \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$ d) None of these

9) $\int_c \frac{z+10}{z^2-4}dz$ Where C is the circle $|z| = 1$ is _____.

a) 2π b) -2π

c) $2\pi i$ d) 0

10) The Fourier expansion is the interval $[-4, 4]$ of the function $f(x) = -x, \quad -4 \le x \le 0$ $= \quad x \quad 0 \le x \le 4$ has _____.

a) No sine terms b) No cosine terms

c) Both cosine & sine terms d) None of these

11) The conditions for expansion of a function in Fourier series are known as ___.

a) Harmonic b) Riemann's condition

c) Dirichlets condition d) Periodic

12) If $\sum x_i = 21, \sum y_i = -7, n = 7$ and $b_{yx} = 3$ then the regression line of y on x is _____.

a) $x + 3y = 10$ b) $x - 3y = 6$

c) $3x - y = 10$ d) $3x - y = 70$

13) A continuous random variable has the following probability density function $f(x) = kx^2, 0 \le x \le 2$ then $k =$ _____.

a) $\frac{8}{3}$ b) $\frac{3}{8}$

c) $\frac{3}{2}$ d) $\frac{2}{3}$

14) If two regression coefficients are -0.1 and -0.9, then the value of r is ___.

a) -0.3 b) 0.3

c) 0.09 d) -0.03

Seat No.	

Set **P**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday,28-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.

Section – I

Q.2 Attempt any three. **09**

a) Solve: $(D^2 + a^2)y = \sin ax$

b) Solve: $(D^2 - 1)y = x \sin 3x + \cos x$

c) Solve: $p^2 - pq = 1 - z^2$

d) Find the inverse Laplace transform of the following by using convolution theorem $\frac{1}{s^2(s+1)^2}$

e) Find Laplace transform of the following

$$\int_0^t \frac{e^{-u} \sin u}{u} du$$

Q.3 Attempt any three. **09**

a) Solve: $(D^2 + 3D + 2)y = \sin(e^x)$

b) Solve: $(D^2 + 5D + 4)y = 3 - 2x$

c) Solve :$(1 + 2x)^2 \frac{d^2y}{dx^2} - 6(1 + 2x)\frac{dy}{dx} + 16y = 8(1 + 2x)^2$

d) Solve: $x(y^2 - z^2)p + y(z^2 - x^2)q - z(x^2 - y^2) = 0$

e) Find $L\{t(2 \sin 3t - 3 \cos 3t)\}$

Q.4 Attempt any two. **10**

a) The deflection of a struct with one end built-in and other supported and subjected to end - thrust P satisfies the equation $\frac{dy^2}{dx^2} + a^2 y = \frac{a^2 R}{P}(\ell - x)$ Given that $dy/dx = 0, y = 0$ when $x = 0$ and $y = 0$ when $n = \ell$ prove that $y = \frac{R}{P}\left[\frac{\sin ax}{a} - \ell \cos ax + \ell - x\right]$ where $a\ell = \tan a\ell$ and ℓ is the length of struct.

b) Solve the following equations by the method of separation of variables $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$ where $u(0, y) = 8e^{-3y}$

c) Using Laplace transformation solve the following differential equation. $(D^2 + 9)y = 18t, y(0) = 0, y'(0) = 0.$

Section – II

Q.5 Attempt any three of the following. **09**

a) Fit a Binominal distribution to the following data

x_i	0	1	2	3	4
$f(x)$	30	62	46	10	2

b) The size of hats is normally distributed with mean of 18.5 cms and standard deviation of 2.5 cms. How many hats in a total of 2000 will have sizes between

1) 18 cms and 20 cms
2) above 20 cms

[Given: For S.N.V,Z area between z = 0 and z = 0.6 is 0.2257 and that between z = 0 and z = 0.2 is 0.0793]

c) Evaluate $\int_c \frac{e^z}{(z-1)(z-4)} dz$ where c is the circle $|z| = 2$ by using Cauchy's Integral formula.

d) Find half - range cosine series for

$$f(x) = 1, \quad 0 \le x \le 1$$
$$= x, \quad 1 \le x \le 2$$

e) Fit a second degree Parabola to the following data

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

Q.6 Attempt any three of the following. **09**

a) Find the Fourier series of

$$f(x) = x^3, \quad -\pi < x < \pi$$

b) If the probability that an individual suffers a bad reaction due to a certain injection is 0.001, determine the probability that out of 2000 individuals

1) exactly 4
2) more than 2 dindividuals will suffer a bad reaction

c) From 10 pairs of observations for x and y the following data is obtained : $n = 10,\ \sum x = 66,\ \sum y = 69,\ \sum x^2 = 476,\ \sum y^2 = 521,\ \sum xy = 485$. It was later found that two pairs of (correct) values.

x	y
4	6
9	8

were (wrongly) copied as

x	y
2	3
7	5

Calculate correct value of the correlation coefficient.

d) The equations of two regression lines obtained in a correlation analysis are $3x + 12y = 19,\ 3y + 9x = 16$. Find

1) mean values of x & y
2) coefficient of correlation

e) If $f(z) = u + iv$ is analytic and $u - v = e^x(\cos y - \sin y)$, find $f(z)$ in terms of z.

Q.7 Attempt any two of the following. **10**

a) Find the Fourier series expansion for $f(x) = x + \frac{x^2}{4}, -\pi < x < \pi$

b) Find the coefficient of correlation and the equations of lines of regression to the following data.

x	5	7	8	10	11	13	16
y	33	30	28	20	18	16	9

c) Evaluate $\int_0^{1+i} (x^2 - iy)dz,$ along the path

1) $y = x$ 2) $y = x^2$

SLR-FM-22

Seat No.	

Set Q

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday,28-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Answer Book page No.3. Each questions carries one mark.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Polar form of C-R equation are _____.
   a) $\frac{\partial u}{\partial \theta} = \frac{1}{r}\frac{\partial v}{\partial r}, \frac{\partial u}{\partial r} = r\frac{\partial v}{\partial \theta}$ b) $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}, \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$
   c) $\frac{\partial u}{\partial r} = r\frac{\partial v}{\partial r}, \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$ d) None of these

2) $\int_c \frac{z+10}{z^2-4}dz$ Where C is the circle $|z| = 1$ is _____.
   a) 2π b) -2π
   c) $2\pi i$ d) 0

3) The Fourier expansion is the interval $[-4, 4]$ of the function $f(x) = -x, \quad -4 \le x \le 0$ $= \quad x \quad 0 \le x \le 4$ has _____.
   a) No sine terms b) No cosine terms
   c) Both cosine & sine terms d) None of these

4) The conditions for expansion of a function in Fourier series are known as ___.
   a) Harmonic b) Riemann's condition
   c) Dirichlets condition d) Periodic

5) If $\sum x_i = 21, \sum y_i = -7, n = 7$ and $b_{yx} = 3$ then the regression line of y on x is _____.
   a) $x + 3y = 10$ b) $x - 3y = 6$
   c) $3x - y = 10$ d) $3x - y = 70$

6) A continuous random variable has the following probability density function $f(x) = kx^2, 0 \le x \le 2$ then $k =$ _____.
   a) $\frac{8}{3}$ b) $\frac{3}{8}$
   c) $\frac{3}{2}$ d) $\frac{2}{3}$

7) If two regression coefficients are -0.1 and -0.9, then the value of r is ___.
   a) -0.3 b) 0.3
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c) $\left[x - \frac{f(D)}{f^1(D)}\right]\frac{1}{f(D)}V$ d) $\left[x + \frac{1}{f^1(D)}f(D)\right]\frac{1}{f(D)}V$

9) The general solution of $(D^4 + 6D^2 + 9)y = 0$ is _____.

a) $y = (C_1 + C_2x)\cos\sqrt{3}x + (C_3 + C_4x)\sin\sqrt{3}x$
b) $y = (C_1 + C_2x)e^x + (C_3 + C_{4x})e^{-x}$
c) $y = (C_1 + C_2)e^{-x} + (C_3 + C_4x)e^x$
d) $y = (C_1 + C_2\cos x)e^x + (C_3 + C_4\sin x)e^x$

10) On putting $\log(5 + 2x) = Z$ the differential equation $(5 + 2x)\frac{d^2y}{dx^2} - 6(5 + 2x)\frac{dy}{dx} + 8y = 6x$ is transformed to _____.

a) $(D^2 + 4D + 2)y = \frac{3}{4}(e^z - 5)$ b) $(D^2 + 4D + 4)y = \frac{3}{4}(e^z - 5)$

c) $(D^2 - 4D + 2)y = \frac{3}{4}(e^z - 5)$ d) $(D^2 - 4D + 2)y = 3(e^z - 5)$

11) The solution of equation $p + q = pq$ is _____.

a) $z = ax + (a + 1)y + c$
b) $z = (a + 1)x + a(a - 1)y + c$
c) $z = (a - 1)x + a(a + 1)y + c$
d) $z(a - 1) = a(a - 1)x + ay + c$

12) The solution of the equation $(mz - ny)p + (nx - lz)q = ly - mx$ is _____.

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b) $\phi\,(\ell x - my + nz,\ x^2 + y^2 + z^2) = 0$
c) $\phi\,(\ell x + my + nz,\ x^2 + y^2 - z^2) = 0$
d) $\phi\,(\ell x + my + nz,\ x^2 - y^2 + z^2) = 0$

13) If $L\{f_1(t)\} = \phi_1(s)$ and $L\{f_2(t)\} = \phi_2(s)$, then $L^{-1}\{\phi_1(s)^*\phi_2(s)\}$ = _____.

a) $\int_0^1 f_1(u)f_2(t-u)du$ b) $\int_0^t f_1(t)f_2(t-u)du$

c) $\int_0^t f_1(u)f_2(t-u)du$ d) None of these

14) The value of integral $\int_0^\infty t^5e^{-3t}dt$ is _____.

a) $\frac{1}{243}$ b) $\frac{40}{243}$

c) $\frac{4}{243}$ d) $\frac{80}{243}$

Seat No.	

Set **Q**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday,28-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.

Section – I

Q.2 Attempt any three. **09**

a) Solve: $(D^2 + a^2)y = \sin ax$

b) Solve: $(D^2 - 1)y = x \sin 3x + \cos x$

c) Solve: $p^2 - pq = 1 - z^2$

d) Find the inverse Laplace transform of the following by using convolution theorem $\frac{1}{s^2(s+1)^2}$

e) Find Laplace transform of the following

$$\int_0^t \frac{e^{-u} \sin u}{u} du$$

Q.3 Attempt any three. **09**

a) Solve: $(D^2 + 3D + 2)y = \sin(e^x)$

b) Solve: $(D^2 + 5D + 4)y = 3 - 2x$

c) Solve :$(1 + 2x)^2 \frac{d^2y}{dx^2} - 6(1 + 2x)\frac{dy}{dx} + 16y = 8(1 + 2x)^2$

d) Solve: $x(y^2 - z^2)p + y(z^2 - x^2)q - z(x^2 - y^2) = 0$

e) Find $L\{t(2 \sin 3t - 3 \cos 3t)\}$

Q.4 Attempt any two. **10**

a) The deflection of a struct with one end built-in and other supported and subjected to end - thrust P satisfies the equation $\frac{dy^2}{dx^2} + a^2 y = \frac{a^2 R}{P}(\ell - x)$ Given that $dy/dx = 0, y = 0$ when $x = 0$ and $y = 0$ when $n = \ell$ prove that $y = \frac{R}{P}\left[\frac{\sin ax}{a} - \ell \cos ax + \ell - x\right]$ where $a\ell = \tan a\ell$ and ℓ is the length of struct.

b) Solve the following equations by the method of separation of variables $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$ where $u(0, y) = 8e^{-3y}$

c) Using Laplace transformation solve the following differential equation. $(D^2 + 9)y = 18t, y(0) = 0, y'(0) = 0.$

Section – II

Q.5 Attempt any three of the following. **09**

a) Fit a Binominal distribution to the following data

x_i	0	1	2	3	4
$f(x)$	30	62	46	10	2

b) The size of hats is normally distributed with mean of 18.5 cms and standard deviation of 2.5 cms. How many hats in a total of 2000 will have sizes between

1) 18 cms and 20 cms
2) above 20 cms

[Given: For S.N.V,Z area between z = 0 and z = 0.6 is 0.2257 and that between z = 0 and z = 0.2 is 0.0793]

c) Evaluate $\int_c \frac{e^z}{(z-1)(z-4)} dz$ where c is the circle $|z| = 2$ by using Cauchy's Integral formula.

d) Find half - range cosine series for

$$f(x) = 1, \quad 0 \le x \le 1$$
$$= x, \quad 1 \le x \le 2$$

e) Fit a second degree Parabola to the following data

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

Q.6 Attempt any three of the following. **09**

a) Find the Fourier series of

$$f(x) = x^3, \quad -\pi < x < \pi$$

b) If the probability that an individual suffers a bad reaction due to a certain injection is 0.001, determine the probability that out of 2000 individuals

1) exactly 4
2) more than 2 dindividuals will suffer a bad reaction

c) From 10 pairs of observations for x and y the following data is obtained : $n = 10,\ \sum x = 66,\ \sum y = 69,\ \sum x^2 = 476,\ \sum y^2 = 521,\ \sum xy = 485$. It was later found that two pairs of (correct) values.

x	y
4	6
9	8

were (wrongly) copied as

x	y
2	3
7	5

Calculate correct value of the correlation coefficient.

d) The equations of two regression lines obtained in a correlation analysis are $3x + 12y = 19,\ 3y + 9x = 16$. Find

1) mean values of x & y
2) coefficient of correlation

e) If $f(z) = u + iv$ is analytic and $u - v = e^x(\cos y - \sin y)$, find $f(z)$ in terms of z.

Q.7 Attempt any two of the following. **10**

a) Find the Fourier series expansion for $f(x) = x + \frac{x^2}{4}, -\pi < x < \pi$

b) Find the coefficient of correlation and the equations of lines of regression to the following data.

x	5	7	8	10	11	13	16
y	33	30	28	20	18	16	9

c) Evaluate $\int_0^{1+i} (x^2 - iy)dz,$ along the path

1) $y = x$ 2) $y = x^2$

Seat No.	

Set **R**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday,28-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Answer Book page No.3. Each questions carries one mark.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The solution of the equation $(mz - ny)p + (nx - lz)q = ly - mx$ is _____.
   a) $\phi\,(\ell x + my + nz,\ x^2 + y^2 + z^2) = 0$
   b) $\phi\,(\ell x - my + nz,\ x^2 + y^2 + z^2) = 0$
   c) $\phi\,(\ell x + my + nz,\ x^2 + y^2 - z^2) = 0$
   d) $\phi\,(\ell x + my + nz,\ x^2 - y^2 + z^2) = 0$

2) If $L\{f_1(t)\} = \phi_1(s)$ and $L\{f_2(t)\} = \phi_2(s)$, then $L^{-1}\{\phi_1(s)^*\phi_2(s)\}$ = _____.
   a) $\int_0^1 f_1(u)f_2(t-u)du$ b) $\int_0^t f_1(t)f_2(t-u)du$
   c) $\int_0^t f_1(u)f_2(t-u)du$ d) None of these

3) The value of integral $\int_0^\infty t^5 e^{-3t}dt$ is _____.
   a) $\frac{1}{243}$ b) $\frac{40}{243}$
   c) $\frac{4}{243}$ d) $\frac{80}{243}$

4) Polar form of C-R equation are _____.
   a) $\frac{\partial u}{\partial \theta} = \frac{1}{r}\frac{\partial v}{\partial r}, \frac{\partial u}{\partial r} = r\frac{\partial v}{\partial \theta}$ b) $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}, \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$
   c) $\frac{\partial u}{\partial r} = r\frac{\partial v}{\partial r}, \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$ d) None of these

5) $\int_c \frac{z+10}{z^2-4}dz$ Where C is the circle $|z| = 1$ is _____.
   a) 2π b) -2π
   c) $2\pi i$ d) 0

6) The Fourier expansion is the interval $[-4, 4]$ of the function
   $f(x) = -x, \quad -4 \le x \le 0$
   $\quad = \ x \quad\ \ 0 \le x \le 4$ has _____.
   a) No sine terms b) No cosine terms
   c) Both cosine & sine terms d) None of these

7) The conditions for expansion of a function in Fourier series are known as ___.
   a) Harmonic
   b) Riemann's condition
   c) Dirichlets condition
   d) Periodic

8) If $\sum x_i = 21, \sum y_i = -7, n = 7$ and $b_{yx} = 3$ then the regression line of y on x is _____.
   a) $x + 3y = 10$
   b) $x - 3y = 6$
   c) $3x - y = 10$
   d) $3x - y = 70$

9) A continuous random variable has the following probability density function $f(x) = kx^2, 0 \leq x \leq 2$ then $k =$ _____.
   a) $\frac{8}{3}$
   b) $\frac{3}{8}$
   c) $\frac{3}{2}$
   d) $\frac{2}{3}$

10) If two regression coefficients are -0.1 and -0.9, then the value of r is ___.
   a) -0.3
   b) 0.3
   c) 0.09
   d) -0.03

11) The P.I. of $X = x.V$, where V is a function of x is _____.
   a) $\left[x + \frac{f^1(D)}{f(D)}\right]\frac{1}{f(D)}V$
   b) $\left[x - \frac{1}{f(D)}f^1(D)\right]\frac{1}{f(D)}V$
   c) $\left[x - \frac{f(D)}{f^1(D)}\right]\frac{1}{f(D)}V$
   d) $\left[x + \frac{1}{f^1(D)}f(D)\right]\frac{1}{f(D)}V$

12) The general solution of $(D^4 + 6D^2 + 9)y = 0$ is _____.
   a) $y = (C_1 + C_2x)\cos\sqrt{3}x + (C_3 + C_4x)\sin\sqrt{3}x$
   b) $y = (C_1 + C_2x)e^x + (C_3 + C_{4x})e^{-x}$
   c) $y = (C_1 + C_2)e^{-x} + (C_3 + C_4x)e^x$
   d) $y = (C_1 + C_2\cos x)e^x + (C_3 + C_4\sin x)e^x$

13) On putting $\log(5 + 2x) = Z$ the differential equation $(5 + 2x)\frac{d^2y}{dx^2} - 6(5 + 2x)\frac{dy}{dx} + 8y = 6x$ is transformed to _____.
   a) $(D^2 + 4D + 2)y = \frac{3}{4}(e^z - 5)$
   b) $(D^2 + 4D + 4)y = \frac{3}{4}(e^z - 5)$
   c) $(D^2 - 4D + 2)y = \frac{3}{4}(e^z - 5)$
   d) $(D^2 - 4D + 2)y = 3(e^z - 5)$

14) The solution of equation $p + q = pq$ is _____.
   a) $z = ax + (a + 1)y + c$
   b) $z = (a + 1)x + a(a - 1)y + c$
   c) $z = (a - 1)x + a(a + 1)y + c$
   d) $z(a - 1) = a(a - 1)x + ay + c$

Seat No.	

Set **R**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday,28-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.

Section – I

Q.2 Attempt any three. **09**

a) Solve: $(D^2 + a^2)y = \sin ax$

b) Solve: $(D^2 - 1)y = x \sin 3x + \cos x$

c) Solve: $p^2 - pq = 1 - z^2$

d) Find the inverse Laplace transform of the following by using convolution theorem $\frac{1}{s^2(s+1)^2}$

e) Find Laplace transform of the following

$$\int_0^t \frac{e^{-u} \sin u}{u} du$$

Q.3 Attempt any three. **09**

a) Solve: $(D^2 + 3D + 2)y = \sin(e^x)$

b) Solve: $(D^2 + 5D + 4)y = 3 - 2x$

c) Solve :$(1 + 2x)^2 \frac{d^2y}{dx^2} - 6(1 + 2x)\frac{dy}{dx} + 16y = 8(1 + 2x)^2$

d) Solve: $x(y^2 - z^2)p + y(z^2 - x^2)q - z(x^2 - y^2) = 0$

e) Find $L\{t(2 \sin 3t - 3 \cos 3t)\}$

Q.4 Attempt any two. **10**

a) The deflection of a struct with one end built-in and other supported and subjected to end - thrust P satisfies the equation $\frac{dy^2}{dx^2} + a^2 y = \frac{a^2 R}{P}(\ell - x)$ Given that $dy/dx = 0, y = 0$ when $x = 0$ and $y = 0$ when $n = \ell$ prove that $y = \frac{R}{P}\left[\frac{\sin ax}{a} - \ell \cos ax + \ell - x\right]$ where $a\ell = \tan a\ell$ and ℓ is the length of struct.

b) Solve the following equations by the method of separation of variables $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$ where $u(0, y) = 8e^{-3y}$

c) Using Laplace transformation solve the following differential equation. $(D^2 + 9)y = 18t, y(0) = 0, y'(0) = 0.$

Section – II

Q.5 Attempt any three of the following. **09**

a) Fit a Binominal distribution to the following data

x_i	0	1	2	3	4
$f(x)$	30	62	46	10	2

b) The size of hats is normally distributed with mean of 18.5 cms and standard deviation of 2.5 cms. How many hats in a total of 2000 will have sizes between

1) 18 cms and 20 cms
2) above 20 cms

[Given: For S.N.V,Z area between z = 0 and z = 0.6 is 0.2257 and that between z = 0 and z = 0.2 is 0.0793]

c) Evaluate $\int_c \frac{e^z}{(z-1)(z-4)} dz$ where c is the circle $|z| = 2$ by using Cauchy's Integral formula.

d) Find half - range cosine series for

$$f(x) = 1, \quad 0 \le x \le 1$$
$$= x, \quad 1 \le x \le 2$$

e) Fit a second degree Parabola to the following data

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

Q.6 Attempt any three of the following. **09**

a) Find the Fourier series of

$$f(x) = x^3, \quad -\pi < x < \pi$$

b) If the probability that an individual suffers a bad reaction due to a certain injection is 0.001, determine the probability that out of 2000 individuals

1) exactly 4
2) more than 2 dindividuals will suffer a bad reaction

c) From 10 pairs of observations for x and y the following data is obtained : $n = 10,\ \sum x = 66,\ \sum y = 69,\ \sum x^2 = 476,\ \sum y^2 = 521,\ \sum xy = 485$. It was later found that two pairs of (correct) values.

x	y
4	6
9	8

were (wrongly) copied as

x	y
2	3
7	5

Calculate correct value of the correlation coefficient.

d) The equations of two regression lines obtained in a correlation analysis are $3x + 12y = 19,\ 3y + 9x = 16$. Find

1) mean values of x & y
2) coefficient of correlation

e) If $f(z) = u + iv$ is analytic and $u - v = e^x(\cos y - \sin y)$, find $f(z)$ in terms of z.

Q.7 Attempt any two of the following. **10**

a) Find the Fourier series expansion for $f(x) = x + \frac{x^2}{4}, -\pi < x < \pi$

b) Find the coefficient of correlation and the equations of lines of regression to the following data.

x	5	7	8	10	11	13	16
y	33	30	28	20	18	16	9

c) Evaluate $\int_0^{1+i} (x^2 - iy)dz,$ along the path

1) $y = x$ 2) $y = x^2$

SLR-FM-22

Seat No.	

Set S

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday,28-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Answer Book page No.3. Each questions carries one mark.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The Fourier expansion is the interval $[-4, 4]$ of the function $f(x) = -x, \quad -4 \le x \le 0$ $= \quad x \quad 0 \le x \le 4$ has _____.
   a) No sine terms b) No cosine terms
   c) Both cosine & sine terms d) None of these

2) The conditions for expansion of a function in Fourier series are known as ___.
   a) Harmonic b) Riemann's condition
   c) Dirichlets condition d) Periodic

3) If $\sum x_i = 21, \sum y_i = -7, n = 7$ and $b_{yx} = 3$ then the regression line of y on x is _____.
   a) $x + 3y = 10$ b) $x - 3y = 6$
   c) $3x - y = 10$ d) $3x - y = 70$

4) A continuous random variable has the following probability density function $f(x) = kx^2, 0 \le x \le 2$ then $k =$ _____.
   a) $\frac{8}{3}$ b) $\frac{3}{8}$
   c) $\frac{3}{2}$ d) $\frac{2}{3}$

5) If two regression coefficients are -0.1 and -0.9, then the value of r is ___.
   a) -0.3 b) 0.3
   c) 0.09 d) -0.03

6) The P.I. of $X = x.V$, where V is a function of x is _____.
   a) $\left[x + \frac{f^1(D)}{f(D)}\right]\frac{1}{f(D)}V$ b) $\left[x - \frac{1}{f(D)}f^1(D)\right]\frac{1}{f(D)}V$
   c) $\left[x - \frac{f(D)}{f^1(D)}\right]\frac{1}{f(D)}V$ d) $\left[x + \frac{1}{f^1(D)}f(D)\right]\frac{1}{f(D)}V$

7) The general solution of $(D^4 + 6D^2 + 9)y = 0$ is _____.
   a) $y = (C_1 + C_2x)\cos\sqrt{3}x + (C_3 + C_4x)\sin\sqrt{3}x$
   b) $y = (C_1 + C_2x)e^x + (C_3 + C_{4x})e^{-x}$
   c) $y = (C_1 + C_2)e^{-x} + (C_3 + C_4x)e^x$
   d) $y = (C_1 + C_2\cos x)e^x + (C_3 + C_4\sin x)e^x$

8) On putting $\log(5+2x) = Z$ the differential equation $(5+2x)\frac{d^2y}{dx^2} - 6(5+2x)\frac{dy}{dx} + 8y = 6x$ is transformed to _____.

a) $(D^2 + 4D + 2)y = \frac{3}{4}(e^z - 5)$ b) $(D^2 + 4D + 4)y = \frac{3}{4}(e^z - 5)$

c) $(D^2 - 4D + 2)y = \frac{3}{4}(e^z - 5)$ d) $(D^2 - 4D + 2)y = 3(e^z - 5)$

9) The solution of equation $p + q = pq$ is _____.

a) $z = ax + (a+1)y + c$

b) $z = (a+1)x + a(a-1)y + c$

c) $z = (a-1)x + a(a+1)y + c$

d) $z(a-1) = a(a-1)x + ay + c$

10) The solution of the equation $(mz - ny)p + (nx - lz)q = ly - mx$ is _____.

a) $\phi\,(\ell x + my + nz,\ x^2 + y^2 + z^2) = 0$

b) $\phi\,(\ell x - my + nz,\ x^2 + y^2 + z^2) = 0$

c) $\phi\,(\ell x + my + nz,\ x^2 + y^2 - z^2) = 0$

d) $\phi\,(\ell x + my + nz,\ x^2 - y^2 + z^2) = 0$

11) If $L\{f_1(t)\} = \phi_1(s)$ and $L\{f_2(t)\} = \phi_2(s)$, then $L^{-1}\{\phi_1(s)^*\phi_2(s)\} =$ _____.

a) $\int_0^1 f_1(u)f_2(t-u)du$ b) $\int_0^t f_1(t)f_2(t-u)du$

c) $\int_0^t f_1(u)f_2(t-u)du$ d) None of these

12) The value of integral $\int_0^\infty t^5 e^{-3t}dt$ is _____.

a) $\frac{1}{243}$ b) $\frac{40}{243}$

c) $\frac{4}{243}$ d) $\frac{80}{243}$

13) Polar form of C-R equation are _____.

a) $\frac{\partial u}{\partial \theta} = \frac{1}{r}\frac{\partial v}{\partial r}, \frac{\partial u}{\partial r} = r\frac{\partial v}{\partial \theta}$ b) $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}, \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$

c) $\frac{\partial u}{\partial r} = r\frac{\partial v}{\partial r}, \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$ d) None of these

14) $\int_c \frac{z+10}{z^2-4}dz$ Where C is the circle $|z| = 1$ is _____.

a) 2π b) -2π

c) $2\pi i$ d) 0

Seat No.	

Set **S**

S.E. (Part – II) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday,28-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.

Section – I

Q.2 Attempt any three. **09**

a) Solve: $(D^2 + a^2)y = \sin ax$

b) Solve: $(D^2 - 1)y = x \sin 3x + \cos x$

c) Solve: $p^2 - pq = 1 - z^2$

d) Find the inverse Laplace transform of the following by using convolution theorem $\frac{1}{s^2(s+1)^2}$

e) Find Laplace transform of the following

$$\int_0^t \frac{e^{-u} \sin u}{u} du$$

Q.3 Attempt any three. **09**

a) Solve: $(D^2 + 3D + 2)y = \sin(e^x)$

b) Solve: $(D^2 + 5D + 4)y = 3 - 2x$

c) Solve :$(1 + 2x)^2 \frac{d^2y}{dx^2} - 6(1 + 2x)\frac{dy}{dx} + 16y = 8(1 + 2x)^2$

d) Solve: $x(y^2 - z^2)p + y(z^2 - x^2)q - z(x^2 - y^2) = 0$

e) Find $L\{t(2 \sin 3t - 3 \cos 3t)\}$

Q.4 Attempt any two. **10**

a) The deflection of a struct with one end built-in and other supported and subjected to end - thrust P satisfies the equation $\frac{dy^2}{dx^2} + a^2 y = \frac{a^2 R}{P}(\ell - x)$ Given that $dy/dx = 0, y = 0$ when $x = 0$ and $y = 0$ when $n = \ell$ prove that $y = \frac{R}{P}\left[\frac{\sin ax}{a} - \ell \cos ax + \ell - x\right]$ where $a\ell = \tan a\ell$ and ℓ is the length of struct.

b) Solve the following equations by the method of separation of variables $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$ where $u(0, y) = 8e^{-3y}$

c) Using Laplace transformation solve the following differential equation. $(D^2 + 9)y = 18t, y(0) = 0, y'(0) = 0.$

Section – II

Q.5 Attempt any three of the following. **09**

a) Fit a Binominal distribution to the following data

x_i	0	1	2	3	4
$f(x)$	30	62	46	10	2

b) The size of hats is normally distributed with mean of 18.5 cms and standard deviation of 2.5 cms. How many hats in a total of 2000 will have sizes between

1) 18 cms and 20 cms
2) above 20 cms

[Given: For S.N.V,Z area between z = 0 and z = 0.6 is 0.2257 and that between z = 0 and z = 0.2 is 0.0793]

c) Evaluate $\int_c \frac{e^z}{(z-1)(z-4)} dz$ where c is the circle $|z| = 2$ by using Cauchy's Integral formula.

d) Find half - range cosine series for

$$f(x) = 1, \quad 0 \le x \le 1$$
$$= x, \quad 1 \le x \le 2$$

e) Fit a second degree Parabola to the following data

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

Q.6 Attempt any three of the following. **09**

a) Find the Fourier series of

$$f(x) = x^3, \quad -\pi < x < \pi$$

b) If the probability that an individual suffers a bad reaction due to a certain injection is 0.001, determine the probability that out of 2000 individuals

1) exactly 4
2) more than 2 dindividuals will suffer a bad reaction

c) From 10 pairs of observations for x and y the following data is obtained : $n = 10,\ \sum x = 66,\ \sum y = 69,\ \sum x^2 = 476,\ \sum y^2 = 521,\ \sum xy = 485$. It was later found that two pairs of (correct) values.

x	y
4	6
9	8

were (wrongly) copied as

x	y
2	3
7	5

Calculate correct value of the correlation coefficient.

d) The equations of two regression lines obtained in a correlation analysis are $3x + 12y = 19,\ 3y + 9x = 16$. Find

1) mean values of x & y
2) coefficient of correlation

e) If $f(z) = u + iv$ is analytic and $u - v = e^x(\cos y - \sin y)$, find $f(z)$ in terms of z.

Q.7 Attempt any two of the following. **10**

a) Find the Fourier series expansion for $f(x) = x + \frac{x^2}{4}, -\pi < x < \pi$

b) Find the coefficient of correlation and the equations of lines of regression to the following data.

x	5	7	8	10	11	13	16
y	33	30	28	20	18	16	9

c) Evaluate $\int_0^{1+i} (x^2 - iy)dz,$ along the path

1) $y = x$ 2) $y = x^2$

Seat No.	

Set **P**

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
3) Use of scientific non programmable calculator is allowed.
4) Figures to the right indicate full marks.
5) Assume suitable data if necessary and mention it clearly before the Solution.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The collapse load for a cantilever beam of span l subjected to uniformly distributed load is _____.
   a) 0.414 Mp/l b) 7.67 Mp/l
   c) 11.656 Mp/l d) none of the above

2) The thickness of base plate s determined from the _____.
   a) flexural strength of the plate
   b) shear strength of plate
   c) bearing strength of concrete pedestal
   d) punching criteria

3) The best arrangement to provide unified behavior in built up steel column is by _____.
   a) lacing b) battening
   c) tie plates d) perforated cover plates

4) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability respectively _____.
   a) 1 and 1.5 b) 1.2 and 1.0
   c) 1.0 and 1.0 d) 1.2 and 1.5

5) The economical spacing of a roof truss depends upon the _____.
   a) cost of purlin and cost of roof covering
   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

6) A gusset plate is subjected to _____.
   a) direct stress b) shear stress
   c) bending stress d) all of the above

7) A beam section is selected and provided on the basis of _____.
   a) section modulus b) deflection
   c) shear d) all of the above

8) The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to _____.
   a) Lo/10 b) Lo/15
   c) Lo/20 d) Lo

9) Battening is preferred when the _____.
   a) column carries axial load only
   b) space between two main components is not very large
   c) both a & b
   d) none of the above

10) The thickness of double flat lacing should not be less than _____.
   a) $1/30^{th}$ length between inner rivets
   b) $1/40^{th}$ length between inner rivets
   c) $1/50^{th}$ length between inner rivets
   d) $1/60^{th}$ length between inner rivets

11) The number of possible plastic hinges for a propped cantilever beam is _____.
   a) 2 b) 1
   c) 3 d) zero

12) The length of the plastic hinge for a simply supported beam of span L subjected to a central point load is of rectangular section.
   a) L/3 b) 2L/3
   c) L/2 d) none of the above

13) Design of beam is governed by shear _____.
   a) When the depth of the beam section is small
   b) when the large concentrated loads are placed near beam supports
   c) both a & b
   d) none of the above is correct

14) The thickness of battens flat should not be less than _____.
   a) $1/30^{th}$ length between inner line of rivets
   b) $1/40^{th}$ length between inner line of rivets
   c) $1/50^{th}$ length between inner line of rivets
   d) $1/60^{th}$ length between inner line of rivets

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Seat No.	

Set P

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 4 is compulsory and attempt any two from Section – I.
2) Q. No. 7 is compulsory and attempt any two from Section – II.
3) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
4) Use of scientific non programmable calculator is allowed.
5) Figures to the right indicate full marks.
6) Assume suitable data if necessary and mention it clearly before the Solution.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Determine the tensile strength of an ISMC 175 when it is connected to gusset plate through the two flanges by two rows of 16mm bolts with a connection length of 200 mm. **09**

Q.3 Design single angle section to carry a axial compression of 90KN. The centre to centre distance between end connection is 2.1m. Assume end connection is done by at least two bolts. Design end connection also. **09**

Q.4 Design a built up column with channel back to back to carry an axial factored load of 2100KN. The column has unsupported length of 7m and is effectively held in position at both ends but restrained against rotation at one end only. Design the suitable lacing system for the same. **10**

Q.5 **Attempt the following.** **09**
a) Salient features of limit state method of design of steel structures.
b) Advantages and disadvantages of welded connection over bolted connection.
c) Behaviour of bolted joints.

Section – II

Q.6 A fixed beam of 6m carries a uniformly distributed load of 60 KN/m on right hand 4.5m. The load factor is 1.15, yield stress is 23.2 KN/m^2, calculate the section modulus of the beam and locate the position of plastic hinges. **09**

Q.7 Design steel beam section for supporting roof of a big hall for the following data and apply the usual checks. Assume steel grade Fe410. **10**

Clear span = 6.5m
End bearing = 150mm
c/c spacing of beams = 3m
Imposed load on beam = 10 KN/m^2
Dead load = 4 KN/m^2
Restriction on beam depth 375mm

The compression flange of the beam is laterally supported throughout.

Q.8 Design I section purlin to support galvanized corrugated iron sheet roof. The purlins are 1.25 m apart over roof trusses spaced 5m centre to centre. The roof surface has inclination of 30° to the horizontal. The weight of corrugated iron sheet is 0.133KN/m^2, the weight of fixtures is 0.05KN/m^2. The design wind pressure for medium permeability is 1.25KN/m^2(outward) parallel to the ridge. **09**

Q.9 Design gusseted base for built up column consisting of 2nos ISMB 400 at a c/c distance of 300mm. It carries axial load of 1200KN. Use M20 grade of concrete for pedestal. **09**

Seat No.	

Set **Q**

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
3) Use of scientific non programmable calculator is allowed.
4) Figures to the right indicate full marks.
5) Assume suitable data if necessary and mention it clearly before the Solution.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to _____.
   a) Lo/10 b) Lo/15
   c) Lo/20 d) Lo

2) Battening is preferred when the _____.
   a) column carries axial load only
   b) space between two main components is not very large
   c) both a & b
   d) none of the above

3) The thickness of double flat lacing should not be less than _____.
   a) $1/30^{th}$ length between inner rivets
   b) $1/40^{th}$ length between inner rivets
   c) $1/50^{th}$ length between inner rivets
   d) $1/60^{th}$ length between inner rivets

4) The number of possible plastic hinges for a propped cantilever beam is _____.
   a) 2 b) 1
   c) 3 d) zero

5) The length of the plastic hinge for a simply supported beam of span L subjected to a central point load is of rectangular section.
   a) L/3 b) 2L/3
   c) L/2 d) none of the above

6) Design of beam is governed by shear _____.
   a) When the depth of the beam section is small
   b) when the large concentrated loads are placed near beam supports
   c) both a & b
   d) none of the above is correct

7) The thickness of battens flat should not be less than _____.
   a) $1/30^{th}$ length between inner line of rivets
   b) $1/40^{th}$ length between inner line of rivets
   c) $1/50^{th}$ length between inner line of rivets
   d) $1/60^{th}$ length between inner line of rivets

8) The collapse load for a cantilever beam of span l subjected to uniformly distributed load is _____.
   a) 0.414 Mp/l
   b) 7.67 Mp/l
   c) 11.656 Mp/l
   d) none of the above

9) The thickness of base plate s determined from the _____.
   a) flexural strength of the plate
   b) shear strength of plate
   c) bearing strength of concrete pedestal
   d) punching criteria

10) The best arrangement to provide unified behavior in built up steel column is by _____.
   a) lacing
   b) battening
   c) tie plates
   d) perforated cover plates

11) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability respectively _____.
   a) 1 and 1.5
   b) 1.2 and 1.0
   c) 1.0 and 1.0
   d) 1.2 and 1.5

12) The economical spacing of a roof truss depends upon the _____.
   a) cost of purlin and cost of roof covering
   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

13) A gusset plate is subjected to _____.
   a) direct stress
   b) shear stress
   c) bending stress
   d) all of the above

14) A beam section is selected and provided on the basis of _____.
   a) section modulus
   b) deflection
   c) shear
   d) all of the above

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Seat No.	

Set Q

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 4 is compulsory and attempt any two from Section – I.
2) Q. No. 7 is compulsory and attempt any two from Section – II.
3) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
4) Use of scientific non programmable calculator is allowed.
5) Figures to the right indicate full marks.
6) Assume suitable data if necessary and mention it clearly before the Solution.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Determine the tensile strength of an ISMC 175 when it is connected to gusset plate through the two flanges by two rows of 16mm bolts with a connection length of 200 mm. **09**

Q.3 Design single angle section to carry a axial compression of 90KN. The centre to centre distance between end connection is 2.1m. Assume end connection is done by at least two bolts. Design end connection also. **09**

Q.4 Design a built up column with channel back to back to carry an axial factored load of 2100KN. The column has unsupported length of 7m and is effectively held in position at both ends but restrained against rotation at one end only. Design the suitable lacing system for the same. **10**

Q.5 **Attempt the following.** **09**
a) Salient features of limit state method of design of steel structures.
b) Advantages and disadvantages of welded connection over bolted connection.
c) Behaviour of bolted joints.

Section – II

Q.6 A fixed beam of 6m carries a uniformly distributed load of 60 KN/m on right hand 4.5m. The load factor is 1.15, yield stress is 23.2 KN/m^2, calculate the section modulus of the beam and locate the position of plastic hinges. **09**

Q.7 Design steel beam section for supporting roof of a big hall for the following data and apply the usual checks. Assume steel grade Fe410. **10**

Clear span = 6.5m
End bearing = 150mm
c/c spacing of beams = 3m
Imposed load on beam = 10 KN/m^2
Dead load = 4 KN/m^2
Restriction on beam depth 375mm

The compression flange of the beam is laterally supported throughout.

Q.8 Design I section purlin to support galvanized corrugated iron sheet roof. The purlins are 1.25 m apart over roof trusses spaced 5m centre to centre. The roof surface has inclination of 30° to the horizontal. The weight of corrugated iron sheet is 0.133KN/m^2, the weight of fixtures is 0.05KN/m^2. The design wind pressure for medium permeability is 1.25KN/m^2(outward) parallel to the ridge. **09**

Q.9 Design gusseted base for built up column consisting of 2nos ISMB 400 at a c/c distance of 300mm. It carries axial load of 1200KN. Use M20 grade of concrete for pedestal. **09**

Seat No.	

Set **R**

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
3) Use of scientific non programmable calculator is allowed.
4) Figures to the right indicate full marks.
5) Assume suitable data if necessary and mention it clearly before the Solution.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The economical spacing of a roof truss depends upon the _____.
   a) cost of purlin and cost of roof covering
   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

2) A gusset plate is subjected to _____.
   a) direct stress b) shear stress
   c) bending stress d) all of the above

3) A beam section is selected and provided on the basis of _____.
   a) section modulus b) deflection
   c) shear d) all of the above

4) The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to _____.
   a) Lo/10 b) Lo/15
   c) Lo/20 d) Lo

5) Battening is preferred when the _____.
   a) column carries axial load only
   b) space between two main components is not very large
   c) both a & b
   d) none of the above

6) The thickness of double flat lacing should not be less than _____.
   a) $1/30^{th}$ length between inner rivets
   b) $1/40^{th}$ length between inner rivets
   c) $1/50^{th}$ length between inner rivets
   d) $1/60^{th}$ length between inner rivets

7) The number of possible plastic hinges for a propped cantilever beam is _____.
   a) 2 b) 1
   c) 3 d) zero

8) The length of the plastic hinge for a simply supported beam of span L subjected to a central point load is of rectangular section.
   a) L/3 b) 2L/3
   c) L/2 d) none of the above

9) Design of beam is governed by shear _____.
   a) When the depth of the beam section is small
   b) when the large concentrated loads are placed near beam supports
   c) both a & b
   d) none of the above is correct

10) The thickness of battens flat should not be less than _____.
   a) $1/30^{th}$ length between inner line of rivets
   b) $1/40^{th}$ length between inner line of rivets
   c) $1/50^{th}$ length between inner line of rivets
   d) $1/60^{th}$ length between inner line of rivets

11) The collapse load for a cantilever beam of span l subjected to uniformly distributed load is _____.
   a) 0.414 Mp/l
   b) 7.67 Mp/l
   c) 11.656 Mp/l
   d) none of the above

12) The thickness of base plate s determined from the _____.
   a) flexural strength of the plate
   b) shear strength of plate
   c) bearing strength of concrete pedestal
   d) punching criteria

13) The best arrangement to provide unified behavior in built up steel column is by _____.
   a) lacing
   b) battening
   c) tie plates
   d) perforated cover plates

14) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability respectively _____.
   a) 1 and 1.5
   b) 1.2 and 1.0
   c) 1.0 and 1.0
   d) 1.2 and 1.5

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Seat No.	

Set R

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 4 is compulsory and attempt any two from Section – I.
2) Q. No. 7 is compulsory and attempt any two from Section – II.
3) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
4) Use of scientific non programmable calculator is allowed.
5) Figures to the right indicate full marks.
6) Assume suitable data if necessary and mention it clearly before the Solution.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Determine the tensile strength of an ISMC 175 when it is connected to gusset plate through the two flanges by two rows of 16mm bolts with a connection length of 200 mm. **09**

Q.3 Design single angle section to carry a axial compression of 90KN. The centre to centre distance between end connection is 2.1m. Assume end connection is done by at least two bolts. Design end connection also. **09**

Q.4 Design a built up column with channel back to back to carry an axial factored load of 2100KN. The column has unsupported length of 7m and is effectively held in position at both ends but restrained against rotation at one end only. Design the suitable lacing system for the same. **10**

Q.5 **Attempt the following.** **09**
a) Salient features of limit state method of design of steel structures.
b) Advantages and disadvantages of welded connection over bolted connection.
c) Behaviour of bolted joints.

Section – II

Q.6 A fixed beam of 6m carries a uniformly distributed load of 60 KN/m on right hand 4.5m. The load factor is 1.15, yield stress is 23.2 KN/m^2, calculate the section modulus of the beam and locate the position of plastic hinges. **09**

Q.7 Design steel beam section for supporting roof of a big hall for the following data and apply the usual checks. Assume steel grade Fe410. **10**

Clear span = 6.5m
End bearing = 150mm
c/c spacing of beams = 3m
Imposed load on beam = 10 KN/m^2
Dead load = 4 KN/m^2
Restriction on beam depth 375mm

The compression flange of the beam is laterally supported throughout.

Q.8 Design I section purlin to support galvanized corrugated iron sheet roof. The purlins are 1.25 m apart over roof trusses spaced 5m centre to centre. The roof surface has inclination of 30° to the horizontal. The weight of corrugated iron sheet is 0.133KN/m^2, the weight of fixtures is 0.05KN/m^2. The design wind pressure for medium permeability is 1.25KN/m^2(outward) parallel to the ridge. **09**

Q.9 Design gusseted base for built up column consisting of 2nos ISMB 400 at a c/c distance of 300mm. It carries axial load of 1200KN. Use M20 grade of concrete for pedestal. **09**

Seat No.	

Set **S**

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
3) Use of scientific non programmable calculator is allowed.
4) Figures to the right indicate full marks.
5) Assume suitable data if necessary and mention it clearly before the Solution.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The thickness of double flat lacing should not be less than _____.
   a) 1/30th length between inner rivets
   b) 1/40th length between inner rivets
   c) 1/50th length between inner rivets
   d) 1/60th length between inner rivets

2) The number of possible plastic hinges for a propped cantilever beam is _____.
   a) 2 b) 1
   c) 3 d) zero

3) The length of the plastic hinge for a simply supported beam of span L subjected to a central point load is of rectangular section.
   a) L/3 b) 2L/3
   c) L/2 d) none of the above

4) Design of beam is governed by shear _____.
   a) When the depth of the beam section is small
   b) when the large concentrated loads are placed near beam supports
   c) both a & b
   d) none of the above is correct

5) The thickness of battens flat should not be less than _____.
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6) The collapse load for a cantilever beam of span l subjected to uniformly distributed load is _____.
   a) 0.414 Mp/l b) 7.67 Mp/l
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7) The thickness of base plate s determined from the _____.
   a) flexural strength of the plate
   b) shear strength of plate
   c) bearing strength of concrete pedestal
   d) punching criteria

8) The best arrangement to provide unified behavior in built up steel column is by _____.
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   b) battening
   c) tie plates
   d) perforated cover plates

9) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability respectively _____.
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   d) 1.2 and 1.5

10) The economical spacing of a roof truss depends upon the _____.
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11) A gusset plate is subjected to _____.
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13) The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to _____.
   a) Lo/10
   b) Lo/15
   c) Lo/20
   d) Lo

14) Battening is preferred when the _____.
   a) column carries axial load only
   b) space between two main components is not very large
   c) both a & b
   d) none of the above

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Seat No.	

Set S

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 4 is compulsory and attempt any two from Section – I.
2) Q. No. 7 is compulsory and attempt any two from Section – II.
3) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
4) Use of scientific non programmable calculator is allowed.
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6) Assume suitable data if necessary and mention it clearly before the Solution.
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Section – I

Q.2 Determine the tensile strength of an ISMC 175 when it is connected to gusset plate through the two flanges by two rows of 16mm bolts with a connection length of 200 mm. **09**

Q.3 Design single angle section to carry a axial compression of 90KN. The centre to centre distance between end connection is 2.1m. Assume end connection is done by at least two bolts. Design end connection also. **09**

Q.4 Design a built up column with channel back to back to carry an axial factored load of 2100KN. The column has unsupported length of 7m and is effectively held in position at both ends but restrained against rotation at one end only. Design the suitable lacing system for the same. **10**

Q.5 **Attempt the following.** **09**
a) Salient features of limit state method of design of steel structures.
b) Advantages and disadvantages of welded connection over bolted connection.
c) Behaviour of bolted joints.

Section – II

Q.6 A fixed beam of 6m carries a uniformly distributed load of 60 KN/m on right hand 4.5m. The load factor is 1.15, yield stress is 23.2 KN/m^2, calculate the section modulus of the beam and locate the position of plastic hinges. **09**

Q.7 Design steel beam section for supporting roof of a big hall for the following data and apply the usual checks. Assume steel grade Fe410. **10**

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Dead load = 4 KN/m^2
Restriction on beam depth 375mm

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Q.9 Design gusseted base for built up column consisting of 2nos ISMB 400 at a c/c distance of 300mm. It carries axial load of 1200KN. Use M20 grade of concrete for pedestal. **09**

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Seat No.	

Set P

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) If solid portion and void portion in a given mass of soil is same then porosity for this soil is _____.
   a) 1 b) 0.75
   c) 0.50 d) 0.25

2) Which factors do not affect the permeability of soil _____.
   a) Shape of soil particle b) Size of soil particle
   c) Specific gravity d) Porosity

3) Optimum moisture content of which soil is more at a given compaction effort _____.
   a) Silt b) Clay
   c) Sand d) Sandy clay

4) Which roller is most suitable for compacting clayey soil?
   a) Pneumatic b) Vibratory
   c) Sheep foot d) smooth wheel

5) Coefficient of volume compressibility is the slope of which of following curve _____.
   a) e - p curve b) e - log p curve
   c) flow curve d) None of these

6) If the soil is dry then percentage air void for this soil is _____.
   a) 1 b) 0
   c) 0.50 d) None of these

7) Permeability of the soil is more when the degree of saturation of soil is __.
   a) 0% b) 25%
   c) 50% d) 100%

8) In compaction test graph is plotted between water content and _____ density of soil.
   a) Bulk b) Submerged
   c) Dry d) Soil solid

9) Process of removal of water from the soil is called _____.
   a) compaction b) consolidation
   c) compression d) none of these

10) Graphical method for finding earth pressure is given by _____.
   a) Terzaghi b) Cassagrande
   c) Boussinesq d) Culman

11) Vane shear test is commonly used to find shear strength of _____ soil.
   a) Clayey b) Sandy
   c) Silty d) Soft clayey soil

12) Height of fall of rammer in modified compaction test is _____.
   a) 250mm b) 310mm
   c) 400mm d) 450mm

13) Which of following shear strength test is quick one?
   a) UU test b) CU test
   c) CD test d) None of these

14) Standard size of soil sample used for conducting unconfined compression test is _____.
   a) 30mm dia. and 60mm height b) 38mm dia. and 76mm height
   c) 50 cm dia and 100 cm length d) 10 cm dia and 20 cm length

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Seat No.	

Set P

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q N 2 is compulsory and Q N 6 is compulsory and attempt any two question from each section.
2) Reinforce your answer with illustrative sketches where-ever possible.
3) Assume suitable data if required
4) Do write units for the calculated quantities.

Section - I

Q.2 Answer any four questions: **08**

a) Draw grain size distribution curve and show D_{10}, D_{30} and D_{60} on it.

b) Name two soil belonging to Fine grained soil and that belonging to coarse grained soil.

c) Define air content and degree of saturation.

d) Draw labelled sketch of triaxial shear apparatus (minimum four parts labeled).

e) Draw graph used to calculate liquid limit for soil and show liquid limit on it.

Q.3 a) With suitable notation prove the relation $e = \frac{wG}{S_r}$ **05**

b) A soil sample has equal amounts of voids and solids, and also amount of air and water in terms of volume is same; for this soil find **05**
1) void ratio of the soil
2) porosity
3) air content
4) % air void and
5) degree of saturation

Q.4 a) What is permeability of soil? Explain any four factors affecting permeability of soil. **05**

b) Soil strata of 3 layers of thickness 1, 1.5, and 2.0 m having the coefficient permeability of $2X10^{-3}$, $1.5X10^{-3}$ and $3X10^{-3}$ cm/s respectively. Estimate the average coefficient of permeability in the direction of **05**
1) Parallel to the bedding plane
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Q.5 a) What are different types of shear test based on drainage of soil? **05**

b) Consolidated undrained test were carried out on a soil sample and following observations were recorded. **05**

Test	Cell pressure (kPa)	Deviator stress at failure (kPa)
1	250	179
2	350	242

Determine shear parameters of soil both in terms of total stress and effective stress, if another identical soil specimen was tested at a cell pressure of 400kPa, what would be deviator stress at failure.

Section – II

Q.6 Answer any four questions: **08**

a) Define Maximum dry density and optimum moisture content.

b) Define over-consolidation ratio and how it is used to classify the soil.

c) Draw compaction curve along with zero air void line (label all parts).

d) Draw typical e - p curve and label various parts of it.

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Q.7 a) Explain step wise procedure for field compaction of soil. **05**

b) The following are the results of a standard compaction test performed on a sample of soil. **05**

Moisture content (%)	7.7	11.5	14.6	17.5	19.7	21.2
Mass of wet soil (kg)	1.7	1.89	2.05	1.99	1.96	1.92

1) Plot compaction curve and hence find OMC and MDD
2) Plot 10% air void line
3) What is the air content and degree of saturation corresponding to MDD?

Q.8 a) Explain e- log p curve and derive the coefficient associated with it. **05**

b) A clay specimen was tested in a laboratory consolidation device, which was 12.7 mm thick and the top and the bottom boundaries were drained. A 50% consolidation time on the specimen was obtained as 28.4 minutes. Determine the following: **05**

1) Time for 50% consolidation in the field with this soil with a 2.5 m thickness where only the top layer is drained
2) Time for 90% consolidation in the field with this soil with a 2.5 m thickness where only the top layer is drained

Q.9 a) Enlist the assumptions of Rankine's Theory of earth pressure. **05**

b) Calculate total active earth pressure and its position with respect to bottom of wall acting on a retaining wall of height 9m retaining two layered soil on back side of it. Top layer 4.2m thick having Υ=18kN/m^3, c = 0 and $\varphi = 27^0$ followed by second layer having Υ=19kN/m^3, c = 0 and $\varphi = 30^0$. **05**

SLR-FM-24

Seat No.	

Set Q

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In compaction test graph is plotted between water content and _____ density of soil.
   a) Bulk b) Submerged
   c) Dry d) Soil solid

2) Process of removal of water from the soil is called _____.
   a) compaction b) consolidation
   c) compression d) none of these

3) Graphical method for finding earth pressure is given by _____.
   a) Terzaghi b) Cassagrande
   c) Boussinesq d) Culman

4) Vane shear test is commonly used to find shear strength of _____ soil.
   a) Clayey b) Sandy
   c) Silty d) Soft clayey soil

5) Height of fall of rammer in modified compaction test is _____.
   a) 250mm b) 310mm
   c) 400mm d) 450mm

6) Which of following shear strength test is quick one?
   a) UU test b) CU test
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7) Standard size of soil sample used for conducting unconfined compression test is _____.
   a) 30mm dia. and 60mm height b) 38mm dia. and 76mm height
   c) 50 cm dia and 100 cm length d) 10 cm dia and 20 cm length

8) If solid portion and void portion in a given mass of soil is same then porosity for this soil is _____.
   a) 1 b) 0.75
   c) 0.50 d) 0.25

9) Which factors do not affect the permeability of soil _____.
   a) Shape of soil particle b) Size of soil particle
   c) Specific gravity d) Porosity

10) Optimum moisture content of which soil is more at a given compaction effort _____.
   a) Silt b) Clay
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11) Which roller is most suitable for compacting clayey soil?
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   c) Sheep foot d) smooth wheel

12) Coefficient of volume compressibility is the slope of which of following curve _____.
   a) e - p curve b) e - log p curve
   c) flow curve d) None of these

13) If the soil is dry then percentage air void for this soil is _____.
   a) 1 b) 0
   c) 0.50 d) None of these

14) Permeability of the soil is more when the degree of saturation of soil is __.
   a) 0% b) 25%
   c) 50% d) 100%

SLR-FM-24

Seat No.	

Set Q

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q N 2 is compulsory and Q N 6 is compulsory and attempt any two question from each section.
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4) Do write units for the calculated quantities.

Section - I

Q.2 Answer any four questions: **08**

a) Draw grain size distribution curve and show D_{10}, D_{30} and D_{60} on it.
b) Name two soil belonging to Fine grained soil and that belonging to coarse grained soil.
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d) Draw labelled sketch of triaxial shear apparatus (minimum four parts labeled).
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Q.3 a) With suitable notation prove the relation $e = \frac{wG}{S_r}$ **05**

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b) Consolidated undrained test were carried out on a soil sample and following observations were recorded. **05**

Test	Cell pressure (kPa)	Deviator stress at failure (kPa)
1	250	179
2	350	242

Determine shear parameters of soil both in terms of total stress and effective stress, if another identical soil specimen was tested at a cell pressure of 400kPa, what would be deviator stress at failure.

Section – II

Q.6 Answer any four questions: **08**

a) Define Maximum dry density and optimum moisture content.

b) Define over-consolidation ratio and how it is used to classify the soil.

c) Draw compaction curve along with zero air void line (label all parts).

d) Draw typical e - p curve and label various parts of it.

e) Write any four analogy between spring model and saturated soil (consolidation).

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Moisture content (%)	7.7	11.5	14.6	17.5	19.7	21.2
Mass of wet soil (kg)	1.7	1.89	2.05	1.99	1.96	1.92

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b) A clay specimen was tested in a laboratory consolidation device, which was 12.7 mm thick and the top and the bottom boundaries were drained. A 50% consolidation time on the specimen was obtained as 28.4 minutes. Determine the following: **05**

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Q.9 a) Enlist the assumptions of Rankine's Theory of earth pressure. **05**

b) Calculate total active earth pressure and its position with respect to bottom of wall acting on a retaining wall of height 9m retaining two layered soil on back side of it. Top layer 4.2m thick having Υ=18kN/m^3, c = 0 and $\varphi = 27^0$ followed by second layer having Υ=19kN/m^3, c = 0 and $\varphi = 30^0$. **05**

SLR-FM-24

Seat No.	

Set R

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Coefficient of volume compressibility is the slope of which of following curve _____.
   a) e - p curve b) e - log p curve
   c) flow curve d) None of these

2) If the soil is dry then percentage air void for this soil is _____.
   a) 1 b) 0
   c) 0.50 d) None of these

3) Permeability of the soil is more when the degree of saturation of soil is __.
   a) 0% b) 25%
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SLR-FM-24

Seat No.	

Set R

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q N 2 is compulsory and Q N 6 is compulsory and attempt any two question from each section.
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Section - I

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a) Draw grain size distribution curve and show D_{10}, D_{30} and D_{60} on it.

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c) Define air content and degree of saturation.

d) Draw labelled sketch of triaxial shear apparatus (minimum four parts labeled).

e) Draw graph used to calculate liquid limit for soil and show liquid limit on it.

Q.3 a) With suitable notation prove the relation $e = \frac{wG}{S_r}$ **05**

b) A soil sample has equal amounts of voids and solids, and also amount of air and water in terms of volume is same; for this soil find **05**

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Q.5 a) What are different types of shear test based on drainage of soil? **05**

b) Consolidated undrained test were carried out on a soil sample and following observations were recorded. **05**

Test	Cell pressure (kPa)	Deviator stress at failure (kPa)
1	250	179
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Determine shear parameters of soil both in terms of total stress and effective stress, if another identical soil specimen was tested at a cell pressure of 400kPa, what would be deviator stress at failure.

Section – II

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a) Define Maximum dry density and optimum moisture content.

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b) Calculate total active earth pressure and its position with respect to bottom of wall acting on a retaining wall of height 9m retaining two layered soil on back side of it. Top layer 4.2m thick having Υ=18kN/m^3, c = 0 and $\varphi = 27^0$ followed by second layer having Υ=19kN/m^3, c = 0 and $\varphi = 30^0$. **05**

Seat No.	

Set **S**

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Graphical method for finding earth pressure is given by _____.
   a) Terzaghi b) Cassagrande
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2) Vane shear test is commonly used to find shear strength of _____ soil.
   a) Clayey b) Sandy
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SLR-FM-24

Seat No.	

Set S

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q N 2 is compulsory and Q N 6 is compulsory and attempt any two question from each section.
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Section - I

Q.2 Answer any four questions: **08**

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Section – II

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SLR-FM-25

Seat No.	

Set P

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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4) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Acidity in water is caused due to _____.
   a) Mineral acids b) Iron sulphate
   c) Free CO_2 d) All of the above

2) Turbidity of raw water is a measure of _____.
   a) Suspended solids b) B. O. D.
   c) Acidity of water d) None of these

3) Hardness of water is caused due to ____.
   a) Calcium sulphate b) Calcium Nitrates
   c) Magnesium sulphate d) None of the above

4) Mostly used coagulant, is _____.
   a) Chlorine b) Lime
   c) Alum d) Bleaching Powder

5) Aeration process is useful for the removal of _____.
   a) Odour b) Suspended solids
   c) Total solids d) All of the above

6) Carbonates in water produce _____.
   a) temporary hardness b) permanent hardness
   c) acidity d) Alkanity

7) _____ is determined by titrating with standard EDTA solution & Eriochrome black T- indicator.
   a) Nitrates b) Hardness
   c) Chlorides d) Turbidity

8) For a city developed haphazardly, the layout of distribution pipes preferred to, is _____.
   a) Radial system b) Ring system
   c) Dead end system d) Iron grid system

9) Water losses in water supply is assumed as _____.
   a) Test pressure b) Working pressure
   c) Pipe pressure d) Design pressure

10) _____ is the pipe connecting to storage tank various fixtures and taps.
   a) Distributing pipe b) Supply pipe
   c) Antisiphonage pipe d) Service pipe

11) _____ can follow direct routes and require shorter length of conduits.
   a) Gravity conduit b) Aqueduct
   c) Tunnels d) Pressure conduits

12) To control the wastage of water _____ measures are taken.
   a) Pipe joints b) Water taps
   c) Zoning system d) All of the above

13) Generally _____ supply will reduce.
   a) Continuous b) Intermittent
   c) Both a) and b) d) None of these

14) Analysis of pipe networks of distribution system is calculated by _____.
   a) Discharge in pipelines b) Equivalent pipe method
   c) Computation of pressure d) Mass curve method

SLR-FM-25

Seat No.	

Set P

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Solve any two from the remaining questions from each section.
3) Figure to the right indicates full marks
4) Assume suitable data wherever required and mention it clearly.
5) Use of non – programmable calculator is allowed.

Section – I

Q.2 a) Write the values of drinking water standards. **03**
1) pH
2) Akalinty
3) Hardness
4) Turbidity
5) Colour
6) Chlorides

b) Population of 5 decades is given below: **07**

Year	1960	1970	1980	1990	2000
Population	35000	38000	40000	42000	49000

Determine the population in year 2020 by geometrical increase method and incremental increase method.

Q.3 a) Which equation to be used to find settling velocity? Derive the formula for the same. **04**

b) A settling tank is designed for an overflow rate of 6000 lit/m^2/hr. What percentage of particles of diameter. **05**
1) 0.06mm and
2) 0.03mm will be removed in this tank?
Temperature of water is 27^0C and Sp. Gr. of particle are 2.65.

Q.4 a) Differentiate slow sand and rapid sand filter with respect to following points. **03**

b) Design a Flocullator for a flow of 7 MLD. Assume suitable data. **06**

Q.5 Write a short note on (any three) **09**
a) Chemistry of chlorination
b) Zeolite method
c) Coagulation
d) Aeration

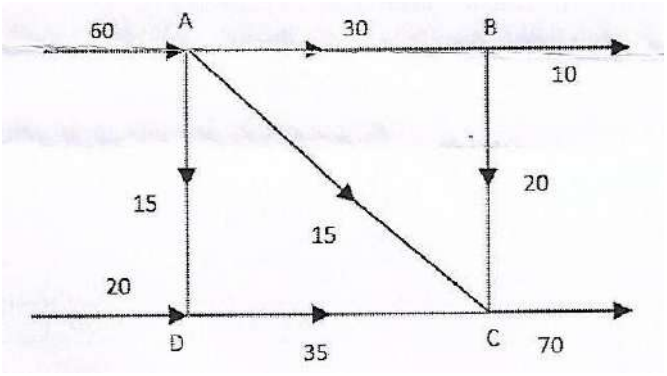
Section - II

Q.6 **a)** Explain with neat sketch dead end system of distribution system. **05**

b) Give drawbacks of intermittent system. **05**

Q.7 **a)** Explain the analytical method of fixing the capacity of service reservoir. **03**

b) Calculate discharge through various pipes using Hardy cross method if the K values in the expression for loss head $h_f = kQ^2, \& \ AB, BC, AC, AD, DC$ are 4,1,3,2 & 1 respectively, find discharge through each pipe & indicate direction of flow. Take two trials. **06**

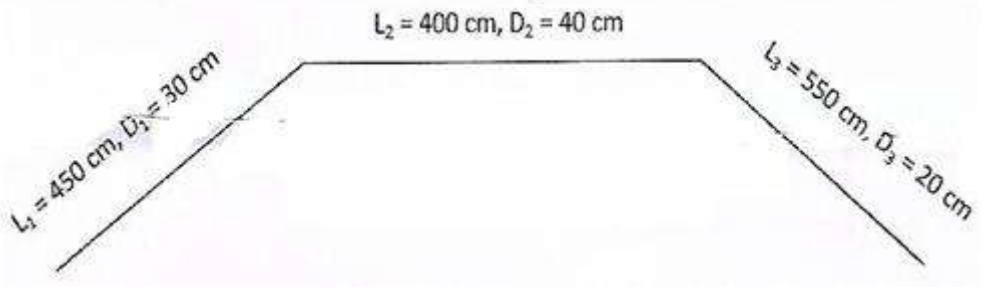


Q.8 **a)** Enumerate various corrosion control methods. **04**

b) Find the equivalent of 30cm equivalent diameter pipe of the network shown below by **05**

1) Darcy Weisbach equation
2) Hazen William's formula

Note: L_1, L_2, L_3 are lengths & D_1, D_2, D_3 are diameters.



Q.9 Write short notes on any three of the following: **09**

a) Check valve
b) Advantages of pressurized water supply system
c) Water meter
d) Fire demand

Seat No.	

Set **Q**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever required and mention it clearly.
4) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) For a city developed haphazardly, the layout of distribution pipes preferred to, is _____.
   a) Radial system b) Ring system
   c) Dead end system d) Iron grid system

2) Water losses in water supply is assumed as _____.
   a) Test pressure b) Working pressure
   c) Pipe pressure d) Design pressure

3) _____ is the pipe connecting to storage tank various fixtures and taps.
   a) Distributing pipe b) Supply pipe
   c) Antisiphonage pipe d) Service pipe

4) _____ can follow direct routes and require shorter length of conduits.
   a) Gravity conduit b) Aqueduct
   c) Tunnels d) Pressure conduits

5) To control the wastage of water _____ measures are taken.
   a) Pipe joints b) Water taps
   c) Zoning system d) All of the above

6) Generally _____ supply will reduce.
   a) Continuous b) Intermittent
   c) Both a) and b) d) None of these

7) Analysis of pipe networks of distribution system is calculated by _____.
   a) Discharge in pipelines b) Equivalent pipe method
   c) Computation of pressure d) Mass curve method

8) Acidity in water is caused due to _____.
   a) Mineral acids b) Iron sulphate
   c) Free CO_2 d) All of the above

9) Turbidity of raw water is a measure of _____.
   a) Suspended solids b) B. O. D.
   c) Acidity of water d) None of these

10) Hardness of water is caused due to ____.
   a) Calcium sulphate b) Calcium Nitrates
   c) Magnesium sulphate d) None of the above

11) Mostly used coagulant, is _____.
   a) Chlorine b) Lime
   c) Alum d) Bleaching Powder

12) Aeration process is useful for the removal of _____.
   a) Odour b) Suspended solids
   c) Total solids d) All of the above

13) Carbonates in water produce _____.
   a) temporary hardness b) permanent hardness
   c) acidity d) Alkanity

14) _____ is determined by titrating with standard EDTA solution & Eriochrome black T- indicator.
   a) Nitrates b) Hardness
   c) Chlorides d) Turbidity

Seat No.	

Set **Q**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Solve any two from the remaining questions from each section.
3) Figure to the right indicates full marks
4) Assume suitable data wherever required and mention it clearly.
5) Use of non – programmable calculator is allowed.

Section – I

Q.2 a) Write the values of drinking water standards. **03**
1) pH
2) Akalinty
3) Hardness
4) Turbidity
5) Colour
6) Chlorides

b) Population of 5 decades is given below: **07**

Year	1960	1970	1980	1990	2000
Population	35000	38000	40000	42000	49000

Determine the population in year 2020 by geometrical increase method and incremental increase method.

Q.3 a) Which equation to be used to find settling velocity? Derive the formula for the same. **04**

b) A settling tank is designed for an overflow rate of 6000 lit/m^2/hr. What percentage of particles of diameter. **05**
1) 0.06mm and
2) 0.03mm will be removed in this tank?
Temperature of water is 27^0C and Sp. Gr. of particle are 2.65.

Q.4 a) Differentiate slow sand and rapid sand filter with respect to following points. **03**

b) Design a Flocullator for a flow of 7 MLD. Assume suitable data. **06**

Q.5 Write a short note on (any three) **09**
a) Chemistry of chlorination
b) Zeolite method
c) Coagulation
d) Aeration

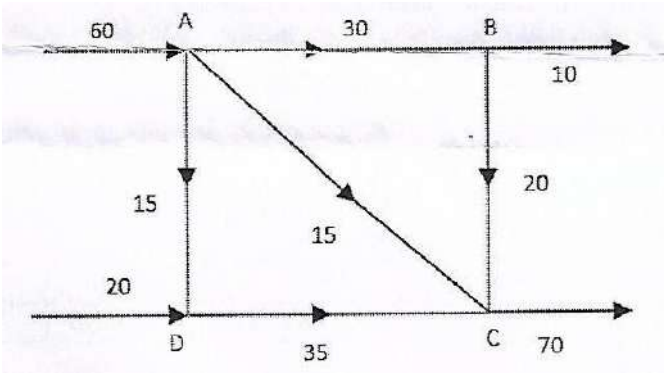
Section - II

Q.6 **a)** Explain with neat sketch dead end system of distribution system. **05**

b) Give drawbacks of intermittent system. **05**

Q.7 **a)** Explain the analytical method of fixing the capacity of service reservoir. **03**

b) Calculate discharge through various pipes using Hardy cross method if the K values in the expression for loss head $h_f = kQ^2$, & AB, BC, AC, AD, DC are 4,1,3,2 & 1 respectively, find discharge through each pipe & indicate direction of flow. Take two trials. **06**

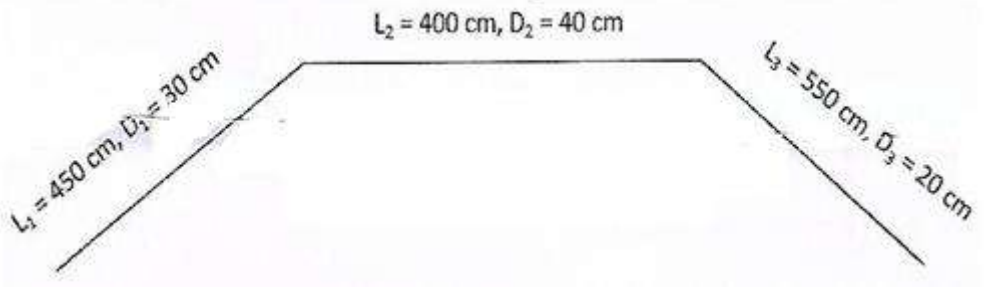


Q.8 **a)** Enumerate various corrosion control methods. **04**

b) Find the equivalent of 30cm equivalent diameter pipe of the network shown below by **05**

1) Darcy Weisbach equation
2) Hazen William's formula

Note: L_1, L_2, L_3 are lengths & D_1, D_2, D_3 are diameters.



Q.9 Write short notes on any three of the following: **09**

a) Check valve
b) Advantages of pressurized water supply system
c) Water meter
d) Fire demand

Seat No.	

Set **R**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever required and mention it clearly.
4) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Aeration process is useful for the removal of _____.
   a) Odour b) Suspended solids
   c) Total solids d) All of the above

2) Carbonates in water produce _____.
   a) temporary hardness b) permanent hardness
   c) acidity d) Alkanity

3) _____ is determined by titrating with standard EDTA solution & Eriochrome black T- indicator.
   a) Nitrates b) Hardness
   c) Chlorides d) Turbidity

4) For a city developed haphazardly, the layout of distribution pipes preferred to, is _____.
   a) Radial system b) Ring system
   c) Dead end system d) Iron grid system

5) Water losses in water supply is assumed as _____.
   a) Test pressure b) Working pressure
   c) Pipe pressure d) Design pressure

6) _____ is the pipe connecting to storage tank various fixtures and taps.
   a) Distributing pipe b) Supply pipe
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7) _____ can follow direct routes and require shorter length of conduits.
   a) Gravity conduit b) Aqueduct
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8) To control the wastage of water _____ measures are taken.
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   c) Zoning system d) All of the above

9) Generally _____ supply will reduce.
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   c) Both a) and b) d) None of these

10) Analysis of pipe networks of distribution system is calculated by _____.
   a) Discharge in pipelines
   b) Equivalent pipe method
   c) Computation of pressure
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11) Acidity in water is caused due to _____.
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   d) All of the above

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   d) None of these

13) Hardness of water is caused due to ____.
   a) Calcium sulphate
   b) Calcium Nitrates
   c) Magnesium sulphate
   d) None of the above

14) Mostly used coagulant, is _____.
   a) Chlorine
   b) Lime
   c) Alum
   d) Bleaching Powder

Seat No.	

Set **R**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
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Section – I

Q.2 a) Write the values of drinking water standards. **03**
1) pH
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3) Hardness
4) Turbidity
5) Colour
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b) Population of 5 decades is given below: **07**

Year	1960	1970	1980	1990	2000
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Q.3 a) Which equation to be used to find settling velocity? Derive the formula for the same. **04**

b) A settling tank is designed for an overflow rate of 6000 lit/m^2/hr. What percentage of particles of diameter. **05**
1) 0.06mm and
2) 0.03mm will be removed in this tank?
Temperature of water is 27^0C and Sp. Gr. of particle are 2.65.

Q.4 a) Differentiate slow sand and rapid sand filter with respect to following points. **03**

b) Design a Flocullator for a flow of 7 MLD. Assume suitable data. **06**

Q.5 Write a short note on (any three) **09**
a) Chemistry of chlorination
b) Zeolite method
c) Coagulation
d) Aeration

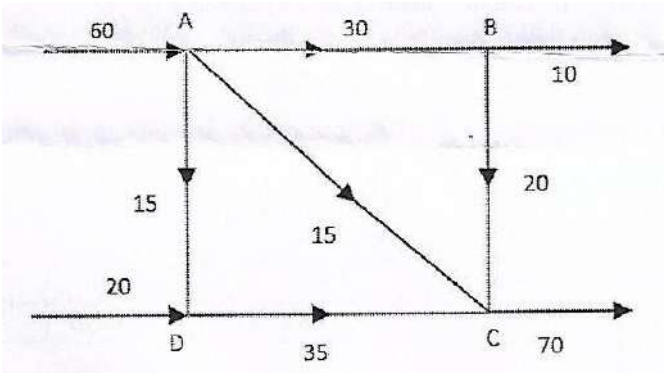
Section - II

Q.6 **a)** Explain with neat sketch dead end system of distribution system. **05**

b) Give drawbacks of intermittent system. **05**

Q.7 **a)** Explain the analytical method of fixing the capacity of service reservoir. **03**

b) Calculate discharge through various pipes using Hardy cross method if the K values in the expression for loss head $h_f = kQ^2, \& \ AB, BC, AC, AD, DC$ are 4,1,3,2 & 1 respectively, find discharge through each pipe & indicate direction of flow. Take two trials. **06**



Q.8 **a)** Enumerate various corrosion control methods. **04**

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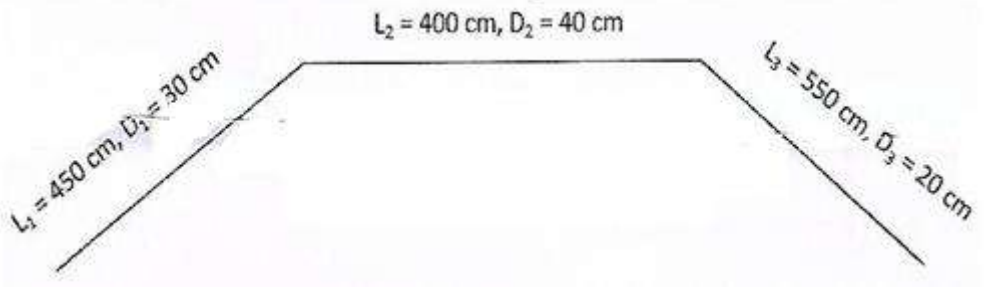

Q.9 Write short notes on any three of the following: **09**

a) Check valve
b) Advantages of pressurized water supply system
c) Water meter
d) Fire demand

SLR-FM-25

Seat No.	

Set S

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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4) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) _____ is the pipe connecting to storage tank various fixtures and taps.
   a) Distributing pipe b) Supply pipe
   c) Antisiphonage pipe d) Service pipe

2) _____ can follow direct routes and require shorter length of conduits.
   a) Gravity conduit b) Aqueduct
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3) To control the wastage of water _____ measures are taken.
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14) Water losses in water supply is assumed as _____.
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Seat No.	

Set **S**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Solve any two from the remaining questions from each section.
3) Figure to the right indicates full marks
4) Assume suitable data wherever required and mention it clearly.
5) Use of non – programmable calculator is allowed.

Section – I

Q.2 a) Write the values of drinking water standards. **03**
1) pH
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3) Hardness
4) Turbidity
5) Colour
6) Chlorides

b) Population of 5 decades is given below: **07**

Year	1960	1970	1980	1990	2000
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Q.3 a) Which equation to be used to find settling velocity? Derive the formula for the same. **04**

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2) 0.03mm will be removed in this tank?
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Q.4 a) Differentiate slow sand and rapid sand filter with respect to following points. **03**

b) Design a Flocullator for a flow of 7 MLD. Assume suitable data. **06**

Q.5 Write a short note on (any three) **09**
a) Chemistry of chlorination
b) Zeolite method
c) Coagulation
d) Aeration

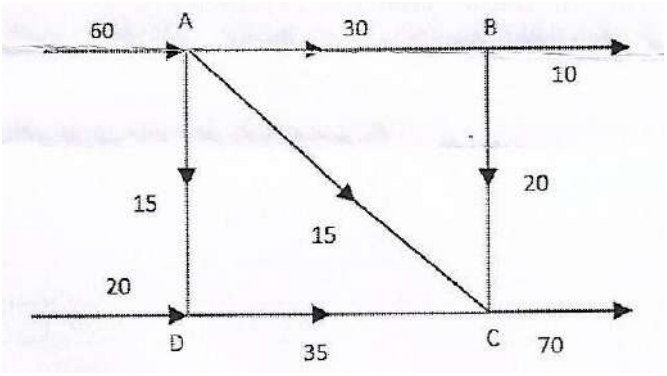
Section - II

Q.6 **a)** Explain with neat sketch dead end system of distribution system. **05**

b) Give drawbacks of intermittent system. **05**

Q.7 **a)** Explain the analytical method of fixing the capacity of service reservoir. **03**

b) Calculate discharge through various pipes using Hardy cross method if the K values in the expression for loss head $h_f = kQ^2$, & AB, BC, AC, AD, DC are 4,1,3,2 & 1 respectively, find discharge through each pipe & indicate direction of flow. Take two trials. **06**



Q.8 **a)** Enumerate various corrosion control methods. **04**

b) Find the equivalent of 30cm equivalent diameter pipe of the network shown below by **05**

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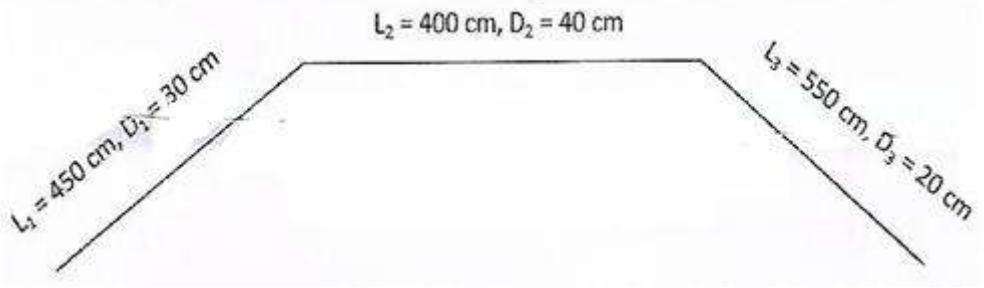
2) Hazen William's formula

Note: L_1, L_2, L_3 are lengths & D_1, D_2, D_3 are diameters.



Q.9 Write short notes on any three of the following: **09**

a) Check valve
b) Advantages of pressurized water supply system
c) Water meter
d) Fire demand

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Seat No.	

Set P

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The maximum quantity of water that is estimated to remain available in a storage reservoir for supply, even during worst dry periods, is known as it _____.
   a) Firm yield b) Design yield
   c) Reservoir yield d) Primary yield

2) The 'surcharge storage' in a dam reservoir is the volume of water stored between _____.
   a) minimum and maximum reservoir levels
   b) minimum and normal reservoir levels
   c) normal and maximum reservoir levels
   d) none of the above

3) Transverse joint in concrete gravity dams are the _____.
   a) horizontal construction joints at each lift height
   b) vertical construction joints full of height and width
   c) diagonal construction joints for torsion
   d) none of the above

4) In order to economise on the provided section of a concrete gravity dam, attempts are made to reduce the uplift, by _____.
   a) providing drainage gallery to collect seepage water
   b) constructing cutoff under upstream face
   c) pressure grouting in dam foundation
   d) all the above methods

5) When seepage takes place through the body of an earthen dam, it leads to _____.
   a) Development of pore pressures in the dam body
   b) Reduction in the shear strength of the dam
   c) Reduction in the developed shear stresses in the dam
   d) Both a & b

6) When the water level standing against an earthen embankment, suddenly falls down, then there is an imminent risk of sliding failure, to the _____.
   a) upstream slope b) downstream slope
   c) both a & b d) none of these

7) When the crest of an ogee spillway is designed to be in accordance with the lower nappe of a free falling water jet over a duly ventilated sharp crested weir, then theoretically _____.
   a) the pressure on the spillway crest always be zero (i.e. atmospheric pressure)
   b) the pressure on the spillway crest will be zero at design head only
   c) the pressure on the spillway crest will always be negative
   d) the pressure on the spillway crest will always be positive

8) Bligh's theory, as applied to the design of weirs and barrages on permeable foundations, account for _____.
   a) hydrostatic forces only
   b) hydrodynamic forces only
   c) both a and b
   d) none of them

9) The safety of a hydraulic structure founded on previous foundation can be ensured _____.
   a) by providing sufficient length of its concrete floor
   b) by providing sufficient depth of its concrete floor
   c) by providing a downstream cutoff of some reasonable depth
   d) all of the above

10) An alluvial river increases its length by meandering due to _____.
   a) variation of discharge
   b) variation of land topography
   c) both a and b
   d) none of the above

11) The upstream angle of inclination of a repelling groyne with normal to the bank line, is of the order of _____.
   a) 5 to 10^{o}
   b) 10 to 30^{o}
   c) 30 to 50^{o}
   d) 70 to 90^{o}

12) Identify the correct statement in regard to hydropower _____.
   a) hydropower stations are generally labour oriented
   b) Gestation period for hydro-power plant is usually small
   c) the hydro generators give high efficiency over a wide range of load
   d) in a hydropower scheme, the firm power is usually high, as compared to total power

13) A run off river plant for hydro power generation is essentially a _____.
   a) high head scheme
   b) low head scheme
   c) medium head scheme
   d) any of these

14) You have to select turbines for a hydropower plant, working on 150m head. The water is sandy and load on the plant is highly variable. Which type of turbines will you generally recommend?
   a) Pelton's turbines
   b) Francis turbines
   c) Kaplan turbines
   d) Any of them will do

Seat No.	

Set **P**

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.3 and Q.No.9 are compulsory.
2) Attempt any two questions from each section

Section – I

Q.2 **a)** Explain the mass curve method that can be used for determining reservoir capacity for fulfilling the given demand. **05**

b) Discuss with a neat sketch, the various storage zones and control levels of the dam reservoir. **04**

Q.3 **a)** Figure shows a cross section of non-overflow section of a gravity dam built of concrete. Calculate the maximum vertical stress at the heel and toe of the dam. Assume weight of concrete as 23.5 kN/m^3. Upstream water level is at Maximum Water level (285m) tail water depth is 6m as shown in Figure 1. Neglect earthquake effects. **10**

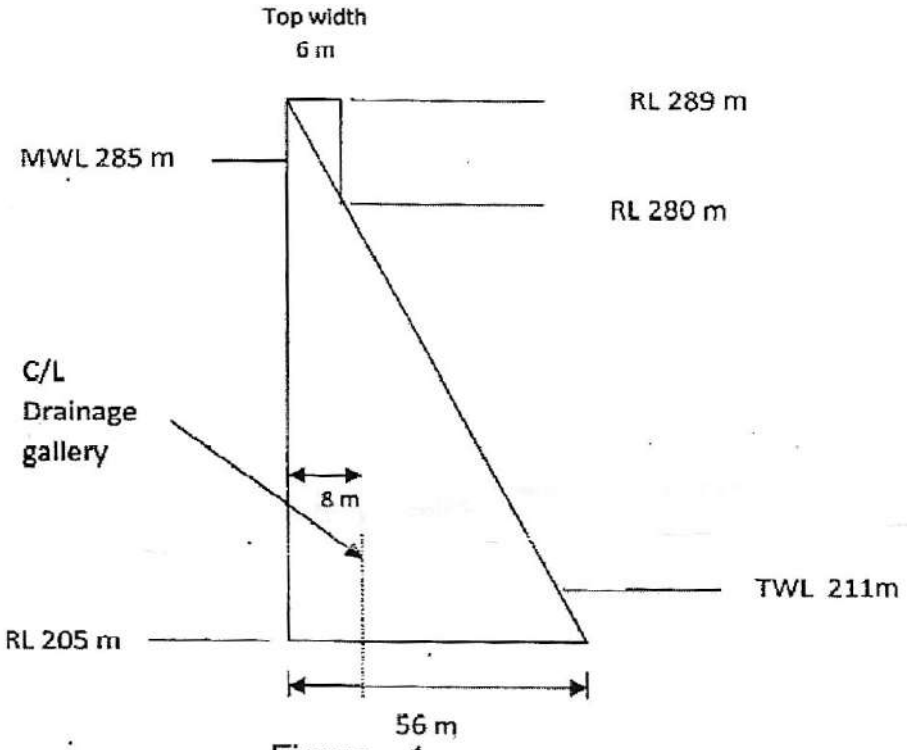

Figure – 1

Q.4 **a)** Distinguish between 'Constant radius' and 'Constant angle' layouts of an 'Arch dam'. What is the best value of angle for constant angle arch dam? **05**

b) Draw a cross section of a 'Zoned Embankment type Earth Dam' and discuss the significance of each component. **04**

Q.5	**a)**	A saddle siphon spillway has the following data. Full reservoir level = 485 m, Level of centre of siphon outlet = 479.6 m, Highest flood level = 485.9 m, Highest flood discharge = 570 cumec. If the dimensions of the throat of the siphon are: width = 4.2 m and height = 1.9 m, determine the number of siphon units required to pass the flood safely. The siphon is to discharge freely in air. Assume coefficient of discharge = 0.65.	**05**
	b)	What are different kinds of spillways and how are they selected for individual conditions?	**04**

Section – II

Q.6	**a)**	Discuss briefly, the causes of failure of hydraulic structures, founded on pervious foundations.	**05**
	b)	What are Kolhapur type weirs? Describe the operation policy of KT weirs over the water year.	**04**
Q.7	**a)**	Give an account of the investigations and surveys required while planning an irrigation canal project in a given tract of land. Discuss the factors governing the selection of alignment of the main canal and its branches.	**05**
	b)	What the different types are of cross drainage works that are necessary on a canal alignment? State briefly the conditions under which each one is used.	**04**
Q.8	**a)**	Explain how do the following assist in river control: 1) Spurs 2) Revetment 3) Guide bunds	**05**
	b)	What is meant by water-logging? What are its ill effects? Describe some anti-water-logging measures with suitable sketches.	**04**
Q.9	**a)**	Distinguish clearly between run-off river Hydropower plants and storage type hydropower plants.	**05**
	b)	A runoff river plant has a installed capacity of 15000 kW and operates at 15 % load factor when it serves as a peak load station. What should be the minimum discharge in the stream so that it may serve as a base load station? The plant efficiency may be taken as 75% when working under a head of 20m. Also calculate the maximum load factor of the plant when the discharge in the stream is 20 m^3/s.	**05**

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Seat No.	

Set Q

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Bligh's theory, as applied to the design of weirs and barrages on permeable foundations, account for _____.
   a) hydrostatic forces only b) hydrodynamic forces only
   c) both a and b d) none of them

2) The safety of a hydraulic structure founded on previous foundation can be ensured _____.
   a) by providing sufficient length of its concrete floor
   b) by providing sufficient depth of its concrete floor
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3) An alluvial river increases its length by meandering due to _____.
   a) variation of discharge b) variation of land topography
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4) The upstream angle of inclination of a repelling groyne with normal to the bank line, is of the order of _____.
   a) 5 to 10^o b) 10 to 30^o
   c) 30 to 50^o d) 70 to 90^o

5) Identify the correct statement in regard to hydropower _____.
   a) hydropower stations are generally labour oriented
   b) Gestation period for hydro-power plant is usually small
   c) the hydro generators give high efficiency over a wide range of load
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6) A run off river plant for hydro power generation is essentially a _____.
   a) high head scheme b) low head scheme
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7) You have to select turbines for a hydropower plant, working on 150m head. The water is sandy and load on the plant is highly variable. Which type of turbines will you generally recommend?
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8) The maximum quantity of water that is estimated to remain available in a storage reservoir for supply, even during worst dry periods, is known as it _____.
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9) The 'surcharge storage' in a dam reservoir is the volume of water stored between _____.
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10) Transverse joint in concrete gravity dams are the _____.
   a) horizontal construction joints at each lift height
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12) When seepage takes place through the body of an earthen dam, it leads to _____.
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13) When the water level standing against an earthen embankment, suddenly falls down, then there is an imminent risk of sliding failure, to the _____.
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   b) downstream slope
   c) both a & b
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14) When the crest of an ogee spillway is designed to be in accordance with the lower nappe of a free falling water jet over a duly ventilated sharp crested weir, then theoretically _____.
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   b) the pressure on the spillway crest will be zero at design head only
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Seat No.	

Set **Q**

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.3 and Q.No.9 are compulsory.
2) Attempt any two questions from each section

Section – I

Q.2 **a)** Explain the mass curve method that can be used for determining reservoir capacity for fulfilling the given demand. **05**

b) Discuss with a neat sketch, the various storage zones and control levels of the dam reservoir. **04**

Q.3 **a)** Figure shows a cross section of non-overflow section of a gravity dam built of concrete. Calculate the maximum vertical stress at the heel and toe of the dam. Assume weight of concrete as 23.5 kN/m^3. Upstream water level is at Maximum Water level (285m) tail water depth is 6m as shown in Figure 1. Neglect earthquake effects. **10**

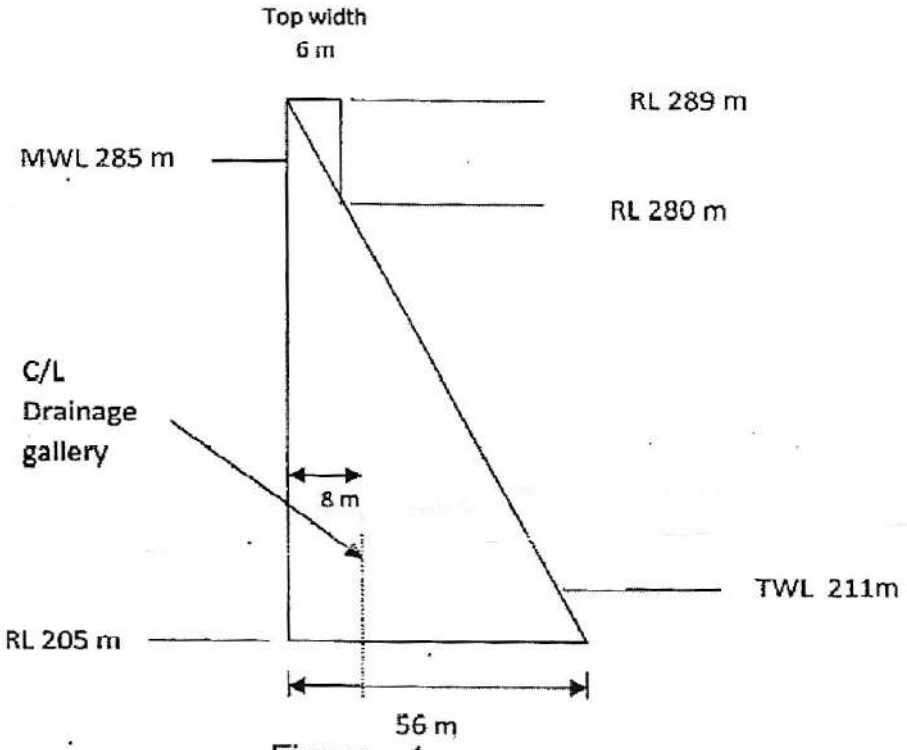

Figure – 1

Q.4 **a)** Distinguish between 'Constant radius' and 'Constant angle' layouts of an 'Arch dam'. What is the best value of angle for constant angle arch dam? **05**

b) Draw a cross section of a 'Zoned Embankment type Earth Dam' and discuss the significance of each component. **04**

Q.5	**a)**	A saddle siphon spillway has the following data. Full reservoir level = 485 m, Level of centre of siphon outlet = 479.6 m, Highest flood level = 485.9 m, Highest flood discharge = 570 cumec. If the dimensions of the throat of the siphon are: width = 4.2 m and height = 1.9 m, determine the number of siphon units required to pass the flood safely. The siphon is to discharge freely in air. Assume coefficient of discharge = 0.65.	**05**
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Section – II

Q.6	**a)**	Discuss briefly, the causes of failure of hydraulic structures, founded on pervious foundations.	**05**
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Q.9	**a)**	Distinguish clearly between run-off river Hydropower plants and storage type hydropower plants.	**05**
	b)	A runoff river plant has a installed capacity of 15000 kW and operates at 15 % load factor when it serves as a peak load station. What should be the minimum discharge in the stream so that it may serve as a base load station? The plant efficiency may be taken as 75% when working under a head of 20m. Also calculate the maximum load factor of the plant when the discharge in the stream is 20 m^3/s.	**05**

Seat No.	

Set **R**

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) When seepage takes place through the body of an earthen dam, it leads to _____.
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Seat No.	

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T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.3 and Q.No.9 are compulsory.
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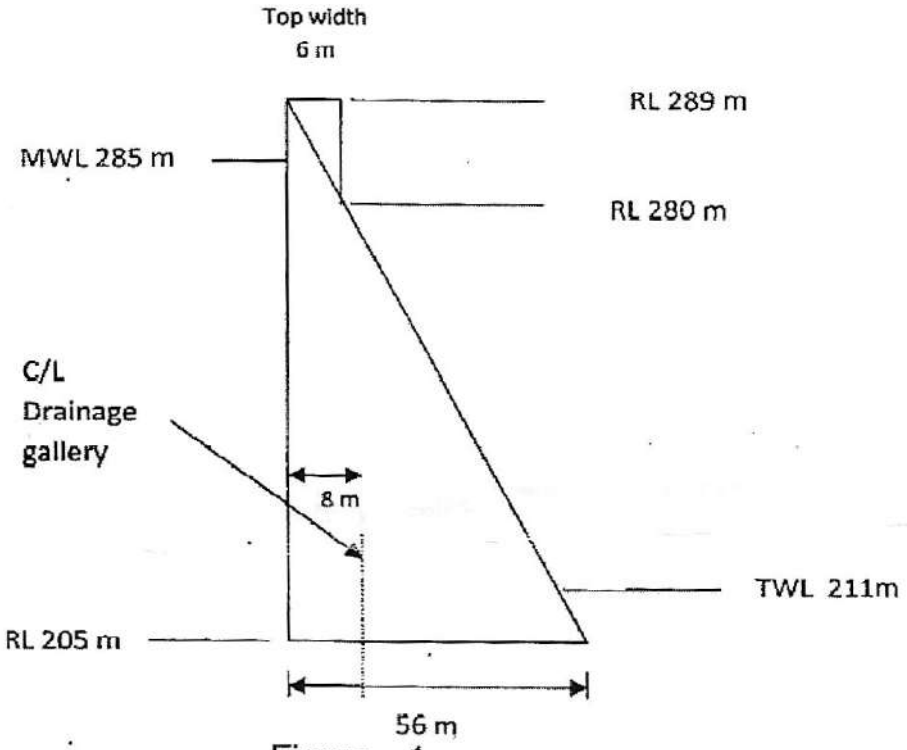

Figure – 1

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SLR-FM-26

Seat No.	

Set S

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

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SLR-FM-26

Seat No.	

Set S

T.E. (Part - I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Friday, 13-12-2019 Max. Marks: 56
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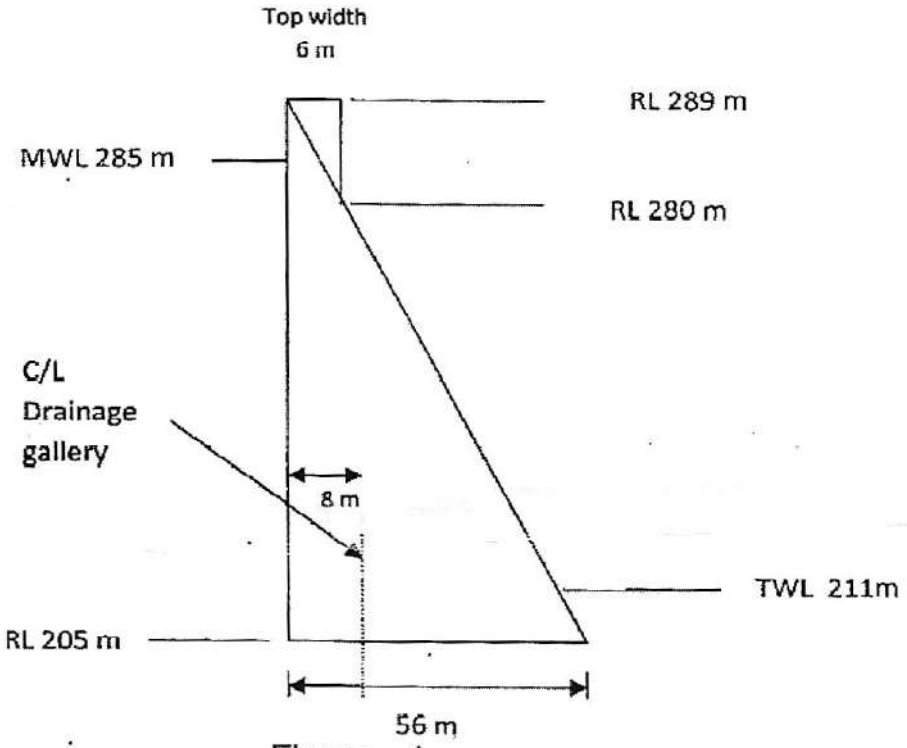

Figure – 1

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Seat No.	

Set **P**

T. E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) In a district where the rainfall is heavy, a state highway of high type bituminous concrete surface pavement 7.0 m wide is to be constructed. What should be the height of the crown with respect to the edges?
   a) 0.087 m b) 0.05 m
   c) 0.07 m d) 0.06 m

2) The stopping sight distance depends upon _____.
   a) total reaction time b) speed of vehicle
   c) efficiency of brakes d) all of the above

3) When the path travelled along the road surface is more than the circumferential movement of the wheels due to rotation, then it results in _____.
   a) Slipping b) Skidding
   c) Turning d) Revolving

4) Match List-I with List-II and select the correct answer using the codes given below the lists.

List -1		List -1	
A	Penetration Test	**1**	Overlay Design
B	Marshal Test	**2**	Determination of Softening Point
C	Ring and Ball Test	**3**	Gradation of asphalt cement
D	Benkelman Beam Test	**4**	Design of bituminous concrete mix

   a) A-4, B-3, C-2, D-1 b) A-2, B-3, C-1, D-4
   c) A-3, B-2, C-4, D-1 d) A A-3, B-4, C-2, D-1

5) On a single lane road with two-way traffic, the minimum stopping sight distance is equal to _____.
   a) stopping distance
   b) two times the stopping distance
   c) half the stopping distance
   d) three times the stopping distance

6) The maximum allowable Los Angeles abrasion value for high quality surface course is _____.
   a) 10% b) 20%
   c) 30% d) 45%

7) Maximum number of vehicles can be parked with _____.
   a) parallel parking b) 30^o angle parking
   c) 45^o angle parking d) 90^o angle parking

8) Essential requirement of soil properties which is used for subgrade construction are _____.
   a) LL to be less than 50% and PI to be less than 25
   b) LL to be less than 60% and PI to be less than 25
   c) LL to be less than 65% and PI to be less than 30
   d) LL to be less than 700% and PI to be less than 35

9) Which one of the following methods is generally considered the best for tunnel ventilation?
   a) Driving a drift through the tunnel
   b) 'Blow in' method
   c) 'Blowout' method
   d) Combination of 'Blow in' and 'Blowout' methods

10) Equivalent radius of resisting section for 20cm thick slab, given that the radius of contact area of wheel load is 15cm is _____.
   a) 15.07cm b) 14.07cm
   c) 16.07cm d) 17.07cm

11) Critical combination of stresses at edge in rigid pavement during summer mid-day are, _____.
   a) Load Stress-Warping stress-frictional stress
   b) Load stress+Warping stress+frictional stress
   c) Load stress +Warping stress-frictional stress
   d) Load Stress-Warping stress +frictional stress

12) The main objective of prime coat is, _____.
   a) Penetrate deep in to the pavement surface and plug the voids
   b) Coat and bond the loose particles on the surface
   c) Render the surface of the base course water resistant
   d) All the above

13) In construction of GSB layer, the rolling is done, _____.
   a) Starting from the center and towards edge
   b) Starting from the center and ends at center
   c) Starting from the lower edge and proceeded towards the center
   d) None of these

14) In order to justify the proposed improvement, the benefit-cost ratio should be _____.
   a) Less than 1.0 b) Greater than 1.0
   c) Between 0 to 1 d) Less than 0.5

Seat No.		Set	P

T. E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any TWO (7 marks each)

a) Calculate the safe overtaking sight distance from the following data for one way and two-way traffic. **07**
1) Speed of overtaking vehicle = 96 kmph.
2) Speed of overtaken vehicle = 22 kmph.
3) Reaction time of driver = 2 sec.
4) Rate of acceleration = 2.5 kmph/sec

b) A radius of 250 m has to be provided at a locality due to site restrictions on a National Highway with design speed 100 kmph. Design the super elevation. Should there be any restriction in speed? **07**

c) Write a detailed note on "Origin and Destination studies". **07**

Q.3 Solve any TWO (7 marks each)

a) Discuss different factors that affect highway alignment with neat sketch. **07**

b) Define camber. State its different types and values adopted under different road conditions. **07**

c) What is highway drainage? How it is carried out? **07**

Section – II

Q.4 Answer any two questions (7 marks each) **14**

a) Enumerate the construction steps of Bituminous Concrete pavement.

b) Determine the warping stresses at interior, edge and corner of a 25cm thick cement concrete pavement with transverse joints at 5.0m interval and longitudinal joints at 3.6m intervals. The modulus of subgrade reaction K is 6.9kg/cm^3 and radius of loaded area is 15cm. Assume temperature differential during day to be 0.6^{o}C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4^{o}C per cm slab thickness during the night (for warping stress at the corner). Assume e=10x10^{-6}per ^{o}C, E=3x10^5 kg/cm^2, μ=0.15.
Use Bradbury chart given in **Figure-I.**

c) Design the flexible pavement using IRC guidelines for the following data.
Input data:
1) Initial Traffic in each direction on counting year, N = 184 CV/day.
2) Construction period since last traffic count, x = 2 Years
3) Design Life of pavement to be considered, n = 15 Years.
4) Design CBR of Subgrade soil to be employed, = 5%.
5) Traffic Growth Rate, r = 7.5 %.
6) Vehicle Damage Factor as per axle load survey, F = 3.5.
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-3 to 5 of IRC-37-2012.

Q.5 Answer any two questions (7 marks each) **14**

a) Compare the annual costs of a 2-lane road for two types of pavement structures:

1) WBM with thin bituminous surface at total cost of Rs. 108 lakhs per km, life of 5 years, interest at 10%, salvage value of Rs. 10 lakhs after 5 years, annual average maintenance cost of Rs. 0.35 lakhs per km and

2) Bituminous Macadam Base and bituminous concrete surface, total cost of Rs. 197 Lakhs, life of 15 years, interest at 8%, salvage value of 25 lakhs at the end of 15 years, annual average maintenance cost of Rs. 0.75 lakhs per km.

b) State methods of tunneling in soft rock. Explain with sketch any one method.

c) Write short notes on:

1) DBFOT concept

2) Tunnel Lining

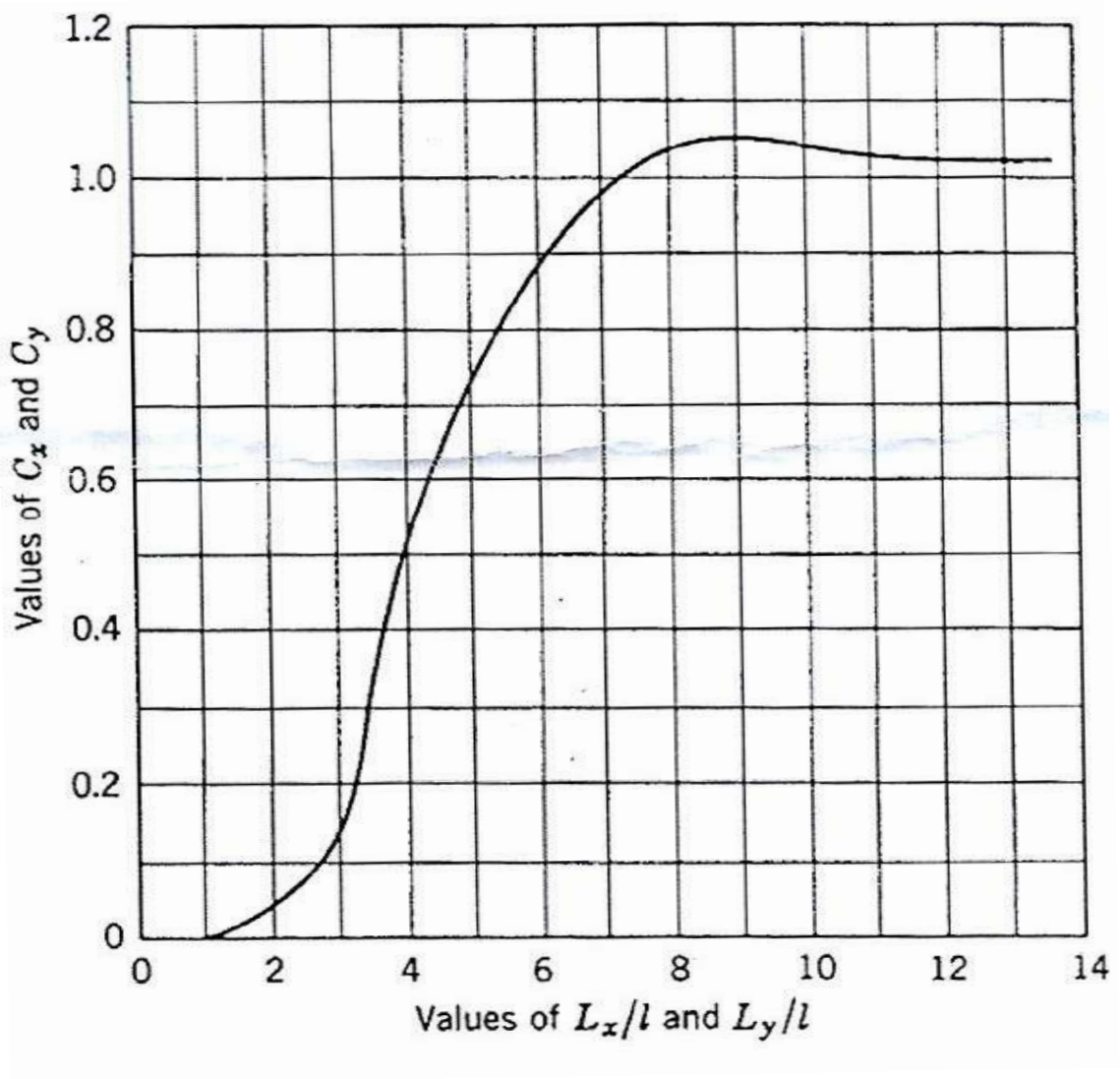


Figure-1

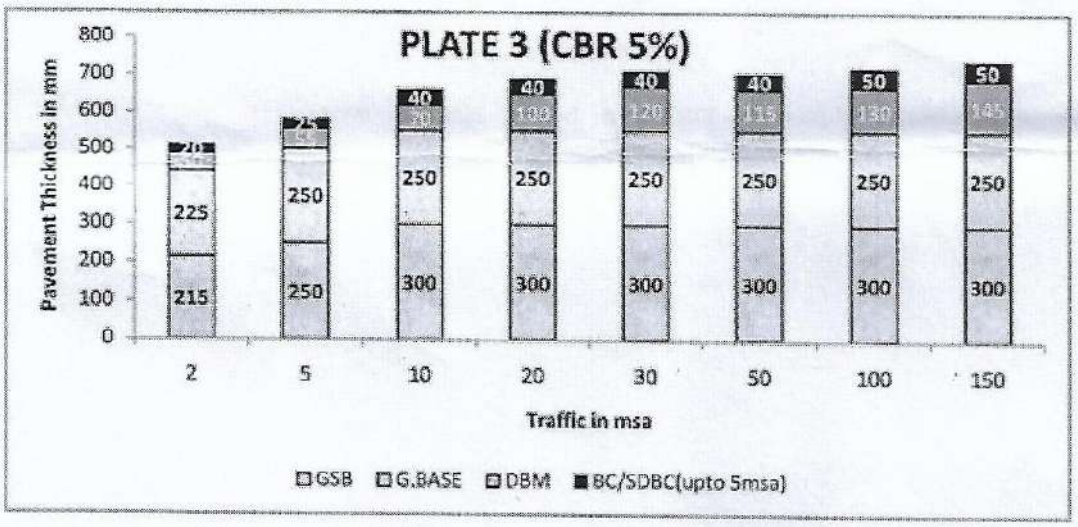


PLATE 3 (CBR 5%)
Pavement Thickness in mm
800
700
600
500
400
300
200
100
0
225
215
250
250
250
300
250
300
250
300
250
300
250
300
250
300
40
40
40
40
50
50
2
5
10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

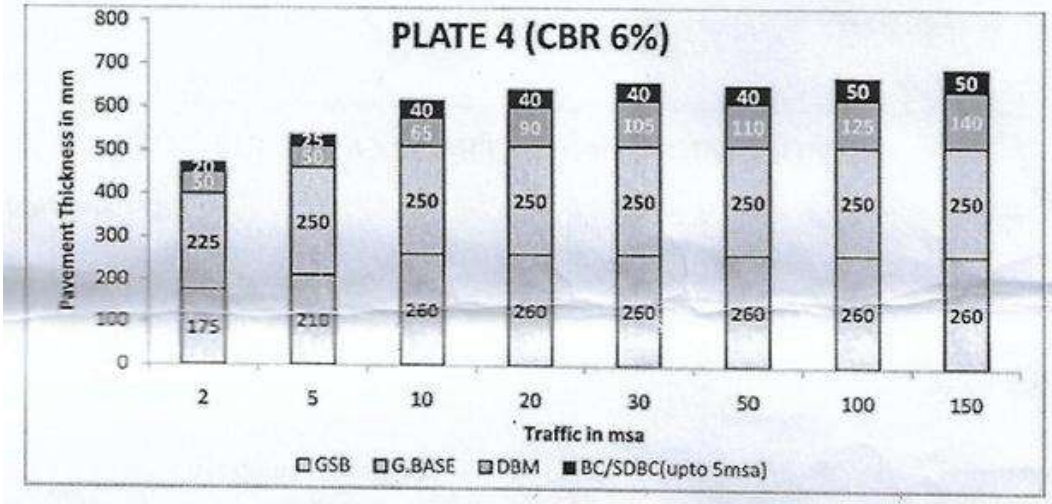


PLATE 4 (CBR 6%)
Pavement Thickness in mm
800
700
600
500
400
300
200
100
0
225
175
250
210
250
260
250
260
250
260
250
260
250
260
250
260
40
40
40
40
50
50
2
5
10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

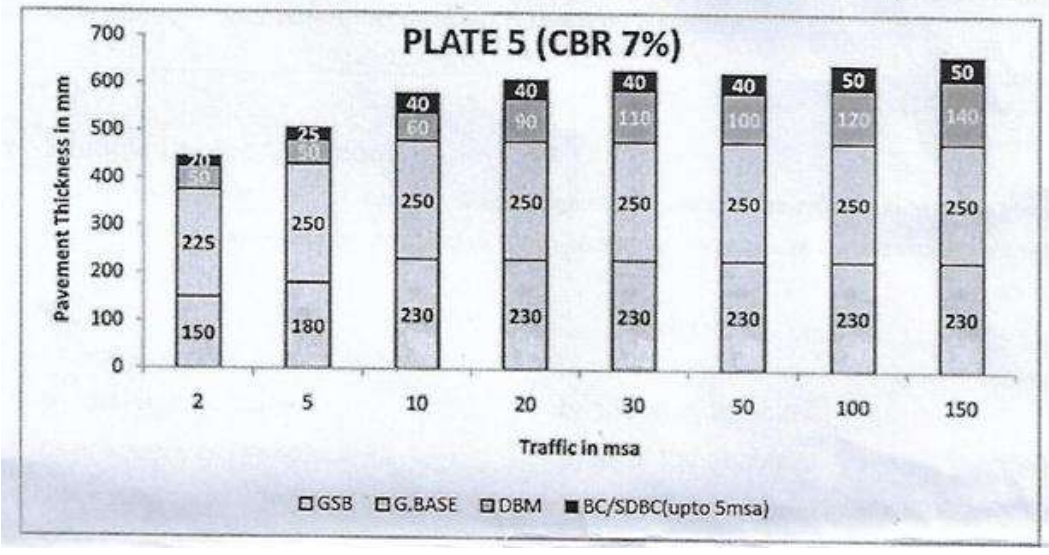


PLATE 5 (CBR 7%)
Pavement Thickness in mm
700
600
500
400
300
200
100
0
225
150
250
180
250
230
250
230
250
230
250
230
250
230
250
230
40
40
40
40
50
50
2
5
10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

Seat No.	

Set **Q**

T. E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Essential requirement of soil properties which is used for subgrade construction are _____.
   a) LL to be less than 50% and PI to be less than 25
   b) LL to be less than 60% and PI to be less than 25
   c) LL to be less than 65% and PI to be less than 30
   d) LL to be less than 700% and PI to be less than 35

2) Which one of the following methods is generally considered the best for tunnel ventilation?
   a) Driving a drift through the tunnel
   b) 'Blow in' method
   c) 'Blowout' method
   d) Combination of 'Blow in' and 'Blowout' methods

3) Equivalent radius of resisting section for 20cm thick slab, given that the radius of contact area of wheel load is 15cm is _____.
   a) 15.07cm b) 14.07cm
   c) 16.07cm d) 17.07cm

4) Critical combination of stresses at edge in rigid pavement during summer mid-day are, _____.
   a) Load Stress-Warping stress-frictional stress
   b) Load stress+Warping stress+frictional stress
   c) Load stress +Warping stress-frictional stress
   d) Load Stress-Warping stress +frictional stress

5) The main objective of prime coat is, _____.
   a) Penetrate deep in to the pavement surface and plug the voids
   b) Coat and bond the loose particles on the surface
   c) Render the surface of the base course water resistant
   d) All the above

6) In construction of GSB layer, the rolling is done, _____.
   a) Starting from the center and towards edge
   b) Starting from the center and ends at center
   c) Starting from the lower edge and proceeded towards the center
   d) None of these

7) In order to justify the proposed improvement, the benefit-cost ratio should be _____.
   a) Less than 1.0 b) Greater than 1.0
   c) Between 0 to 1 d) Less than 0.5

8) In a district where the rainfall is heavy, a state highway of high type bituminous concrete surface pavement 7.0 m wide is to be constructed. What should be the height of the crown with respect to the edges?
   a) 0.087 m b) 0.05 m
   c) 0.07 m d) 0.06 m

9) The stopping sight distance depends upon _____.
   a) total reaction time b) speed of vehicle
   c) efficiency of brakes d) all of the above

10) When the path travelled along the road surface is more than the circumferential movement of the wheels due to rotation, then it results in _____.
   a) Slipping b) Skidding
   c) Turning d) Revolving

11) Match List-I with List-II and select the correct answer using the codes given below the lists.

List -1		List -1	
A	Penetration Test	**1**	Overlay Design
B	Marshal Test	**2**	Determination of Softening Point
C	Ring and Ball Test	**3**	Gradation of asphalt cement
D	Benkelman Beam Test	**4**	Design of bituminous concrete mix

   a) A-4, B-3, C-2, D-1 b) A-2, B-3, C-1, D-4
   c) A-3, B-2, C-4, D-1 d) A A-3, B-4, C-2, D-1

12) On a single lane road with two-way traffic, the minimum stopping sight distance is equal to _____.
   a) stopping distance
   b) two times the stopping distance
   c) half the stopping distance
   d) three times the stopping distance

13) The maximum allowable Los Angeles abrasion value for high quality surface course is _____.
   a) 10% b) 20%
   c) 30% d) 45%

14) Maximum number of vehicles can be parked with _____.
   a) parallel parking b) 30^o angle parking
   c) 45^o angle parking d) 90^o angle parking

Seat No.	

Set **Q**

T. E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any TWO (7 marks each)

a) Calculate the safe overtaking sight distance from the following data for one way and two-way traffic. **07**
1) Speed of overtaking vehicle = 96 kmph.
2) Speed of overtaken vehicle = 22 kmph.
3) Reaction time of driver = 2 sec.
4) Rate of acceleration = 2.5 kmph/sec

b) A radius of 250 m has to be provided at a locality due to site restrictions on a National Highway with design speed 100 kmph. Design the super elevation. Should there be any restriction in speed? **07**

c) Write a detailed note on "Origin and Destination studies". **07**

Q.3 Solve any TWO (7 marks each)

a) Discuss different factors that affect highway alignment with neat sketch. **07**

b) Define camber. State its different types and values adopted under different road conditions. **07**

c) What is highway drainage? How it is carried out? **07**

Section – II

Q.4 Answer any two questions (7 marks each) **14**

a) Enumerate the construction steps of Bituminous Concrete pavement.

b) Determine the warping stresses at interior, edge and corner of a 25cm thick cement concrete pavement with transverse joints at 5.0m interval and longitudinal joints at 3.6m intervals. The modulus of subgrade reaction K is 6.9kg/cm^3 and radius of loaded area is 15cm. Assume temperature differential during day to be 0.6^{o}C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4^{o}C per cm slab thickness during the night (for warping stress at the corner). Assume e=10x10^{-6}per ^{o}C, E=3x10^5 kg/cm^2, μ=0.15.
Use Bradbury chart given in **Figure-I.**

c) Design the flexible pavement using IRC guidelines for the following data.
Input data:
1) Initial Traffic in each direction on counting year, N = 184 CV/day.
2) Construction period since last traffic count, x = 2 Years
3) Design Life of pavement to be considered, n = 15 Years.
4) Design CBR of Subgrade soil to be employed, = 5%.
5) Traffic Growth Rate, r = 7.5 %.
6) Vehicle Damage Factor as per axle load survey, F = 3.5.
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-3 to 5 of IRC-37-2012.

Q.5 Answer any two questions (7 marks each) **14**

a) Compare the annual costs of a 2-lane road for two types of pavement structures:

1) WBM with thin bituminous surface at total cost of Rs. 108 lakhs per km, life of 5 years, interest at 10%, salvage value of Rs. 10 lakhs after 5 years, annual average maintenance cost of Rs. 0.35 lakhs per km and

2) Bituminous Macadam Base and bituminous concrete surface, total cost of Rs. 197 Lakhs, life of 15 years, interest at 8%, salvage value of 25 lakhs at the end of 15 years, annual average maintenance cost of Rs. 0.75 lakhs per km.

b) State methods of tunneling in soft rock. Explain with sketch any one method.

c) Write short notes on:

1) DBFOT concept

2) Tunnel Lining

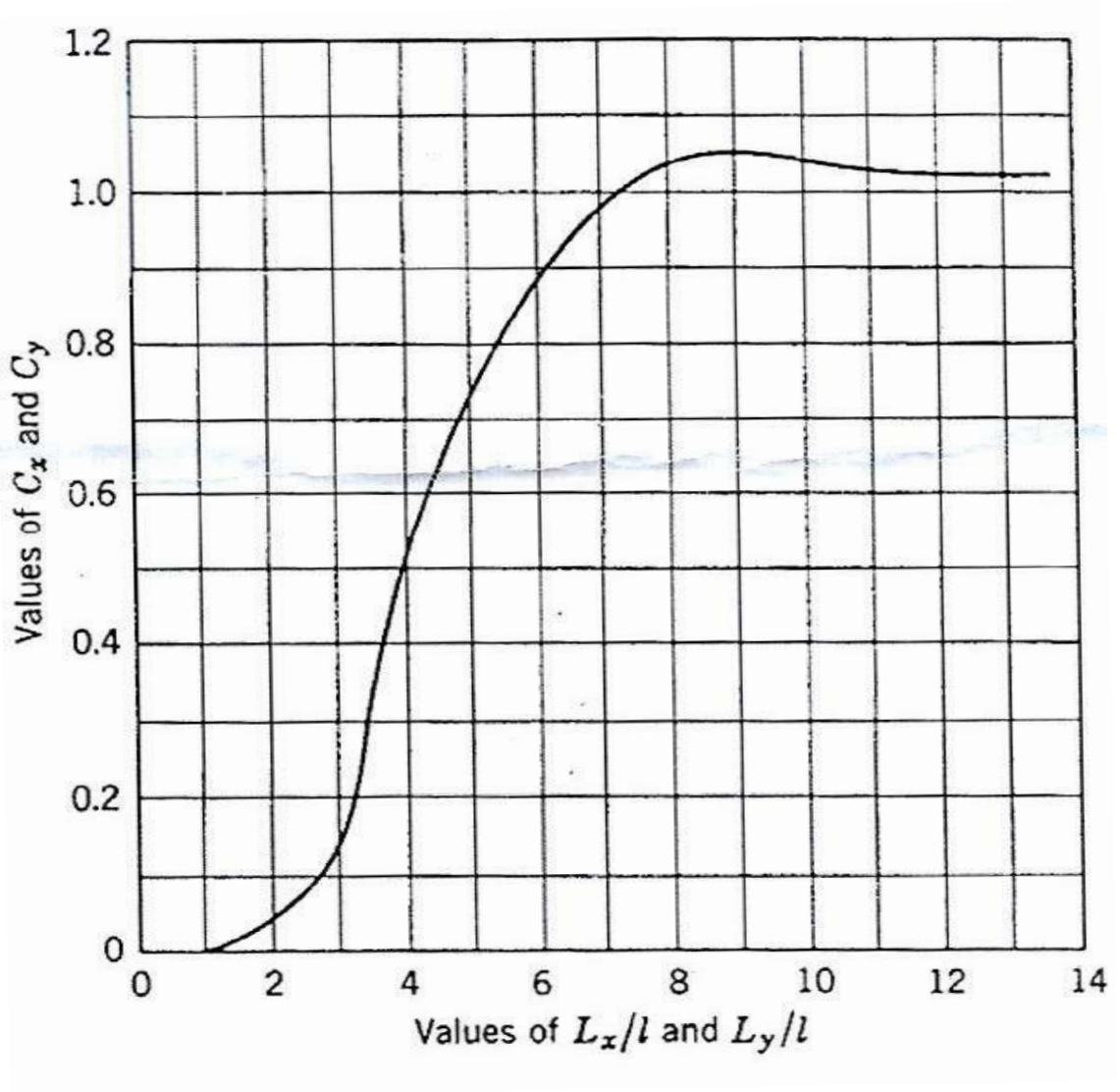
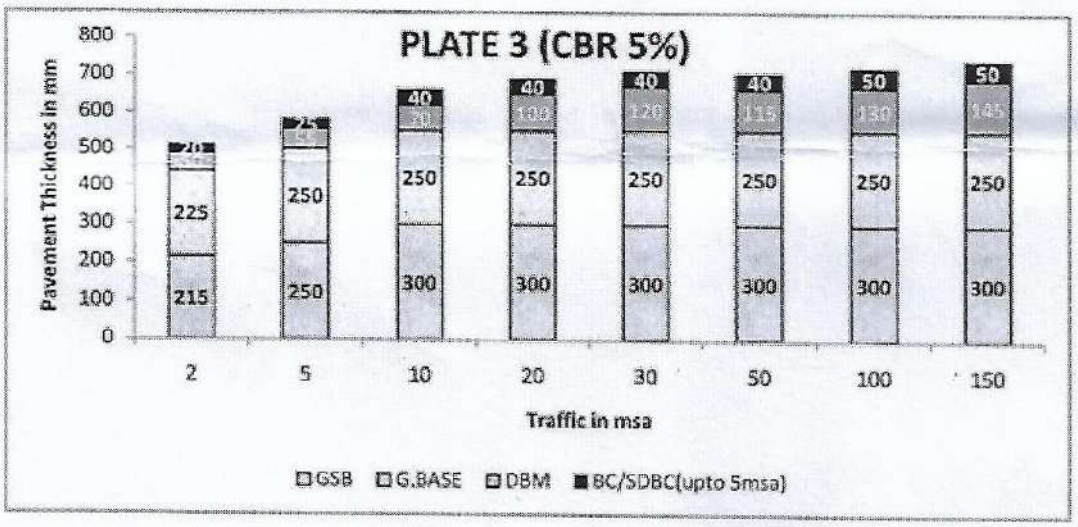
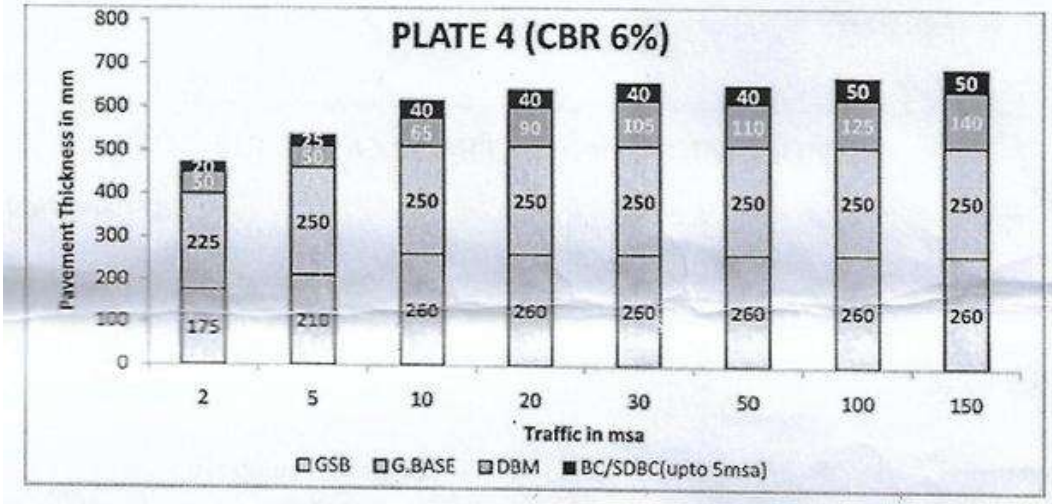
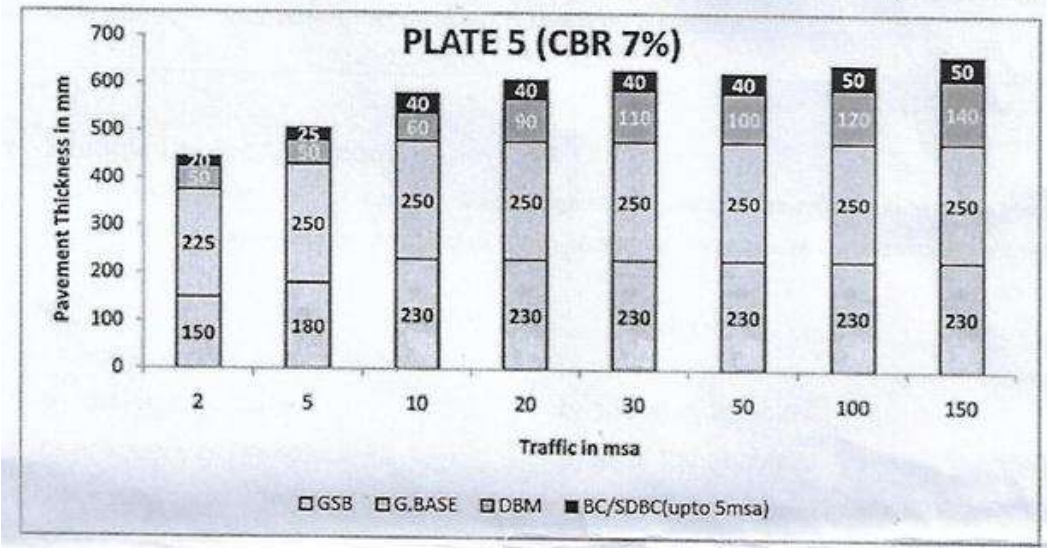


Figure-1



IRC: 37-2012





Seat No.	

Set **R**

T. E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) On a single lane road with two-way traffic, the minimum stopping sight distance is equal to _____.
   a) stopping distance
   b) two times the stopping distance
   c) half the stopping distance
   d) three times the stopping distance

2) The maximum allowable Los Angeles abrasion value for high quality surface course is _____.
   a) 10% b) 20%
   c) 30% d) 45%

3) Maximum number of vehicles can be parked with _____.
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6) Equivalent radius of resisting section for 20cm thick slab, given that the radius of contact area of wheel load is 15cm is _____.
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7) Critical combination of stresses at edge in rigid pavement during summer mid-day are, _____.
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List -1		**List -1**	
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B	Marshal Test	**2**	Determination of Softening Point
C	Ring and Ball Test	**3**	Gradation of asphalt cement
D	Benkelman Beam Test	**4**	Design of bituminous concrete mix

   a) A-4, B-3, C-2, D-1 b) A-2, B-3, C-1, D-4
   c) A-3, B-2, C-4, D-1 d) A A-3, B-4, C-2, D-1

Seat No.	

Set **R**

T. E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

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c) Write a detailed note on "Origin and Destination studies". **07**

Q.3 Solve any TWO (7 marks each)

a) Discuss different factors that affect highway alignment with neat sketch. **07**

b) Define camber. State its different types and values adopted under different road conditions. **07**

c) What is highway drainage? How it is carried out? **07**

Section – II

Q.4 Answer any two questions (7 marks each) **14**

a) Enumerate the construction steps of Bituminous Concrete pavement.

b) Determine the warping stresses at interior, edge and corner of a 25cm thick cement concrete pavement with transverse joints at 5.0m interval and longitudinal joints at 3.6m intervals. The modulus of subgrade reaction K is 6.9kg/cm^3 and radius of loaded area is 15cm. Assume temperature differential during day to be 0.6^{o}C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4^{o}C per cm slab thickness during the night (for warping stress at the corner). Assume e=10x10^{-6}per ^{o}C, E=3x10^5 kg/cm^2, μ=0.15.
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4) Design CBR of Subgrade soil to be employed, = 5%.
5) Traffic Growth Rate, r = 7.5 %.
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Use Plate-3 to 5 of IRC-37-2012.

Q.5 Answer any two questions (7 marks each) **14**

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2) Bituminous Macadam Base and bituminous concrete surface, total cost of Rs. 197 Lakhs, life of 15 years, interest at 8%, salvage value of 25 lakhs at the end of 15 years, annual average maintenance cost of Rs. 0.75 lakhs per km.

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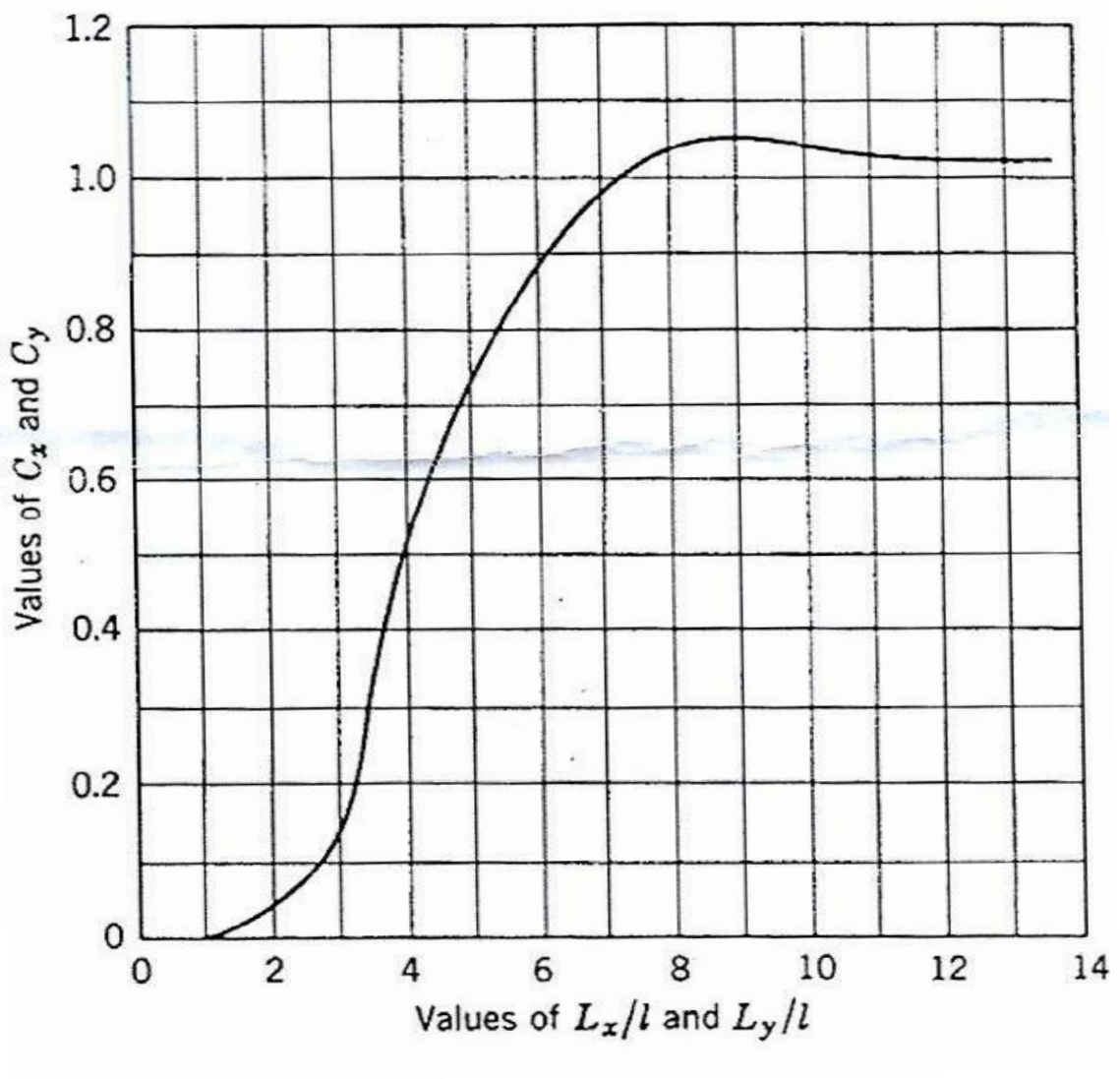

Figure-1

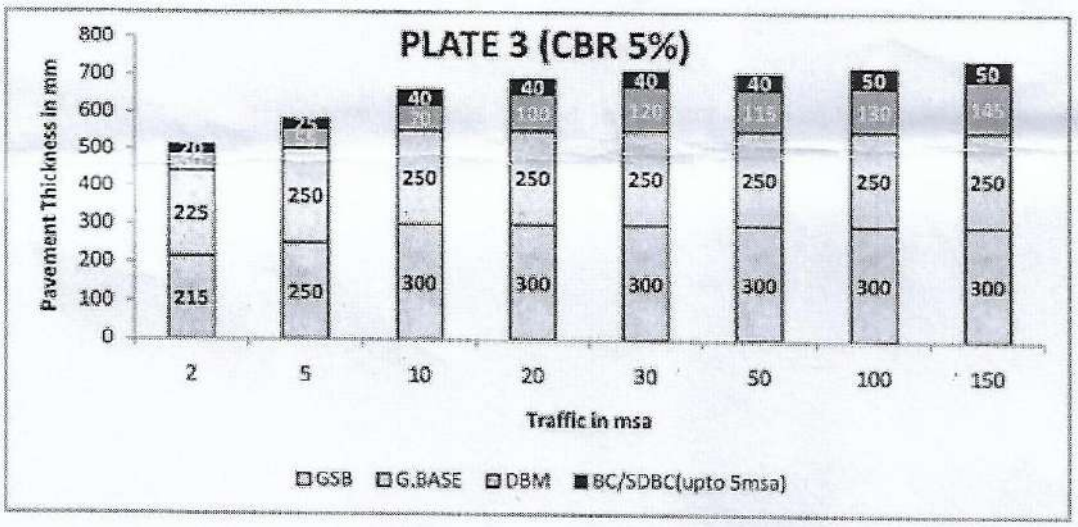
PLATE 3 (CBR 5%)
Pavement Thickness in mm
800
700
600
500
400
300
200
100
0
225
215
250
250
250
300
250
300
250
300
250
300
250
300
250
300
40
40
40
40
50
50
2
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20
30
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100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

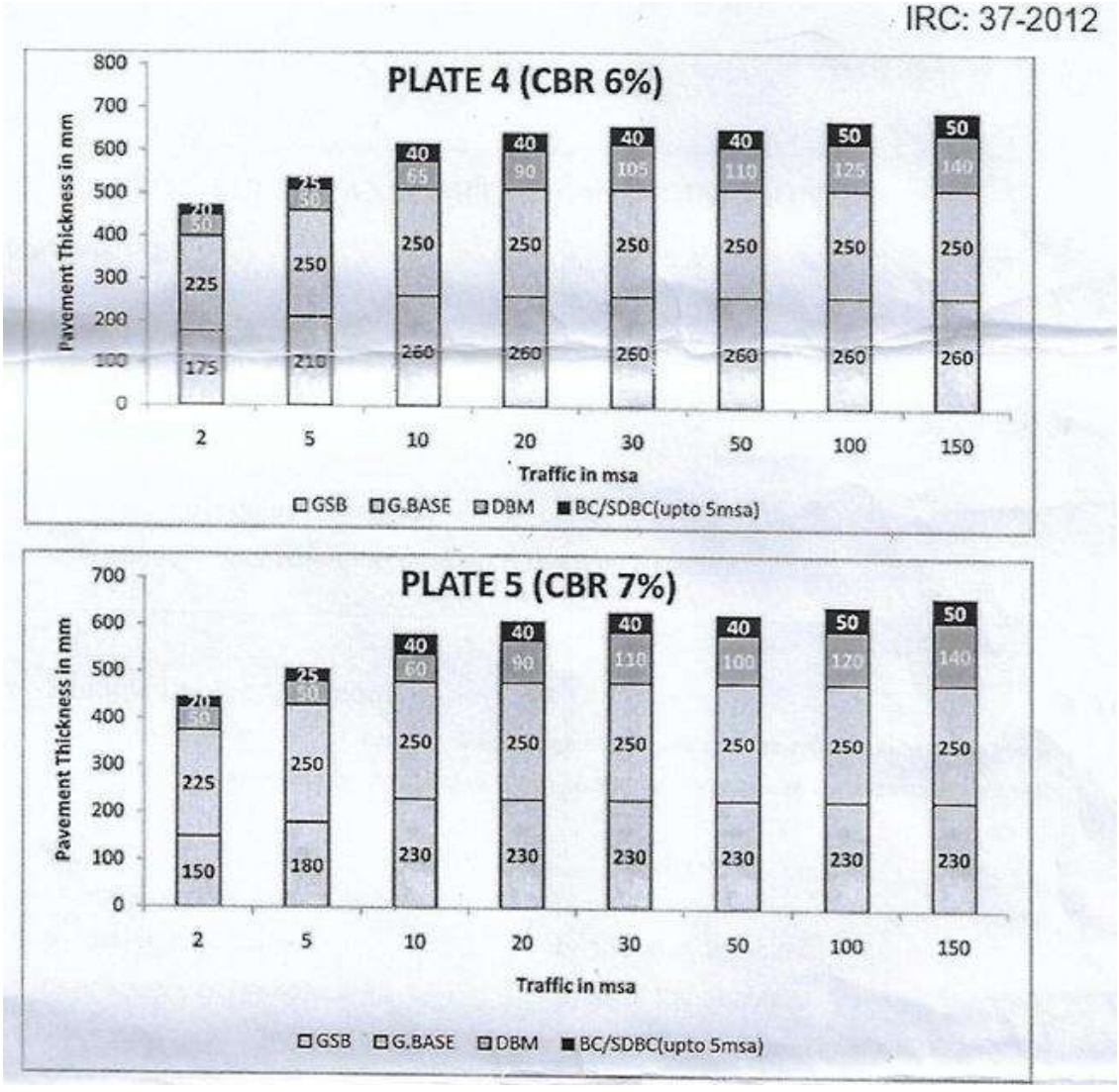
PLATE 4 (CBR 6%)
Pavement Thickness in mm
800
700
600
500
400
300
200
100
0
225
175
250
210
250
260
250
260
250
260
250
260
250
260
250
260
40
40
40
40
50
50
2
5
10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)
PLATE 5 (CBR 7%)
Pavement Thickness in mm
700
600
500
400
300
200
100
0
225
150
250
180
250
230
250
230
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230
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40
50
50
2
5
10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

Seat No.	

Set **S**

T. E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Equivalent radius of resisting section for 20cm thick slab, given that the radius of contact area of wheel load is 15cm is _____.
   a) 15.07cm b) 14.07cm
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2) Critical combination of stresses at edge in rigid pavement during summer mid-day are, _____.
   a) Load Stress-Warping stress-frictional stress
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6) In a district where the rainfall is heavy, a state highway of high type bituminous concrete surface pavement 7.0 m wide is to be constructed. What should be the height of the crown with respect to the edges?
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   a) 10%
   b) 20%
   c) 30%
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12) Maximum number of vehicles can be parked with _____.
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   b) 30^{o} angle parking
   c) 45^{o} angle parking
   d) 90^{o} angle parking

13) Essential requirement of soil properties which is used for subgrade construction are _____.
   a) LL to be less than 50% and PI to be less than 25
   b) LL to be less than 60% and PI to be less than 25
   c) LL to be less than 65% and PI to be less than 30
   d) LL to be less than 700% and PI to be less than 35

14) Which one of the following methods is generally considered the best for tunnel ventilation?
   a) Driving a drift through the tunnel
   b) ‘Blow in’ method
   c) ‘Blowout’ method
   d) Combination of ‘Blow in’ and ‘Blowout’ methods

SLR-FM-27

Seat No.		Set	S

T. E. (Part – I) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any TWO (7 marks each)

a) Calculate the safe overtaking sight distance from the following data for one way and two-way traffic. **07**
1) Speed of overtaking vehicle = 96 kmph.
2) Speed of overtaken vehicle = 22 kmph.
3) Reaction time of driver = 2 sec.
4) Rate of acceleration = 2.5 kmph/sec

b) A radius of 250 m has to be provided at a locality due to site restrictions on a National Highway with design speed 100 kmph. Design the super elevation. Should there be any restriction in speed? **07**

c) Write a detailed note on "Origin and Destination studies". **07**

Q.3 Solve any TWO (7 marks each)

a) Discuss different factors that affect highway alignment with neat sketch. **07**

b) Define camber. State its different types and values adopted under different road conditions. **07**

c) What is highway drainage? How it is carried out? **07**

Section – II

Q.4 Answer any two questions (7 marks each) **14**

a) Enumerate the construction steps of Bituminous Concrete pavement.

b) Determine the warping stresses at interior, edge and corner of a 25cm thick cement concrete pavement with transverse joints at 5.0m interval and longitudinal joints at 3.6m intervals. The modulus of subgrade reaction K is 6.9kg/cm^3 and radius of loaded area is 15cm. Assume temperature differential during day to be 0.6^{o}C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4^{o}C per cm slab thickness during the night (for warping stress at the corner). Assume e=10x10^{-6}per ^{o}C, E=3x10^5 kg/cm^2, μ=0.15.
Use Bradbury chart given in **Figure-I.**

c) Design the flexible pavement using IRC guidelines for the following data.
Input data:
1) Initial Traffic in each direction on counting year, N = 184 CV/day.
2) Construction period since last traffic count, x = 2 Years
3) Design Life of pavement to be considered, n = 15 Years.
4) Design CBR of Subgrade soil to be employed, = 5%.
5) Traffic Growth Rate, r = 7.5 %.
6) Vehicle Damage Factor as per axle load survey, F = 3.5.
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-3 to 5 of IRC-37-2012.

Q.5 Answer any two questions (7 marks each) **14**

a) Compare the annual costs of a 2-lane road for two types of pavement structures:

1) WBM with thin bituminous surface at total cost of Rs. 108 lakhs per km, life of 5 years, interest at 10%, salvage value of Rs. 10 lakhs after 5 years, annual average maintenance cost of Rs. 0.35 lakhs per km and

2) Bituminous Macadam Base and bituminous concrete surface, total cost of Rs. 197 Lakhs, life of 15 years, interest at 8%, salvage value of 25 lakhs at the end of 15 years, annual average maintenance cost of Rs. 0.75 lakhs per km.

b) State methods of tunneling in soft rock. Explain with sketch any one method.

c) Write short notes on:

1) DBFOT concept

2) Tunnel Lining

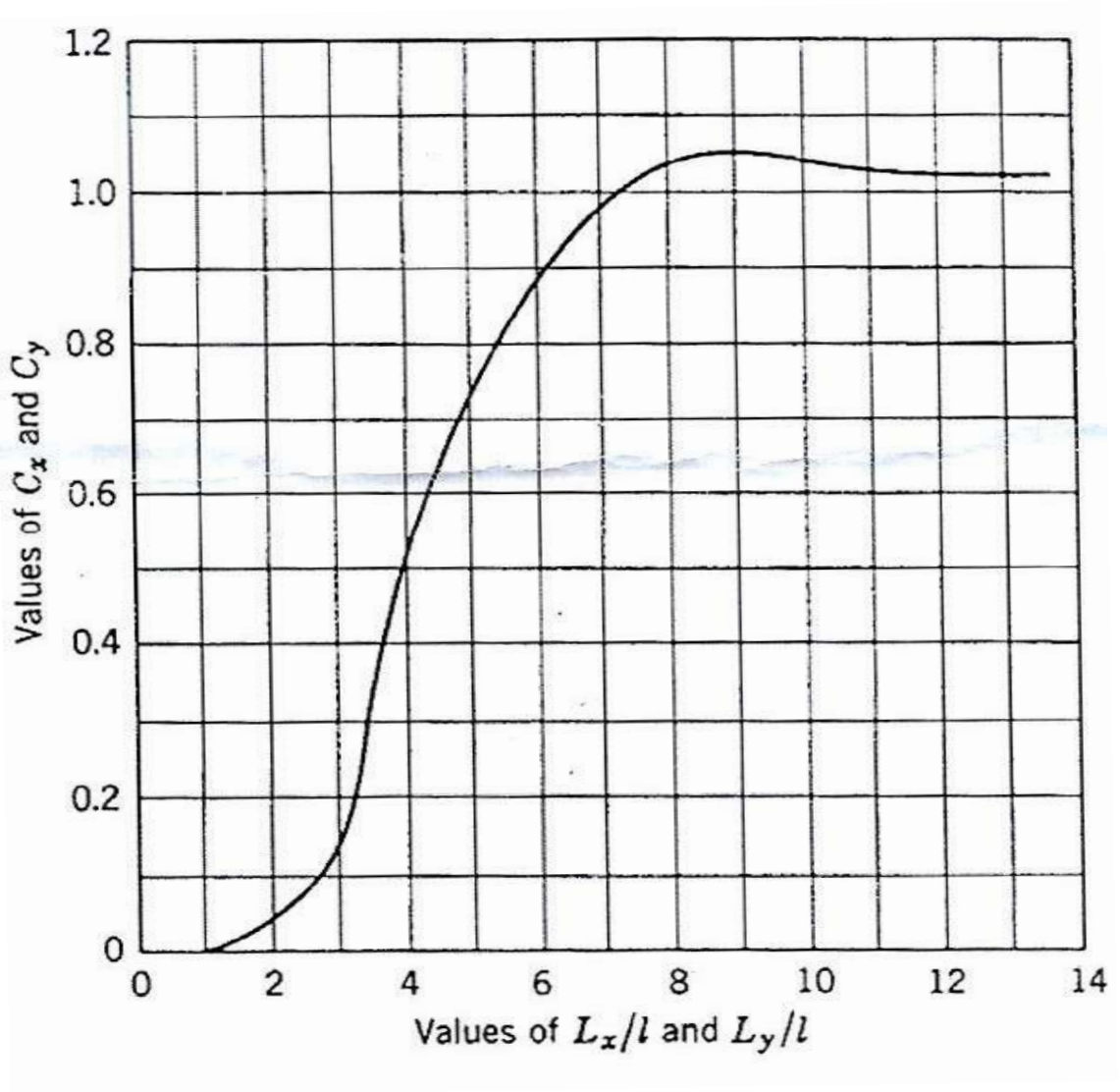
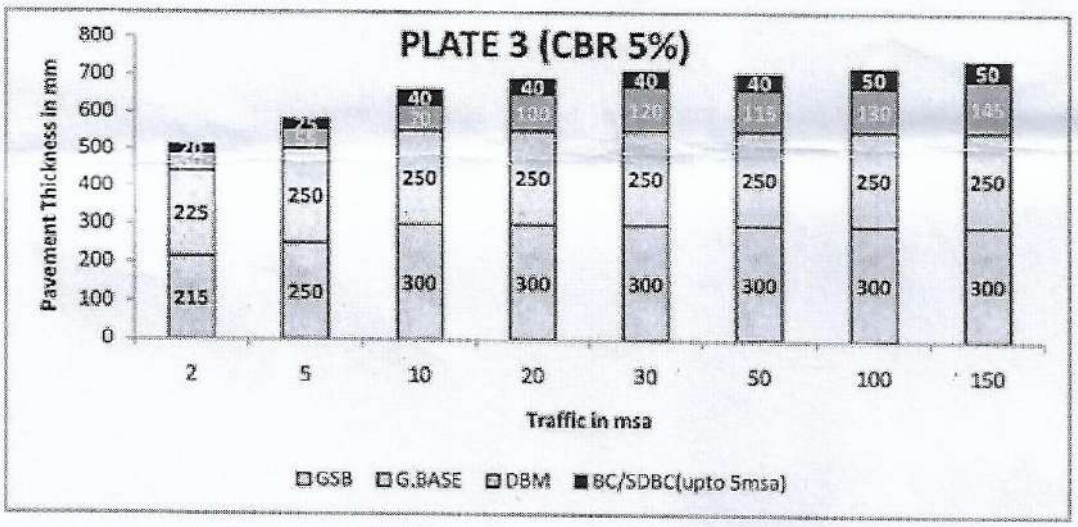
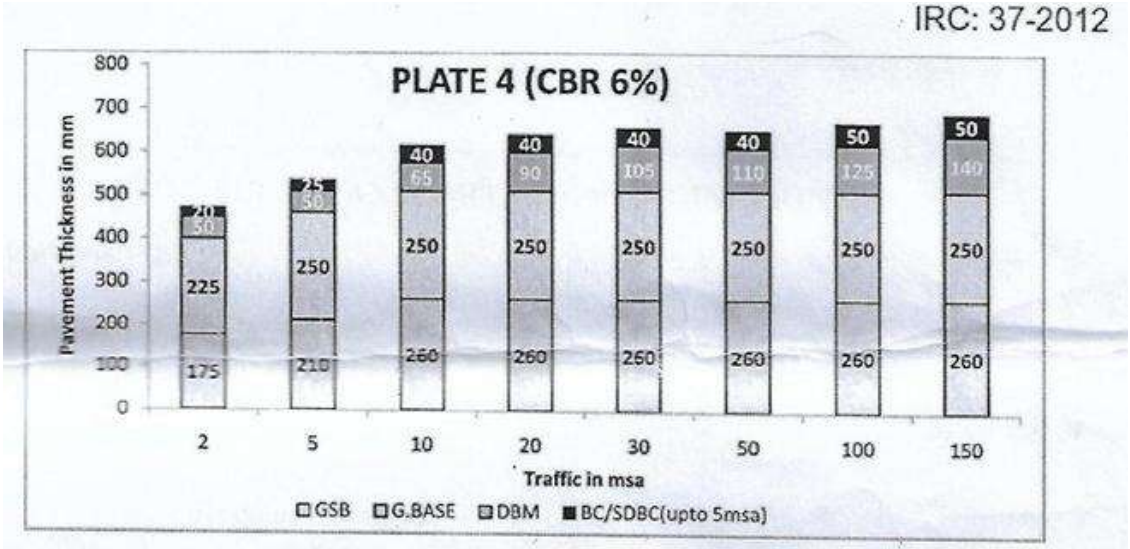
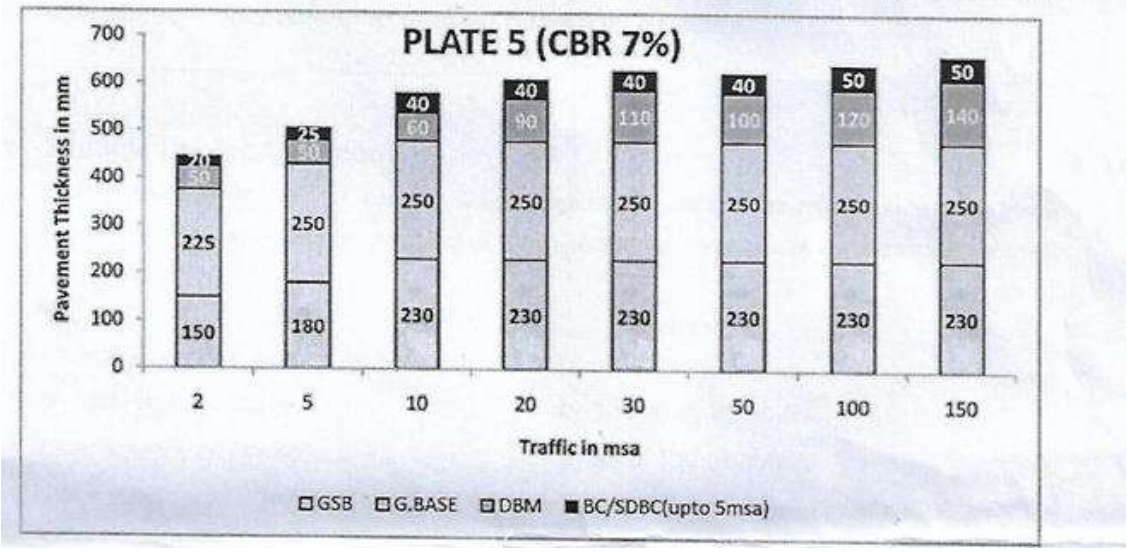


Figure-1



IRC: 37-2012





SLR-FM-28

Seat No.	

Set P

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures to the right indicate full marks.

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) The term sociology was given by _____.
   a) Herbert Spencer b) August Comte
   c) Karl Marx d) Max Weber

2) Status and _____ are interrelated and interdepended.
   a) Position b) Function
   c) Role d) Person

3) Urban society is _____.
   a) Heterogeneous b) Homogeneous
   c) Cultural d) Normative

4) A family is _____ unit.
   a) Social b) Bilateral
   c) Cultural d) Unilateral

5) Castes are _____ groups.
   a) Religious b) Formal
   c) Exogamous d) Endogamous

6) The term Sanskritization was given by _____.
   a) Ghurye b) Mukherjee
   c) Sriniwas d) Dr. Ambedkar

7) The directions of social change are _____.
   a) Uncertain b) Certain
   c) Positive d) Negative

8) A Social movement runs with _____.
   a) Media b) Ideology
   c) Government d) Philosophy

9) The process of socialization initiates at _____ stage.
   a) Anal b) Oral
   c) Oedipal d) Adult

10) Environmental science is the study of _____.
   a) Nature b) Society
   c) Diversity d) Srroundings

SLR-FM-28

Seat No.	

Set P

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Write answer on any Four of the following: **16**

a) Explain the meaning and elements of social structure.
b) Discuss on demographic features of India.
c) Elucidate nature and types of social institutions.
d) Explain the nature and process of social change.
e) Give and account of nature and types of social movements.
f) What is Human Ecology?

Q.3 **a)** Explain the environmental changes and related development in India. **12**

OR

b) What are the agencies of socialization?

Q.4 What the conventional characteristics of caste in India? **12**

SLR-FM-28

Seat No.	

Set Q

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures to the right indicate full marks.

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) The term Sanskritization was given by _____.
   a) Ghurye b) Mukherjee
   c) Sriniwas d) Dr. Ambedkar

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   a) Uncertain b) Certain
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   c) Cultural d) Normative

9) A family is _____ unit.
   a) Social b) Bilateral
   c) Cultural d) Unilateral

10) Castes are _____ groups.
   a) Religious b) Formal
   c) Exogamous d) Endogamous

SLR-FM-28

Seat No.	

Set Q

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Write answer on any Four of the following: **16**

a) Explain the meaning and elements of social structure.
b) Discuss on demographic features of India.
c) Elucidate nature and types of social institutions.
d) Explain the nature and process of social change.
e) Give and account of nature and types of social movements.
f) What is Human Ecology?

Q.3 **a)** Explain the environmental changes and related development in India. **12**

OR

b) What are the agencies of socialization?

Q.4 What the conventional characteristics of caste in India? **12**

Seat No.	

Set **R**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures to the right indicate full marks.

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) The process of socialization initiates at _____ stage.
   a) Anal b) Oral
   c) Oedipal d) Adult

2) Environmental science is the study of _____.
   a) Nature b) Society
   c) Diversity d) Srroundings

3) The term sociology was given by _____.
   a) Herbert Spencer b) August Comte
   c) Karl Marx d) Max Weber

4) Status and _____ are interrelated and interdepended.
   a) Position b) Function
   c) Role d) Person

5) Urban society is _____.
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   c) Sriniwas d) Dr. Ambedkar

9) The directions of social change are _____.
   a) Uncertain b) Certain
   c) Positive d) Negative

10) A Social movement runs with _____.
   a) Media b) Ideology
   c) Government d) Philosophy

SLR-FM-28

Seat No.	

Set R

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Write answer on any Four of the following: **16**

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c) Elucidate nature and types of social institutions.
d) Explain the nature and process of social change.
e) Give and account of nature and types of social movements.
f) What is Human Ecology?

Q.3 **a)** Explain the environmental changes and related development in India. **12**

OR

b) What are the agencies of socialization?

Q.4 What the conventional characteristics of caste in India? **12**

SLR-FM-28

Seat No.	

Set S

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures to the right indicate full marks.

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Urban society is _____.
   a) Heterogeneous b) Homogeneous
   c) Cultural d) Normative

2) A family is _____ unit.
   a) Social b) Bilateral
   c) Cultural d) Unilateral

3) Castes are _____ groups.
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   c) Exogamous d) Endogamous

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   a) Nature b) Society
   c) Diversity d) Srroundings

9) The term sociology was given by _____.
   a) Herbert Spencer b) August Comte
   c) Karl Marx d) Max Weber

10) Status and _____ are interrelated and interdepended.
   a) Position b) Function
   c) Role d) Person

SLR-FM-28

Seat No.	

Set S

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Write answer on any Four of the following: **16**

a) Explain the meaning and elements of social structure.
b) Discuss on demographic features of India.
c) Elucidate nature and types of social institutions.
d) Explain the nature and process of social change.
e) Give and account of nature and types of social movements.
f) What is Human Ecology?

Q.3 **a)** Explain the environmental changes and related development in India. **12**

OR

b) What are the agencies of socialization?

Q.4 What the conventional characteristics of caste in India? **12**

Seat No.	

Set **P**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Morals are the welfare principles enunciated by the _____.
   a) Wise People b) Based on their experience
   c) Group of People d) None of Above

2) Ethics is the word that refers to _____.
   a) Human tendency b) Morals, values, and beliefs
   c) Only Values d) Psychology

3) The study on ethics helps to know the people's _____.
   a) Learn good or bad things b) Copyright
   c) Morality d) Beliefs, values, and morals

4) What is Integrity?
   a) Thought and words b) Honesty
   c) Moral d) 15 years

5) Work ethics is defined as a _____.
   a) Motivation
   b) Set of attitudes concerned with the value of work
   c) Attitude
   d) Values

6) Many complex social problems exist in the _____.
   a) Industry/ Business b) Society
   c) Home d) None of the above

7) Virtues are _____.
   a) Moral b) Ethics
   c) Values d) positive and preferred values

8) Honesty is a _____.
   a) Virtue b) Truthfulness
   c) T trustworthiness d) Communication

9) Courage is the tendency to accept and face _____.
   a) elf-confidence
   b) Risks and difficult tasks in rational ways
   c) Physical courage
   d) Social courage

10) Commitment means _____.
   a) Alignment to goals b) Adherence to ethical principles
   c) EMPATHY d) All the above

Seat No.	

Set **P**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 What are the Objectives of Engineering Ethics? **10**

Q.3 What is the Difference Between Moral and Ethics? **10**

OR

What is Value and Types of Values. **10**

Q.4 **Write short notes on any four** **20**

a) Moral
b) Ethics
c) Commitment
d) Integrity
e) Work Ethics
f) Virtues

Seat No.	

Set **Q**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
SELF LEARNING (ALL BRANCH)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) Many complex social problems exist in the _____.
   a) Industry/ Business b) Society
   c) Home d) None of the above

2) Virtues are _____.
   a) Moral b) Ethics
   c) Values d) positive and preferred values

3) Honesty is a _____.
   a) Virtue b) Truthfulness
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4) Courage is the tendency to accept and face _____.
   a) elf-confidence
   b) Risks and difficult tasks in rational ways
   c) Physical courage
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5) Commitment means _____.
   a) Alignment to goals b) Adherence to ethical principles
   c) EMPATHY d) All the above

6) Morals are the welfare principles enunciated by the _____.
   a) Wise People b) Based on their experience
   c) Group of People d) None of Above

7) Ethics is the word that refers to _____.
   a) Human tendency b) Morals, values, and beliefs
   c) Only Values d) Psychology

8) The study on ethics helps to know the people's _____.
   a) Learn good or bad things b) Copyright
   c) Morality d) Beliefs, values, and morals

9) What is Integrity?
   a) Thought and words b) Honesty
   c) Moral d) 15 years

10) Work ethics is defined as a _____.
   a) Motivation
   b) Set of attitudes concerned with the value of work
   c) Attitude
   d) Values

SLR-FM-29

Seat No.	

Set Q

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 What are the Objectives of Engineering Ethics? **10**

Q.3 What is the Difference Between Moral and Ethics? **10**

OR

What is Value and Types of Values. **10**

Q.4 **Write short notes on any four** **20**

a) Moral
b) Ethics
c) Commitment
d) Integrity
e) Work Ethics
f) Virtues

Seat No.	

Set **R**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
SELF LEARNING (ALL BRANCH)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Courage is the tendency to accept and face _____.
   a) elf-confidence
   b) Risks and difficult tasks in rational ways
   c) Physical courage
   d) Social courage

2) Commitment means _____.
   a) Alignment to goals b) Adherence to ethical principles
   c) EMPATHY d) All the above

3) Morals are the welfare principles enunciated by the _____.
   a) Wise People b) Based on their experience
   c) Group of People d) None of Above

4) Ethics is the word that refers to _____.
   a) Human tendency b) Morals, values, and beliefs
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6) What is Integrity?
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   c) Moral d) 15 years

7) Work ethics is defined as a _____.
   a) Motivation
   b) Set of attitudes concerned with the value of work
   c) Attitude
   d) Values

8) Many complex social problems exist in the _____.
   a) Industry/ Business b) Society
   c) Home d) None of the above

9) Virtues are _____.
   a) Moral b) Ethics
   c) Values d) positive and preferred values

10) Honesty is a _____.
   a) Virtue b) Truthfulness
   c) T trustworthiness d) Communication

Seat No.	

Set **R**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 What are the Objectives of Engineering Ethics? **10**

Q.3 What is the Difference Between Moral and Ethics? **10**

OR

What is Value and Types of Values. **10**

Q.4 **Write short notes on any four** **20**

a) Moral
b) Ethics
c) Commitment
d) Integrity
e) Work Ethics
f) Virtues

Seat No.	

Set **S**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
SELF LEARNING (ALL BRANCH)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) The study on ethics helps to know the people's _____.
   a) Learn good or bad things b) Copyright
   c) Morality d) Beliefs, values, and morals

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   c) Moral d) 15 years

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8) Commitment means _____.
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9) Morals are the welfare principles enunciated by the _____.
   a) Wise People b) Based on their experience
   c) Group of People d) None of Above

10) Ethics is the word that refers to _____.
   a) Human tendency b) Morals, values, and beliefs
   c) Only Values d) Psychology

Seat No.	

Set **S**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 What are the Objectives of Engineering Ethics? **10**

Q.3 What is the Difference Between Moral and Ethics? **10**

OR

What is Value and Types of Values. **10**

Q.4 **Write short notes on any four** **20**

a) Moral
b) Ethics
c) Commitment
d) Integrity
e) Work Ethics
f) Virtues

SLR-FM-30

Set No.	

Set P

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures at right indicate marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Microeconomic theory deals with _____.
   a) Economic behavior of individual economic decision making units
   b) Economy as whole
   c) Trade relations
   d) Economic growth of the society

2) In a mixed economy which sector (s) is/are found _____.
   a) Private only b) Public only
   c) None d) Both (a) private (b) public

3) Who is known as father of economics?
   a) Adam Smith b) Prof. A. Samulson
   c) Alfred Marshall d) J. R. Hicks

4) Which of these is an economic activity?
   a) Father teaching his son at home instead of spending on coaching
   b) A housewife making food for the family on her own
   c) A hair dresser doing hair cut designing on payment
   d) A singer giving a show on his son's wedding anniversary

5) Which of the following is true with respect to the law of diminishing marginal utility?
   a) The more the consumption, lesser the marginal utility from every additional unit consumed
   b) The more the consumption, the greater the marginal utility from every additional unit consumed
   c) The lesser the consumption, the lesser the marginal utility from every additional unit consumed
   d) The lesser the consumption, no marginal utility from every additional unit consumed

6) Which of the following is NOT an account in the Balance of Payments?
   a) Current Account b) Capital Account
   c) Financial Account d) Future Account

7) The MPC can be defined as that fraction of a _____.
   a) Change in income that is not consumed
   b) Change in income that is consumed
   c) Given total income that is not consumed
   d) Given total income that is consumed

8) Which of the following market structures has a predominant feature of price leadership?
   a) Perfectly competitive
   b) Monopoly
   c) Oligopoly
   d) Monopolistic competitive

9) Average revenue is _____.
   a) Total revenue divided by the number of units sold
   b) Revenue earned by all the units of the output
   c) Revenue earned by the average sized firm in the industry
   d) Net addition made to the total revenue by selling one more unit of a commodity

10) Mr. Amol an Indian Citizen is working for an Indian MNC in USA. The income earned by Amol is part of _____.
   a) The GDP of India and GNP of USA
   b) Indian GNP and USA's GDP
   c) India's GDP and USA's GDP
   d) Indian GNP and USA's GNP

SLR-FM-30

Seat No.	

Set P

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) Attempt any four questions out of question no. two to seven.
2) Figures at right indicate marks.

Q.2 **Write short notes.** **10**
a) Positive and Normative Economics
b) Saving and investment

Q.3 **Write short notes.** **10**
a) Importance of Money in the economy
b) International Trade

Q.4 Discuss the role of state government in economic activity. **10**

Q.5 Explain the properties of perfect and imperfectly competitive market. **10**

Q.6 What is mean by consumption? Illustrate the determinants of consumption. **10**

Q.7 Define central bank, discuss the function of central banking in India. **10**

SLR-FM-30

Set No.	

Set Q

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures at right indicate marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Which of the following is NOT an account in the Balance of Payments?
   a) Current Account b) Capital Account
   c) Financial Account d) Future Account

2) The MPC can be defined as that fraction of a _____.
   a) Change in income that is not consumed
   b) Change in income that is consumed
   c) Given total income that is not consumed
   d) Given total income that is consumed

3) Which of the following market structures has a predominant feature of price leadership?
   a) Perfectly competitive b) Monopoly
   c) Oligopoly d) Monopolistic competitive

4) Average revenue is _____.
   a) Total revenue divided by the number of units sold
   b) Revenue earned by all the units of the output
   c) Revenue earned by the average sized firm in the industry
   d) Net addition made to the total revenue by selling one more unit of a commodity

5) Mr. Amol an Indian Citizen is working for an Indian MNC in USA. The income earned by Amol is part of _____.
   a) The GDP of India and GNP of USA
   b) Indian GNP and USA's GDP
   c) India's GDP and USA's GDP
   d) Indian GNP and USA's GNP

6) Microeconomic theory deals with _____.
   a) Economic behavior of individual economic decision making units
   b) Economy as whole
   c) Trade relations
   d) Economic growth of the society

7) In a mixed economy which sector (s) is/are found _____.
   a) Private only b) Public only
   c) None d) Both (a) private (b) public

8) Who is known as father of economics?
   a) Adam Smith
   b) Prof. A. Samulson
   c) Alfred Marshall
   d) J. R. Hicks

9) Which of these is an economic activity?
   a) Father teaching his son at home instead of spending on coaching
   b) A housewife making food for the family on her own
   c) A hair dresser doing hair cut designing on payment
   d) A singer giving a show on his son's wedding anniversary

10) Which of the following is true with respect to the law of diminishing marginal utility?
   a) The more the consumption, lesser the marginal utility from every additional unit consumed
   b) The more the consumption, the greater the marginal utility from every additional unit consumed
   c) The lesser the consumption, the lesser the marginal utility from every additional unit consumed
   d) The lesser the consumption, no marginal utility from every additional unit consumed

SLR-FM-30

Seat No.	

Set Q

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) Attempt any four questions out of question no. two to seven.
2) Figures at right indicate marks.

Q.2 **Write short notes.** **10**
a) Positive and Normative Economics
b) Saving and investment

Q.3 **Write short notes.** **10**
a) Importance of Money in the economy
b) International Trade

Q.4 Discuss the role of state government in economic activity. **10**

Q.5 Explain the properties of perfect and imperfectly competitive market. **10**

Q.6 What is mean by consumption? Illustrate the determinants of consumption. **10**

Q.7 Define central bank, discuss the function of central banking in India. **10**

Set No.	

Set R

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures at right indicate marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Average revenue is _____.
   a) Total revenue divided by the number of units sold
   b) Revenue earned by all the units of the output
   c) Revenue earned by the average sized firm in the industry
   d) Net addition made to the total revenue by selling one more unit of a commodity

2) Mr. Amol an Indian Citizen is working for an Indian MNC in USA. The income earned by Amol is part of _____.
   a) The GDP of India and GNP of USA
   b) Indian GNP and USA's GDP
   c) India's GDP and USA's GDP
   d) Indian GNP and USA's GNP

3) Microeconomic theory deals with _____.
   a) Economic behavior of individual economic decision making units
   b) Economy as whole
   c) Trade relations
   d) Economic growth of the society

4) In a mixed economy which sector (s) is/are found _____.
   a) Private only b) Public only
   c) None d) Both (a) private (b) public

5) Who is known as father of economics?
   a) Adam Smith b) Prof. A. Samulson
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   c) The lesser the consumption, the lesser the marginal utility from every additional unit consumed
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8) Which of the following is NOT an account in the Balance of Payments?
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   c) Given total income that is not consumed
   d) Given total income that is consumed

10) Which of the following market structures has a predominant feature of price leadership?
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   c) Oligopoly
   d) Monopolistic competitive

SLR-FM-30

Seat No.	

Set R

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) Attempt any four questions out of question no. two to seven.
2) Figures at right indicate marks.

Q.2 **Write short notes.** **10**
- **a)** Positive and Normative Economics
- **b)** Saving and investment

Q.3 **Write short notes.** **10**
- **a)** Importance of Money in the economy
- **b)** International Trade

Q.4 Discuss the role of state government in economic activity. **10**

Q.5 Explain the properties of perfect and imperfectly competitive market. **10**

Q.6 What is mean by consumption? Illustrate the determinants of consumption. **10**

Q.7 Define central bank, discuss the function of central banking in India. **10**

SLR-FM-30

Set No.	

Set S

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures at right indicate marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Who is known as father of economics?
   a) Adam Smith b) Prof. A. Samulson
   c) Alfred Marshall d) J. R. Hicks

2) Which of these is an economic activity?
   a) Father teaching his son at home instead of spending on coaching
   b) A housewife making food for the family on her own
   c) A hair dresser doing hair cut designing on payment
   d) A singer giving a show on his son's wedding anniversary

3) Which of the following is true with respect to the law of diminishing marginal utility?
   a) The more the consumption, lesser the marginal utility from every additional unit consumed
   b) The more the consumption, the greater the marginal utility from every additional unit consumed
   c) The lesser the consumption, the lesser the marginal utility from every additional unit consumed
   d) The lesser the consumption, no marginal utility from every additional unit consumed

4) Which of the following is NOT an account in the Balance of Payments?
   a) Current Account b) Capital Account
   c) Financial Account d) Future Account

5) The MPC can be defined as that fraction of a _____.
   a) Change in income that is not consumed
   b) Change in income that is consumed
   c) Given total income that is not consumed
   d) Given total income that is consumed

6) Which of the following market structures has a predominant feature of price leadership?
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7) Average revenue is _____.
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   b) Revenue earned by all the units of the output
   c) Revenue earned by the average sized firm in the industry
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8) Mr. Amol an Indian Citizen is working for an Indian MNC in USA. The income earned by Amol is part of _____.
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   b) Indian GNP and USA's GDP
   c) India's GDP and USA's GDP
   d) Indian GNP and USA's GNP

9) Microeconomic theory deals with _____.
   a) Economic behavior of individual economic decision making units
   b) Economy as whole
   c) Trade relations
   d) Economic growth of the society

10) In a mixed economy which sector (s) is/are found _____.
   a) Private only
   b) Public only
   c) None
   d) Both (a) private (b) public

SLR-FM-30

Seat No.	

Set S

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) Attempt any four questions out of question no. two to seven.
2) Figures at right indicate marks.

Q.2 **Write short notes.** **10**
a) Positive and Normative Economics
b) Saving and investment

Q.3 **Write short notes.** **10**
a) Importance of Money in the economy
b) International Trade

Q.4 Discuss the role of state government in economic activity. **10**

Q.5 Explain the properties of perfect and imperfectly competitive market. **10**

Q.6 What is mean by consumption? Illustrate the determinants of consumption. **10**

Q.7 Define central bank, discuss the function of central banking in India. **10**

SLR-FM-31

Seat No.	

Set P

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Aches, shallow breathing and sweating, frequent colds are _____ symptoms of stress.
   a) Physical b) Behavioral
   c) Emotional d) Cognitive

2) Which one is not a characteristics of Positive Stress?
   a) It improves performance b) It feels exciting
   c) It motivates d) It's frustrating

3) _____ deals with prioritizing & scheduling the activities to cope up with multiple job demands.
   a) Physical Exercise b) Time Management
   c) Wellness Programs d) Relaxation

4) Which one is not an environmental stressor?
   a) Weather b) Traffic
   c) Financial problems d) Substandard housing

5) Following are the examples of negative stressors.
   a) Unemployment b) Legal problems
   c) Divorce d) All of the above

6) Which of the following is a stressful event?
   a) Birthday b) Studying
   c) Spouse death d) Vacation

7) Stress which is healthy for organisation or for the individual is known as _____.
   a) Eustress b) Distress
   c) Resistance d) None of these

8) Stress is a normal physical response to events that make a person _____.
   a) Feels upset b) Excited
   c) Boring d) Happy

9) _____ is regarded as father of stress research.
   a) Hans Selye b) Sigmund Freud
   c) Atkinson Potter d) Mrunal Sengupta

10) _____ is an organizational way of managing stress.
   a) Job enlargement b) Jogging
   c) Job redesign d) Meditation

SLR-FM-31

Seat No.	

Set P

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Solve any 4 from Q. No. 2 to Q. No. 7.
2) Figure to the right indicates full marks.

Q.2 Individual can also manage stress on their own. Explain. **10**

Q.3 Explain in detail various sources of stress. **10**

Q.4 Whether optimal stress can be effective. Explain this statement. **10**

Q.5 Highlight the role of social support in minimizing the effects of stress. **10**

Q.6 Define stress and state the current and historical status of stress.

Q.7 Explain the nature of stress response. **10**

Seat No.	

Set **Q**

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Which of the following is a stressful event?
   a) Birthday b) Studying
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2) Stress which is healthy for organisation or for the individual is known as _____.
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5) _____ is an organizational way of managing stress.
   a) Job enlargement b) Jogging
   c) Job redesign d) Meditation

6) Aches, shallow breathing and sweating, frequent colds are _____ symptoms of stress.
   a) Physical b) Behavioral
   c) Emotional d) Cognitive

7) Which one is not a characteristics of Positive Stress?
   a) It improves performance b) It feels exciting
   c) It motivates d) It's frustrating

8) _____ deals with prioritizing & scheduling the activities to cope up with multiple job demands.
   a) Physical Exercise b) Time Management
   c) Wellness Programs d) Relaxation

9) Which one is not an environmental stressor?
   a) Weather b) Traffic
   c) Financial problems d) Substandard housing

10) Following are the examples of negative stressors.
   a) Unemployment b) Legal problems
   c) Divorce d) All of the above

SLR-FM-31

Seat No.	

Set Q

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Solve any 4 from Q. No. 2 to Q. No. 7.
2) Figure to the right indicates full marks.

Q.2 Individual can also manage stress on their own. Explain. **10**

Q.3 Explain in detail various sources of stress. **10**

Q.4 Whether optimal stress can be effective. Explain this statement. **10**

Q.5 Highlight the role of social support in minimizing the effects of stress. **10**

Q.6 Define stress and state the current and historical status of stress.

Q.7 Explain the nature of stress response. **10**

SLR-FM-31

Seat No.	

Set R

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) _____ is regarded as father of stress research.
   a) Hans Selye b) Sigmund Freud
   c) Atkinson Potter d) Mrunal Sengupta

2) _____ is an organizational way of managing stress.
   a) Job enlargement b) Jogging
   c) Job redesign d) Meditation

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7) Following are the examples of negative stressors.
   a) Unemployment b) Legal problems
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8) Which of the following is a stressful event?
   a) Birthday b) Studying
   c) Spouse death d) Vacation

9) Stress which is healthy for organisation or for the individual is known as _____.
   a) Eustress b) Distress
   c) Resistance d) None of these

10) Stress is a normal physical response to events that make a person _____.
   a) Feels upset b) Excited
   c) Boring d) Happy

SLR-FM-31

Seat No.	

Set R

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Solve any 4 from Q. No. 2 to Q. No. 7.
2) Figure to the right indicates full marks.

Q.2 Individual can also manage stress on their own. Explain. **10**

Q.3 Explain in detail various sources of stress. **10**

Q.4 Whether optimal stress can be effective. Explain this statement. **10**

Q.5 Highlight the role of social support in minimizing the effects of stress. **10**

Q.6 Define stress and state the current and historical status of stress.

Q.7 Explain the nature of stress response. **10**

SLR-FM-31

Seat No.	

Set S

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) _____ deals with prioritizing & scheduling the activities to cope up with multiple job demands.
   a) Physical Exercise b) Time Management
   c) Wellness Programs d) Relaxation

2) Which one is not an environmental stressor?
   a) Weather b) Traffic
   c) Financial problems d) Substandard housing

3) Following are the examples of negative stressors.
   a) Unemployment b) Legal problems
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10) Which one is not a characteristics of Positive Stress?
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Seat No.	

Set **S**

T.E (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Solve any 4 from Q. No. 2 to Q. No. 7.
2) Figure to the right indicates full marks.

Q.2 Individual can also manage stress on their own. Explain. **10**

Q.3 Explain in detail various sources of stress. **10**

Q.4 Whether optimal stress can be effective. Explain this statement. **10**

Q.5 Highlight the role of social support in minimizing the effects of stress. **10**

Q.6 Define stress and state the current and historical status of stress.

Q.7 Explain the nature of stress response. **10**

SLR-FM-32

Seat No.	

Set P

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures al right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) The first Patent Law was enacted in India in the year ____.
   a) 1856 b) 1880
   c) 1905 d) 1850

2) The legislation covering intellectual property right in India for Information Technology is _____.
   a) Information Technology Act 2003
   b) Information Technology Act 2000
   c) Information Technology Act 2008
   d) None of these

3) What is copyright meant for?
   a) Film work b) Books
   c) Essay d) All of these

4) What is the term of Patent?
   a) 35 years b) 25 years
   c) 20 years d) 15 years

5) Intellectual Property Rights (IPR) protect the use of information and ideas that are of _____.
   a) Ethical value b) Moral value
   c) Social value d) Commercial value

6) The following can be patented _____.
   a) Machine b) Process
   c) Composition of matter d) All of these

7) The following can not be exploited by assigning or by licensing the rights to others _____.
   a) Patents b) Designs
   c) Trademark d) All of these

8) What protects the intellectual property created by artists?
   a) Copyright b) Patents
   c) Trademarks d) Registered Designs

9) If a company develops a new technology that improves its main product, what type of intellectual property can they use to stop others from copying their invention?

a) Copyright
b) Patents
c) Trademarks
d) Registered Designs

10) All of the following are examples of intellectual property protections except ___.

a) Copyrights
b) Patents
c) Contracts
d) Trademarks

Seat No.	

Set **P**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Attempt following questions (Any Two) **20**

a) What is intellectual property? How it is useful for Engineers?
b) Explain concept of valuation of IP & value Realization.
c) Compare the Indian IPR system with international IPR frameworks.

Q.3 Write short notes (Any Four) **20**

a) Copy rights
b) Commercialization
c) Bio technology and intellectual property
d) Protection of Traditional knowledge
e) IPR & Electronic Commerce
f) TRIPS & Access to Medicines

Seat No.	

Set | Q

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) The following can be patented _____.
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3) What protects the intellectual property created by artists?
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8) What is copyright meant for?
   a) Film work b) Books
   c) Essay d) All of these

9) What is the term of Patent?

a) 35 years
b) 25 years
c) 20 years
d) 15 years

10) Intellectual Property Rights (IPR) protect the use of information and ideas that are of _____.

a) Ethical value
b) Moral value
c) Social value
d) Commercial value

SLR-FM-32

Seat No.	

Set Q

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Attempt following questions (Any Two) **20**

a) What is intellectual property? How it is useful for Engineers?
b) Explain concept of valuation of IP & value Realization.
c) Compare the Indian IPR system with international IPR frameworks.

Q.3 Write short notes (Any Four) **20**

a) Copy rights
b) Commercialization
c) Bio technology and intellectual property
d) Protection of Traditional knowledge
e) IPR & Electronic Commerce
f) TRIPS & Access to Medicines

Seat No.	

Set **R**

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures al right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) If a company develops a new technology that improves its main product, what type of intellectual property can they use to stop others from copying their invention?
   a) Copyright b) Patents
   c) Trademarks d) Registered Designs

2) All of the following are examples of intellectual property protections except ___.
   a) Copyrights b) Patents
   c) Contracts d) Trademarks

3) The first Patent Law was enacted in India in the year ____.
   a) 1856 b) 1880
   c) 1905 d) 1850

4) The legislation covering intellectual property right in India for Information Technology is _____.
   a) Information Technology Act 2003
   b) Information Technology Act 2000
   c) Information Technology Act 2008
   d) None of these

5) What is copyright meant for?
   a) Film work b) Books
   c) Essay d) All of these

6) What is the term of Patent?
   a) 35 years b) 25 years
   c) 20 years d) 15 years

7) Intellectual Property Rights (IPR) protect the use of information and ideas that are of _____.
   a) Ethical value b) Moral value
   c) Social value d) Commercial value

8) The following can be patented _____.
   a) Machine b) Process
   c) Composition of matter d) All of these

9) The following can not be exploited by assigning or by licensing the rights to others _____.

a) Patents
b) Designs
c) Trademark
d) All of these

10) What protects the intellectual property created by artists?

a) Copyright
b) Patents
c) Trademarks
d) Registered Designs

SLR-FM-32

Seat No.	

Set R

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Attempt following questions (Any Two) **20**

a) What is intellectual property? How it is useful for Engineers?
b) Explain concept of valuation of IP & value Realization.
c) Compare the Indian IPR system with international IPR frameworks.

Q.3 Write short notes (Any Four) **20**

a) Copy rights
b) Commercialization
c) Bio technology and intellectual property
d) Protection of Traditional knowledge
e) IPR & Electronic Commerce
f) TRIPS & Access to Medicines

Seat No.		Set	S

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures al right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) What is copyright meant for?
   a) Film work b) Books
   c) Essay d) All of these

2) What is the term of Patent?
   a) 35 years b) 25 years
   c) 20 years d) 15 years

3) Intellectual Property Rights (IPR) protect the use of information and ideas that are of _____.
   a) Ethical value b) Moral value
   c) Social value d) Commercial value

4) The following can be patented _____.
   a) Machine b) Process
   c) Composition of matter d) All of these

5) The following can not be exploited by assigning or by licensing the rights to others _____.
   a) Patents b) Designs
   c) Trademark d) All of these

6) What protects the intellectual property created by artists?
   a) Copyright b) Patents
   c) Trademarks d) Registered Designs

7) If a company develops a new technology that improves its main product, what type of intellectual property can they use to stop others from copying their invention?
   a) Copyright b) Patents
   c) Trademarks d) Registered Designs

8) All of the following are examples of intellectual property protections except ___.
   a) Copyrights b) Patents
   c) Contracts d) Trademarks

9) The first Patent Law was enacted in India in the year ____.
   a) 1856 b) 1880
   c) 1905 d) 1850

10) The legislation covering intellectual property right in India for Information Technology is _____.
    a) Information Technology Act 2003
    b) Information Technology Act 2000
    c) Information Technology Act 2008
    d) None of these

SLR-FM-32

Seat No.	

Set S

T.E. (Part – I) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Attempt following questions (Any Two) **20**

a) What is intellectual property? How it is useful for Engineers?
b) Explain concept of valuation of IP & value Realization.
c) Compare the Indian IPR system with international IPR frameworks.

Q.3 Write short notes (Any Four) **20**

a) Copy rights
b) Commercialization
c) Bio technology and intellectual property
d) Protection of Traditional knowledge
e) IPR & Electronic Commerce
f) TRIPS & Access to Medicines

SLR-FM-33

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) In section II, Solve any three questions.
4) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Compatibility conditions are essentially required to solve, _____. 01
   a) Substitute frame b) Complex frame
   c) Redundant frame d) Compound truss

2) Which one of the fallowing doesn't fall under category of force method? 01
   a) Consistent deformation method
   b) Flexibility method
   c) Stiffness method
   d) Energy method

3) Flexibility coefficient of beam shown in fig 1 is _____. 01

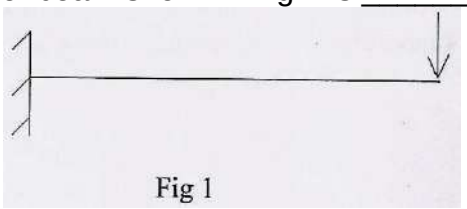


Fig 1

   a) $\frac{L^2}{2\,EI}$ b) $\frac{L^3}{3\,EI}$
   c) $\frac{L^3}{4\,EI}$ d) $\frac{L^3}{6\,EI}$

4) Expression given by Castigliano's theorem to determine deflection of any point in structure is _____. 01
   a) $\int \frac{M}{EI} x \frac{\partial M}{\partial p}$ b) $\int \frac{\partial M}{\partial p} \frac{dx}{EI}$
   c) $\int M \frac{\partial M}{\partial p} \frac{dx}{EI}$ d) None of these

5) Degree of static indeterminacy of beam (neglecting A.F) shown in fig 2. 01

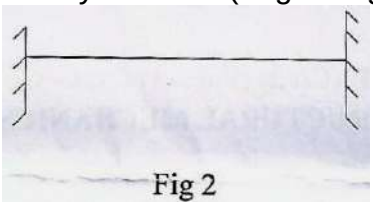


Fig 2

a) 1 b) 3
c) 2 d) 4

6) Degree of kinematic indeterminacy of truss shown in fig 3. 01

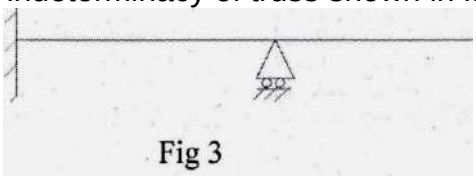


Fig 3

a) 3 b) 5
c) 6 d) 2

7) The flexibility matrix is _____. 01
a) Symmetric b) Unsymmetric
c) triangular d) none of these

8) Due to sinking of support by 'δ', the moment developed is _____. 01
a) $6\mathrm{EI}\delta/\mathrm{L}3$ b) $12EI\delta\ /\ L3$
c) $6\mathrm{EI}\delta\ /\ \mathrm{L}2$ d) $6\mathrm{EI}\delta\ /\ \mathrm{L}$

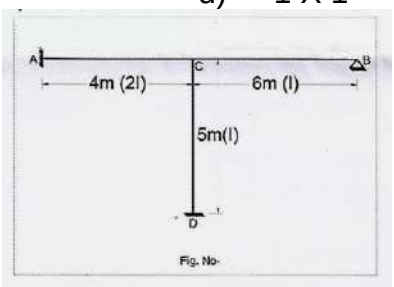
9) In portal frames, sway is produced due to _____. 01
a) Eccentric loading on frame
b) Horizontal loading on column
c) Different end conditions of columns
d) All of the above

10) Shape of ILD for indeterminate structure is _____. 01
a) Linear b) Nonlinear
c) Triangular d) All of the above

11) Size of stiffness matrix for propped cantilever beam is _____. 01
a) 2 X 2 b) 3 X 3
c) 4 X 4 d) None of these

12) Mullar Breslau principle for influence line is applicable for _____. 01
a) Simple beam b) Continuous beam
c) Redundant truss d) all of these

13) Size of Stiffness matrix for frame as shown in fig. is _____. 02
a) 3 X 3 b) 4 X 4
c) 2 X 2 d) 1 X 1



Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Questions No.2 is Compulsory. and attempt any two questions from remaining to Q.3 to Q.5 section I.
2) Questions No.8 is Compulsory. and attempt any two questions from remaining to Q.6, Q.7 and Q.9 section II.
3) Figures to the right indicate full marks.
4) Assume additional data if required and mention it clearly.

Section – I

Q.2 **Solve any four.** **10**
a) Define static and kinematic indeterminacy with examples.
b) Differentiate between flexibility and stiffness method.
c) Enlist various methods of force method of analysis.
d) Explain Castigliano's theorem for solving indeterminate beams.
e) Enlist various methods of Displacement method of analysis.

Q.3 Analyse the continuous beam using Consistent Deformation method. Support B sinks by 10mm. EI= 75000 kNm^2. Refer Fig 4. **09**

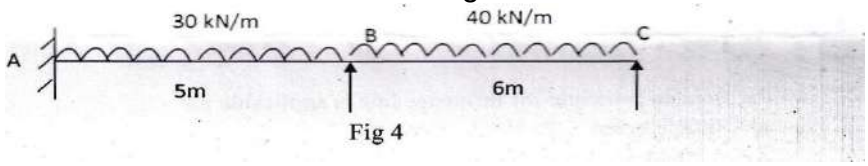


Fig 4

Q.4 Draw SFD and BMD using Strain Energy method. Refer Fig 5. **09**

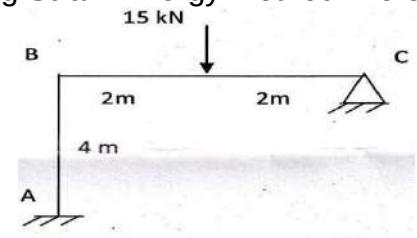


Fig 5

Q.5 Analyze the beam using flexibility method. Refer Fig. 6 **09**

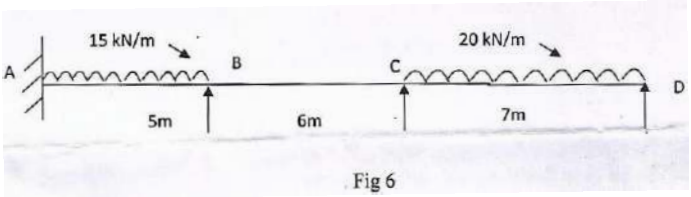
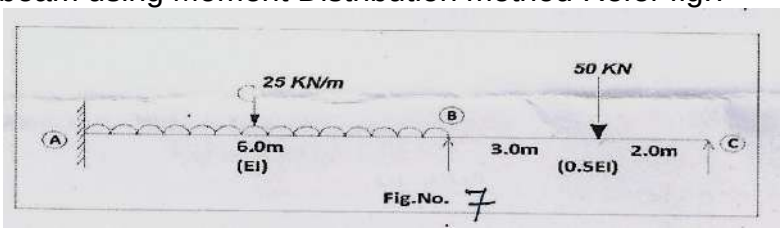


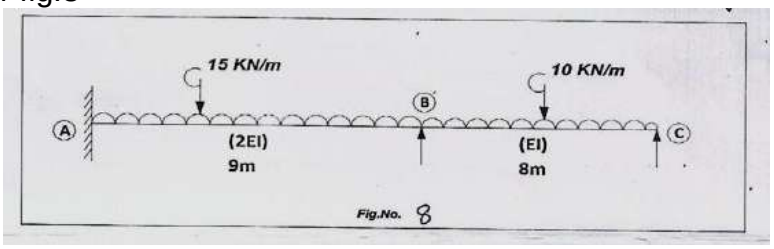
Fig 6

Section – II

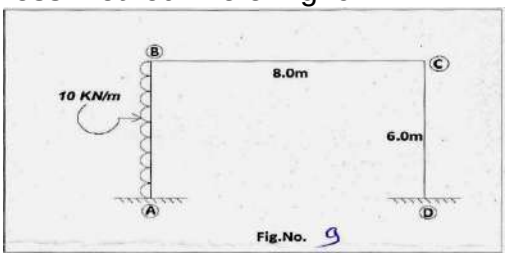
Q.6 Analyze the beam using Moment Distribution method Refer fig.7 **09**



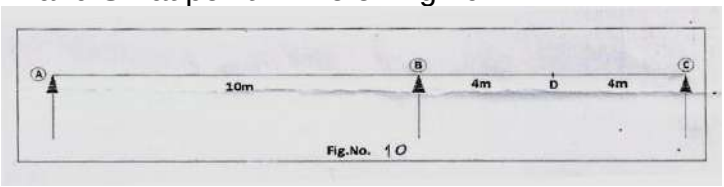
Q.7 Analyze Continuous Beam and draw S.F and B.M Diagram Using Stiffness Method Refer fig.8 **09**



Q.8 Draw B.M.D. Use Stiffness Method. Refer fig. 9 **10**



Q.9 Draw ILD for BM and SF at point D. Refer Fig.10 **09**



SLR-FM-33

Seat No.	

Set Q

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) In section II, Solve any three questions.
4) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Due to sinking of support by 'δ', the moment developed is _____. 01
   a) $6\mathrm{EI}\delta/\mathrm{L}3$ b) $12EI\delta\ /\ L3$
   c) $6\mathrm{EI}\delta\ /\ \mathrm{L}2$ d) $6\mathrm{EI}\delta\ /\ \mathrm{L}$

2) In portal frames, sway is produced due to _____. 01
   a) Eccentric loading on frame
   b) Horizontal loading on column
   c) Different end conditions of columns
   d) All of the above

3) Shape of ILD for indeterminate structure is _____. 01
   a) Linear b) Nonlinear
   c) Triangular d) All of the above

4) Size of stiffness matrix for propped cantilever beam is _____. 01
   a) 2 X 2 b) 3 X 3
   c) 4 X 4 d) None of these

5) Mullar Breslau principle for influence line is applicable for _____. 01
   a) Simple beam b) Continuous beam
   c) Redundant truss d) all of these

6) Compatibility conditions are essentially required to solve, _____. 01
   a) Substitute frame b) Complex frame
   c) Redundant frame d) Compound truss

7) Which one of the fallowing doesn't fall under category of force method? 01
   a) Consistent deformation method
   b) Flexibility method
   c) Stiffness method
   d) Energy method

8) Flexibility coefficient of beam shown in fig 1 is _____. 01

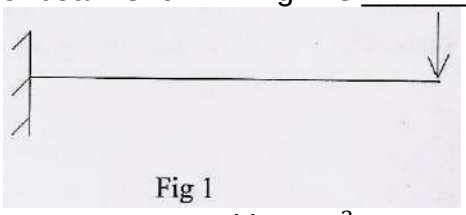


Fig 1

a) $\frac{L^2}{2\,EI}$ b) $\frac{L^3}{3\,EI}$
c) $\frac{L^3}{4\,EI}$ d) $\frac{L^3}{6\,EI}$

9) Expression given by Castigliano's theorem to determine deflection of any point in structure is _____. 01

a) $\int \frac{M}{EI} x \frac{\partial M}{\partial p}$ b) $\int \frac{\partial M}{\partial p} \frac{dx}{EI}$
c) $\int M \frac{\partial M}{\partial p} \frac{dx}{EI}$ d) None of these

10) Degree of static indeterminacy of beam (neglecting A.F) shown in fig 2. 01

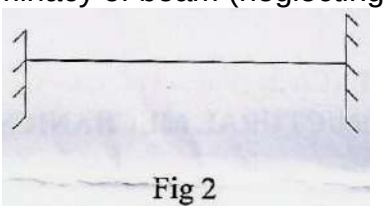


Fig 2

a) 1 b) 3
c) 2 d) 4

11) Degree of kinematic indeterminacy of truss shown in fig 3. 01

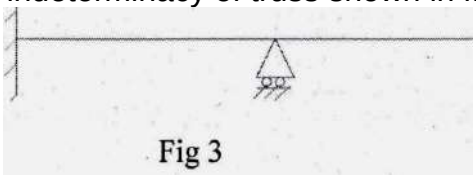


Fig 3

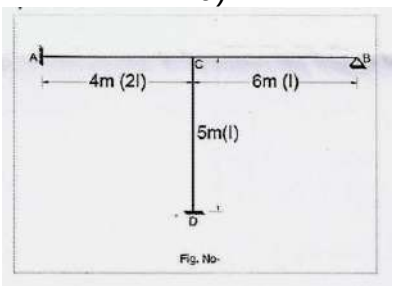
a) 3 b) 5
c) 6 d) 2

12) The flexibility matrix is _____. 01

a) Symmetric b) Unsymmetric
c) triangular d) none of these

13) Size of Stiffness matrix for frame as shown in fig. is _____. 02

a) 3 X 3 b) 4 X 4
c) 2 X 2 d) 1 X 1



Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Questions No.2 is Compulsory. and attempt any two questions from remaining to Q.3 to Q.5 section I.
2) Questions No.8 is Compulsory. and attempt any two questions from remaining to Q.6, Q.7 and Q.9 section II.
3) Figures to the right indicate full marks.
4) Assume additional data if required and mention it clearly.

Section – I

Q.2 **Solve any four.** **10**
a) Define static and kinematic indeterminacy with examples.
b) Differentiate between flexibility and stiffness method.
c) Enlist various methods of force method of analysis.
d) Explain Castigliano's theorem for solving indeterminate beams.
e) Enlist various methods of Displacement method of analysis.

Q.3 Analyse the continuous beam using Consistent Deformation method. Support B sinks by 10mm. EI= 75000 kNm^2. Refer Fig 4. **09**

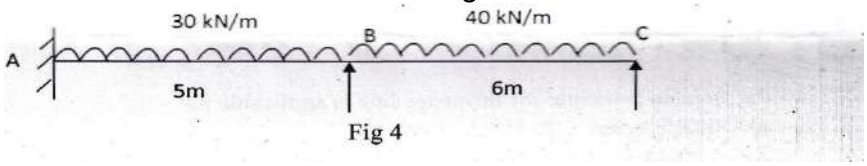


Fig 4

Q.4 Draw SFD and BMD using Strain Energy method. Refer Fig 5. **09**

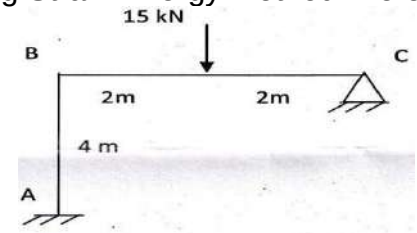


Fig 5

Q.5 Analyze the beam using flexibility method. Refer Fig. 6 **09**

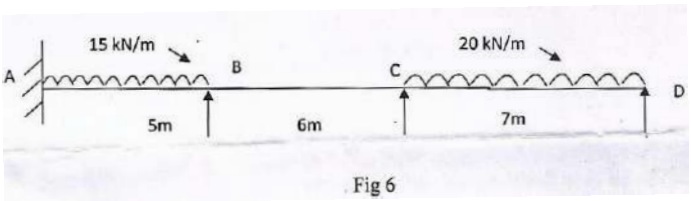
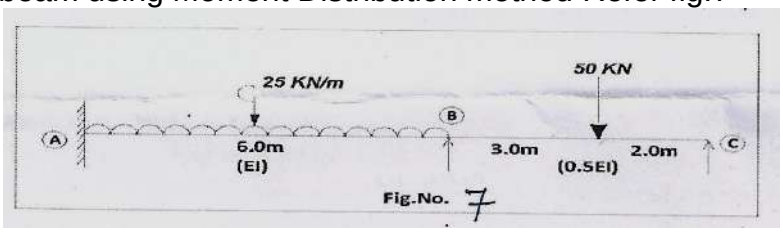


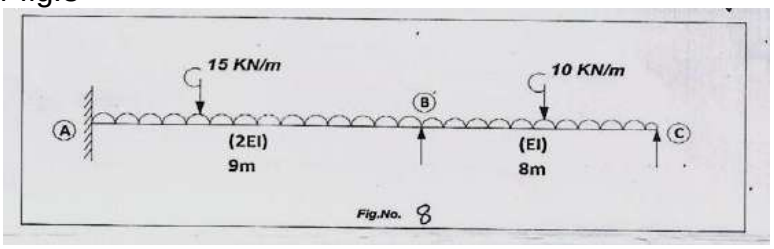
Fig 6

Section – II

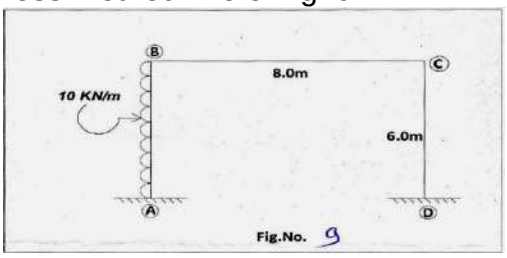
Q.6 Analyze the beam using Moment Distribution method Refer fig.7 **09**



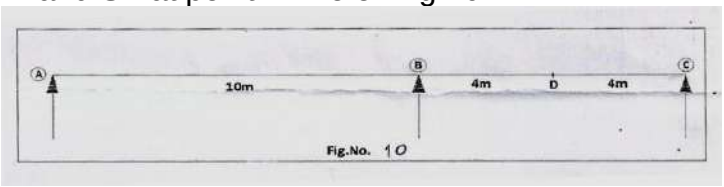
Q.7 Analyze Continuous Beam and draw S.F and B.M Diagram Using Stiffness Method Refer fig.8 **09**



Q.8 Draw B.M.D. Use Stiffness Method. Refer fig. 9 **10**



Q.9 Draw ILD for BM and SF at point D. Refer Fig.10 **09**



SLR-FM-33

Seat No.	

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) In section II, Solve any three questions.
4) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Size of stiffness matrix for propped cantilever beam is _____. 01
   a) 2 X 2 b) 3 X 3
   c) 4 X 4 d) None of these

2) Mullar Breslau principle for influence line is applicable for _____. 01
   a) Simple beam b) Continuous beam
   c) Redundant truss d) all of these

3) Compatibility conditions are essentially required to solve, _____. 01
   a) Substitute frame b) Complex frame
   c) Redundant frame d) Compound truss

4) Which one of the fallowing doesn't fall under category of force method? 01
   a) Consistent deformation method
   b) Flexibility method
   c) Stiffness method
   d) Energy method

5) Flexibility coefficient of beam shown in fig 1 is _____. 01

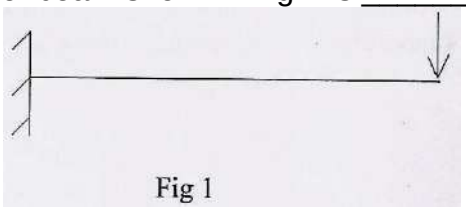


Fig 1

   a) $\frac{L^2}{2\,EI}$ b) $\frac{L^3}{3\,EI}$
   c) $\frac{L^3}{4\,EI}$ d) $\frac{L^3}{6\,EI}$

6) Expression given by Castigliano's theorem to determine deflection of any point in structure is _____. 01

a) $\int \frac{M}{EI} x \frac{\partial M}{\partial p}$ b) $\int \frac{\partial M}{\partial p} \frac{dx}{EI}$

c) $\int M \frac{\partial M}{\partial p} \frac{dx}{EI}$ d) None of these

7) Degree of static indeterminacy of beam (neglecting A.F) shown in fig 2. 01

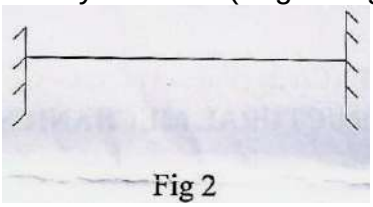


Fig 2

a) 1 b) 3
c) 2 d) 4

8) Degree of kinematic indeterminacy of truss shown in fig 3. 01

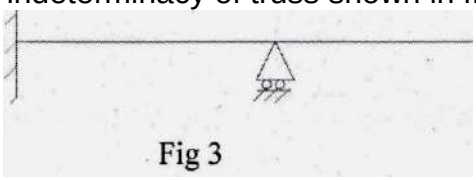


Fig 3

a) 3 b) 5
c) 6 d) 2

9) The flexibility matrix is _____. 01

a) Symmetric b) Unsymmetric
c) triangular d) none of these

10) Due to sinking of support by 'δ', the moment developed is _____. 01

a) $6\mathrm{EI}\delta/\mathrm{L}3$ b) $12EI\delta\ /\ L3$
c) $6\mathrm{EI}\delta\ /\ \mathrm{L}2$ d) $6\mathrm{EI}\delta\ /\ \mathrm{L}$

11) In portal frames, sway is produced due to _____. 01

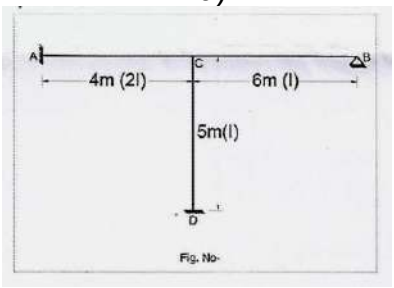
a) Eccentric loading on frame
b) Horizontal loading on column
c) Different end conditions of columns
d) All of the above

12) Shape of ILD for indeterminate structure is _____. 01

a) Linear b) Nonlinear
c) Triangular d) All of the above

13) Size of Stiffness matrix for frame as shown in fig. is _____. 02

a) 3 X 3 b) 4 X 4
c) 2 X 2 d) 1 X 1



Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Questions No.2 is Compulsory. and attempt any two questions from remaining to Q.3 to Q.5 section I.
2) Questions No.8 is Compulsory. and attempt any two questions from remaining to Q.6, Q.7 and Q.9 section II.
3) Figures to the right indicate full marks.
4) Assume additional data if required and mention it clearly.

Section – I

Q.2 **Solve any four.** **10**
a) Define static and kinematic indeterminacy with examples.
b) Differentiate between flexibility and stiffness method.
c) Enlist various methods of force method of analysis.
d) Explain Castigliano's theorem for solving indeterminate beams.
e) Enlist various methods of Displacement method of analysis.

Q.3 Analyse the continuous beam using Consistent Deformation method. Support B sinks by 10mm. EI= 75000 kNm^2. Refer Fig 4. **09**

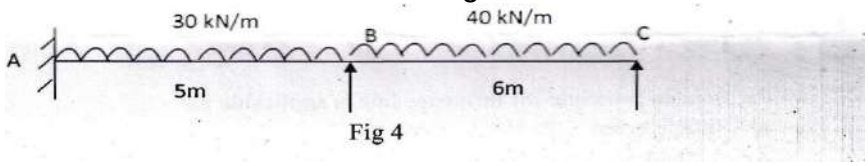


Fig 4

Q.4 Draw SFD and BMD using Strain Energy method. Refer Fig 5. **09**

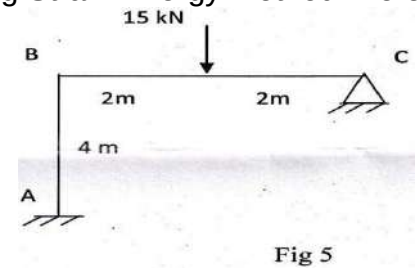


Fig 5

Q.5 Analyze the beam using flexibility method. Refer Fig. 6 **09**

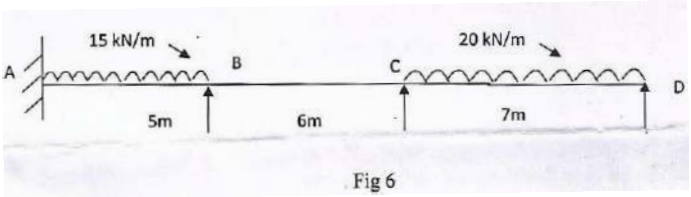
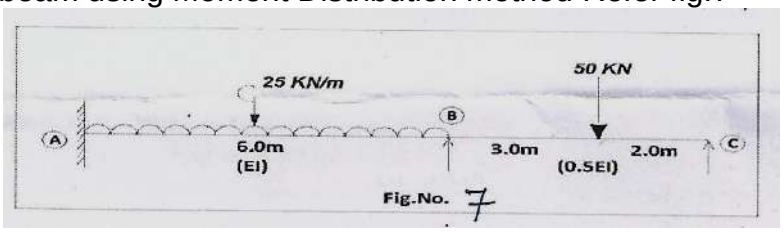


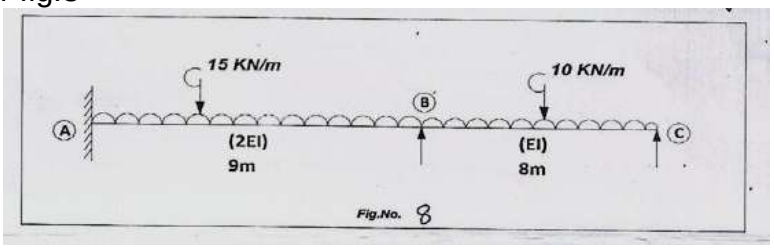
Fig 6

Section – II

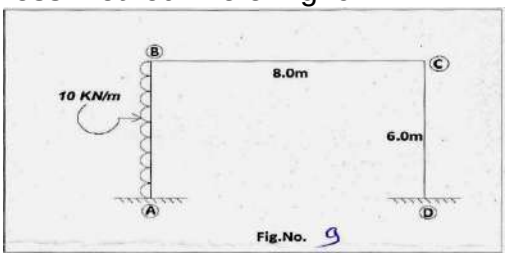
Q.6 Analyze the beam using Moment Distribution method Refer fig.7 **09**



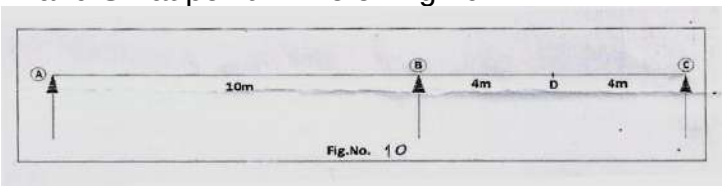
Q.7 Analyze Continuous Beam and draw S.F and B.M Diagram Using Stiffness Method Refer fig.8 **09**



Q.8 Draw B.M.D. Use Stiffness Method. Refer fig. 9 **10**



Q.9 Draw ILD for BM and SF at point D. Refer Fig.10 **09**



SLR-FM-33

Seat No.	

Set S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) In section II, Solve any three questions.
4) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Degree of kinematic indeterminacy of truss shown in fig 3. 01

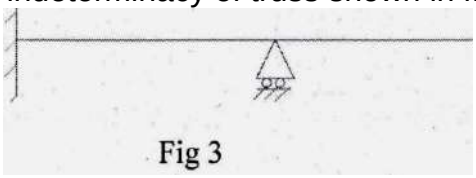


Fig 3

a) 3 b) 5
c) 6 d) 2

2) The flexibility matrix is _____. 01
a) Symmetric b) Unsymmetric
c) triangular d) none of these

3) Due to sinking of support by 'δ', the moment developed is _____. 01
a) $6\mathrm{EI}\delta/\mathrm{L}3$ b) $12EI\delta\ /\ L3$
c) $6\mathrm{EI}\delta\ /\ \mathrm{L}2$ d) $6\mathrm{EI}\delta\ /\ \mathrm{L}$

4) In portal frames, sway is produced due to _____. 01
a) Eccentric loading on frame
b) Horizontal loading on column
c) Different end conditions of columns
d) All of the above

5) Shape of ILD for indeterminate structure is _____. 01
a) Linear b) Nonlinear
c) Triangular d) All of the above

6) Size of stiffness matrix for propped cantilever beam is _____. 01
a) 2 X 2 b) 3 X 3
c) 4 X 4 d) None of these

7) Mullar Breslau principle for influence line is applicable for _____. 01
a) Simple beam b) Continuous beam
c) Redundant truss d) all of these

8) Compatibility conditions are essentially required to solve, _____. 01
   a) Substitute frame b) Complex frame
   c) Redundant frame d) Compound truss

9) Which one of the fallowing doesn't fall under category of force method? 01
   a) Consistent deformation method
   b) Flexibility method
   c) Stiffness method
   d) Energy method

10) Flexibility coefficient of beam shown in fig 1 is _____. 01

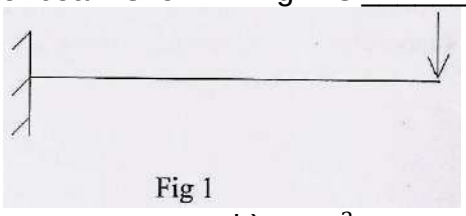


Fig 1

   a) $\frac{L^2}{2\,EI}$ b) $\frac{L^3}{3\,EI}$
   c) $\frac{L^3}{4\,EI}$ d) $\frac{L^3}{6\,EI}$

11) Expression given by Castigliano's theorem to determine deflection of any point in structure is _____. 01
   a) $\int \frac{M}{EI} x \frac{\partial M}{\partial p}$ b) $\int \frac{\partial M}{\partial p} \frac{dx}{EI}$
   c) $\int M \frac{\partial M}{\partial p} \frac{dx}{EI}$ d) None of these

12) Degree of static indeterminacy of beam (neglecting A.F) shown in fig 2. 01

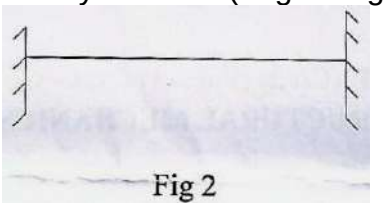
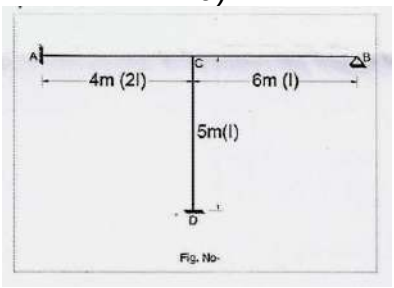


Fig 2

   a) 1 b) 3
   c) 2 d) 4

13) Size of Stiffness matrix for frame as shown in fig. is _____. 02
   a) 3 X 3 b) 4 X 4
   c) 2 X 2 d) 1 X 1



Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Questions No.2 is Compulsory. and attempt any two questions from remaining to Q.3 to Q.5 section I.
2) Questions No.8 is Compulsory. and attempt any two questions from remaining to Q.6, Q.7 and Q.9 section II.
3) Figures to the right indicate full marks.
4) Assume additional data if required and mention it clearly.

Section – I

Q.2 **Solve any four.** **10**
a) Define static and kinematic indeterminacy with examples.
b) Differentiate between flexibility and stiffness method.
c) Enlist various methods of force method of analysis.
d) Explain Castigliano's theorem for solving indeterminate beams.
e) Enlist various methods of Displacement method of analysis.

Q.3 Analyse the continuous beam using Consistent Deformation method. Support B sinks by 10mm. EI= 75000 kNm^2. Refer Fig 4. **09**

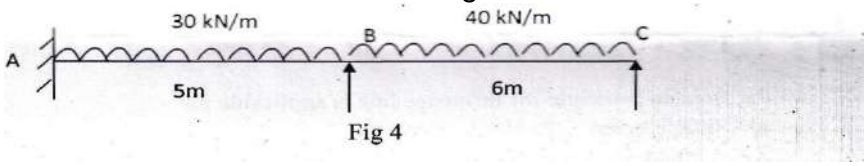


Fig 4

Q.4 Draw SFD and BMD using Strain Energy method. Refer Fig 5. **09**

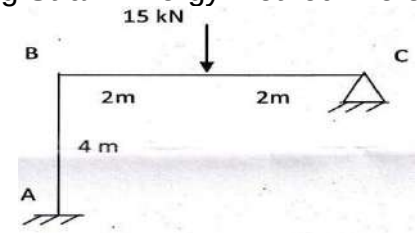


Fig 5

Q.5 Analyze the beam using flexibility method. Refer Fig. 6 **09**

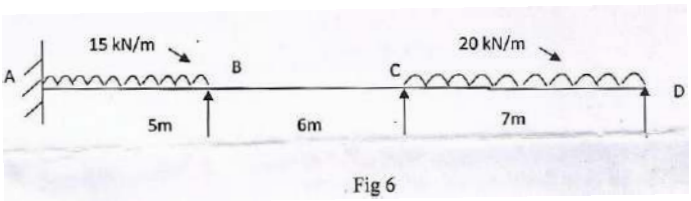
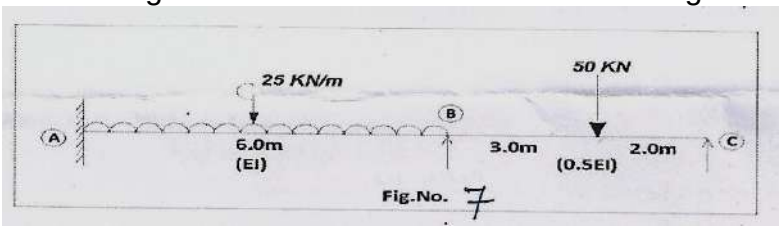


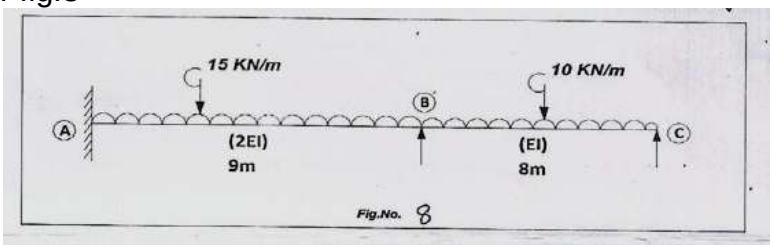
Fig 6

Section – II

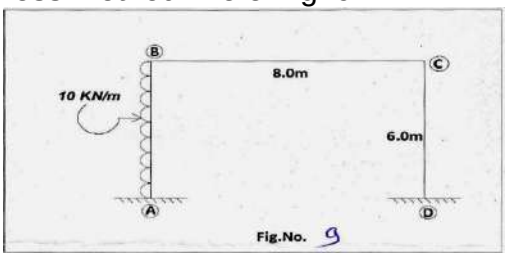
Q.6 Analyze the beam using Moment Distribution method Refer fig.7 **09**



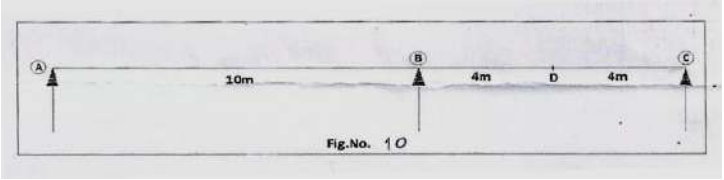
Q.7 Analyze Continuous Beam and draw S.F and B.M Diagram Using Stiffness Method Refer fig.8 **09**



Q.8 Draw B.M.D. Use Stiffness Method. Refer fig. 9 **10**



Q.9 Draw ILD for BM and SF at point D. Refer Fig.10 **09**



SLR-FM-34

Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentences. **14**

1) RQD is the ratio of _____.
   a) Sum of lengths of rock core pieces greater than 15 cm to the total length of core run
   b) Sum of lengths of rock core pieces greater than 10 cm to the total length of core run
   c) Sum of lengths of rock core pieces to the total length of core run
   d) Sum of lengths of unbroken rock core pieces to the total length of core run

2) One of the purposes of Soil exploration is _____.
   a) To understand the behaviour of the structure
   b) To estimate the load coming on the soil
   c) To find the quantity and quality of water
   d) To determine basic properties of soil

3) Which one of the following is not the assumption made in Terazaghi's bearing capacity analysis?
   a) The strip footing has rough base
   b) Failure zone do not extend above the horizontal plane through the base of the footing
   c) Plastic zone is not fully developed
   d) The elastic zone has straight boundaries

4) According to IS: 1904 - 1966, maximum safe bearing capacity for coarse sand, medium sand and fine sand are respectively (in kg/cm^2)
   a) 4.5, 2.5, 1.5 b) 33, 16.5, 9
   c) 16.5, 9.0, 4.5 d) None of these

5) The allowable soil pressure for foundation in cohesive soil is generally controlled by ____.
   a) Settlements b) Bearing capacity
   c) both (a) and (b) d) neither (a) nor (b)

6) How much is the drive weight used in Standard Penetration test as per IS 2131: 1981?
   a) 53.5 kg b) 63.5 kg
   c) 73.5 kg d) 83.5 kg

7) In case of plate load test seating load to be applied is _____.
   a) 5 kPa b) 10 kPa
   c) 7 kPa d) None

8) Curb is a component in case of _____.
   a) Box caisson b) Pneumatic caisson
   c) Open caisson d) All

9) These types of soil deposits are often found near the mouths of rivers, along the perimeters of bays and beneath swamps or lagoons _____.
   a) Weak/compressible soil b) Collapsible soil
   c) Expansive soil d) Corrosive soil

10) The negative skin friction on a pile develops when _____.
   a) The soil in which it is driven is sandy soil
   b) The soil surrounding it settles more than the pile
   c) The ground water table rises
   d) The soil near the tip is clay

11) The group efficiency of driven piles in sand at a close spacing may be _____.
   a) Equal to 100% b) Greater than 100%
   c) Below 100% d) None of the above

12) In stability analysis, the term mobilized shear strength is referred to as ____.
   a) Shear strength b) Maximum shear stress
   c) Applied shear stress d) None

13) Taylor's stability charts are based on the total stress using the _____.
   a) Friction circle method b) Method of slices
   c) $\phi u = 0$ analysis d) None

14) Which of the following geosynthetic material acts as separator _____.
   a) Geocells b) Geomat
   c) Geotextiles d) Geofoam

Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 is compulsory; answer any two from remaining questions from Section – I.
2) Q.6 is compulsory; answer any two from remaining questions from Section – II.
3) Figures to the right indicate full marks.
4) Assume additional data if required and mention it clearly.

Section – I

Q.2 **a)** With a neat sketch explain borelog chart. **04**

b) Determine the ultimate bearing capacity of square footing of 1.5 m size, at a depth of 1.5 m, in a pure clay with an unconfined strength of 150 kN/m^2. $\phi = 0^0$ and $\gamma = 17$ kN/m^3, Take Nc $= 5.7$, Nq $= 1.0$, and N$\gamma = 0$ **06**

Q.3 **a**) Enlist the difference between general shear failure and Local shear failure. **03**

b) Determine the allowable gross load and net allowable load of square footing of 2m side and With a depth of foundation 1.0 m. use Terzaghi's bearing capacity theory and assume local Shear failure, take factor of safety 3.0, the soil at the site has $\gamma = 18$ kN/m^3, $c = 15$ kN/m^2 And $\phi = 25^0$, Take Nc $= 14.8$, Nq $= 5.6$, and N$\gamma = 3.2$ **06**

Q.4 **a)** Explain the procedure of Plate load test with neat sketches. **05**

b) Calculate the consolidation settlement of a clay layer of 12 m thick with initial void ratio of 0.90. The unit weight of clay is 18 kN/m^3 and liquid limit of undisturbed soil is 60%. Foundation load will subject the center of layer to a vertical stress increase of 10 kPa. **04**

Q.5 **a)** Explain uses of geotextiles in road construction with neat sketches. **04**

b) What is collapsible soil? What are the precautions of be taken before starting of construction in collapsible soil? **05**

Section – II

Q.6 **a)** Write short note on Negative skin friction. **04**

b) Design a strap footing for two columns using following data. **06**
Load carried by external column is 2800 kN and that by internal column is 4250 kN c/c Spacing between the columns is 6.8 m, size of each column is 450 mm × 450 mm and External column is at a distance of 280 mm from the boundary. Assume allowable soil pressure is 325 kN/m^2.

Q.7 **a)** A reinforced cement concrete pile weighing 30kN (including helmet and dolly) is driven by a drop hammer weighing 30 kN with an effective fall of 0.9 m. the average penetration per blow is 15mm. the total temporary elastic compression of the pile, pile cap and soil may be taken as 18 mm. coefficient of restitution 0.36, what is the allowable load on the pile with a factor of safety 2.0, Use Haley's formula. **06**

b) List out the types of Caissons. **03**

Q.8	**a)**	Design sheet pile wall for a height of 5.0 m in sandy soil and supporting sandy soil having $\gamma = 16$ kN/m^3, c = 0kN/m^2 and $\phi = 30^0$. Also draw the sketch of wall with design details.	**06**
	b)	Write a brief critical note on 'Taylor's Stability Number'	**03**
Q.9	**a)**	Draw a neat labeled sketch of a slope and enlist causes of failure of slope.	**03**
	b)	Briefly explain the procedure of friction circle method to determine stability of slopes	**06**

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentences. **14**

1) Curb is a component in case of _____.
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2) These types of soil deposits are often found near the mouths of rivers, along the perimeters of bays and beneath swamps or lagoons _____.
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3) The negative skin friction on a pile develops when _____.
   a) The soil in which it is driven is sandy soil
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4) The group efficiency of driven piles in sand at a close spacing may be _____.
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5) In stability analysis, the term mobilized shear strength is referred to as ____.
   a) Shear strength b) Maximum shear stress
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6) Taylor's stability charts are based on the total stress using the _____.
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   c) Geotextiles d) Geofoam

8) RQD is the ratio of _____.
   a) Sum of lengths of rock core pieces greater than 15 cm to the total length of core run
   b) Sum of lengths of rock core pieces greater than 10 cm to the total length of core run
   c) Sum of lengths of rock core pieces to the total length of core run
   d) Sum of lengths of unbroken rock core pieces to the total length of core run

9) One of the purposes of Soil exploration is _____.
   a) To understand the behaviour of the structure
   b) To estimate the load coming on the soil
   c) To find the quantity and quality of water
   d) To determine basic properties of soil

10) Which one of the following is not the assumption made in Terazaghi's bearing capacity analysis?
   a) The strip footing has rough base
   b) Failure zone do not extend above the horizontal plane through the base of the footing
   c) Plastic zone is not fully developed
   d) The elastic zone has straight boundaries

11) According to IS: 1904 - 1966, maximum safe bearing capacity for coarse sand, medium sand and fine sand are respectively (in kg/cm^2)
   a) 4.5, 2.5, 1.5 b) 33, 16.5, 9
   c) 16.5, 9.0, 4.5 d) None of these

12) The allowable soil pressure for foundation in cohesive soil is generally controlled by ____.
   a) Settlements b) Bearing capacity
   c) both (a) and (b) d) neither (a) nor (b)

13) How much is the drive weight used in Standard Penetration test as per IS 2131: 1981?
   a) 53.5 kg b) 63.5 kg
   c) 73.5 kg d) 83.5 kg

14) In case of plate load test seating load to be applied is _____.
   a) 5 kPa b) 10 kPa
   c) 7 kPa d) None

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 is compulsory; answer any two from remaining questions from Section – I.
2) Q.6 is compulsory; answer any two from remaining questions from Section – II.
3) Figures to the right indicate full marks.
4) Assume additional data if required and mention it clearly.

Section – I

Q.2 **a)** With a neat sketch explain borelog chart. **04**

b) Determine the ultimate bearing capacity of square footing of 1.5 m size, at a depth of 1.5 m, in a pure clay with an unconfined strength of 150 kN/m^2. $\phi = 0^0$ and $\gamma = 17$ kN/m^3, Take Nc $= 5.7$, Nq $= 1.0$, and N$\gamma = 0$ **06**

Q.3 **a**) Enlist the difference between general shear failure and Local shear failure. **03**

b) Determine the allowable gross load and net allowable load of square footing of 2m side and With a depth of foundation 1.0 m. use Terzaghi's bearing capacity theory and assume local Shear failure, take factor of safety 3.0, the soil at the site has $\gamma = 18$ kN/m^3, $c = 15$ kN/m^2 And $\phi = 25^0$, Take Nc $= 14.8$, Nq $= 5.6$, and N$\gamma = 3.2$ **06**

Q.4 **a)** Explain the procedure of Plate load test with neat sketches. **05**

b) Calculate the consolidation settlement of a clay layer of 12 m thick with initial void ratio of 0.90. The unit weight of clay is 18 kN/m^3 and liquid limit of undisturbed soil is 60%. Foundation load will subject the center of layer to a vertical stress increase of 10 kPa. **04**

Q.5 **a)** Explain uses of geotextiles in road construction with neat sketches. **04**

b) What is collapsible soil? What are the precautions of be taken before starting of construction in collapsible soil? **05**

Section – II

Q.6 **a)** Write short note on Negative skin friction. **04**

b) Design a strap footing for two columns using following data. **06**
Load carried by external column is 2800 kN and that by internal column is 4250 kN c/c Spacing between the columns is 6.8 m, size of each column is 450 mm × 450 mm and External column is at a distance of 280 mm from the boundary. Assume allowable soil pressure is 325 kN/m^2.

Q.7 **a)** A reinforced cement concrete pile weighing 30kN (including helmet and dolly) is driven by a drop hammer weighing 30 kN with an effective fall of 0.9 m. the average penetration per blow is 15mm. the total temporary elastic compression of the pile, pile cap and soil may be taken as 18 mm. coefficient of restitution 0.36, what is the allowable load on the pile with a factor of safety 2.0, Use Haley's formula. **06**

b) List out the types of Caissons. **03**

Q.8	**a)**	Design sheet pile wall for a height of 5.0 m in sandy soil and supporting sandy soil having $\gamma = 16$ kN/m^3, c = 0kN/m^2 and $\phi = 30^0$. Also draw the sketch of wall with design details.	**06**
	b)	Write a brief critical note on 'Taylor's Stability Number'	**03**
Q.9	**a)**	Draw a neat labeled sketch of a slope and enlist causes of failure of slope.	**03**
	b)	Briefly explain the procedure of friction circle method to determine stability of slopes	**06**

Seat No.	

Set **R**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentences. **14**

1) The allowable soil pressure for foundation in cohesive soil is generally controlled by ____.
   a) Settlements b) Bearing capacity
   c) both (a) and (b) d) neither (a) nor (b)

2) How much is the drive weight used in Standard Penetration test as per IS 2131: 1981?
   a) 53.5 kg b) 63.5 kg
   c) 73.5 kg d) 83.5 kg

3) In case of plate load test seating load to be applied is _____.
   a) 5 kPa b) 10 kPa
   c) 7 kPa d) None

4) Curb is a component in case of _____.
   a) Box caisson b) Pneumatic caisson
   c) Open caisson d) All

5) These types of soil deposits are often found near the mouths of rivers, along the perimeters of bays and beneath swamps or lagoons _____.
   a) Weak/compressible soil b) Collapsible soil
   c) Expansive soil d) Corrosive soil

6) The negative skin friction on a pile develops when _____.
   a) The soil in which it is driven is sandy soil
   b) The soil surrounding it settles more than the pile
   c) The ground water table rises
   d) The soil near the tip is clay

7) The group efficiency of driven piles in sand at a close spacing may be _____.
   a) Equal to 100% b) Greater than 100%
   c) Below 100% d) None of the above

8) In stability analysis, the term mobilized shear strength is referred to as ____.
   a) Shear strength b) Maximum shear stress
   c) Applied shear stress d) None

9) Taylor's stability charts are based on the total stress using the _____.
   a) Friction circle method b) Method of slices
   c) $\phi u = 0$ analysis d) None

10) Which of the following geosynthetic material acts as separator _____.
   a) Geocells
   b) Geomat
   c) Geotextiles
   d) Geofoam

11) RQD is the ratio of _____.
   a) Sum of lengths of rock core pieces greater than 15 cm to the total length of core run
   b) Sum of lengths of rock core pieces greater than 10 cm to the total length of core run
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12) One of the purposes of Soil exploration is _____.
   a) To understand the behaviour of the structure
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13) Which one of the following is not the assumption made in Terazaghi's bearing capacity analysis?
   a) The strip footing has rough base
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   c) Plastic zone is not fully developed
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14) According to IS: 1904 - 1966, maximum safe bearing capacity for coarse sand, medium sand and fine sand are respectively (in kg/cm^2)
   a) 4.5, 2.5, 1.5
   b) 33, 16.5, 9
   c) 16.5, 9.0, 4.5
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Seat No.	

Set R

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 is compulsory; answer any two from remaining questions from Section – I.
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Section – I

Q.2 **a)** With a neat sketch explain borelog chart. **04**

b) Determine the ultimate bearing capacity of square footing of 1.5 m size, at a depth of 1.5 m, in a pure clay with an unconfined strength of 150 kN/m^2. $\phi = 0^0$ and $\gamma = 17$ kN/m^3, Take Nc $= 5.7$, Nq $= 1.0$, and N$\gamma = 0$ **06**

Q.3 **a**) Enlist the difference between general shear failure and Local shear failure. **03**

b) Determine the allowable gross load and net allowable load of square footing of 2m side and With a depth of foundation 1.0 m. use Terzaghi's bearing capacity theory and assume local Shear failure, take factor of safety 3.0, the soil at the site has $\gamma = 18$ kN/m^3, $c = 15$ kN/m^2 And $\phi = 25^0$, Take Nc $= 14.8$, Nq $= 5.6$, and N$\gamma = 3.2$ **06**

Q.4 **a)** Explain the procedure of Plate load test with neat sketches. **05**

b) Calculate the consolidation settlement of a clay layer of 12 m thick with initial void ratio of 0.90. The unit weight of clay is 18 kN/m^3 and liquid limit of undisturbed soil is 60%. Foundation load will subject the center of layer to a vertical stress increase of 10 kPa. **04**

Q.5 **a)** Explain uses of geotextiles in road construction with neat sketches. **04**

b) What is collapsible soil? What are the precautions of be taken before starting of construction in collapsible soil? **05**

Section – II

Q.6 **a)** Write short note on Negative skin friction. **04**

b) Design a strap footing for two columns using following data. **06**
Load carried by external column is 2800 kN and that by internal column is 4250 kN c/c Spacing between the columns is 6.8 m, size of each column is 450 mm × 450 mm and External column is at a distance of 280 mm from the boundary. Assume allowable soil pressure is 325 kN/m^2.

Q.7 **a)** A reinforced cement concrete pile weighing 30kN (including helmet and dolly) is driven by a drop hammer weighing 30 kN with an effective fall of 0.9 m. the average penetration per blow is 15mm. the total temporary elastic compression of the pile, pile cap and soil may be taken as 18 mm. coefficient of restitution 0.36, what is the allowable load on the pile with a factor of safety 2.0, Use Haley's formula. **06**

b) List out the types of Caissons. **03**

Q.8	**a)**	Design sheet pile wall for a height of 5.0 m in sandy soil and supporting sandy soil having $\gamma = 16$ kN/m^3, c = 0kN/m^2 and $\phi = 30^0$. Also draw the sketch of wall with design details.	**06**
	b)	Write a brief critical note on 'Taylor's Stability Number'	**03**
Q.9	**a)**	Draw a neat labeled sketch of a slope and enlist causes of failure of slope.	**03**
	b)	Briefly explain the procedure of friction circle method to determine stability of slopes	**06**

SLR-FM-34

Seat No.	

Set S

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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1) The negative skin friction on a pile develops when _____.
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   c) Expansive soil d) Corrosive soil

Seat No.		Set	S

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 is compulsory; answer any two from remaining questions from Section – I.
2) Q.6 is compulsory; answer any two from remaining questions from Section – II.
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b) Determine the allowable gross load and net allowable load of square footing of 2m side and With a depth of foundation 1.0 m. use Terzaghi's bearing capacity theory and assume local Shear failure, take factor of safety 3.0, the soil at the site has $\gamma = 18$ kN/m^3, $c = 15$ kN/m^2 And $\phi = 25^0$, Take Nc $= 14.8$, Nq $= 5.6$, and N$\gamma = 3.2$ **06**

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b) Calculate the consolidation settlement of a clay layer of 12 m thick with initial void ratio of 0.90. The unit weight of clay is 18 kN/m^3 and liquid limit of undisturbed soil is 60%. Foundation load will subject the center of layer to a vertical stress increase of 10 kPa. **04**

Q.5 **a)** Explain uses of geotextiles in road construction with neat sketches. **04**

b) What is collapsible soil? What are the precautions of be taken before starting of construction in collapsible soil? **05**

Section – II

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b) Design a strap footing for two columns using following data. **06**
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	b)	Write a brief critical note on 'Taylor's Stability Number'	**03**
Q.9	**a)**	Draw a neat labeled sketch of a slope and enlist causes of failure of slope.	**03**
	b)	Briefly explain the procedure of friction circle method to determine stability of slopes	**06**

SLR-FM-35

Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – II

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever necessary and mention it clearly.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives form the options and rewrite the sentence. 14

1) Quantity of wastewater flowing through sewers in dry season is known as ____.
   a) WWF b) DWF
   c) Storm water flow d) Sullage

2) _____ sewer collects sewage directly from houses.
   a) Trunk b) Lateral
   c) Sub main d) House

3) Pick out the odd one from the following.
   a) Sutro weir b) Parshall flume
   c) Proportional flow weir d) V - notch

4) RBC and Trickling filters are examples of _____ process.
   a) Suspended growth process b) Anaerobic process
   c) Attached growth process d) All of above

5) Maximum population that can be served by using septic tank is _____.
   a) 100 b) 200
   c) 250 d) 300

6) Organic loading adopted for low rate trickling filter is _____ $g/d/m^3$.
   a) 80 to 320 b) 800 to 3200
   c) 500 to 1000 d) 5000 to 10000

7) _____ is ultimate disposal option considered in Municipal Solid (MSW) waste management.
   a) Landfill b) Incineration
   c) Composting d) Open burning

8) Pick out the odd one with respect to digestion process _____.
   a) Hydrolysis b) Acidogenesis
   c) Methanogenesis d) Dilution

9) Disposal option/s for screenings is/are _____.
   a) Burial b) Incineration
   c) Digestion d) All of above

10) Pollutants emitted from identifiable sources are known as _____ pollutants.
   a) Tertiary
   b) Secondary
   c) Primary
   d) None of these

11) Indicator used in BDO test is _____.
   a) Potassium chromate
   b) Starch
   c) MO
   d) PP

12) DO deficit = DO_{sat} - _____.
   a) Initial DO
   b) Final DO
   c) Actual DO or DO of mix
   d) None of these

13) _____ type of digestion takes less time for digestion.
   a) Thermophilic
   b) Mesophilic
   c) Anaerobic
   d) All of the above

14) Mesosphere and Thermosphere together can be called as _____.
   a) Chemosphere
   b) Lithosphere
   c) Ionosphere
   d) Radiosphere

SLR-FM-35

Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:30 AM To 01:00 PM

Instructions: 1) Q. No. 2 & Q. 7 are compulsory.
2) Answer any two questions from each section
3) Figures to the right indicate full marks.
4) Assume suitable data wherever necessary and mention it clearly.
5) Use of non programmable calculator is allowed.

Section I

Q.2 **a)** Draw a flow chart for treatment of domestic wastewater consisting of ASP as secondary biological unit. Also state function of each unit in tabular format. **05**

b) A sewer of 1m dia. Carries a certain discharge while running full. What will be the depth of flow and corresponding velocity ratio if discharge in the sewer is reduced to one fourth of the value? Assume N remains constant at all states of flow. **05**

Q.3 **a**) Define BOD. Differentiate between BOD and COD **04**

b) Define SVI and state its unit. Derive relation between SVI and recirculation (Q_r) **05**

Q.4 **a)** Define - **04**
1) HRT
2) Sludge age
3) Volumetric loading
4) F/M ratio

b) Design a completely mixed ASP for following data: **05**
1) Wastewater flow = 20 MLd
2) Influent BOD = 200 mg/Lit
3) Effluent BOD = 25 mg/Lit
4) MLSS = 2000 mg/Lit
5) F/M = 0.2
6) SVI = 80 ml/gm
Also design diffused aeration system

Q.5 **Write Short notes. (Any three)** **09**
a) Stages in Anaerobic digestion
b) NRC equation
c) Operational Problems in tricking filter
d) SBR

Section-II

Q.6 **a)** Give detailed classification of sources of air pollutants **04**

b) Find resultant values of temperature, BOD_5 and DO if wastewater is discharged into river. **05**

Parameter	wastewater	River
Temperature	25^0 C	20^0 C
BOD_5	200 mg/lit	0 mg/lit
DO	0 mg/lit	9.17 mg/lit
Flow	0.8 m^3/sec	10 m^3/sec

Q.7 **a)** Enlist different types of particulate control equipment's used to control air pollution. Explain spray tower in detail. **05**

b) Explain Global warming with respect to following points: Definition, causes, diagram, effects and remedies **05**

Q.8 **a)** Explain stability conditions in detail. **05**

b) What is composting? List out different methods of composting and discuss Indore method in detail. **04**

Q.9 **Write short notes. (Any three)** **09**

a) Zones of purification in self-purification of stream process

b) Chemical characteristics of solid wastes

c) Decentralized treatment

d) ESP

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – II

Day & Date: Monday, 25-11-2019 Max. Marks: 70
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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SLR-FM-35

Seat No.	

Set Q

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:30 AM To 01:00 PM

Instructions: 1) Q. No. 2 & Q. 7 are compulsory.
2) Answer any two questions from each section
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Section I

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4) F/M ratio

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6) SVI = 80 ml/gm

Also design diffused aeration system

Q.5 **Write Short notes. (Any three)** **09**
a) Stages in Anaerobic digestion
b) NRC equation
c) Operational Problems in tricking filter
d) SBR

Section-II

Q.6 **a)** Give detailed classification of sources of air pollutants **04**

b) Find resultant values of temperature, BOD_5 and DO if wastewater is discharged into river. **05**

Parameter	wastewater	River
Temperature	25^0 C	20^0 C
BOD_5	200 mg/lit	0 mg/lit
DO	0 mg/lit	9.17 mg/lit
Flow	0.8 m^3/sec	10 m^3/sec

Q.7 **a)** Enlist different types of particulate control equipment's used to control air pollution. Explain spray tower in detail. **05**

b) Explain Global warming with respect to following points: Definition, causes, diagram, effects and remedies **05**

Q.8 **a)** Explain stability conditions in detail. **05**

b) What is composting? List out different methods of composting and discuss Indore method in detail. **04**

Q.9 **Write short notes. (Any three)** **09**

a) Zones of purification in self-purification of stream process

b) Chemical characteristics of solid wastes

c) Decentralized treatment

d) ESP

Seat No.	

Set **R**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – II

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever necessary and mention it clearly.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives form the options and rewrite the sentence. 14

1) Maximum population that can be served by using septic tank is _____.
   a) 100 b) 200
   c) 250 d) 300

2) Organic loading adopted for low rate trickling filter is _____ g/d/m^3.
   a) 80 to 320 b) 800 to 3200
   c) 500 to 1000 d) 5000 to 10000

3) _____ is ultimate disposal option considered in Municipal Solid (MSW) waste management.
   a) Landfill b) Incineration
   c) Composting d) Open burning

4) Pick out the odd one with respect to digestion process _____.
   a) Hydrolysis b) Acidogenesis
   c) Methanogenesis d) Dilution

5) Disposal option/s for screenings is/are _____.
   a) Burial b) Incineration
   c) Digestion d) All of above

6) Pollutants emitted from identifiable sources are known as _____ pollutants.
   a) Tertiary b) Secondary
   c) Primary d) None of these

7) Indicator used in BDO test is _____.
   a) Potassium chromate b) Starch
   c) MO d) PP

8) DO deficit = DO_{sat} - _____.
   a) Initial DO b) Final DO
   c) Actual DO or DO of mix d) None of these

9) _____ type of digestion takes less time for digestion.
   a) Thermophilic b) Mesophilic
   c) Anaerobic d) All of the above

10) Mesosphere and Thermosphere together can be called as _____.
   a) Chemosphere b) Lithosphere
   c) Ionosphere d) Radiosphere

11) Quantity of wastewater flowing through sewers in dry season is known as ____.
   a) WWF b) DWF
   c) Storm water flow d) Sullage

12) _____ sewer collects sewage directly from houses.
   a) Trunk b) Lateral
   c) Sub main d) House

13) Pick out the odd one from the following.
   a) Sutro weir b) Parshall flume
   c) Proportional flow weir d) V - notch

14) RBC and Trickling filters are examples of _____ process.
   a) Suspended growth process b) Anaerobic process
   c) Attached growth process d) All of above

SLR-FM-35

Seat No.	

Set R

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:30 AM To 01:00 PM

Instructions: 1) Q. No. 2 & Q. 7 are compulsory.
2) Answer any two questions from each section
3) Figures to the right indicate full marks.
4) Assume suitable data wherever necessary and mention it clearly.
5) Use of non programmable calculator is allowed.

Section I

Q.2 **a)** Draw a flow chart for treatment of domestic wastewater consisting of ASP as secondary biological unit. Also state function of each unit in tabular format. **05**

b) A sewer of 1m dia. Carries a certain discharge while running full. What will be the depth of flow and corresponding velocity ratio if discharge in the sewer is reduced to one fourth of the value? Assume N remains constant at all states of flow. **05**

Q.3 **a**) Define BOD. Differentiate between BOD and COD **04**

b) Define SVI and state its unit. Derive relation between SVI and recirculation (Q_r) **05**

Q.4 **a)** Define - **04**
1) HRT
2) Sludge age
3) Volumetric loading
4) F/M ratio

b) Design a completely mixed ASP for following data: **05**
1) Wastewater flow = 20 MLd
2) Influent BOD = 200 mg/Lit
3) Effluent BOD = 25 mg/Lit
4) MLSS = 2000 mg/Lit
5) F/M = 0.2
6) SVI = 80 ml/gm

Also design diffused aeration system

Q.5 **Write Short notes. (Any three)** **09**
a) Stages in Anaerobic digestion
b) NRC equation
c) Operational Problems in tricking filter
d) SBR

Section-II

Q.6 **a)** Give detailed classification of sources of air pollutants **04**

b) Find resultant values of temperature, BOD_5 and DO if wastewater is discharged into river. **05**

Parameter	wastewater	River
Temperature	25^0 C	20^0 C
BOD_5	200 mg/lit	0 mg/lit
DO	0 mg/lit	9.17 mg/lit
Flow	0.8 m^3/sec	10 m^3/sec

Q.7 **a)** Enlist different types of particulate control equipment's used to control air pollution. Explain spray tower in detail. **05**

b) Explain Global warming with respect to following points: Definition, causes, diagram, effects and remedies **05**

Q.8 **a)** Explain stability conditions in detail. **05**

b) What is composting? List out different methods of composting and discuss Indore method in detail. **04**

Q.9 **Write short notes. (Any three)** **09**

a) Zones of purification in self-purification of stream process

b) Chemical characteristics of solid wastes

c) Decentralized treatment

d) ESP

SLR-FM-35

Seat No.	

Set S

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – II

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever necessary and mention it clearly.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives form the options and rewrite the sentence. 14

1) Pollutants emitted from identifiable sources are known as _____ pollutants.
   a) Tertiary b) Secondary
   c) Primary d) None of these

2) Indicator used in BDO test is _____.
   a) Potassium chromate b) Starch
   c) MO d) PP

3) DO deficit = DO_{sat} - _____.
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4) _____ type of digestion takes less time for digestion.
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6) Quantity of wastewater flowing through sewers in dry season is known as ____.
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   c) Storm water flow d) Sullage

7) _____ sewer collects sewage directly from houses.
   a) Trunk b) Lateral
   c) Sub main d) House

8) Pick out the odd one from the following.
   a) Sutro weir b) Parshall flume
   c) Proportional flow weir d) V - notch

9) RBC and Trickling filters are examples of _____ process.
   a) Suspended growth process b) Anaerobic process
   c) Attached growth process d) All of above

10) Maximum population that can be served by using septic tank is _____.
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   c) 250 d) 300

11) Organic loading adopted for low rate trickling filter is _____ g/d/m^3.
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   c) 500 to 1000 d) 5000 to 10000

12) _____ is ultimate disposal option considered in Municipal Solid (MSW) waste management.
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   c) Composting d) Open burning

13) Pick out the odd one with respect to digestion process _____.
   a) Hydrolysis b) Acidogenesis
   c) Methanogenesis d) Dilution

14) Disposal option/s for screenings is/are _____.
   a) Burial b) Incineration
   c) Digestion d) All of above

SLR-FM-35

Seat No.	

Set S

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:30 AM To 01:00 PM

Instructions: 1) Q. No. 2 & Q. 7 are compulsory.
2) Answer any two questions from each section
3) Figures to the right indicate full marks.
4) Assume suitable data wherever necessary and mention it clearly.
5) Use of non programmable calculator is allowed.

Section I

Q.2 **a)** Draw a flow chart for treatment of domestic wastewater consisting of ASP as secondary biological unit. Also state function of each unit in tabular format. **05**

b) A sewer of 1m dia. Carries a certain discharge while running full. What will be the depth of flow and corresponding velocity ratio if discharge in the sewer is reduced to one fourth of the value? Assume N remains constant at all states of flow. **05**

Q.3 **a**) Define BOD. Differentiate between BOD and COD **04**

b) Define SVI and state its unit. Derive relation between SVI and recirculation (Q_r) **05**

Q.4 **a)** Define - **04**
1) HRT
2) Sludge age
3) Volumetric loading
4) F/M ratio

b) Design a completely mixed ASP for following data: **05**
1) Wastewater flow = 20 MLd
2) Influent BOD = 200 mg/Lit
3) Effluent BOD = 25 mg/Lit
4) MLSS = 2000 mg/Lit
5) F/M = 0.2
6) SVI = 80 ml/gm

Also design diffused aeration system

Q.5 **Write Short notes. (Any three)** **09**
a) Stages in Anaerobic digestion
b) NRC equation
c) Operational Problems in tricking filter
d) SBR

Section-II

Q.6 **a)** Give detailed classification of sources of air pollutants **04**

b) Find resultant values of temperature, BOD_5 and DO if wastewater is discharged into river. **05**

Parameter	wastewater	River
Temperature	25^0 C	20^0 C
BOD_5	200 mg/lit	0 mg/lit
DO	0 mg/lit	9.17 mg/lit
Flow	0.8 m^3/sec	10 m^3/sec

Q.7 **a)** Enlist different types of particulate control equipment's used to control air pollution. Explain spray tower in detail. **05**

b) Explain Global warming with respect to following points: Definition, causes, diagram, effects and remedies **05**

Q.8 **a)** Explain stability conditions in detail. **05**

b) What is composting? List out different methods of composting and discuss Indore method in detail. **04**

Q.9 **Write short notes. (Any three)** **09**

a) Zones of purification in self-purification of stream process

b) Chemical characteristics of solid wastes

c) Decentralized treatment

d) ESP

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Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figure to the right indicates full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Row wise and column wise difference between two minimum cost in VAM method is _____.
   a) Capital cost
   b) Fixed cost
   c) Variable cost
   d) None

2) Major elements of queuing system are _____.
   a) Customer b) Queue
   c) Service Channel d) All the above

3) MBO is developed by _____.
   a) Gilberth b) Peter Drucker
   c) Fayol d) Taylor

4) ABC analysis considers _____.
   a) Total consumption of items
   b) Total amount of items
   c) Both a) and b)
   d) None of these

5) Pure strategy games are those in which both players _____.
   a) Play more than one strategy
   b) Stay with one strategy throughout
   c) Employ fresh strategies every time the act is played
   d) Play 3 strategies

6) Saddle point is the point of intersection of two _____.
   a) Mixed strategies b) Pure strategies
   c) Both a) and b) d) None of these

7) Dual is obtained for _____.
   a) Simplex problem
   b) Transportation problem
   c) Both a) and b)
   d) None of these

8) Military organization is: _____.
   a) Fine and staff b) Matrix
   c) Line d) Functional

9) EOQ means _____.
   a) Economic Offering Quantity b) Empty Order Quantity
   c) Economic Order Quantity d) Economic Order Quality

10) Lead time involves: _____.
   a) Raising of purchase requisition b) Transportation
   c) Placement of an order d) All of the above

11) In decision tree problem, the node mode is shown by _____.
   a) Square b) Circle
   c) Triangle d) Rectangle

12) Dynamic programming is discovered by _____.
   a) Taylor b) Henny Fayol
   c) Richard Bellmen d) Monte - Carlo

13) Graphical method to solve linear programming problem is commonly used if _____.
   a) No. of decision variable is two b) No.of decision variable is three
   c) No. of decision variable is four d) No. of decision variable is one

14) When total supply total demand, the transportation problem is called?
   a) Simple b) Balanced
   c) Equated d) Zero

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Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data whenever required.
4) Use of non-programmable calculator is allowed.

Section I

Q.2 Answer any three. **24**

a) Write down contribution of Gilberth & Taylor towards development of management.

b) A person requires 10, 12 & 12 units of chemicals P, Q & R resp. for his garden.
Liquid product contain 5, 2 & 1 units of P, Q & R resp. per jar. Dry product contains 1, 2 & 4 units of P, Q & R resp. per cartoon.
If the liquid product sells for Rs.3 per jar & the day product sells for Rs.2 per cartoon, how many of each should be purchased to minimize the cost & meet the requirement?
Formulate the LLP & solve it graphically.

c) Solves the following assignment model to find maximum expected sale.

Area / Salesmen	I	II	II	IV
A	42	35	28	21
B	30	25	20	15
C	30	25	20	15
D	24	20	16	12

d) Write note on:
1) Decision
2) Assignment model

e) Two proposals for flood control namely X & Y are under consideration. The capital investment in x & y is Rs.28 lakhs & Rs.14 lakhs resp. There are three states of nature high flood (S1), medium flood (S2) and low flood (S3) with probabilities 0.5, 0.3 & 0.2 resp.
The damage saving estimates under S1, S2 & S3 are Rs.100 lakhs, Rs.60 lakhs & Rs.20 lakhs due to plant x, whereas Rs.24 lakhs, Rs.44 lakhs & Rs.20 lakhs resp. due to plant y. The saving is estimated in per annum. The effective life of both system is 10 yrs.
Draw the decision tree, find expected monetary value for each proposals & indicate which is more beneficial proposal?

Section – II

Q.3 Answer any one. **04**

a) Note on communication process

b) Note on Queuing theory

Q.4 Answer any four. **28**

a) Explain importance of material.

b) What is Break Even Analysis? Explain with example how it is important for material management.

c) Taking any example tell how average chart & range charts are used in SQC?

d) Classify the following items into ABC categories using graphi

Item	Unit Price in Rs.	Annual consumption unit
A11	1200	25
A12	900	35
A13	1400	15
A14	400	55
A15	300	35
A16	700	10
A17	400	25
A18	5000	10
A19	250	15
A20	220	25
A21	225	25
A22	225	25

e) Write note on Profit & Loss account and Balance sheet.

f) Write a note various types inventory cost.

g) ABC corporation has got a demand for particular part at 10000 units per year. The cost per unit is Rs 2 and it cost Rs 36 to place an order and to process the delivery. The inventory carrying cost is estimated at 9 percent of average inventory investment. Determine.

1) EOQ
2) Optimum numbers of orders to be placed per annum
3) Total cost of inventory per annum

SLR-FM-36

Seat No.	

Set Q

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figure to the right indicates full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Military organization is: _____.
   a) Fine and staff b) Matrix
   c) Line d) Functional

2) EOQ means _____.
   a) Economic Offering Quantity b) Empty Order Quantity
   c) Economic Order Quantity d) Economic Order Quality

3) Lead time involves: _____.
   a) Raising of purchase requisition b) Transportation
   c) Placement of an order d) All of the above

4) In decision tree problem, the node mode is shown by _____.
   a) Square b) Circle
   c) Triangle d) Rectangle

5) Dynamic programming is discovered by _____.
   a) Taylor b) Henny Fayol
   c) Richard Bellmen d) Monte - Carlo

6) Graphical method to solve linear programming problem is commonly used if _____.
   a) No. of decision variable is two b) No.of decision variable is three
   c) No. of decision variable is four d) No. of decision variable is one

7) When total supply total demand, the transportation problem is called?
   a) Simple b) Balanced
   c) Equated d) Zero

8) Row wise and column wise difference between two minimum cost in VAM method is _____.
   a) Capital cost
   b) Fixed cost
   c) Variable cost
   d) None

9) Major elements of queuing system are _____.
   a) Customer b) Queue
   c) Service Channel d) All the above

10) MBO is developed by _____.
   a) Gilberth
   b) Peter Drucker
   c) Fayol
   d) Taylor

11) ABC analysis considers _____.
   a) Total consumption of items
   b) Total amount of items
   c) Both a) and b)
   d) None of these

12) Pure strategy games are those in which both players _____.
   a) Play more than one strategy
   b) Stay with one strategy throughout
   c) Employ fresh strategies every time the act is played
   d) Play 3 strategies

13) Saddle point is the point of intersection of two _____.
   a) Mixed strategies
   b) Pure strategies
   c) Both a) and b)
   d) None of these

14) Dual is obtained for _____.
   a) Simplex problem
   b) Transportation problem
   c) Both a) and b)
   d) None of these

SLR-FM-36

Seat No.	

Set Q

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data whenever required.
4) Use of non-programmable calculator is allowed.

Section I

Q.2 Answer any three. **24**

a) Write down contribution of Gilberth & Taylor towards development of management.

b) A person requires 10, 12 & 12 units of chemicals P, Q & R resp. for his garden.
Liquid product contain 5, 2 & 1 units of P, Q & R resp. per jar. Dry product contains 1, 2 & 4 units of P, Q & R resp. per cartoon.
If the liquid product sells for Rs.3 per jar & the day product sells for Rs.2 per cartoon, how many of each should be purchased to minimize the cost & meet the requirement?
Formulate the LLP & solve it graphically.

c) Solves the following assignment model to find maximum expected sale.

Area / Salesmen	I	II	II	IV
A	42	35	28	21
B	30	25	20	15
C	30	25	20	15
D	24	20	16	12

d) Write note on:
1) Decision
2) Assignment model

e) Two proposals for flood control namely X & Y are under consideration.
The capital investment in x & y is Rs.28 lakhs & Rs.14 lakhs resp. There are three states of nature high flood (S1), medium flood (S2) and low flood (S3) with probabilities 0.5, 0.3 & 0.2 resp.
The damage saving estimates under S1, S2 & S3 are Rs.100 lakhs, Rs.60 lakhs & Rs.20 lakhs due to plant x, whereas Rs.24 lakhs, Rs.44 lakhs & Rs.20 lakhs resp. due to plant y. The saving is estimated in per annum.
The effective life of both system is 10 yrs.
Draw the decision tree, find expected monetary value for each proposals & indicate which is more beneficial proposal?

Section – II

Q.3 Answer any one. **04**

a) Note on communication process

b) Note on Queuing theory

Q.4 Answer any four. **28**

a) Explain importance of material.

b) What is Break Even Analysis? Explain with example how it is important for material management.

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d) Classify the following items into ABC categories using graphi

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A19	250	15
A20	220	25
A21	225	25
A22	225	25

e) Write note on Profit & Loss account and Balance sheet.

f) Write a note various types inventory cost.

g) ABC corporation has got a demand for particular part at 10000 units per year. The cost per unit is Rs 2 and it cost Rs 36 to place an order and to process the delivery. The inventory carrying cost is estimated at 9 percent of average inventory investment. Determine.

1) EOQ
2) Optimum numbers of orders to be placed per annum
3) Total cost of inventory per annum

Seat No.	

Set **R**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
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4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Pure strategy games are those in which both players _____.
   a) Play more than one strategy
   b) Stay with one strategy throughout
   c) Employ fresh strategies every time the act is played
   d) Play 3 strategies

2) Saddle point is the point of intersection of two _____.
   a) Mixed strategies b) Pure strategies
   c) Both a) and b) d) None of these

3) Dual is obtained for _____.
   a) Simplex problem
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11) Row wise and column wise difference between two minimum cost in VAM method is _____.
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14) ABC analysis considers _____.
   a) Total consumption of items
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SLR-FM-36

Seat No.	

Set R

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
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Section I

Q.2 Answer any three. **24**

a) Write down contribution of Gilberth & Taylor towards development of management.

b) A person requires 10, 12 & 12 units of chemicals P, Q & R resp. for his garden.
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e) Two proposals for flood control namely X & Y are under consideration.
The capital investment in x & y is Rs.28 lakhs & Rs.14 lakhs resp. There are three states of nature high flood (S1), medium flood (S2) and low flood (S3) with probabilities 0.5, 0.3 & 0.2 resp.
The damage saving estimates under S1, S2 & S3 are Rs.100 lakhs, Rs.60 lakhs & Rs.20 lakhs due to plant x, whereas Rs.24 lakhs, Rs.44 lakhs & Rs.20 lakhs resp. due to plant y. The saving is estimated in per annum.
The effective life of both system is 10 yrs.
Draw the decision tree, find expected monetary value for each proposals & indicate which is more beneficial proposal?

Section – II

Q.3 Answer any one. **04**

a) Note on communication process

b) Note on Queuing theory

Q.4 Answer any four. **28**

a) Explain importance of material.

b) What is Break Even Analysis? Explain with example how it is important for material management.

c) Taking any example tell how average chart & range charts are used in SQC?

d) Classify the following items into ABC categories using graphi

Item	Unit Price in Rs.	Annual consumption unit
A11	1200	25
A12	900	35
A13	1400	15
A14	400	55
A15	300	35
A16	700	10
A17	400	25
A18	5000	10
A19	250	15
A20	220	25
A21	225	25
A22	225	25

e) Write note on Profit & Loss account and Balance sheet.

f) Write a note various types inventory cost.

g) ABC corporation has got a demand for particular part at 10000 units per year. The cost per unit is Rs 2 and it cost Rs 36 to place an order and to process the delivery. The inventory carrying cost is estimated at 9 percent of average inventory investment. Determine.

1) EOQ
2) Optimum numbers of orders to be placed per annum
3) Total cost of inventory per annum

Seat No.	

Set **S**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figure to the right indicates full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Lead time involves: _____.
   a) Raising of purchase requisition b) Transportation
   c) Placement of an order d) All of the above

2) In decision tree problem, the node mode is shown by _____.
   a) Square b) Circle
   c) Triangle d) Rectangle

3) Dynamic programming is discovered by _____.
   a) Taylor b) Henny Fayol
   c) Richard Bellmen d) Monte - Carlo

4) Graphical method to solve linear programming problem is commonly used if _____.
   a) No. of decision variable is two b) No.of decision variable is three
   c) No. of decision variable is four d) No. of decision variable is one

5) When total supply total demand, the transportation problem is called?
   a) Simple b) Balanced
   c) Equated d) Zero

6) Row wise and column wise difference between two minimum cost in VAM method is _____.
   a) Capital cost
   b) Fixed cost
   c) Variable cost
   d) None

7) Major elements of queuing system are _____.
   a) Customer b) Queue
   c) Service Channel d) All the above

8) MBO is developed by _____.
   a) Gilberth b) Peter Drucker
   c) Fayol d) Taylor

9) ABC analysis considers _____.
   a) Total consumption of items
   b) Total amount of items
   c) Both a) and b)
   d) None of these

10) Pure strategy games are those in which both players _____.
   a) Play more than one strategy
   b) Stay with one strategy throughout
   c) Employ fresh strategies every time the act is played
   d) Play 3 strategies

11) Saddle point is the point of intersection of two _____.
   a) Mixed strategies b) Pure strategies
   c) Both a) and b) d) None of these

12) Dual is obtained for _____.
   a) Simplex problem
   b) Transportation problem
   c) Both a) and b)
   d) None of these

13) Military organization is: _____.
   a) Fine and staff b) Matrix
   c) Line d) Functional

14) EOQ means _____.
   a) Economic Offering Quantity b) Empty Order Quantity
   c) Economic Order Quantity d) Economic Order Quality

SLR-FM-36

Seat No.	

Set S

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data whenever required.
4) Use of non-programmable calculator is allowed.

Section I

Q.2 Answer any three. **24**

a) Write down contribution of Gilberth & Taylor towards development of management.

b) A person requires 10, 12 & 12 units of chemicals P, Q & R resp. for his garden.
Liquid product contain 5, 2 & 1 units of P, Q & R resp. per jar. Dry product contains 1, 2 & 4 units of P, Q & R resp. per cartoon.
If the liquid product sells for Rs.3 per jar & the day product sells for Rs.2 per cartoon, how many of each should be purchased to minimize the cost & meet the requirement?
Formulate the LLP & solve it graphically.

c) Solves the following assignment model to find maximum expected sale.

Area / Salesmen	I	II	II	IV
A	42	35	28	21
B	30	25	20	15
C	30	25	20	15
D	24	20	16	12

d) Write note on:
1) Decision
2) Assignment model

e) Two proposals for flood control namely X & Y are under consideration.
The capital investment in x & y is Rs.28 lakhs & Rs.14 lakhs resp. There are three states of nature high flood (S1), medium flood (S2) and low flood (S3) with probabilities 0.5, 0.3 & 0.2 resp.
The damage saving estimates under S1, S2 & S3 are Rs.100 lakhs, Rs.60 lakhs & Rs.20 lakhs due to plant x, whereas Rs.24 lakhs, Rs.44 lakhs & Rs.20 lakhs resp. due to plant y. The saving is estimated in per annum.
The effective life of both system is 10 yrs.
Draw the decision tree, find expected monetary value for each proposals & indicate which is more beneficial proposal?

Section – II

Q.3 Answer any one. **04**

a) Note on communication process

b) Note on Queuing theory

Q.4 Answer any four. **28**

a) Explain importance of material.

b) What is Break Even Analysis? Explain with example how it is important for material management.

c) Taking any example tell how average chart & range charts are used in SQC?

d) Classify the following items into ABC categories using graphi

Item	Unit Price in Rs.	Annual consumption unit
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A15	300	35
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A17	400	25
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A19	250	15
A20	220	25
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e) Write note on Profit & Loss account and Balance sheet.

f) Write a note various types inventory cost.

g) ABC corporation has got a demand for particular part at 10000 units per year. The cost per unit is Rs 2 and it cost Rs 36 to place an order and to process the delivery. The inventory carrying cost is estimated at 9 percent of average inventory investment. Determine.

1) EOQ
2) Optimum numbers of orders to be placed per annum
3) Total cost of inventory per annum

SLR-FM-37

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF STEEL STRUCTURES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Use of IS Codes & Steel Table are allowed.
4) Use of scientific non-programmable calculator is allowed.
5) Assume additional data if required and mention it clearly.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) In elastic analysis _____ Condition/s occurs.
   a) Mechanism condition b) Equilibrium condition
   c) Plastic moment condition d) None of the above

2) The provision for expansion and contraction should be made such as to permit movements of free bearings to the extent not less than for every 30m length equal to _____.
   a) 20mm b) 25mm
   c) 30mm d) 40mm

3) The bearings no pin shall be of diameter less than _____.
   a) 8 cm b) 10 cm
   c) 12 cm d) 15 cm

4) The fully plastic moment Mp of rectangular section of breadth b and depth d is given by _____.
   a) $\mathrm{Mp} = \mathrm{fybd}^2/6$ b) $\mathrm{Mp} = \mathrm{fybd}^2/4$
   c) $\mathrm{Mp} = \mathrm{fybd}^2/12$ d) $\mathrm{Mp} = \mathrm{fybd}^2/8$

5) Which approximate method of analysis of building frames for lateral loads is/are more accurate?
   a) portal method b) cantilever method
   c) factor method d) all of these

6) In static theorem or lower bound theorem the relation between the value of W and collapse load Wc is _____.
   a) $\mathrm{W} \leq \mathrm{Wc}$ b) $\mathrm{W} = \mathrm{Wc}$
   c) $\mathrm{W} \geq \mathrm{Wc}$ d) None of these

7) The effective width b for a light gauge steel plate is given by _____.
   a) $b = 0.9\ (E/Fy)^{1/2}$ b) $1.9\ (E/Fy)^{1/2}$
   c) $2.9\ (E/Fy)^{1/2}$ d) $3.9\ (E/Fy)^{1/2}$

8) The critical stress of the plate in light gauge section is given by _____.
   a) $f_{ck} = \pi^2 E/[12(1-\mu^2)(w/t)^2]$ b) $f_{ck} = \pi^2 E/[12(1-\mu)(w/t)^2]$
   c) $f_{ck} = \pi^2 E/[12(1-\mu^2)(w/t)]$ d) $f_{ck} = \pi^2 E/[12(1-\mu)(w/t)]$

9) The bending stress compression in web Fw due to bending moments in a beam section of light gauge steel should not exceed _____.
   a) $Fw \leq 300000/(h/t)^2$ b) $Fw \leq 320000/(h/t)^2$
   c) $Fw \leq 3586000/(h/t)^2$ d) $Fw \geq 300000/(h/t)^2$

10) For design of railway bridges, the permissible primary stresses are increase by _____ when wind loading is considered in addition to dead load, live load, longitudinal, racking and impact forces.
   a) 16.67% b) 33.33%
   c) 25% d) 40%

11) The shape factor for thin tubular section is _____.
   a) 1.27 b) 1.15
   c) 1.5 d) 1.7

12) The permissible stress in axial compression is dependent upon _____.
   a) only on effective length of the column
   b) only on the yield stress of member
   c) only on least radius of gyration
   d) all of these

13) Classify the ISLB 300@37.7kg/m.
   a) plastic b) compact
   c) semi compact d) slender

14) Sliding plate bearing are suitable for _____.
   a) spans less than 10 m b) spans more than 10 m to 50 m
   c) spans more than 50 m d) suspension bridges

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF STEEL STRUCTURES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) From Section - I Q. No.2 is compulsory and attempts any two questions from remaining questions.
2) From Section - II Q. No.7 is compulsory and attempts any two questions from remaining questions.
3) Figures to the right indicate full marks.
4) Use of IS Codes & Steel Table are allowed.
5) Use of scientific non-programmable calculator is allowed.
6) Assume additional data if required and mention it clearly.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Design the central bottom cord of the N type truss provided for the foot bridge of effective span 20m having clear width of 2.5m. The flooring consists of timber planks of 6cms. Assume self weight of timber plank as 8000N/m^3. Live load of 4000N/m^2. Provide 10 panels of 2m each, keeping the height of main truss as 1.8m for N type truss. **10**

Q.3 Explain cantilever method for analyzing a building frame subjected to horizontal forces. Also write the assumptions made in the analysis. **09**

Q.4 Design a light gauge steel section of a column of 4m long to carry a load of 200KN. **09**

Q.5 **Attempt the following.** **09**
a) Explain the advantages and disadvantages of using cold framed light gauge steel members.
b) Write a short note on roller bearing with neat sketch.
c) Compare the merits of factor method with cantilever method of analysis of lateral loads.

Section – II

Q.6 Design the continues beam ABCD for a load of 1000N/m throughout the span ABCD. Take load factor of 1.85. **09**

Q.7 A portal frame ABCD fixed at A and D, subjected to a loading of 40KN at midpoint of beam BC and 20KN at B acting towards right. The plastic moment capacities for the beams and columns being M_1 and M_2 respectively. Compute the values of M_1 and M_2 for the frame to have minimum weight. **10**
Take AB = CD = 3.0 m and BC = 9m.

Q.8 A column 4.2m in height and effectively restrained in position as well as in direction at both the ends carries an axial load of 1250 KN. Design suitable I section, if the column is encased in concrete. Take f_y = 250N/mm^2. **09**

Q.9 **Attempt the following.** **09**
a) State the basic theorems of plastic analysis.
b) What are the conditions to fulfill for a encased beam?
c) Find the shape factor for a circular section.

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF STEEL STRUCTURES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Use of IS Codes & Steel Table are allowed.
4) Use of scientific non-programmable calculator is allowed.
5) Assume additional data if required and mention it clearly.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The critical stress of the plate in light gauge section is given by _____.
   a) $f_{ck} = \pi^2 E/[12(1-\mu^2)(w/t)^2]$ b) $f_{ck} = \pi^2 E/[12(1-\mu)(w/t)^2]$
   c) $f_{ck} = \pi^2 E/[12(1-\mu^2)(w/t)]$ d) $f_{ck} = \pi^2 E/[12(1-\mu)(w/t)]$

2) The bending stress compression in web Fw due to bending moments in a beam section of light gauge steel should not exceed _____.
   a) $Fw \leq 300000/(h/t)^2$ b) $Fw \leq 320000/(h/t)^2$
   c) $Fw \leq 3586000/(h/t)^2$ d) $Fw \geq 300000/(h/t)^2$

3) For design of railway bridges, the permissible primary stresses are increase by _____ when wind loading is considered in addition to dead load, live load, longitudinal, racking and impact forces.
   a) 16.67% b) 33.33%
   c) 25% d) 40%

4) The shape factor for thin tubular section is _____.
   a) 1.27 b) 1.15
   c) 1.5 d) 1.7

5) The permissible stress in axial compression is dependent upon _____.
   a) only on effective length of the column
   b) only on the yield stress of member
   c) only on least radius of gyration
   d) all of these

6) Classify the ISLB 300@37.7kg/m.
   a) plastic b) compact
   c) semi compact d) slender

7) Sliding plate bearing are suitable for _____.
   a) spans less than 10 m b) spans more than 10 m to 50 m
   c) spans more than 50 m d) suspension bridges

8) In elastic analysis _____ Condition/s occurs.
   a) Mechanism condition b) Equilibrium condition
   c) Plastic moment condition d) None of the above

9) The provision for expansion and contraction should be made such as to permit movements of free bearings to the extent not less than for every 30m length equal to _____.
   a) 20mm b) 25mm
   c) 30mm d) 40mm

10) The bearings no pin shall be of diameter less than _____.
   a) 8 cm b) 10 cm
   c) 12 cm d) 15 cm

11) The fully plastic moment Mp of rectangular section of breadth b and depth d is given by _____.
   a) $\mathrm{Mp} = \mathrm{fybd}^2/6$ b) $\mathrm{Mp} = \mathrm{fybd}^2/4$
   c) $\mathrm{Mp} = \mathrm{fybd}^2/12$ d) $\mathrm{Mp} = \mathrm{fybd}^2/8$

12) Which approximate method of analysis of building frames for lateral loads is/are more accurate?
   a) portal method b) cantilever method
   c) factor method d) all of these

13) In static theorem or lower bound theorem the relation between the value of W and collapse load Wc is _____.
   a) $\mathrm{W} \leq \mathrm{Wc}$ b) $\mathrm{W} = \mathrm{Wc}$
   c) $\mathrm{W} \geq \mathrm{Wc}$ d) None of these

14) The effective width b for a light gauge steel plate is given by _____.
   a) b= 0.9 $(E/Fy)^{1/2}$ b) 1.9 $(E/Fy)^{1/2}$
   c) 2.9 $(E/Fy)^{1/2}$ d) 3.9 $(E/Fy)^{1/2}$

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF STEEL STRUCTURES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) From Section - I Q. No.2 is compulsory and attempts any two questions from remaining questions.
2) From Section - II Q. No.7 is compulsory and attempts any two questions from remaining questions.
3) Figures to the right indicate full marks.
4) Use of IS Codes & Steel Table are allowed.
5) Use of scientific non-programmable calculator is allowed.
6) Assume additional data if required and mention it clearly.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Design the central bottom cord of the N type truss provided for the foot bridge of effective span 20m having clear width of 2.5m. The flooring consists of timber planks of 6cms. Assume self weight of timber plank as 8000N/m^3. Live load of 4000N/m^2. Provide 10 panels of 2m each, keeping the height of main truss as 1.8m for N type truss. **10**

Q.3 Explain cantilever method for analyzing a building frame subjected to horizontal forces. Also write the assumptions made in the analysis. **09**

Q.4 Design a light gauge steel section of a column of 4m long to carry a load of 200KN. **09**

Q.5 **Attempt the following.** **09**
a) Explain the advantages and disadvantages of using cold framed light gauge steel members.
b) Write a short note on roller bearing with neat sketch.
c) Compare the merits of factor method with cantilever method of analysis of lateral loads.

Section – II

Q.6 Design the continues beam ABCD for a load of 1000N/m throughout the span ABCD. Take load factor of 1.85. **09**

Q.7 A portal frame ABCD fixed at A and D, subjected to a loading of 40KN at midpoint of beam BC and 20KN at B acting towards right. The plastic moment capacities for the beams and columns being M_1 and M_2 respectively. Compute the values of M_1 and M_2 for the frame to have minimum weight. **10**
Take AB = CD = 3.0 m and BC = 9m.

Q.8 A column 4.2m in height and effectively restrained in position as well as in direction at both the ends carries an axial load of 1250 KN. Design suitable I section, if the column is encased in concrete. Take f_y = 250N/mm^2. **09**

Q.9 **Attempt the following.** **09**
a) State the basic theorems of plastic analysis.
b) What are the conditions to fulfill for a encased beam?
c) Find the shape factor for a circular section.

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF STEEL STRUCTURES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Use of IS Codes & Steel Table are allowed.
4) Use of scientific non-programmable calculator is allowed.
5) Assume additional data if required and mention it clearly.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Which approximate method of analysis of building frames for lateral loads is/are more accurate?
   a) portal method b) cantilever method
   c) factor method d) all of these

2) In static theorem or lower bound theorem the relation between the value of W and collapse load Wc is _____.
   a) $W \leq Wc$ b) $W = Wc$
   c) $W \geq Wc$ d) None of these

3) The effective width b for a light gauge steel plate is given by _____.
   a) b= 0.9 $(E/Fy)^{1/2}$ b) 1.9 $(E/Fy)^{1/2}$
   c) 2.9 $(E/Fy)^{1/2}$ d) 3.9 $(E/Fy)^{1/2}$

4) The critical stress of the plate in light gauge section is given by _____.
   a) $f_{ck} = \pi^2 E/[12(1-\mu^2)(w/t)^2]$ b) $f_{ck} = \pi^2 E/[12(1-\mu)(w/t)^2]$
   c) $f_{ck} = \pi^2 E/[12(1-\mu^2)(w/t)]$ d) $f_{ck} = \pi^2 E/[12(1-\mu)(w/t)]$

5) The bending stress compression in web Fw due to bending moments in a beam section of light gauge steel should not exceed _____.
   a) Fw ≤ $300000/(h/t)^2$ b) Fw ≤ $320000/(h/t)^2$
   c) Fw ≤ $3586000/(h/t)^2$ d) Fw ≥ $300000/(h/t)^2$

6) For design of railway bridges, the permissible primary stresses are increase by _____ when wind loading is considered in addition to dead load, live load, longitudinal, racking and impact forces.
   a) 16.67% b) 33.33%
   c) 25% d) 40%

7) The shape factor for thin tubular section is _____.
   a) 1.27 b) 1.15
   c) 1.5 d) 1.7

8) The permissible stress in axial compression is dependent upon _____.
   a) only on effective length of the column
   b) only on the yield stress of member
   c) only on least radius of gyration
   d) all of these

9) Classify the ISLB 300@37.7kg/m.
   a) plastic b) compact
   c) semi compact d) slender

10) Sliding plate bearing are suitable for _____.
   a) spans less than 10 m b) spans more than 10 m to 50 m
   c) spans more than 50 m d) suspension bridges

11) In elastic analysis _____ Condition/s occurs.
   a) Mechanism condition b) Equilibrium condition
   c) Plastic moment condition d) None of the above

12) The provision for expansion and contraction should be made such as to permit movements of free bearings to the extent not less than for every 30m length equal to _____.
   a) 20mm b) 25mm
   c) 30mm d) 40mm

13) The bearings no pin shall be of diameter less than _____.
   a) 8 cm b) 10 cm
   c) 12 cm d) 15 cm

14) The fully plastic moment Mp of rectangular section of breadth b and depth d is given by _____.
   a) $\mathrm{Mp} = \mathrm{fybd}^2/6$ b) $\mathrm{Mp} = \mathrm{fybd}^2/4$
   c) $\mathrm{Mp} = \mathrm{fybd}^2/12$ d) $\mathrm{Mp} = \mathrm{fybd}^2/8$

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF STEEL STRUCTURES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) From Section - I Q. No.2 is compulsory and attempts any two questions from remaining questions.
2) From Section - II Q. No.7 is compulsory and attempts any two questions from remaining questions.
3) Figures to the right indicate full marks.
4) Use of IS Codes & Steel Table are allowed.
5) Use of scientific non-programmable calculator is allowed.
6) Assume additional data if required and mention it clearly.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Design the central bottom cord of the N type truss provided for the foot bridge of effective span 20m having clear width of 2.5m. The flooring consists of timber planks of 6cms. Assume self weight of timber plank as 8000N/m^3. Live load of 4000N/m^2. Provide 10 panels of 2m each, keeping the height of main truss as 1.8m for N type truss. **10**

Q.3 Explain cantilever method for analyzing a building frame subjected to horizontal forces. Also write the assumptions made in the analysis. **09**

Q.4 Design a light gauge steel section of a column of 4m long to carry a load of 200KN. **09**

Q.5 **Attempt the following.** **09**
a) Explain the advantages and disadvantages of using cold framed light gauge steel members.
b) Write a short note on roller bearing with neat sketch.
c) Compare the merits of factor method with cantilever method of analysis of lateral loads.

Section – II

Q.6 Design the continues beam ABCD for a load of 1000N/m throughout the span ABCD. Take load factor of 1.85. **09**

Q.7 A portal frame ABCD fixed at A and D, subjected to a loading of 40KN at midpoint of beam BC and 20KN at B acting towards right. The plastic moment capacities for the beams and columns being M_1 and M_2 respectively. Compute the values of M_1 and M_2 for the frame to have minimum weight. **10**
Take AB = CD = 3.0 m and BC = 9m.

Q.8 A column 4.2m in height and effectively restrained in position as well as in direction at both the ends carries an axial load of 1250 KN. Design suitable I section, if the column is encased in concrete. Take f_y = 250N/mm^2. **09**

Q.9 **Attempt the following.** **09**
a) State the basic theorems of plastic analysis.
b) What are the conditions to fulfill for a encased beam?
c) Find the shape factor for a circular section.

Seat No.	

Set | S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF STEEL STRUCTURES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Use of IS Codes & Steel Table are allowed.
4) Use of scientific non-programmable calculator is allowed.
5) Assume additional data if required and mention it clearly.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) For design of railway bridges, the permissible primary stresses are increase by _____ when wind loading is considered in addition to dead load, live load, longitudinal, racking and impact forces.
   a) 16.67% b) 33.33%
   c) 25% d) 40%

2) The shape factor for thin tubular section is _____.
   a) 1.27 b) 1.15
   c) 1.5 d) 1.7

3) The permissible stress in axial compression is dependent upon _____.
   a) only on effective length of the column
   b) only on the yield stress of member
   c) only on least radius of gyration
   d) all of these

4) Classify the ISLB 300@37.7kg/m.
   a) plastic b) compact
   c) semi compact d) slender

5) Sliding plate bearing are suitable for _____.
   a) spans less than 10 m b) spans more than 10 m to 50 m
   c) spans more than 50 m d) suspension bridges

6) In elastic analysis _____ Condition/s occurs.
   a) Mechanism condition b) Equilibrium condition
   c) Plastic moment condition d) None of the above

7) The provision for expansion and contraction should be made such as to permit movements of free bearings to the extent not less than for every 30m length equal to _____.
   a) 20mm b) 25mm
   c) 30mm d) 40mm

8) The bearings no pin shall be of diameter less than _____.
   a) 8 cm b) 10 cm
   c) 12 cm d) 15 cm

9) The fully plastic moment Mp of rectangular section of breadth b and depth d is given by _____.
   a) $\mathrm{Mp} = \mathrm{fybd}^2/6$ b) $\mathrm{Mp} = \mathrm{fybd}^2/4$
   c) $\mathrm{Mp} = \mathrm{fybd}^2/12$ d) $\mathrm{Mp} = \mathrm{fybd}^2/8$

10) Which approximate method of analysis of building frames for lateral loads is/are more accurate?
   a) portal method b) cantilever method
   c) factor method d) all of these

11) In static theorem or lower bound theorem the relation between the value of W and collapse load Wc is _____.
   a) $\mathrm{W} \leq \mathrm{Wc}$ b) $\mathrm{W} = \mathrm{Wc}$
   c) $\mathrm{W} \geq \mathrm{Wc}$ d) None of these

12) The effective width b for a light gauge steel plate is given by _____.
   a) b= 0.9 $(E/Fy)^{1/2}$ b) 1.9 $(E/Fy)^{1/2}$
   c) 2.9 $(E/Fy)^{1/2}$ d) 3.9 $(E/Fy)^{1/2}$

13) The critical stress of the plate in light gauge section is given by _____.
   a) $\mathrm{f_{ck}} = \pi^2\mathrm{E}/[12(1-\mu^2)(\mathrm{w/t})^2]$ b) $\mathrm{f_{ck}} = \pi^2\mathrm{E}/[12(1-\mu)(\mathrm{w/t})^2]$
   c) $\mathrm{f_{ck}} = \pi^2\mathrm{E}/[12(1-\mu^2)(\mathrm{w/t})]$ d) $\mathrm{f_{ck}} = \pi^2\mathrm{E}/[12(1-\mu)(\mathrm{w/t})]$

14) The bending stress compression in web Fw due to bending moments in a beam section of light gauge steel should not exceed _____.
   a) Fw ≤ $300000/(h/t)^2$ b) Fw ≤ $320000/(h/t)^2$
   c) Fw ≤ $3586000/(h/t)^2$ d) Fw ≥ $300000/(h/t)^2$

SLR-FM-37

Seat No.	

Set S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF STEEL STRUCTURES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) From Section - I Q. No.2 is compulsory and attempts any two questions from remaining questions.
2) From Section - II Q. No.7 is compulsory and attempts any two questions from remaining questions.
3) Figures to the right indicate full marks.
4) Use of IS Codes & Steel Table are allowed.
5) Use of scientific non-programmable calculator is allowed.
6) Assume additional data if required and mention it clearly.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Design the central bottom cord of the N type truss provided for the foot bridge of effective span 20m having clear width of 2.5m. The flooring consists of timber planks of 6cms. Assume self weight of timber plank as 8000N/m^3. Live load of 4000N/m^2. Provide 10 panels of 2m each, keeping the height of main truss as 1.8m for N type truss. **10**

Q.3 Explain cantilever method for analyzing a building frame subjected to horizontal forces. Also write the assumptions made in the analysis. **09**

Q.4 Design a light gauge steel section of a column of 4m long to carry a load of 200KN. **09**

Q.5 **Attempt the following.** **09**
a) Explain the advantages and disadvantages of using cold framed light gauge steel members.
b) Write a short note on roller bearing with neat sketch.
c) Compare the merits of factor method with cantilever method of analysis of lateral loads.

Section – II

Q.6 Design the continues beam ABCD for a load of 1000N/m throughout the span ABCD. Take load factor of 1.85. **09**

Q.7 A portal frame ABCD fixed at A and D, subjected to a loading of 40KN at midpoint of beam BC and 20KN at B acting towards right. The plastic moment capacities for the beams and columns being M_1 and M_2 respectively. Compute the values of M_1 and M_2 for the frame to have minimum weight. **10**
Take AB = CD = 3.0 m and BC = 9m.

Q.8 A column 4.2m in height and effectively restrained in position as well as in direction at both the ends carries an axial load of 1250 KN. Design suitable I section, if the column is encased in concrete. Take f_y = 250N/mm^2. **09**

Q.9 **Attempt the following.** **09**
a) State the basic theorems of plastic analysis.
b) What are the conditions to fulfill for a encased beam?
c) Find the shape factor for a circular section.

Seat No.	

Set **P**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to the right indicate full marks.
2) Assume suitable data wherever necessary and mention it clearly.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) _____ action changes characteristics of stream when wastewater is discharge into it.
   a) reaeration b) dilution
   c) deoxygenation d) sedimentation

2) Most polluted zone in self-purification process is _____.
   a) Zone of active decomposition b) Zone of recovery
   c) Zone of pure water d) Zone of degradation

3) _____ phase of microorganisms growth is last phase of their life.
   a) endogenous growth b) log growth
   c) lag growth d) all of above

4) Aerobic condition in effluent treatment can be achieved by the use of _____.
   a) dissolved oxygen b) diffused aeration
   c) coagulation d) sludge control

5) _____ is meant for reduction of moisture content of sludge.
   a) dewatering b) conditioning
   c) thickening d) All of above

6) _____ is the process of removal of non-biodegradable organics using fixed bed of activated carbon column.
   a) adsorption b) reverse osmosis
   c) electrodialysis d) chemical precipitation

7) For a conventional sludge digesters detention period of _____ is provided.
   a) 20 to 30 minutes b) 30 to 90 days
   c) 4 to 6 hrs. d) 1 to 2 days

8) Molases is waste product of _____ industry.
   a) textile b) pulp and paper
   c) sugar d) tannery

9) Yeast sludge containing rich in proteins, carbohydrates vitamins are treated separately for _____.
   a) segregation b) recycle
   c) byproduct recovery d) high efficiency

10) In the sugar mill the clarified juice is bleached by _____ process.
   a) sulphitation b) dechlorination
   c) aeration d) coagulation

11) _____ involves the exposure of waste in increasing the concentration of microbiological population.
   a) nitrifying of bacteria b) denitrifying of bacteria
   c) acclimatization of bacteria d) photosynthesis

12) Fermentation is one of the process of _____ Industry.
   a) pulp and paper b) distillery industry
   c) sugar industry d) dairy industry

13) Excess lime treatment is practiced for wastewater treatment of _____ industry.
   a) pulp and paper b) distillery industry
   c) sugar industry d) dairy industry

14) _____ industry wastewater has highest BOD value.
   a) pulp and paper b) distillery industry
   c) sugar industry d) dairy industry

Seat No.	

Set **P**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question no.3 from Section-I is compulsory. solve any two question from remaining question.
2) Question no.8 from Section-I is compulsory. solve any two question from remaining question.
3) Figures to the right indicate full marks.
4) Assume suitable data wherever necessary and mention it clearly.
5) Use of non-programmable calculator is allowed.

Section - I

Q.2 **a)** **Define** **04**
i) Grab sample
ii) Composite sample
iii) Population equivalent
iv) Relative stability

b) Define Water Quality Index. List various methods used for determination of WQI. Explain any one method in detail. **05**

Q.3 **a)** Compute reaction rate constant and ultimate BOD using method of least square method for the following BOD test data for a stream receiving some treated effluent. **05**

t (days)	2	4	6	8	10
y (mg/Lit)	11	18	22	24	26

b) Explain in detail self-purification of stream process. **05**

Q.4 **a)** Explain in detail Waste Strength reduction. **05**

b) Write Strreter Phelps equation and explain each and every term used in it. **04**

Q.5 **a)** **Write short note on :** **09**
i) Waste volume reduction
ii) Electro dialysis process
iii) Neutralization

Section - II

Q.6 **a)** Explain with flow diagram the “Massive Lime Treatment” for color removal in pulp and paper mill. **05**

b) If wastewater discharge is allowed in surface waters, then what are possible effects on water quality? Explain. **04**

Q.7 Give the characteristics of wastewater , draw the wastewater treatment flow diagram and explain in detail.

a) Distillery **04**

b) Sugar industry **05**

Q.8 Draw manufacturing process flow diagram, indicate the sources wastes and explain in detail.

a) Tannery Industries **05**

b) Paper and pulp mill **05**

Q.9 **Write short note.** **09**

a) Operation and maintenance requirement

b) Water Pollution Control Act

c) Constructed wetlands for treatment of wastewater

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to the right indicate full marks.
2) Assume suitable data wherever necessary and mention it clearly.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Molases is waste product of _____ industry.
   a) textile b) pulp and paper
   c) sugar d) tannery

2) Yeast sludge containing rich in proteins, carbohydrates vitamins are treated separately for _____.
   a) segregation b) recycle
   c) byproduct recovery d) high efficiency

3) In the sugar mill the clarified juice is bleached by _____ process.
   a) sulphitation b) dechlorination
   c) aeration d) coagulation

4) _____ involves the exposure of waste in increasing the concentration of microbiological population.
   a) nitrifying of bacteria b) denitrifying of bacteria
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   c) sugar industry d) dairy industry

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   c) sugar industry d) dairy industry

7) _____ industry wastewater has highest BOD value.
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   c) deoxygenation d) sedimentation

9) Most polluted zone in self-purification process is _____.
   a) Zone of active decomposition b) Zone of recovery
   c) Zone of pure water d) Zone of degradation

10) _____ phase of microorganisms growth is last phase of their life.
   a) endogenous growth b) log growth
   c) lag growth d) all of above

11) Aerobic condition in effluent treatment can be achieved by the use of _____.
   a) dissolved oxygen b) diffused aeration
   c) coagulation d) sludge control

12) _____ is meant for reduction of moisture content of sludge.
   a) dewatering b) conditioning
   c) thickening d) All of above

13) _____ is the process of removal of non-biodegradable organics using fixed bed of activated carbon column.
   a) adsorption b) reverse osmosis
   c) electrodialysis d) chemical precipitation

14) For a conventional sludge digesters detention period of _____ is provided.
   a) 20 to 30 minutes b) 30 to 90 days
   c) 4 to 6 hrs. d) 1 to 2 days

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question no.3 from Section-I is compulsory. solve any two question from remaining question.
2) Question no.8 from Section-I is compulsory. solve any two question from remaining question.
3) Figures to the right indicate full marks.
4) Assume suitable data wherever necessary and mention it clearly.
5) Use of non-programmable calculator is allowed.

Section - I

Q.2 **a)** **Define** **04**
i) Grab sample
ii) Composite sample
iii) Population equivalent
iv) Relative stability

b) Define Water Quality Index. List various methods used for determination of WQI. Explain any one method in detail. **05**

Q.3 **a)** Compute reaction rate constant and ultimate BOD using method of least square method for the following BOD test data for a stream receiving some treated effluent. **05**

t (days)	2	4	6	8	10
y (mg/Lit)	11	18	22	24	26

b) Explain in detail self-purification of stream process. **05**

Q.4 **a)** Explain in detail Waste Strength reduction. **05**
b) Write Strreter Phelps equation and explain each and every term used in it. **04**

Q.5 **a)** **Write short note on :** **09**
i) Waste volume reduction
ii) Electro dialysis process
iii) Neutralization

Section - II

Q.6 **a)** Explain with flow diagram the “Massive Lime Treatment” for color removal in pulp and paper mill. **05**
b) If wastewater discharge is allowed in surface waters, then what are possible effects on water quality? Explain. **04**

Q.7 Give the characteristics of wastewater , draw the wastewater treatment flow diagram and explain in detail.
a) Distillery **04**
b) Sugar industry **05**

Q.8 Draw manufacturing process flow diagram, indicate the sources wastes and explain in detail.

a) Tannery Industries **05**

b) Paper and pulp mill **05**

Q.9 **Write short note.** **09**

a) Operation and maintenance requirement

b) Water Pollution Control Act

c) Constructed wetlands for treatment of wastewater

Seat No.	

Set **R**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to the right indicate full marks.
2) Assume suitable data wherever necessary and mention it clearly.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) _____ is meant for reduction of moisture content of sludge.
   a) dewatering b) conditioning
   c) thickening d) All of above

2) _____ is the process of removal of non-biodegradable organics using fixed bed of activated carbon column.
   a) adsorption b) reverse osmosis
   c) electrodialysis d) chemical precipitation

3) For a conventional sludge digesters detention period of _____ is provided.
   a) 20 to 30 minutes b) 30 to 90 days
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   c) byproduct recovery d) high efficiency

6) In the sugar mill the clarified juice is bleached by _____ process.
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7) _____ involves the exposure of waste in increasing the concentration of microbiological population.
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8) Fermentation is one of the process of _____ Industry.
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9) Excess lime treatment is practiced for wastewater treatment of _____ industry.
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11) _____ action changes characteristics of stream when wastewater is discharge into it.
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12) Most polluted zone in self-purification process is _____.
   a) Zone of active decomposition b) Zone of recovery
   c) Zone of pure water d) Zone of degradation

13) _____ phase of microorganisms growth is last phase of their life.
   a) endogenous growth b) log growth
   c) lag growth d) all of above

14) Aerobic condition in effluent treatment can be achieved by the use of _____.
   a) dissolved oxygen b) diffused aeration
   c) coagulation d) sludge control

SLR-FM-38

Seat No.	

Set R

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question no.3 from Section-I is compulsory. solve any two question from remaining question.
2) Question no.8 from Section-I is compulsory. solve any two question from remaining question.
3) Figures to the right indicate full marks.
4) Assume suitable data wherever necessary and mention it clearly.
5) Use of non-programmable calculator is allowed.

Section - I

Q.2 **a)** **Define** **04**
i) Grab sample
ii) Composite sample
iii) Population equivalent
iv) Relative stability

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b) Explain in detail self-purification of stream process. **05**

Q.4 **a)** Explain in detail Waste Strength reduction. **05**
b) Write Strreter Phelps equation and explain each and every term used in it. **04**

Q.5 **a)** **Write short note on :** **09**
i) Waste volume reduction
ii) Electro dialysis process
iii) Neutralization

Section - II

Q.6 **a)** Explain with flow diagram the “Massive Lime Treatment” for color removal in pulp and paper mill. **05**

b) If wastewater discharge is allowed in surface waters, then what are possible effects on water quality? Explain. **04**

Q.7 Give the characteristics of wastewater , draw the wastewater treatment flow diagram and explain in detail.
a) Distillery **04**
b) Sugar industry **05**

Q.8 Draw manufacturing process flow diagram, indicate the sources wastes and explain in detail.

a) Tannery Industries **05**

b) Paper and pulp mill **05**

Q.9 **Write short note.** **09**

a) Operation and maintenance requirement

b) Water Pollution Control Act

c) Constructed wetlands for treatment of wastewater

Seat No.	

Set **S**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to the right indicate full marks.
2) Assume suitable data wherever necessary and mention it clearly.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In the sugar mill the clarified juice is bleached by _____ process.
   a) sulphitation b) dechlorination
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13) Molases is waste product of _____ industry.
   a) textile b) pulp and paper
   c) sugar d) tannery

14) Yeast sludge containing rich in proteins, carbohydrates vitamins are treated separately for _____.
   a) segregation b) recycle
   c) byproduct recovery d) high efficiency

SLR-FM-38

Seat No.	

Set S

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INDUSTRIAL WASTE TREATMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question no.3 from Section-I is compulsory. solve any two question from remaining question.
2) Question no.8 from Section-I is compulsory. solve any two question from remaining question.
3) Figures to the right indicate full marks.
4) Assume suitable data wherever necessary and mention it clearly.
5) Use of non-programmable calculator is allowed.

Section - I

Q.2 **a)** **Define** **04**
i) Grab sample
ii) Composite sample
iii) Population equivalent
iv) Relative stability

b) Define Water Quality Index. List various methods used for determination of WQI. Explain any one method in detail. **05**

Q.3 **a)** Compute reaction rate constant and ultimate BOD using method of least square method for the following BOD test data for a stream receiving some treated effluent. **05**

t (days)	2	4	6	8	10
y (mg/Lit)	11	18	22	24	26

b) Explain in detail self-purification of stream process. **05**

Q.4 **a)** Explain in detail Waste Strength reduction. **05**
b) Write Strreter Phelps equation and explain each and every term used in it. **04**

Q.5 **a)** **Write short note on :** **09**
i) Waste volume reduction
ii) Electro dialysis process
iii) Neutralization

Section - II

Q.6 **a)** Explain with flow diagram the “Massive Lime Treatment” for color removal in pulp and paper mill. **05**

b) If wastewater discharge is allowed in surface waters, then what are possible effects on water quality? Explain. **04**

Q.7 Give the characteristics of wastewater , draw the wastewater treatment flow diagram and explain in detail.
a) Distillery **04**
b) Sugar industry **05**

Q.8 Draw manufacturing process flow diagram, indicate the sources wastes and explain in detail.

a) Tannery Industries **05**

b) Paper and pulp mill **05**

Q.9 **Write short note.** **09**

a) Operation and maintenance requirement

b) Water Pollution Control Act

c) Constructed wetlands for treatment of wastewater

SLR-FM-39

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Draw neat labeled diagrams whenever necessary.
3) Use of only non programmable calculator is allowed.
4) Assume suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The capacity of small hydro power plant are in order of _____.
   a) 20-5 MW b) 15-100 MW
   c) 1-15 MW d) 15-20 MW

2) Power plant having maximum demand more than the installed rated capacity will have utilization factor _____.
   a) Equal to unity b) More than unity
   c) Less than unity d) None

3) Which plant can never have 100 percent load factor?
   a) Base load plant b) Peak load plant
   c) Nuclear power plant d) Hydroelectric plant

4) Function of surge tank is to _____.
   a) Store water on load rejection
   b) Furnish additional water during increased load demand
   c) Both to store and supply water
   d) None

5) Unit power of turbine is _____.
   a) $P/H^{3/2}$ b) P/H
   c) $P/\sqrt{H}$ d) P/H^2

6) Pump storage scheme are used to improve _____.
   a) Load factor
   b) Power factor
   c) Plant capacity factor as well as load factor
   d) Delivery factor

7) Cavitation in a turbine causes _____.
   a) Low efficiency
   b) Blade surface is damaged
   c) Vibration and noise
   d) None of the above

8) The draft tube is provided to _____.
   a) reduce the effect of water hammer
   b) raise the water surface of the stream to create an artificial head
   c) increase the acting head on the water wheel
   d) none of the above

9) In hydro electric power station what is an enlarge body of water just above the intake and used as a regulating reservoir called _____.
   a) Penstock b) Spillways
   c) Reservoir d) Fore bay

10) Jet ratio 'm' is defined as the ratio of _____.
   a) Diameter of jet of water to diameter of pelton wheel.
   b) Velocity of vane to velocity of jet of water
   c) Velocity of flow to velocity of jet of water
   d) Diameter of pelton wheel to diameter of jet

11) Water hammer' process in penstock result in _____.
   a) pressure decreases
   b) noise decreases
   c) noise increases, pressure increases, velocity decreases
   d) None

12) The load factor for the peak day of the year determines the required _____.
   a) Water storage b) Pondage
   c) Generating capacity d) None

13) In Francis turbine runner, the number of blades is usually of the order of _____.
   a) 16-24 b) 12-14
   c) 6-8 d) 3-6

14) Surge tank is necessarily provided _____.
   a) long penstocks b) short length penstocks
   c) surface penstocks d) embedded penstocks

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Attempt any two questions from Section one (Que.no.2 to 4) and attempt any two questions from section two (Que. no. 5 to 7).
2) Figures to the right indicates full marks.
3) Draw neat labeled diagrams whenever necessary.
4) Use of only non programmable calculator is allowed.
5) Assume suitable data wherever necessary.

Section – I

Q.2 **a)** What do you understand by non-conventional sources of power generation? What is the scope of these sources in India? **07**

b) When a run of river plant operates as a peak load stations with a weekly load factor of 21%, all its capacity is firm capacity. What will be the minimum flow in the river so that the station may serve as the base load stations. It is given that, installed capacity of generator = 14,000 kW, Operating Head = 14 m, Plant efficiency = 82%, also estimate the daily load factor of the plant if the stream flow is 20 cumcs. **07**

Q.3 **a)** Define Hydrograph and explain its importance in the design of storage type hydro electric power plant. **05**

b) Common load shared by two stations base load plant with 50 MW capacity and other being standby plant with 55 MW capacity. The yearly output for base load station is 210×10^6 KWh and for standby station is 18×10^6 KWh. The peak load taken by standby station is 17 MW which works for 2424 hrs during the year. The base load station takes peak load as 32 MW. Calculate annual load factor, plant use factor, and capacity factor for both the stations. **05**

c) What is a surge tank and are its functions? Describe different types of surge tanks. **04**

Q.4 **a)** A penstock, with an internal diameter 1.25 m, supplies water at a head equivalent to 18.7 kg/cm^2. There is a possibility of 20% in the pressure due to transient conditions. The design stress and the efficiency of the joint may be assumed to be 1020 kg/m^2 and 85% resp. Find the wall thickness of penstock. **06**

b) What are the principal components of a 'Hydro-electric' scheme? Discuss the utility of each component. **04**

c) What do you understand by 'Water Hammer' in pipe line? Derive an expression for the water hammer pressure in case of rigid pipe. **04**

Section – II

Q.5 **a)** The following data refers to a proposed hydroelectric power plant, available Head = 27 m, catchment area = 400 km^2 a Rainfall = 150 cm/yr, of total rain fall utilized = 7.5%, turbine efficiency 82%, penstock efficiency 85%, generator efficiency 86%, load factor 0.42, calculate the power that can be developed suggest suitable turbine for the plant. **07**

b) What do you understand by 'pump storage plant'? What are the advantages and disadvantages of this power plant? Where can such schemes to be applied? **07**

Q.6 **a)** What do you understand by the term 'specific speed' of a turbine? What information does it give and how it is made use in practice? **04**

b) A Power house is equipped with 4 units of vertical shaft pelton turbines to be coupled with 71000 kVA, 3 phase. 50 hertz generation. The generation are provided with 10 pairs of poles. The gross design head is 505 m and transmission efficiency of head race tunnel and penstocks together is to be 94 %. The four units together will provide for a power of 348000 hp at a efficiency of 91 %. The nozzle efficiency is 0.98. **06**

Find:

1) the design discharge for the turbine
2) jet dia, and no. of jets
3) the nozzle tip diameter
4) the pitch circle dia. of the wheel
5) the specific speed and
6) number of buckets on the wheel

c) Explain the function of Anchor block and enlist the forces acting on it? Draw a neat figure. **04**

Q.7 **a)** In an estuary, which is being considered for possible tidal power generation during tidal cycle, the observed difference between high and low water of the tide was 5.0 m. It has been estimated this estuary having an area of 0.45 km^2 can generate power of 3 hours in each cycle. Assuming the average available head to be 4.0 m and the overall efficiency of the generation to 77%. Calculate the power (hp) at any instant and the total energy in a year. Take Density of sea water as 1025kg/m^3. **06**

b) Describe how ocean tides are generated. With tidal cycle in view, describe how hydropower can be generated. Enumerate the limitations of tidal power generation. **04**

c) Explain the terms: **04**

1) Draft tube
2) Trash rack

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Draw neat labeled diagrams whenever necessary.
3) Use of only non programmable calculator is allowed.
4) Assume suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The draft tube is provided to _____.
   a) reduce the effect of water hammer
   b) raise the water surface of the stream to create an artificial head
   c) increase the acting head on the water wheel
   d) none of the above

2) In hydro electric power station what is an enlarge body of water just above the intake and used as a regulating reservoir called _____.
   a) Penstock b) Spillways
   c) Reservoir d) Fore bay

3) Jet ratio 'm' is defined as the ratio of _____.
   a) Diameter of jet of water to diameter of pelton wheel.
   b) Velocity of vane to velocity of jet of water
   c) Velocity of flow to velocity of jet of water
   d) Diameter of pelton wheel to diameter of jet

4) Water hammer' process in penstock result in _____.
   a) pressure decreases
   b) noise decreases
   c) noise increases, pressure increases, velocity decreases
   d) None

5) The load factor for the peak day of the year determines the required _____.
   a) Water storage b) Pondage
   c) Generating capacity d) None

6) In Francis turbine runner, the number of blades is usually of the order of _____.
   a) 16-24 b) 12-14
   c) 6-8 d) 3-6

7) Surge tank is necessarily provided _____.
   a) long penstocks b) short length penstocks
   c) surface penstocks d) embedded penstocks

8) The capacity of small hydro power plant are in order of _____.
   a) 20-5 MW
   b) 15-100 MW
   c) 1-15 MW
   d) 15-20 MW

9) Power plant having maximum demand more than the installed rated capacity will have utilization factor _____.
   a) Equal to unity
   b) More than unity
   c) Less than unity
   d) None

10) Which plant can never have 100 percent load factor?
   a) Base load plant
   b) Peak load plant
   c) Nuclear power plant
   d) Hydroelectric plant

11) Function of surge tank is to _____.
   a) Store water on load rejection
   b) Furnish additional water during increased load demand
   c) Both to store and supply water
   d) None

12) Unit power of turbine is _____.
   a) $P/H^{3/2}$
   b) P/H
   c) $P/\sqrt{H}$
   d) P/H^{2}

13) Pump storage scheme are used to improve _____.
   a) Load factor
   b) Power factor
   c) Plant capacity factor as well as load factor
   d) Delivery factor

14) Cavitation in a turbine causes _____.
   a) Low efficiency
   b) Blade surface is damaged
   c) Vibration and noise
   d) None of the above

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Attempt any two questions from Section one (Que.no.2 to 4) and attempt any two questions from section two (Que. no. 5 to 7).
2) Figures to the right indicates full marks.
3) Draw neat labeled diagrams whenever necessary.
4) Use of only non programmable calculator is allowed.
5) Assume suitable data wherever necessary.

Section – I

Q.2 **a)** What do you understand by non-conventional sources of power generation? What is the scope of these sources in India? **07**

b) When a run of river plant operates as a peak load stations with a weekly load factor of 21%, all its capacity is firm capacity. What will be the minimum flow in the river so that the station may serve as the base load stations. It is given that, installed capacity of generator = 14,000 kW, Operating Head = 14 m, Plant efficiency = 82%, also estimate the daily load factor of the plant if the stream flow is 20 cumcs. **07**

Q.3 **a)** Define Hydrograph and explain its importance in the design of storage type hydro electric power plant. **05**

b) Common load shared by two stations base load plant with 50 MW capacity and other being standby plant with 55 MW capacity. The yearly output for base load station is 210×10^6 KWh and for standby station is 18×10^6 KWh. The peak load taken by standby station is 17 MW which works for 2424 hrs during the year. The base load station takes peak load as 32 MW. Calculate annual load factor, plant use factor, and capacity factor for both the stations. **05**

c) What is a surge tank and are its functions? Describe different types of surge tanks. **04**

Q.4 **a)** A penstock, with an internal diameter 1.25 m, supplies water at a head equivalent to 18.7 kg/cm^2. There is a possibility of 20% in the pressure due to transient conditions. The design stress and the efficiency of the joint may be assumed to be 1020 kg/m^2 and 85% resp. Find the wall thickness of penstock. **06**

b) What are the principal components of a 'Hydro-electric' scheme? Discuss the utility of each component. **04**

c) What do you understand by 'Water Hammer' in pipe line? Derive an expression for the water hammer pressure in case of rigid pipe. **04**

Section – II

Q.5 **a)** The following data refers to a proposed hydroelectric power plant, available Head = 27 m, catchment area = 400 km^2 a Rainfall = 150 cm/yr, of total rain fall utilized = 7.5%, turbine efficiency 82%, penstock efficiency 85%, generator efficiency 86%, load factor 0.42, calculate the power that can be developed suggest suitable turbine for the plant. **07**

b) What do you understand by 'pump storage plant'? What are the advantages and disadvantages of this power plant? Where can such schemes to be applied? **07**

Q.6 **a)** What do you understand by the term 'specific speed' of a turbine? What information does it give and how it is made use in practice? **04**

b) A Power house is equipped with 4 units of vertical shaft pelton turbines to be coupled with 71000 kVA, 3 phase. 50 hertz generation. The generation are provided with 10 pairs of poles. The gross design head is 505 m and transmission efficiency of head race tunnel and penstocks together is to be 94 %. The four units together will provide for a power of 348000 hp at a efficiency of 91 %. The nozzle efficiency is 0.98. **06**

Find:

1) the design discharge for the turbine
2) jet dia, and no. of jets
3) the nozzle tip diameter
4) the pitch circle dia. of the wheel
5) the specific speed and
6) number of buckets on the wheel

c) Explain the function of Anchor block and enlist the forces acting on it? Draw a neat figure. **04**

Q.7 **a)** In an estuary, which is being considered for possible tidal power generation during tidal cycle, the observed difference between high and low water of the tide was 5.0 m. It has been estimated this estuary having an area of 0.45 km^2 can generate power of 3 hours in each cycle. Assuming the average available head to be 4.0 m and the overall efficiency of the generation to 77%. Calculate the power (hp) at any instant and the total energy in a year. Take Density of sea water as 1025kg/m^3. **06**

b) Describe how ocean tides are generated. With tidal cycle in view, describe how hydropower can be generated. Enumerate the limitations of tidal power generation. **04**

c) Explain the terms: **04**

1) Draft tube
2) Trash rack

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Draw neat labeled diagrams whenever necessary.
3) Use of only non programmable calculator is allowed.
4) Assume suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Unit power of turbine is _____.
   a) $P/H^{3/2}$ b) P/H
   c) $P/\sqrt{H}$ d) P/H^2

2) Pump storage scheme are used to improve _____.
   a) Load factor
   b) Power factor
   c) Plant capacity factor as well as load factor
   d) Delivery factor

3) Cavitation in a turbine causes _____.
   a) Low efficiency
   b) Blade surface is damaged
   c) Vibration and noise
   d) None of the above

4) The draft tube is provided to _____.
   a) reduce the effect of water hammer
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5) In hydro electric power station what is an enlarge body of water just above the intake and used as a regulating reservoir called _____.
   a) Penstock b) Spillways
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6) Jet ratio 'm' is defined as the ratio of _____.
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7) Water hammer' process in penstock result in _____.
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8) The load factor for the peak day of the year determines the required _____.
   a) Water storage
   b) Pondage
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   d) None

9) In Francis turbine runner, the number of blades is usually of the order of _____.
   a) 16-24
   b) 12-14
   c) 6-8
   d) 3-6

10) Surge tank is necessarily provided _____.
   a) long penstocks
   b) short length penstocks
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11) The capacity of small hydro power plant are in order of _____.
   a) 20-5 MW
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12) Power plant having maximum demand more than the installed rated capacity will have utilization factor _____.
   a) Equal to unity
   b) More than unity
   c) Less than unity
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13) Which plant can never have 100 percent load factor?
   a) Base load plant
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14) Function of surge tank is to _____.
   a) Store water on load rejection
   b) Furnish additional water during increased load demand
   c) Both to store and supply water
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Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Attempt any two questions from Section one (Que.no.2 to 4) and attempt any two questions from section two (Que. no. 5 to 7).
2) Figures to the right indicates full marks.
3) Draw neat labeled diagrams whenever necessary.
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Section – I

Q.2 **a)** What do you understand by non-conventional sources of power generation? What is the scope of these sources in India? **07**

b) When a run of river plant operates as a peak load stations with a weekly load factor of 21%, all its capacity is firm capacity. What will be the minimum flow in the river so that the station may serve as the base load stations. It is given that, installed capacity of generator = 14,000 kW, Operating Head = 14 m, Plant efficiency = 82%, also estimate the daily load factor of the plant if the stream flow is 20 cumcs. **07**

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Q.7 **a)** In an estuary, which is being considered for possible tidal power generation during tidal cycle, the observed difference between high and low water of the tide was 5.0 m. It has been estimated this estuary having an area of 0.45 km^2 can generate power of 3 hours in each cycle. Assuming the average available head to be 4.0 m and the overall efficiency of the generation to 77%. Calculate the power (hp) at any instant and the total energy in a year. Take Density of sea water as 1025kg/m^3. **06**

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c) Explain the terms: **04**

1) Draft tube
2) Trash rack

SLR-FM-39

Seat No.		Set	S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
WATER POWER ENGINEERING

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Attempt any two questions from Section one (Que.no.2 to 4) and attempt any two questions from section two (Que. no. 5 to 7).
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Section – II

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c) Explain the terms: **04**

1) Draft tube
2) Trash rack

SLR-FM-40

Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Answer MCQ/Objective type questions on Page No.3 only, Don't forget to Mention, Q.P. set (A/B/C/D) on the top of Page.
3) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The specific surface area of cement is expressed in _____.
   a) mm^2 b) mm^2/gram
   c) gram/ mm^2 d) none of these

2) The compaction factor test of cement concrete determines its _____.
   a) strength b) porosity
   c) workability d) flexural strength

3) The ratio of tensile strength of concrete to compressive strength is _____.
   a) 1/10 b) 1/33
   c) 1/20 d) 1/25

4) Water gain in cement concrete is defined as _____.
   a) separation of coarser particles of mix causing non-homogeneity
   b) appearance of water over surface of finished concrete
   c) formation of capillary pores in fresh cement
   d) none of these

5) A mixer designated as 400 NT indicates that _____.
   a) It is non tilting type mixer
   b) mix batch capacity is 400 liter
   c) both a & b
   d) none of these

6) The cement-sand ratio in ferrocement matrix should not be leaner than _____.
   a) 1.1 b) 1.6
   c) 1.3 d) 1.4

7) In ultrasonic pulse velocity test, poor quality of concrete is indicated if pulse velocity is _____.
   a) Below 2.5 km/s b) Between 3 to 3.5 km/s
   c) Above 4.5 km/s d) None of these

8) Slump value of concrete is a measure of its _____.
   a) consistency b) compressive strenght
   c) tensile strenght d) impact value

9) Factors which affect workability are _____.
   a) water content b) shape and size of aggregate
   c) grading of aggregate d) all of above

10) RMC stands for _____.
   a) Rapid Mix Cement b) Ready Mix Concrete
   c) Ready Mix Cements d) Rapid Mix Concrete

11) Particles of 0.002mm size are that of _____.
   a) clay b) Sand
   c) gravel d) none of these

12) Non uniform compaction may cause the concrete _____.
   a) porous b) non-homogeneous
   c) reduce strength d) all of above

13) If fineness modulus of sand is 2.7, it is graded as _____.
   a) very fine sand b) medium sand
   c) coarser sand d) all of above

14) If slump value is 75mm its workability is _____.
   a) very high b) High
   c) medium d) all of above

Seat No.	

Set **P**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from Q no.2,3,4 and 7,8,9.
2) Q. NO. 5 and 6 are compulsory.
3) Figures to right indicate full marks.
4) Use of non-programmable calculators allowed.
5) Assume suitable data if necessary and mention it clearly.

Section - I

Q.2 Give brief classification of course aggregate. Write short note on recycled aggregate. **09**

Q.3 Write short note chemical admixture and explain their effect on the properties of concrete. **09**

Q.4 Explain in detail Roller Compacted Concrete and Radiation Shielding Concrete **09**

Q.5 Define Durability and Carbonation of concrete. Explain factors which affect durability of concrete in detail. **10**

Section –II

Q.6 What are the particular requirements for pumpability of a concrete mix? **10**

Q.7 What are the special precautions to be adopted on the site for efficiently using ready mixed concrete? Explain in detail. **09**

Q.8 What is Mix Design? Write down design steps of concrete mix design using IS 10262:2009 method. **09**

Q.9 What are the factors contributing cracks in concrete? Explain any crack repair technique in detail. **09**

SLR-FM-40

Seat No.	

Set Q

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED CONCRETE TECHNOLOGY

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Slump value of concrete is a measure of its _____.
   a) consistency b) compressive strenght
   c) tensile strenght d) impact value

2) Factors which affect workability are _____.
   a) water content b) shape and size of aggregate
   c) grading of aggregate d) all of above

3) RMC stands for _____.
   a) Rapid Mix Cement b) Ready Mix Concrete
   c) Ready Mix Cements d) Rapid Mix Concrete

4) Particles of 0.002mm size are that of _____.
   a) clay b) Sand
   c) gravel d) none of these

5) Non uniform compaction may cause the concrete _____.
   a) porous b) non-homogeneous
   c) reduce strength d) all of above

6) If fineness modulus of sand is 2.7, it is graded as _____.
   a) very fine sand b) medium sand
   c) coarser sand d) all of above

7) If slump value is 75mm its workability is _____.
   a) very high b) High
   c) medium d) all of above

8) The specific surface area of cement is expressed in _____.
   a) mm^2 b) mm^2/gram
   c) gram/ mm^2 d) none of these

9) The compaction factor test of cement concrete determines its _____.
   a) strength b) porosity
   c) workability d) flexural strength

10) The ratio of tensile strength of concrete to compressive strength is _____.
   a) 1/10 b) 1/33
   c) 1/20 d) 1/25

11) Water gain in cement concrete is defined as _____.
   a) separation of coarser particles of mix causing non-homogeneity
   b) appearance of water over surface of finished concrete
   c) formation of capillary pores in fresh cement
   d) none of these

12) A mixer designated as 400 NT indicates that _____.
   a) It is non tilting type mixer
   b) mix batch capacity is 400 liter
   c) both a & b
   d) none of these

13) The cement-sand ratio in ferrocement matrix should not be leaner than _____.
   a) 1.1 b) 1.6
   c) 1.3 d) 1.4

14) In ultrasonic pulse velocity test, poor quality of concrete is indicated if pulse velocity is _____.
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Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

A) A person is in the business of buying and selling items. He has 10 units in stock and plans for the next three periods. He can buy the item at the rate of Rs 50, 55 and 58 at the beginning of periods 1, 2 and 3 and can sell them at Rs 60, 64 and 66 at the end of the three periods. He can use the money earned by selling at the end of the period to buy items at the beginning of the next period. He can buy a maximum of 200 per period. He can borrow money at the rate of 2% per period at the beginning of each period. He can borrow a maximum of Rs 8000 per period and he cannot borrow more than Rs 20000 in total. He has to pay back all the loans with interest at the end of the third period.
(for sub questions 1 to 3)

1) What is the correct objective function for this problem?
   a) Maximize the total money available at the end of the third period
   b) Maximize the total money at the end of the third period less total money borrowed
   c) Maximize the total money at the end of the third period less total money paid back including interest
   d) Maximize the number of items sold at the end of the third period

2) How many decision variables are in the formulation?
   a) 3 b) 6
   c) 9 d) 10

3) How many constraints (except non-negativity constraints) are in the formulation?
   a) 6 b) 9
   c) 12 d) 13

B) A food stall sells idlis, dosas and poories. A plate of idli has 2 pieces, a plate of dosa has 1 piece while a plate of poori has 2 pieces. They also sell a "combo" which has 2 idlis and 2 poories. A kg of batter costs Rs 60 and twelve spoons of batter. Each piece of idli requires 1 spoon of batter and each dosa requires 1.5 spoons of batter. Each poori piece requires 1 ball of wheat dough and a kg of wheat dough that costs Rs 60 can make 20 balls of dough. The selling prices of the items are Rs 40, 60, 60 and 90 per plate respectively. The owner has Rs 800 with her and estimates the demand for the four items (in plates) as 50, 30, 20 and 10 respectively. There is a penalty cost of Rs 10 for any unmet plate of demand of an item. Idli being the most commonly consumed item, the owner wishes to meet at least 80% of the demand. Formulate an LP problem and answer the following questions: (for sub questions 4 to 6)

4) What is the most suitable objective function for this problem?
   a) Maximize the total money earned by sale
   b) Maximize the total money earned by sale less the cost of items bought
   c) Maximize the total plates made of all the items
   d) Minimize the unmet demand

5) How many decision variables are in the formulation?
   a) 3 b) 4
   c) 5 d) 8

6) How many constraints (except non-negativity constraints) are in the formulation?
   a) 3 b) 4
   c) 5 d) 6

C) 7) If primal is maximize $40\,X_1 + 35\,X_2$, subjected to $2\,X_1 + 3\,X_2 \leq 60$ and $4\,X_1 + 3\,X_2 \leq 96,\ X_1, X_2 \geq 0$ the dual will have objective function as _____.
   a) $3y_1 + 3\,y_2$ (minimize) b) $3y_1 - 3\,y_2$ (maximize)
   c) $60y_1 + 96y_2$ (minimize) d) $60y_1 + 96y_2$ (maximize)

8) The necessary condition for single variable unconstrained optimization problem is _____.
   a) $f^1(x^*) = 0$ b) $f^1(x^*) \neq 0$
   c) $f^1(x^*) < 0$ d) $f^1(x^*) > 0$

9) If $f(x)$ has only one variable useful, the second derivative $d^2f\,/\,(dx^2)$ is positive for its _____.
   a) Maximum values b) Minimum values
   c) Minimax d) Maxmin

10) In an LPP; Max 5x + 6y. Subject to 2x + 3y ≥ 50, 4x + 3y ≥ 100, the objective function of first phase in 2-phase method is _____.
   a) 5x + 6y b) +5x + 6y - MA_1 - MA_2
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11) One of the important reason for carrying inventory is to _____.
   a) Improve customer service b) Get quantity discount
   c) Maintain operational capability d) All of the above

12) A type of decision-making environment is _____.
   a) Certainty b) Uncertainty
   c) Risk d) All of the above

13) The size of the payoff matrix of a game can be reduced by using the principle of _____.

a) Game inversion
b) Rotation Reduction
c) Dominance
d) Game transpose

14) A situation in which a decision maker knows all of the possible outcomes of a decision and also knows the probability associated with each outcome is referred to as _____.

a) Certainty
b) Uncertainty
c) Risk
d) Strategy

Seat No.	

Set **P**

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6) Use of non-programmable calculator is allowed

Section – I

Q.2 **a)** Analyze the function $f(x) = 12x^5 - 45x^4 + 45x^3 + 5$ and classify the stationary points as maxima, minima and points of inflection. **08**

b) Write dual for following Primal **04**

Maximize $z = 4x_1 + 3x_2$
Subject to
$x_1 + (2/3)x_2 \leq 6000$
$x_1 - x_2 \geq 2000$
$x_1 \leq 4000$
x_1 unrestricted
$x_2 \geq 0$

Q.3 Minimize $z = 3x_1 + 5x_2$ **08**
S.T. $x_1 + x_2 \geq 2$
$x_2 \leq 6$
$3x_1 + 2x_2 = 18$
$x_1, x_2 \geq 0$
Incorporate artificial variables and transform the LP problem.

Q.4 Solve using Simplex method **08**
Maximize $z = 4x_1 - x_2 + 2x_3$
ST $2x_1 + x_2 + 2x_3 \leq 6$
$x_1 - 4x_2 + 2x_3 \leq 0$
$5x_1 - 2x_2 - 2x_3 \leq 4$
$x_1, x_2, x_3 \geq 0$

Q.5 Consider three factories (F) located in three different cities, producing a particular chemical. The chemical is to be transported to four different warehouses (Wh), from where it is supplied to the customers. The transportation cost per truck load from each factory to each warehouse is determined and are given in the table below. Production and demands are also given in the table below. **08**

	Wh 1	Wh 2	Wh 3	Wh 4	Production
F1	523	682	458	850	60
F2	420	412	362	729	110
F3	670	558	895	695	150
Demand	65	85	80	70	

Find Minimum cost of transportation.

Section – II

Q.6 **a)** What is decision under uncertainty? Explain With example. **04**

b) Find the value of game graphically. **08**

$$\begin{array}{c} \\ \text{Player A} \end{array} \begin{array}{c} \text{Player B} \\ \begin{vmatrix} 3 & -3 & 4 \\ -1 & 1 & -3 \end{vmatrix} \end{array}$$

Q.7 A stockist purchases an item at the rate of Rs. 40 per piece from a manufacture. 2000 units of the items are required per year. What should be the order quantity per order if the cost per order is Rs. 15 and the inventory charges per year are 20 paise. **08**

Q.8 Using Branch & bound method solve following integer programming problem. **08**

Maximize $z = 7x_1 + 9x_2$

S. to.

$-x_1 + 3x_2 \leq 6$

$7x_1 + x_2 \leq 35$

$(0 \leq x_1, x_2 \leq 7)$

and x_1, x_2 are integers.

Q.9 **Write note. (Any two)** **08**

a) Economic Order Quantity

b) Dynamic Programming

c) Artificial Neural Network (ANN)

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Seat No.	

Set Q

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4) Solve any two out of 7, 8, 9.
5) Assume suitable data whenever required.
6) Use of non-programmable calculator is allowed

Section – I

Q.2 **a)** Analyze the function $f(x) = 12x^5 - 45x^4 + 45x^3 + 5$ and classify the stationary points as maxima, minima and points of inflection. **08**

b) Write dual for following Primal **04**

Maximize $z = 4x_1 + 3x_2$
Subject to
$x_1 + (2/3)x_2 \leq 6000$
$x_1 - x_2 \geq 2000$
$x_1 \leq 4000$
x_1 unrestricted
$x_2 \geq 0$

Q.3 Minimize $z = 3x_1 + 5x_2$ **08**
S.T. $x_1 + x_2 \geq 2$
$x_2 \leq 6$
$3x_1 + 2x_2 = 18$
$x_1, x_2 \geq 0$
Incorporate artificial variables and transform the LP problem.

Q.4 Solve using Simplex method **08**
Maximize $z = 4x_1 - x_2 + 2x_3$
ST $2x_1 + x_2 + 2x_3 \leq 6$
$x_1 - 4x_2 + 2x_3 \leq 0$
$5x_1 - 2x_2 - 2x_3 \leq 4$
$x_1, x_2, x_3 \geq 0$

Q.5 Consider three factories (F) located in three different cities, producing a particular chemical. The chemical is to be transported to four different warehouses (Wh), from where it is supplied to the customers. The transportation cost per truck load from each factory to each warehouse is determined and are given in the table below. Production and demands are also given in the table below. **08**

	Wh 1	Wh 2	Wh 3	Wh 4	Production
F1	523	682	458	850	60
F2	420	412	362	729	110
F3	670	558	895	695	150
Demand	65	85	80	70	

Find Minimum cost of transportation.

Section – II

Q.6 **a)** What is decision under uncertainty? Explain With example. **04**

b) Find the value of game graphically. **08**

$$\begin{array}{c} \\ \text{Player A} \end{array} \begin{array}{c} \text{Player B} \\ \begin{vmatrix} 3 & -3 & 4 \\ -1 & 1 & -3 \end{vmatrix} \end{array}$$

Q.7 A stockist purchases an item at the rate of Rs. 40 per piece from a manufacture. 2000 units of the items are required per year. What should be the order quantity per order if the cost per order is Rs. 15 and the inventory charges per year are 20 paise. **08**

Q.8 Using Branch & bound method solve following integer programming problem. **08**

Maximize $z = 7x_1 + 9x_2$

S. to.

$-x_1 + 3x_2 \leq 6$

$7x_1 + x_2 \leq 35$

$(0 \leq x_1, x_2 \leq 7)$

and x_1, x_2 are integers.

Q.9 **Write note. (Any two)** **08**

a) Economic Order Quantity

b) Dynamic Programming

c) Artificial Neural Network (ANN)

SLR-FM-44

Seat No.	

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book pages No.3. Each question carries one marks.
2) Answer MCQ/Objective type questions on page No.3 only. Don't forget to Mention, Q.P. Set (P/Q/R/S) on Top of page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

A) A person is in the business of buying and selling items. He has 10 units in stock and plans for the next three periods. He can buy the item at the rate of Rs 50, 55 and 58 at the beginning of periods 1, 2 and 3 and can sell them at Rs 60, 64 and 66 at the end of the three periods. He can use the money earned by selling at the end of the period to buy items at the beginning of the next period. He can buy a maximum of 200 per period. He can borrow money at the rate of 2% per period at the beginning of each period. He can borrow a maximum of Rs 8000 per period and he cannot borrow more than Rs 20000 in total. He has to pay back all the loans with interest at the end of the third period.
(for sub questions 1 to 3)

1) How many constraints (except non-negativity constraints) are in the formulation?
   a) 6 b) 9
   c) 12 d) 13

2) How many decision variables are in the formulation?
   a) 3 b) 6
   c) 9 d) 10

3) What is the correct objective function for this problem?
   a) Maximize the total money available at the end of the third period
   b) Maximize the total money at the end of the third period less total money borrowed
   c) Maximize the total money at the end of the third period less total money paid back including interest
   d) Maximize the number of items sold at the end of the third period

B) A food stall sells idlis, dosas and poories. A plate of idli has 2 pieces, a plate of dosa has 1 piece while a plate of poori has 2 pieces. They also sell a "combo" which has 2 idlis and 2 poories. A kg of batter costs Rs 60 and twelve spoons of batter. Each piece of idli requires 1 spoon of batter and each dosa requires 1.5 spoons of batter. Each poori piece requires 1 ball of wheat dough and a kg of wheat dough that costs Rs 60 can make 20 balls of dough. The selling prices of the items are Rs 40, 60, 60 and 90 per plate respectively. The owner has Rs 800 with her and estimates the demand for the four items (in plates) as 50, 30, 20 and 10 respectively. There is a penalty cost of Rs 10 for any unmet plate of demand of an item. Idli being the most commonly consumed item, the owner wishes to meet at least 80% of the demand. Formulate an LP problem and answer the following questions: (for sub questions 4 to 6)

4) How many constraints (except non-negativity constraints) are in the formulation?
   a) 3 b) 4
   c) 5 d) 6

5) How many decision variables are in the formulation?
   a) 3 b) 4
   c) 5 d) 8

6) What is the most suitable objective function for this problem?
   a) Maximize the total money earned by sale
   b) Maximize the total money earned by sale less the cost of items bought
   c) Maximize the total plates made of all the items
   d) Minimize the unmet demand

C) 7) If $f(x)$ has only one variable useful, the second derivative $d^2f / (dx^2)$ is positive for its _____.
   a) Maximum values b) Minimum values
   c) Minimax d) Maxmin

8) In an LPP; Max 5x + 6y. Subject to 2x + 3y ≥ 50, 4x + 3y ≥ 100, the objective function of first phase in 2-phase method is _____.
   a) 5x + 6y b) +5x + 6y - MA_1 - MA_2
   c) +A_1 + A_2 d) 0x + oy - A_1 - A_2

9) One of the important reason for carrying inventory is to _____.
   a) Improve customer service b) Get quantity discount
   c) Maintain operational capability d) All of the above

10) A type of decision-making environment is _____.
   a) Certainty b) Uncertainty
   c) Risk d) All of the above

11) The size of the payoff matrix of a game can be reduced by using the principle of _____.
   a) Game inversion b) Rotation Reduction
   c) Dominance d) Game transpose

12) A situation in which a decision maker knows all of the possible outcomes of a decision and also knows the probability associated with each outcome is referred to as _____.
   a) Certainty b) Uncertainty
   c) Risk d) Strategy

13) If primal is maximize $40\,X_1 + 35\,X_2$, subjected to $2\,X_1 + 3\,X_2 \leq 60$ and $4\,X_1 + 3\,X_2 \leq 96,\ X_1, X_2 \geq 0$ the dual will have objective function as _____.

a) $3y_1 + 3\,y_2$ (minimize) b) $3y_1 - 3\,y_2$ (maximize)

c) $60y_1 + 96y_2$ (minimize) d) $60y_1 + 96y_2$ (maximize)

14) The necessary condition for single variable unconstrained optimization problem is _____.

a) $f^1(x^*) = 0$ b) $f^1(x^*) \neq 0$

c) $f^1(x^*) < 0$ d) $f^1(x^*) > 0$

SLR-FM-44

Seat No.	

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No. 2 is compulsory.
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6) Use of non-programmable calculator is allowed

Section – I

Q.2 **a)** Analyze the function $f(x) = 12x^5 - 45x^4 + 45x^3 + 5$ and classify the stationary points as maxima, minima and points of inflection. **08**

b) Write dual for following Primal **04**

Maximize $z = 4x_1 + 3x_2$
Subject to
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$x_1 - x_2 \geq 2000$
$x_1 \leq 4000$
x_1 unrestricted
$x_2 \geq 0$

Q.3 Minimize $z = 3x_1 + 5x_2$ **08**
S.T. $x_1 + x_2 \geq 2$
$x_2 \leq 6$
$3x_1 + 2x_2 = 18$
$x_1, x_2 \geq 0$
Incorporate artificial variables and transform the LP problem.

Q.4 Solve using Simplex method **08**
Maximize $z = 4x_1 - x_2 + 2x_3$
ST $2x_1 + x_2 + 2x_3 \leq 6$
$x_1 - 4x_2 + 2x_3 \leq 0$
$5x_1 - 2x_2 - 2x_3 \leq 4$
$x_1, x_2, x_3 \geq 0$

Q.5 Consider three factories (F) located in three different cities, producing a particular chemical. The chemical is to be transported to four different warehouses (Wh), from where it is supplied to the customers. The transportation cost per truck load from each factory to each warehouse is determined and are given in the table below. Production and demands are also given in the table below. **08**

	Wh 1	Wh 2	Wh 3	Wh 4	Production
F1	523	682	458	850	60
F2	420	412	362	729	110
F3	670	558	895	695	150
Demand	65	85	80	70	

Find Minimum cost of transportation.

Section – II

Q.6 **a)** What is decision under uncertainty? Explain With example. **04**

b) Find the value of game graphically. **08**

$$\begin{array}{c} \\ \text{Player A} \end{array} \begin{array}{c} \text{Player B} \\ \begin{vmatrix} 3 & -3 & 4 \\ -1 & 1 & -3 \end{vmatrix} \end{array}$$

Q.7 A stockist purchases an item at the rate of Rs. 40 per piece from a manufacture. 2000 units of the items are required per year. What should be the order quantity per order if the cost per order is Rs. 15 and the inventory charges per year are 20 paise. **08**

Q.8 Using Branch & bound method solve following integer programming problem. **08**

Maximize $z = 7x_1 + 9x_2$

S. to.

$-x_1 + 3x_2 \leq 6$

$7x_1 + x_2 \leq 35$

$(0 \leq x_1, x_2 \leq 7)$

and x_1, x_2 are integers.

Q.9 **Write note. (Any two)** **08**

a) Economic Order Quantity

b) Dynamic Programming

c) Artificial Neural Network (ANN)

SLR-FM-44

Seat No.		Set	S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book pages No.3. Each question carries one marks.
2) Answer MCQ/Objective type questions on page No.3 only. Don't forget to Mention, Q.P. Set (P/Q/R/S) on Top of page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

A) A person is in the business of buying and selling items. He has 10 units in stock and plans for the next three periods. He can buy the item at the rate of Rs 50, 55 and 58 at the beginning of periods 1, 2 and 3 and can sell them at Rs 60, 64 and 66 at the end of the three periods. He can use the money earned by selling at the end of the period to buy items at the beginning of the next period. He can buy a maximum of 200 per period. He can borrow money at the rate of 2% per period at the beginning of each period. He can borrow a maximum of Rs 8000 per period and he cannot borrow more than Rs 20000 in total. He has to pay back all the loans with interest at the end of the third period.
(for sub questions 1 to 3)

1) What is the correct objective function for this problem?
   a) Maximize the total money available at the end of the third period
   b) Maximize the total money at the end of the third period less total money borrowed
   c) Maximize the total money at the end of the third period less total money paid back including interest
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2) How many decision variables are in the formulation?
   a) 3 b) 6
   c) 9 d) 10

3) How many constraints (except non-negativity constraints) are in the formulation?
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B) A food stall sells idlis, dosas and poories. A plate of idli has 2 pieces, a plate of dosa has 1 piece while a plate of poori has 2 pieces. They also sell a "combo" which has 2 idlis and 2 poories. A kg of batter costs Rs 60 and twelve spoons of batter. Each piece of idli requires 1 spoon of batter and each dosa requires 1.5 spoons of batter. Each poori piece requires 1 ball of wheat dough and a kg of wheat dough that costs Rs 60 can make 20 balls of dough. The selling prices of the items are Rs 40, 60, 60 and 90 per plate respectively. The owner has Rs 800 with her and estimates the demand for the four items (in plates) as 50, 30, 20 and 10 respectively. There is a penalty cost of Rs 10 for any unmet plate of demand of an item. Idli being the most commonly consumed item, the owner wishes to meet at least 80% of the demand. Formulate an LP problem and answer the following questions: (for sub questions 4 to 6)

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c) $+A_1 + A_2$
d) $0x + oy - A_1 - A_2$

13) One of the important reason for carrying inventory is to _____.

a) Improve customer service
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d) All of the above

14) A type of decision-making environment is _____.

a) Certainty
b) Uncertainty
c) Risk
d) All of the above

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPTIMIZATION TECHNIQUES

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No. 2 is compulsory.
2) Solve any two out of 3, 4, 5.
3) Question No. 6 is compulsory.
4) Solve any two out of 7, 8, 9.
5) Assume suitable data whenever required.
6) Use of non-programmable calculator is allowed

Section – I

Q.2 **a)** Analyze the function $f(x) = 12x^5 - 45x^4 + 45x^3 + 5$ and classify the stationary points as maxima, minima and points of inflection. **08**

b) Write dual for following Primal **04**

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Subject to
$x_1 + (2/3)x_2 \leq 6000$
$x_1 - x_2 \geq 2000$
$x_1 \leq 4000$
x_1 unrestricted
$x_2 \geq 0$

Q.3 Minimize $z = 3x_1 + 5x_2$ **08**
S.T. $x_1 + x_2 \geq 2$
$x_2 \leq 6$
$3x_1 + 2x_2 = 18$
$x_1, x_2 \geq 0$
Incorporate artificial variables and transform the LP problem.

Q.4 Solve using Simplex method **08**
Maximize $z = 4x_1 - x_2 + 2x_3$
ST $2x_1 + x_2 + 2x_3 \leq 6$
$x_1 - 4x_2 + 2x_3 \leq 0$
$5x_1 - 2x_2 - 2x_3 \leq 4$
$x_1, x_2, x_3 \geq 0$

Q.5 Consider three factories (F) located in three different cities, producing a particular chemical. The chemical is to be transported to four different warehouses (Wh), from where it is supplied to the customers. The transportation cost per truck load from each factory to each warehouse is determined and are given in the table below. Production and demands are also given in the table below. **08**

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F1	523	682	458	850	60
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Demand	65	85	80	70	

Find Minimum cost of transportation.

Section – II

Q.6 **a)** What is decision under uncertainty? Explain With example. **04**

b) Find the value of game graphically. **08**

$$\begin{array}{c} \\ \text{Player A} \end{array} \begin{array}{c} \text{Player B} \\ \begin{vmatrix} 3 & -3 & 4 \\ -1 & 1 & -3 \end{vmatrix} \end{array}$$

Q.7 A stockist purchases an item at the rate of Rs. 40 per piece from a manufacture. 2000 units of the items are required per year. What should be the order quantity per order if the cost per order is Rs. 15 and the inventory charges per year are 20 paise. **08**

Q.8 Using Branch & bound method solve following integer programming problem. **08**

Maximize $z = 7x_1 + 9x_2$

S. to.

$-x_1 + 3x_2 \leq 6$

$7x_1 + x_2 \leq 35$

$(0 \leq x_1, x_2 \leq 7)$

and x_1, x_2 are integers.

Q.9 **Write note. (Any two)** **08**

a) Economic Order Quantity

b) Dynamic Programming

c) Artificial Neural Network (ANN)

SLR-FM-45

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No.1 is Compulsory. It should be solve within first 30 Minutes in Answer Book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The primary goal of response to a disaster is _____.
   a) saving lives, protecting property, environment and meeting basic needs of human beings
   b) other living beings after the disaster
   c) both A and B
   d) none of these

2) The National Disaster Management Authority (NDMA) is at _____.
   a) New Delhi b) Mumbai
   c) Chennai d) Kolkata

3) Currently alMD maintains a seismological network, consisting of a total of _____ observatories, spread over the entire length and breadth of the country.
   a) 84 b) 64
   c) 44 d) 24

4) _____ drought correlates the supply and demand of goods with the all other droughts.
   a) Meteorological drought b) Hydrological drought
   c) Agricultural drought d) Socio-economic drought

5) Richter scale is a _____.
   a) logarithmic scale b) calculus scale
   c) volumetric scale d) area to vibration ratio scale

6) Disaster Management Act was enforceable since _____.
   a) 2001 b) 2003
   c) 2005 d) 2007

7) Responsibility for securing the scene, preserving life and treating the wounded is the responsibility of _____.
   a) first responders
   b) district disaster management department
   c) state government
   d) none of these

8) Who heads the National Crisis Management Committee?
   a) Prime Minister
   b) President
   c) Cabinet Secretary
   d) Ministry of Environment

9) Which of the following statements is/are correct about National disaster response force?
   I) The parent agency of National Disaster Management Authority is Ministry of Home Affairs.
   II) The Chairman of the NDMA is Home Minister.
   a) Only I
   b) Only II
   c) Both I & II
   d) None

10) The union health minister is a chairman of _____.
   a) Indian Red Cross Society
   b) National Disaster Management Authority
   c) Indian Medical Association
   d) None of the above

11) The long-term average time interval between two successive hazard events of a similar size is known as the _____.
   a) Event period
   b) Return period
   c) Time Interval
   d) Event Interval

12) What does the acronym WFED stand for?
   a) World Food and Engineering Organizations
   b) World Flood of Earthquake Organizations
   c) World Federation of Earthquake Organizations
   d) World Federation of Engineering Organizations

13) Disaster Management Division is nodal agency of _____.
   a) Ministry of home affairs
   b) Ministry of Finance
   c) Ministry of Agriculture and Farmer's welfare
   d) Prime Minister's Office

14) Every year, Central government provides _____ of the size of the calamity relief fund.
   a) 25%
   b) 50%
   c) 75%
   d) No any such specification

SLR-FM-45

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No.5 from Section-I is Compulsory. Solve any two questions from Remaining questions.
2) Question No. 9 from Section-II is Compulsory. Solve any two questions from Remaining questions.
3) Figures to right indicate full marks.

Section – I

Q.2 **a)** Define: **04**
i) Hazards
ii) Disasters
Also discuss difference between them.

b) What do you mean by environmental hazards and environmental stress? **05**

Q.3 **a)** Define drought? Also discuss types and causes of droughts. **04**

b) Define Landslides? Discuss its causes and damage assessment process in brief. **05**

Q.4 **a)** Discuss the causes and control measures of soil erosion. **04**

b) Write a note on: **05**
i) Deforestation
ii) Population Explosion

Q.5 **a)** What do you mean by Structural and Non-Structural Mitigation? Discuss in brief. **04**

b) Discuss various stages in disaster management cycle with help of pictorial representation. **06**

Section – II

Q.6 **a)** Discuss the role of Indian Meteorological observatories in disaster mitigation activities. **04**

b) Write a note on: Prediction and warning systems of disasters **05**

Q.7 **a)** Discuss the importance of media in disaster management. **04**

b) What is the role of local bodies and NGO's in disaster response activities? **05**

Q.8 Consider a war disaster circumstances in border region of your country, being a Disaster Manager, how will you manage this disaster? Discuss with reference to the Disaster Management Cycle. **09**

Q.9 **a)** What is the role of NIDM disaster management activities? **04**

b) State various international agencies involved in disaster management activities. Also discuss the role of any three international agencies in disaster management process. **06**

SLR-FM-45

Seat No.	

Set Q

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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7) Every year, Central government provides _____ of the size of the calamity relief fund.
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   c) 2005 d) 2007

14) Responsibility for securing the scene, preserving life and treating the wounded is the responsibility of _____.
   a) first responders
   b) district disaster management department
   c) state government
   d) none of these

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No.5 from Section-I is Compulsory. Solve any two questions from Remaining questions.
2) Question No. 9 from Section-II is Compulsory. Solve any two questions from Remaining questions.
3) Figures to right indicate full marks.

Section – I

Q.2 **a)** Define: **04**
i) Hazards
ii) Disasters
Also discuss difference between them.

b) What do you mean by environmental hazards and environmental stress? **05**

Q.3 **a)** Define drought? Also discuss types and causes of droughts. **04**

b) Define Landslides? Discuss its causes and damage assessment process in brief. **05**

Q.4 **a)** Discuss the causes and control measures of soil erosion. **04**

b) Write a note on: **05**
i) Deforestation
ii) Population Explosion

Q.5 **a)** What do you mean by Structural and Non-Structural Mitigation? Discuss in brief. **04**

b) Discuss various stages in disaster management cycle with help of pictorial representation. **06**

Section – II

Q.6 **a)** Discuss the role of Indian Meteorological observatories in disaster mitigation activities. **04**

b) Write a note on: Prediction and warning systems of disasters **05**

Q.7 **a)** Discuss the importance of media in disaster management. **04**

b) What is the role of local bodies and NGO's in disaster response activities? **05**

Q.8 Consider a war disaster circumstances in border region of your country, being a Disaster Manager, how will you manage this disaster? Discuss with reference to the Disaster Management Cycle. **09**

Q.9 **a)** What is the role of NIDM disaster management activities? **04**

b) State various international agencies involved in disaster management activities. Also discuss the role of any three international agencies in disaster management process. **06**

SLR-FM-45

Seat No.	

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No.1 is Compulsory. It should be solve within first 30 Minutes in Answer Book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Richter scale is a _____.
   a) logarithmic scale b) calculus scale
   c) volumetric scale d) area to vibration ratio scale

2) Disaster Management Act was enforceable since _____.
   a) 2001 b) 2003
   c) 2005 d) 2007

3) Responsibility for securing the scene, preserving life and treating the wounded is the responsibility of _____.
   a) first responders
   b) district disaster management department
   c) state government
   d) none of these

4) Who heads the National Crisis Management Committee?
   a) Prime Minister b) President
   c) Cabinet Secretary d) Ministry of Environment

5) Which of the following statements is/are correct about National disaster response force?
   I) The parent agency of National Disaster Management Authority is Ministry of Home Affairs.
   II) The Chairman of the NDMA is Home Minister.
   a) Only I b) Only II
   c) Both I & II d) None

6) The union health minister is a chairman of _____.
   a) Indian Red Cross Society
   b) National Disaster Management Authority
   c) Indian Medical Association
   d) None of the above

7) The long-term average time interval between two successive hazard events of a similar size is known as the _____.
   a) Event period b) Return period
   c) Time Interval d) Event Interval

8) What does the acronym WFED stand for?
   a) World Food and Engineering Organizations
   b) World Flood of Earthquake Organizations
   c) World Federation of Earthquake Organizations
   d) World Federation of Engineering Organizations

9) Disaster Management Division is nodal agency of _____.
   a) Ministry of home affairs
   b) Ministry of Finance
   c) Ministry of Agriculture and Farmer's welfare
   d) Prime Minister's Office

10) Every year, Central government provides _____ of the size of the calamity relief fund.
   a) 25% b) 50%
   c) 75% d) No any such specification

11) The primary goal of response to a disaster is _____.
   a) saving lives, protecting property, environment and meeting basic needs of human beings
   b) other living beings after the disaster
   c) both A and B
   d) none of these

12) The National Disaster Management Authority (NDMA) is at _____.
   a) New Delhi b) Mumbai
   c) Chennai d) Kolkata

13) Currently alMD maintains a seismological network, consisting of a total of _____ observatories, spread over the entire length and breadth of the country.
   a) 84 b) 64
   c) 44 d) 24

14) _____ drought correlates the supply and demand of goods with the all other droughts.
   a) Meteorological drought b) Hydrological drought
   c) Agricultural drought d) Socio-economic drought

SLR-FM-45

Seat No.	

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No.5 from Section-I is Compulsory. Solve any two questions from Remaining questions.
2) Question No. 9 from Section-II is Compulsory. Solve any two questions from Remaining questions.
3) Figures to right indicate full marks.

Section – I

Q.2 **a)** Define: **04**
i) Hazards
ii) Disasters
Also discuss difference between them.

b) What do you mean by environmental hazards and environmental stress? **05**

Q.3 **a)** Define drought? Also discuss types and causes of droughts. **04**

b) Define Landslides? Discuss its causes and damage assessment process in brief. **05**

Q.4 **a)** Discuss the causes and control measures of soil erosion. **04**

b) Write a note on: **05**
i) Deforestation
ii) Population Explosion

Q.5 **a)** What do you mean by Structural and Non-Structural Mitigation? Discuss in brief. **04**

b) Discuss various stages in disaster management cycle with help of pictorial representation. **06**

Section – II

Q.6 **a)** Discuss the role of Indian Meteorological observatories in disaster mitigation activities. **04**

b) Write a note on: Prediction and warning systems of disasters **05**

Q.7 **a)** Discuss the importance of media in disaster management. **04**

b) What is the role of local bodies and NGO's in disaster response activities? **05**

Q.8 Consider a war disaster circumstances in border region of your country, being a Disaster Manager, how will you manage this disaster? Discuss with reference to the Disaster Management Cycle. **09**

Q.9 **a)** What is the role of NIDM disaster management activities? **04**

b) State various international agencies involved in disaster management activities. Also discuss the role of any three international agencies in disaster management process. **06**

SLR-FM-45

Seat No.		Set	S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No.1 is Compulsory. It should be solve within first 30 Minutes in Answer Book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The union health minister is a chairman of _____.
   a) Indian Red Cross Society
   b) National Disaster Management Authority
   c) Indian Medical Association
   d) None of the above

2) The long-term average time interval between two successive hazard events of a similar size is known as the _____.
   a) Event period b) Return period
   c) Time Interval d) Event Interval

3) What does the acronym WFED stand for?
   a) World Food and Engineering Organizations
   b) World Flood of Earthquake Organizations
   c) World Federation of Earthquake Organizations
   d) World Federation of Engineering Organizations

4) Disaster Management Division is nodal agency of _____.
   a) Ministry of home affairs
   b) Ministry of Finance
   c) Ministry of Agriculture and Farmer's welfare
   d) Prime Minister's Office

5) Every year, Central government provides _____ of the size of the calamity relief fund.
   a) 25% b) 50%
   c) 75% d) No any such specification

6) The primary goal of response to a disaster is _____.
   a) saving lives, protecting property, environment and meeting basic needs of human beings
   b) other living beings after the disaster
   c) both A and B
   d) none of these

7) The National Disaster Management Authority (NDMA) is at _____.
   a) New Delhi b) Mumbai
   c) Chennai d) Kolkata

8) Currently alMD maintains a seismological network, consisting of a total of _____ observatories, spread over the entire length and breadth of the country.
   a) 84 b) 64
   c) 44 d) 24

9) _____ drought correlates the supply and demand of goods with the all other droughts.
   a) Meteorological drought b) Hydrological drought
   c) Agricultural drought d) Socio-economic drought

10) Richter scale is a _____.
   a) logarithmic scale b) calculus scale
   c) volumetric scale d) area to vibration ratio scale

11) Disaster Management Act was enforceable since _____.
   a) 2001 b) 2003
   c) 2005 d) 2007

12) Responsibility for securing the scene, preserving life and treating the wounded is the responsibility of _____.
   a) first responders
   b) district disaster management department
   c) state government
   d) none of these

13) Who heads the National Crisis Management Committee?
   a) Prime Minister b) President
   c) Cabinet Secretary d) Ministry of Environment

14) Which of the following statements is/are correct about National disaster response force?
   I) The parent agency of National Disaster Management Authority is Ministry of Home Affairs.
   II) The Chairman of the NDMA is Home Minister.
   a) Only I b) Only Il
   c) Both I & Il d) None

SLR-FM-45

Seat No.	

Set S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DISASTER MANAGEMENT

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No.5 from Section-I is Compulsory. Solve any two questions from Remaining questions.
2) Question No. 9 from Section-II is Compulsory. Solve any two questions from Remaining questions.
3) Figures to right indicate full marks.

Section – I

Q.2 **a)** Define: **04**
i) Hazards
ii) Disasters
Also discuss difference between them.

b) What do you mean by environmental hazards and environmental stress? **05**

Q.3 **a)** Define drought? Also discuss types and causes of droughts. **04**

b) Define Landslides? Discuss its causes and damage assessment process in brief. **05**

Q.4 **a)** Discuss the causes and control measures of soil erosion. **04**

b) Write a note on: **05**
i) Deforestation
ii) Population Explosion

Q.5 **a)** What do you mean by Structural and Non-Structural Mitigation? Discuss in brief. **04**

b) Discuss various stages in disaster management cycle with help of pictorial representation. **06**

Section – II

Q.6 **a)** Discuss the role of Indian Meteorological observatories in disaster mitigation activities. **04**

b) Write a note on: Prediction and warning systems of disasters **05**

Q.7 **a)** Discuss the importance of media in disaster management. **04**

b) What is the role of local bodies and NGO's in disaster response activities? **05**

Q.8 Consider a war disaster circumstances in border region of your country, being a Disaster Manager, how will you manage this disaster? Discuss with reference to the Disaster Management Cycle. **09**

Q.9 **a)** What is the role of NIDM disaster management activities? **04**

b) State various international agencies involved in disaster management activities. Also discuss the role of any three international agencies in disaster management process. **06**

SLR-FM-46

Seat No.		Set	P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No.1 is compulsory and it should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume additional data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) To protect geosynthetic from UV exposure _____ is added to it.
   a) Plastic b) Carbon Black
   c) Benzene d) Cement

2) The shape of apertures in geonets is _____.
   a) Square b) Circular
   c) Triangular d) Diamond

3) A planar, polymeric product consisting of a mesh or net-like regular open network of intersecting tensile-resistant elements, integrally connected at the junctions, is called _____.
   a) Geotextile b) Geogrid
   c) Geonet d) Geocell

4) The materials used in the manufacturing of geosynthetics are primarily synthetic polymers generally derived from _____.
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

5) Indian standard for sampling of geosynthetic specimens is _____.
   a) IS 800 b) IS 14706
   c) IS 456 d) IS 2700

6) MFI is acronym for _____.
   a) Mount flow Instrument b) Money fix Installment
   c) Metal flow Index d) Melt flow Index

7) The core of GCL is made of _____.
   a) bentonite clay b) cement
   c) clay d) timber

8) Which of the following tests measures the toughness of road aggregates?
   a) Crushing strength test b) Abrasion test
   c) Impact test d) Shape test

9) The sum of flakiness index and elongation index should not exceed ____.
   a) 15 b) 20
   c) 30 d) 40

10) The width of grips for performing the grab tensile strength is, _____.
   a) 25 mm b) 10 mm
   c) 15 mm d) 35 mm

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume additional data, if required and state it clearly.

Q.2 Attempt any eight questions **40**

a) List the various functions performed by geosynthetics. Explain any one in detail.

b) Explain Geosynthtics application in pavement for separation and reinforcement.

c) Explain the process of construction of landfill using geosynthetics.

d) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier.

e) List the various processes by which,

i) non-woven geosynthetics
ii) geogrids are manufactured

f) What are the mechanical properties of geosynthetics?

g) How are impact and abrasion tests conducted?

h) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds.

i) With a neat sketch explain the procedure for
i) In plane permeability of geosynthetics.
ii) Grab tensile strength of geosynthetics.

j) What are the different construction factors that affect the performance of reinforced soil?

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No.1 is compulsory and it should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume additional data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) MFI is acronym for _____.
   a) Mount flow Instrument b) Money fix Installment
   c) Metal flow Index d) Melt flow Index

2) The core of GCL is made of _____.
   a) bentonite clay b) cement
   c) clay d) timber

3) Which of the following tests measures the toughness of road aggregates?
   a) Crushing strength test b) Abrasion test
   c) Impact test d) Shape test

4) The sum of flakiness index and elongation index should not exceed ____.
   a) 15 b) 20
   c) 30 d) 40

5) The width of grips for performing the grab tensile strength is, _____.
   a) 25 mm b) 10 mm
   c) 15 mm d) 35 mm

6) To protect geosynthetic from UV exposure _____ is added to it.
   a) Plastic b) Carbon Black
   c) Benzene d) Cement

7) The shape of apertures in geonets is _____.
   a) Square b) Circular
   c) Triangular d) Diamond

8) A planar, polymeric product consisting of a mesh or net-like regular open network of intersecting tensile-resistant elements, integrally connected at the junctions, is called _____.
   a) Geotextile b) Geogrid
   c) Geonet d) Geocell

9) The materials used in the manufacturing of geosynthetics are primarily synthetic polymers generally derived from _____.
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

10) Indian standard for sampling of geosynthetic specimens is _____.
   a) IS 800 b) IS 14706
   c) IS 456 d) IS 2700

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume additional data, if required and state it clearly.

Q.2 Attempt any eight questions **40**

a) List the various functions performed by geosynthetics. Explain any one in detail.

b) Explain Geosynthtics application in pavement for separation and reinforcement.

c) Explain the process of construction of landfill using geosynthetics.

d) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier.

e) List the various processes by which,

i) non-woven geosynthetics
ii) geogrids are manufactured

f) What are the mechanical properties of geosynthetics?

g) How are impact and abrasion tests conducted?

h) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds.

i) With a neat sketch explain the procedure for
i) In plane permeability of geosynthetics.
ii) Grab tensile strength of geosynthetics.

j) What are the different construction factors that affect the performance of reinforced soil?

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No.1 is compulsory and it should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume additional data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) The sum of flakiness index and elongation index should not exceed ____.
   a) 15 b) 20
   c) 30 d) 40

2) The width of grips for performing the grab tensile strength is, _____.
   a) 25 mm b) 10 mm
   c) 15 mm d) 35 mm

3) To protect geosynthetic from UV exposure _____ is added to it.
   a) Plastic b) Carbon Black
   c) Benzene d) Cement

4) The shape of apertures in geonets is _____.
   a) Square b) circular
   c) Triangular d) diamond

5) A planar, polymeric product consisting of a mesh or net-like regular open network of intersecting tensile-resistant elements, integrally connected at the junctions, is called _____.
   a) Geotextile b) Geogrid
   c) Geonet d) Geocell

6) The materials used in the manufacturing of geosynthetics are primarily synthetic polymers generally derived from _____.
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

7) Indian standard for sampling of geosynthetic specimens is _____.
   a) IS 800 b) IS 14706
   c) IS 456 d) IS 2700

8) MFI is acronym for _____.
   a) Mount flow Instrument b) Money fix Installment
   c) Metal flow Index d) Melt flow Index

9) The core of GCL is made of _____.
   a) bentonite clay b) cement
   c) clay d) timber

10) Which of the following tests measures the toughness of road aggregates?
   a) Crushing strength test b) Abrasion test
   c) Impact test d) Shape test

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume additional data, if required and state it clearly.

Q.2 Attempt any eight questions **40**

a) List the various functions performed by geosynthetics. Explain any one in detail.

b) Explain Geosynthtics application in pavement for separation and reinforcement.

c) Explain the process of construction of landfill using geosynthetics.

d) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier.

e) List the various processes by which,

i) non-woven geosynthetics
ii) geogrids are manufactured

f) What are the mechanical properties of geosynthetics?

g) How are impact and abrasion tests conducted?

h) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds.

i) With a neat sketch explain the procedure for
i) In plane permeability of geosynthetics.
ii) Grab tensile strength of geosynthetics.

j) What are the different construction factors that affect the performance of reinforced soil?

Seat No.		Set	S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No.1 is compulsory and it should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume additional data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) A planar, polymeric product consisting of a mesh or net-like regular open network of intersecting tensile-resistant elements, integrally connected at the junctions, is called _____.
   a) Geotextile b) Geogrid
   c) Geonet d) Geocell

2) The materials used in the manufacturing of geosynthetics are primarily synthetic polymers generally derived from _____.
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

3) Indian standard for sampling of geosynthetic specimens is _____.
   a) IS 800 b) IS 14706
   c) IS 456 d) IS 2700

4) MFI is acronym for _____.
   a) Mount flow Instrument b) Money fix Installment
   c) Metal flow Index d) Melt flow Index

5) The core of GCL is made of _____.
   a) bentonite clay b) cement
   c) clay d) timber

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   a) Crushing strength test b) Abrasion test
   c) Impact test d) Shape test

7) The sum of flakiness index and elongation index should not exceed ____.
   a) 15 b) 20
   c) 30 d) 40

8) The width of grips for performing the grab tensile strength is, _____.
   a) 25 mm b) 10 mm
   c) 15 mm d) 35 mm

9) To protect geosynthetic from UV exposure _____ is added to it.
   a) Plastic b) Carbon Black
   c) Benzene d) Cement

10) The shape of apertures in geonets is _____.
   a) Square b) circular
   c) Triangular d) diamond

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume additional data, if required and state it clearly.

Q.2 Attempt any eight questions **40**

a) List the various functions performed by geosynthetics. Explain any one in detail.

b) Explain Geosynthtics application in pavement for separation and reinforcement.

c) Explain the process of construction of landfill using geosynthetics.

d) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier.

e) List the various processes by which,

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ii) geogrids are manufactured

f) What are the mechanical properties of geosynthetics?

g) How are impact and abrasion tests conducted?

h) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds.

i) With a neat sketch explain the procedure for
i) In plane permeability of geosynthetics.
ii) Grab tensile strength of geosynthetics.

j) What are the different construction factors that affect the performance of reinforced soil?

SLR-FM-47

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Softening point of bitumen to be used for road construction at a place where maximum temperature is 40° should be _____.
   a) Less than 40° b) Greater than 40°
   c) Equal to 40° d) None of these

2) Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates, _____.
   a) Potholes b) Ravelling
   c) Edge breaking d) Rutting

3) Critical combination of stresses for corner region in cement concrete road is _____.
   a) Load stress + warping stress - frictional stress
   b) Load stress + warping stress + frictional stress
   c) Load stress + warping stress
   d) Load stress + frictional stress

4) In highway construction, rolling starts from _____.
   a) Sides and proceed to centre
   b) Centre and proceed to sides
   c) One side and proceed to other side
   d) Any of the above

5) When the bituminous surfacing is done on already existing black top road, the type of treatment to be given is _____.
   a) Seal coat b) Tack coat
   c) Prime coat d) Fog seal

6) The maximum spacing of contraction joints in rigid pavements is, _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) 5.5m

7) Maximum thickness of expansion joint in rigid pavement is _____.
   a) 10 mm b) 25 mm
   c) 50 mm d) 100 mm

8) Match List-I(Test) with List-II(Purpose) and select the correct answer using the codes: _____.

	List – I		List – II
A)	Impact test	1)	Bitumen
B)	Los Angeles abrasion test	2)	Toughness
C)	Crushing test	3)	Hardness
D)	Stripping test	4)	Strength

Codes:

	A	**B**	**C**	**D**
a)	2	3	4	1
b)	4	1	2	3
c)	4	3	2	1
d)	2	1	4	3

9) Most suitable material for highway embankment is _____.

a) Granular soil b) Organic clay
c) Silty soil d) Clayey soil

10) The most suitable equipment for compacting clayey soil is: _____.

a) Smooth wheeled roller b) Pneumatic tyred roller
c) Sheep foot roller d) Vibratory roller

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

Q.2 Answer any five questions. **40**

a) Discuss the importance of gross wheel load and contact pressure in stress distribution pattern and in pavement design. Illustrate with stress distribution diagram.

b) Explain the importance of:
i) Softening Point Test
ii) Ductility Test of Bitumen

c) Explain various types of joints provided in cement concrete pavement with neat sketches.

d) The number of commercial vehicles per day at present count is 6000. Design life is 15 years. Traffic growth rate is 8%, VDF is 4.5, lateral distribution factor for 6 lane divided highway is 0.6. Calculate the number of standard axles in the design life if the construction period is 2 years.

e) Mention the specifications of materials and construction steps for Wet Mix Macadam.

f) List the different distresses in flexible pavement. Explain any two distresses with suitable remedial measure.

g) Explain the causes of for mud pumping in CC pavements. Explain how this leads to failure of CC pavement slabs.

h) The plate bearing tests were conducted with 30cm plate diameter on soil subgrade and over a base course of thickness 45cm. The pressures yielded at 0.5cm deflection on the subgrade and base course were 1.25kg/cm^2 and 8.0kg/cm^2 respectively. Design the pavement section for 5100kg wheel load with tyre pressure of 7kg/cm^2 for an allowable deflection of 0.5cm using Burmister's two - layer deflection factor chart **(Use Figure-1).**

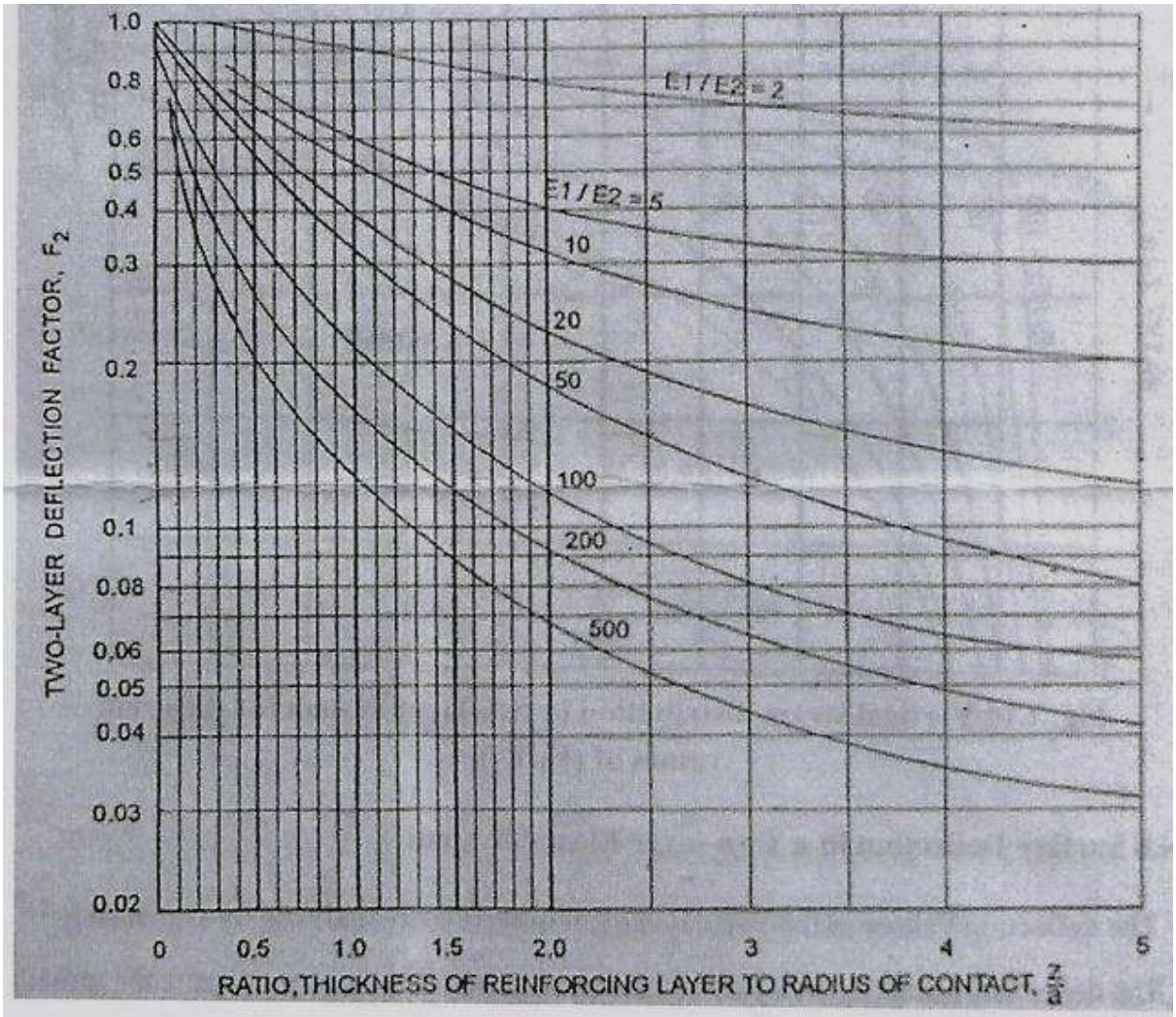

Figure-1-Burmister's two layer deflection factors

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) The maximum spacing of contraction joints in rigid pavements is, _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) 5.5m

2) Maximum thickness of expansion joint in rigid pavement is _____.
   a) 10 mm b) 25 mm
   c) 50 mm d) 100 mm

3) Match List-I(Test) with List-II(Purpose) and select the correct answer using the codes: _____.

	List – I		List – II
A)	Impact test	1)	Bitumen
B)	Los Angeles abrasion test	2)	Toughness
C)	Crushing test	3)	Hardness
D)	Stripping test	4)	Strength

Codes:

	A	**B**	**C**	**D**
a)	2	3	4	1
b)	4	1	2	3
c)	4	3	2	1
d)	2	1	4	3

4) Most suitable material for highway embankment is _____.
   a) Granular soil b) Organic clay
   c) Silty soil d) Clayey soil

5) The most suitable equipment for compacting clayey soil is: _____.
   a) Smooth wheeled roller b) Pneumatic tyred roller
   c) Sheep foot roller d) Vibratory roller

6) Softening point of bitumen to be used for road construction at a place where maximum temperature is 40° should be _____.
   a) Less than 40° b) Greater than 40°
   c) Equal to 40° d) None of these

7) Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates, _____.
   a) Potholes
   b) Ravelling
   c) Edge breaking
   d) Rutting

8) Critical combination of stresses for corner region in cement concrete road is _____.
   a) Load stress + warping stress - frictional stress
   b) Load stress + warping stress + frictional stress
   c) Load stress + warping stress
   d) Load stress + frictional stress

9) In highway construction, rolling starts from _____.
   a) Sides and proceed to centre
   b) Centre and proceed to sides
   c) One side and proceed to other side
   d) Any of the above

10) When the bituminous surfacing is done on already existing black top road, the type of treatment to be given is _____.
   a) Seal coat
   b) Tack coat
   c) Prime coat
   d) Fog seal

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

Q.2 Answer any five questions. **40**

a) Discuss the importance of gross wheel load and contact pressure in stress distribution pattern and in pavement design. Illustrate with stress distribution diagram.

b) Explain the importance of:
i) Softening Point Test
ii) Ductility Test of Bitumen

c) Explain various types of joints provided in cement concrete pavement with neat sketches.

d) The number of commercial vehicles per day at present count is 6000. Design life is 15 years. Traffic growth rate is 8%, VDF is 4.5, lateral distribution factor for 6 lane divided highway is 0.6. Calculate the number of standard axles in the design life if the construction period is 2 years.

e) Mention the specifications of materials and construction steps for Wet Mix Macadam.

f) List the different distresses in flexible pavement. Explain any two distresses with suitable remedial measure.

g) Explain the causes of for mud pumping in CC pavements. Explain how this leads to failure of CC pavement slabs.

h) The plate bearing tests were conducted with 30cm plate diameter on soil subgrade and over a base course of thickness 45cm. The pressures yielded at 0.5cm deflection on the subgrade and base course were 1.25kg/cm^2 and 8.0kg/cm^2 respectively. Design the pavement section for 5100kg wheel load with tyre pressure of 7kg/cm^2 for an allowable deflection of 0.5cm using Burmister's two - layer deflection factor chart **(Use Figure-1).**

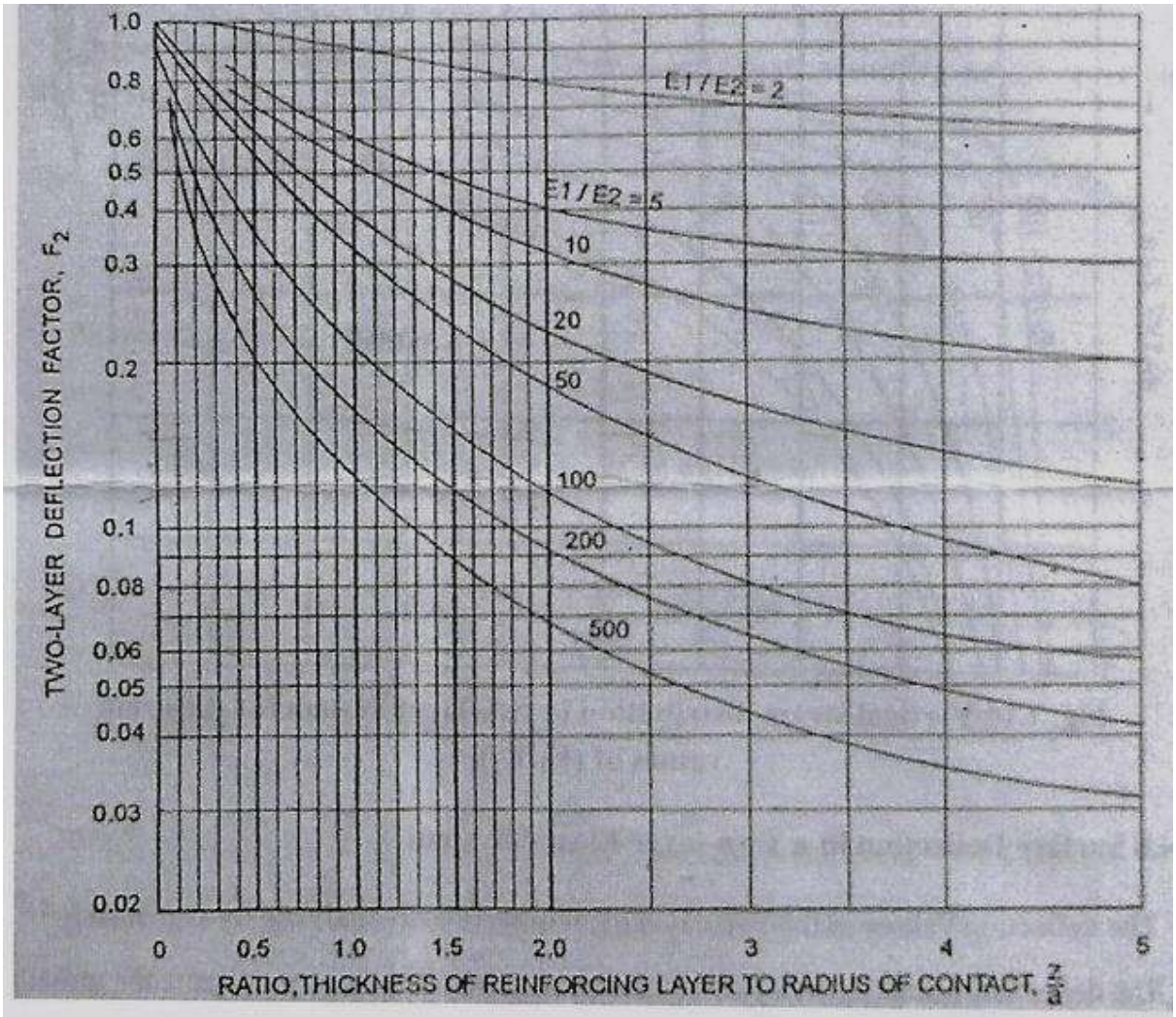

Figure-1-Burmister's two layer deflection factors

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Most suitable material for highway embankment is _____.
   a) Granular soil b) Organic clay
   c) Silty soil d) Clayey soil

2) The most suitable equipment for compacting clayey soil is: _____.
   a) Smooth wheeled roller b) Pneumatic tyred roller
   c) Sheep foot roller d) Vibratory roller

3) Softening point of bitumen to be used for road construction at a place where maximum temperature is 40° should be _____.
   a) Less than 40° b) Greater than 40°
   c) Equal to 40° d) None of these

4) Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates, _____.
   a) Potholes b) Ravelling
   c) Edge breaking d) Rutting

5) Critical combination of stresses for corner region in cement concrete road is _____.
   a) Load stress + warping stress - frictional stress
   b) Load stress + warping stress + frictional stress
   c) Load stress + warping stress
   d) Load stress + frictional stress

6) In highway construction, rolling starts from _____.
   a) Sides and proceed to centre
   b) Centre and proceed to sides
   c) One side and proceed to other side
   d) Any of the above

7) When the bituminous surfacing is done on already existing black top road, the type of treatment to be given is _____.
   a) Seal coat b) Tack coat
   c) Prime coat d) Fog seal

8) The maximum spacing of contraction joints in rigid pavements is, _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) 5.5m

9) Maximum thickness of expansion joint in rigid pavement is _____.
   a) 10 mm b) 25 mm
   c) 50 mm d) 100 mm

10) Match List-I(Test) with List-II(Purpose) and select the correct answer using the codes: _____.

	List – I		List – II
A)	Impact test	1)	Bitumen
B)	Los Angeles abrasion test	2)	Toughness
C)	Crushing test	3)	Hardness
D)	Stripping test	4)	Strength

Codes:

	A	**B**	**C**	**D**
a)	2	3	4	1
b)	4	1	2	3
c)	4	3	2	1
d)	2	1	4	3

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

Q.2 Answer any five questions. **40**

a) Discuss the importance of gross wheel load and contact pressure in stress distribution pattern and in pavement design. Illustrate with stress distribution diagram.

b) Explain the importance of:
i) Softening Point Test
ii) Ductility Test of Bitumen

c) Explain various types of joints provided in cement concrete pavement with neat sketches.

d) The number of commercial vehicles per day at present count is 6000. Design life is 15 years. Traffic growth rate is 8%, VDF is 4.5, lateral distribution factor for 6 lane divided highway is 0.6. Calculate the number of standard axles in the design life if the construction period is 2 years.

e) Mention the specifications of materials and construction steps for Wet Mix Macadam.

f) List the different distresses in flexible pavement. Explain any two distresses with suitable remedial measure.

g) Explain the causes of for mud pumping in CC pavements. Explain how this leads to failure of CC pavement slabs.

h) The plate bearing tests were conducted with 30cm plate diameter on soil subgrade and over a base course of thickness 45cm. The pressures yielded at 0.5cm deflection on the subgrade and base course were 1.25kg/cm^2 and 8.0kg/cm^2 respectively. Design the pavement section for 5100kg wheel load with tyre pressure of 7kg/cm^2 for an allowable deflection of 0.5cm using Burmister's two - layer deflection factor chart **(Use Figure-1).**

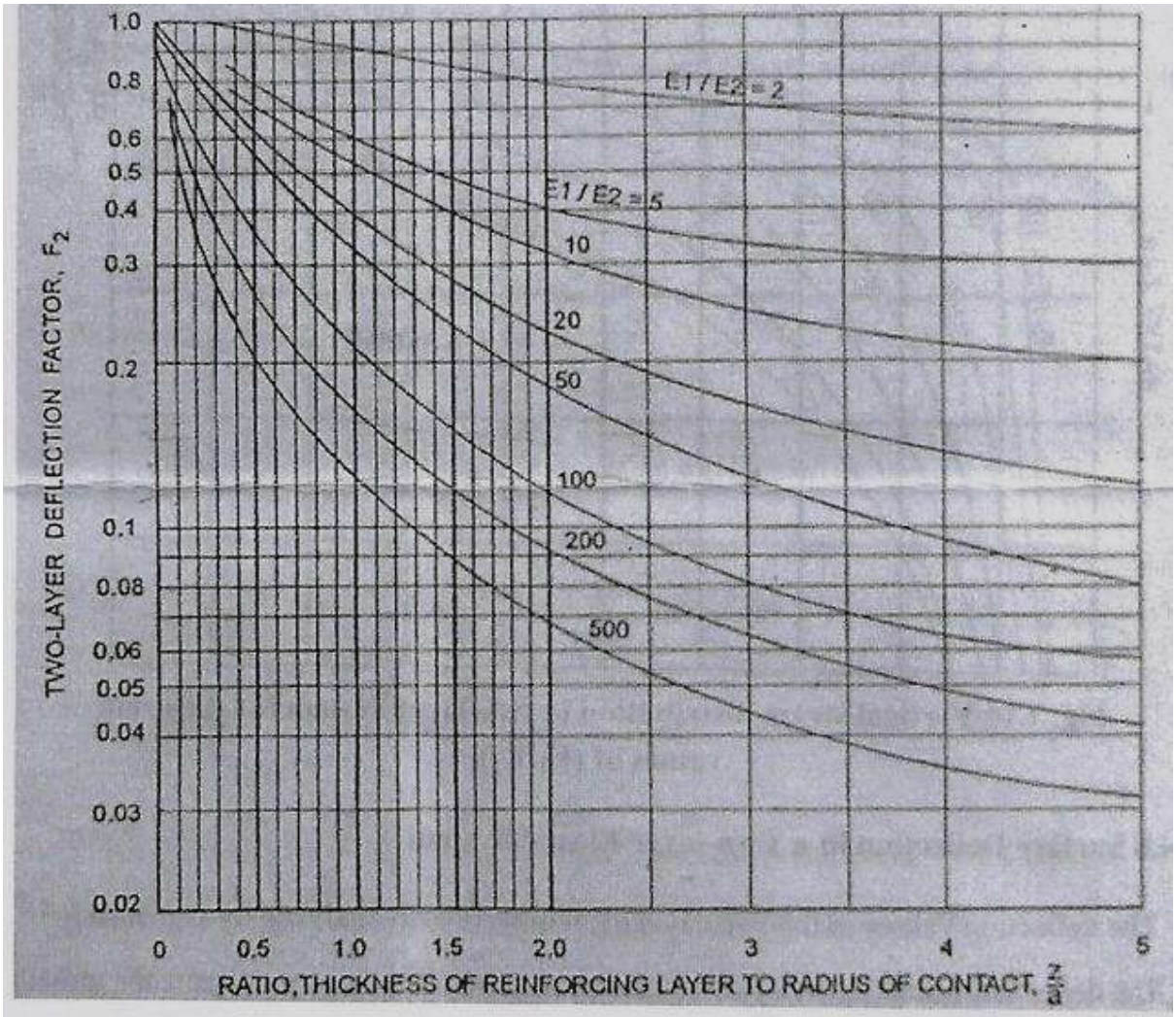

Figure-1-Burmister's two layer deflection factors

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Critical combination of stresses for corner region in cement concrete road is _____.
   a) Load stress + warping stress - frictional stress
   b) Load stress + warping stress + frictional stress
   c) Load stress + warping stress
   d) Load stress + frictional stress

2) In highway construction, rolling starts from _____.
   a) Sides and proceed to centre
   b) Centre and proceed to sides
   c) One side and proceed to other side
   d) Any of the above

3) When the bituminous surfacing is done on already existing black top road, the type of treatment to be given is _____.
   a) Seal coat b) Tack coat
   c) Prime coat d) Fog seal

4) The maximum spacing of contraction joints in rigid pavements is, _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) 5.5m

5) Maximum thickness of expansion joint in rigid pavement is _____.
   a) 10 mm b) 25 mm
   c) 50 mm d) 100 mm

6) Match List-I(Test) with List-II(Purpose) and select the correct answer using the codes: _____.

	List – I		List – II
A)	Impact test	1)	Bitumen
B)	Los Angeles abrasion test	2)	Toughness
C)	Crushing test	3)	Hardness
D)	Stripping test	4)	Strength

Codes:

	A	**B**	**C**	**D**
a)	2	3	4	1
b)	4	1	2	3
c)	4	3	2	1
d)	2	1	4	3

7) Most suitable material for highway embankment is _____.

a) Granular soil b) Organic clay
c) Silty soil d) Clayey soil

8) The most suitable equipment for compacting clayey soil is: _____.

a) Smooth wheeled roller b) Pneumatic tyred roller
c) Sheep foot roller d) Vibratory roller

9) Softening point of bitumen to be used for road construction at a place where maximum temperature is 40° should be _____.

a) Less than 40° b) Greater than 40°
c) Equal to 40° d) None of these

10) Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates, _____.

a) Potholes b) Ravelling
c) Edge breaking d) Rutting

SLR-FM-47

Seat No.	

Set S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

Q.2 Answer any five questions. **40**

a) Discuss the importance of gross wheel load and contact pressure in stress distribution pattern and in pavement design. Illustrate with stress distribution diagram.

b) Explain the importance of:
i) Softening Point Test
ii) Ductility Test of Bitumen

c) Explain various types of joints provided in cement concrete pavement with neat sketches.

d) The number of commercial vehicles per day at present count is 6000. Design life is 15 years. Traffic growth rate is 8%, VDF is 4.5, lateral distribution factor for 6 lane divided highway is 0.6. Calculate the number of standard axles in the design life if the construction period is 2 years.

e) Mention the specifications of materials and construction steps for Wet Mix Macadam.

f) List the different distresses in flexible pavement. Explain any two distresses with suitable remedial measure.

g) Explain the causes of for mud pumping in CC pavements. Explain how this leads to failure of CC pavement slabs.

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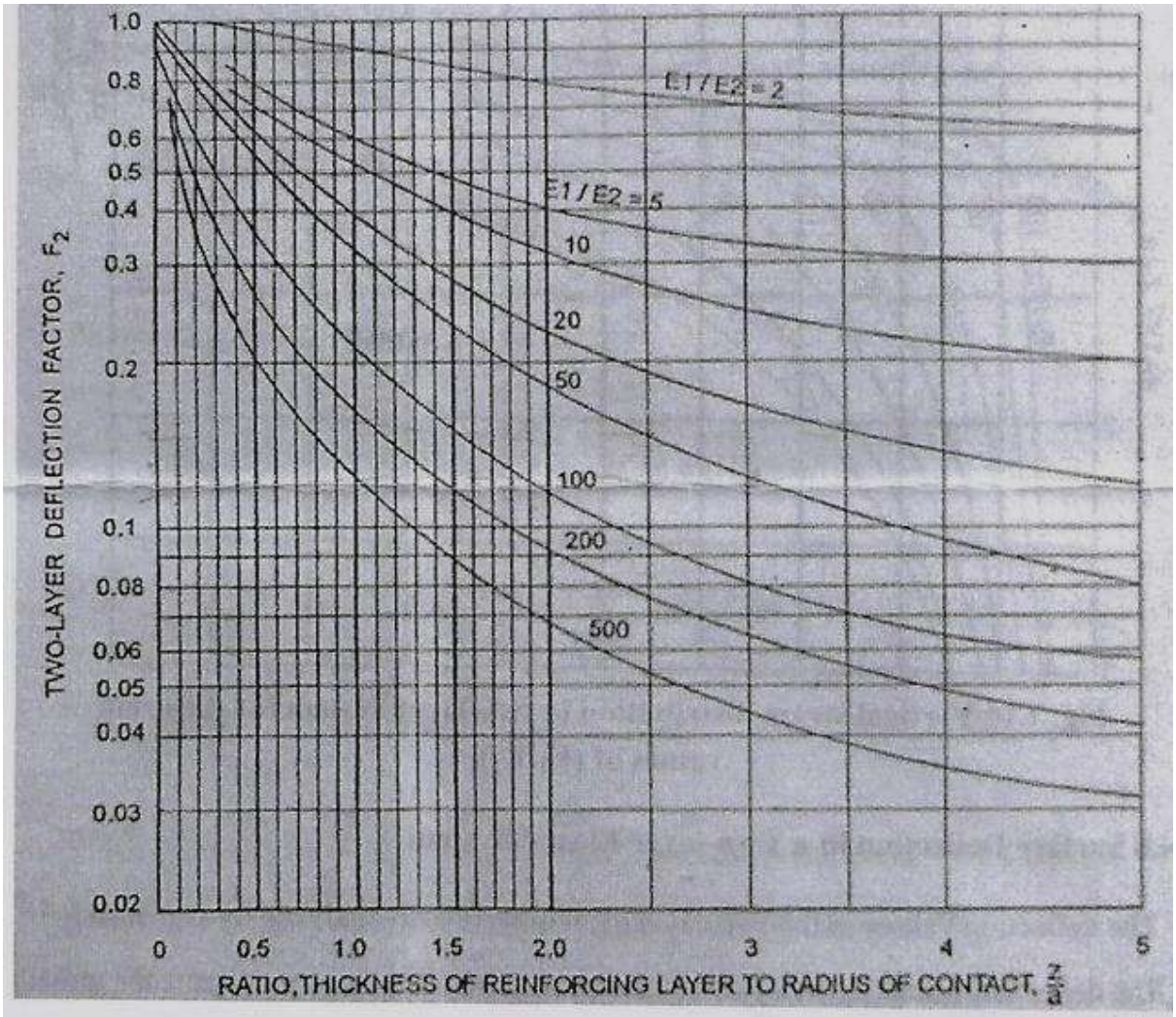

Figure-1-Burmister's two layer deflection factors

SLR-FM-48

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
PLANNING FOR SUSTAINABLE DEVELOPMENT

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume any suitable data if needed.

Attempt any five of the following question. (10 marks each) **50**

Q.1 Explain main principles of sustainable development.

Q.2 Write a short note on Innovation strategies & Environmental Management.

Q.3 What is institutional theory in sustainable development?

Q.4 Write a note on policy responses to environmental degradation.

Q.5 As a Civil Engineer discuss measures to be taken for sustainable development in civil engineering projects.

Q.6 Explain 'Squaring the circle' concept in sustainable management.

Q.7 How innovation contributes in sustainable development? Explain.

SLR-FM-49

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) KAIZEN Means _____.
   a) Quality improvement Technique
   b) Change to become good
   c) Achieving Quality
   d) None

2) The underlying cause(s) of TQM deficiencies is (are): _____.
   a) The failure of managers to understand the concept of quality
   b) Costly implementation of quality management system
   c) Lack of employee involvement
   d) All of the given option

3) Total quality costs include: _____.
   a) Prevention costs b) Appraisal costs
   c) Failure costs d) All of the given options

4) MIS structure is based on _____.
   a) Management Activity b) Population
   c) Both a) and b) d) None

5) ISO 9000 seek's standardization in terms of _____.
   a) products b) production procedures
   c) suppliers specifications d) procedures to manage quality

6) An _____ is a set of processes and procedures that transform data into information and knowledge.
   a) information system b) Knowledge system
   c) Database system d) Computer system

7) The objective of ISO-9000 family of Quality management is _____.
   a) Customer satisfaction b) Employee satisfaction
   c) Skill enhancement d) Environmental issues

8) TQM & ISO both focuses on _____.
   a) Customer b) Employee
   c) Supplier d) All of the above

9) The person who ensures that systems are developed on time, within budget, and with acceptable quality is a _____.
   a) systems designer
   b) project manager
   c) systems owner
   d) systems builder

10) Internal information for MIS may come from any one of the following department _____.
   a) Customers care department
   b) HR department
   c) Marketing department
   d) Production department

SLR-FM-49

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any four questions from Q. No.2.
2) Figures to right indicate full marks.

Q.2 Attempt any Four. **40**

a) What are the factors affecting the poor quality and Construction?

b) Differentiate between Quality Control and Quality Assurance.

c) Give Measures to overcome the causes responsible for poor quality of construction.

d) Discuss the advantages of implementing TQM in the Indian construction sector.

e) Define data and information. What are the major differences between them? Explain with the help of suitable Example.

f) What data information is required for planning of new road corridor between two megacities?

g) Write a detailed note on application of mobile technology in construction Industry.

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) An _____ is a set of processes and procedures that transform data into information and knowledge.
   a) information system b) Knowledge system
   c) Database system d) Computer system

2) The objective of ISO-9000 family of Quality management is _____.
   a) Customer satisfaction b) Employee satisfaction
   c) Skill enhancement d) Environmental issues

3) TQM & ISO both focuses on _____.
   a) Customer b) Employee
   c) Supplier d) All of the above

4) The person who ensures that systems are developed on time, within budget, and with acceptable quality is a _____.
   a) systems designer b) project manager
   c) systems owner d) systems builder

5) Internal information for MIS may come from any one of the following department _____.
   a) Customers care department b) HR department
   c) Marketing department d) Production department

6) KAIZEN Means _____.
   a) Quality improvement Technique
   b) Change to become good
   c) Achieving Quality
   d) None

7) The underlying cause(s) of TQM deficiencies is (are): _____.
   a) The failure of managers to understand the concept of quality
   b) Costly implementation of quality management system
   c) Lack of employee involvement
   d) All of the given option

8) Total quality costs include: _____.
   a) Prevention costs b) Appraisal costs
   c) Failure costs d) All of the given options

9) MIS structure is based on _____.
   a) Management Activity b) Population
   c) Both a) and b) d) None

10) ISO 9000 seek's standardization in terms of _____.
   a) products b) production procedures
   c) suppliers specifications d) procedures to manage quality

SLR-FM-49

Seat No.	

Set Q

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any four questions from Q. No.2.
2) Figures to right indicate full marks.

Q.2 Attempt any Four. **40**

a) What are the factors affecting the poor quality and Construction?

b) Differentiate between Quality Control and Quality Assurance.

c) Give Measures to overcome the causes responsible for poor quality of construction.

d) Discuss the advantages of implementing TQM in the Indian construction sector.

e) Define data and information. What are the major differences between them? Explain with the help of suitable Example.

f) What data information is required for planning of new road corridor between two megacities?

g) Write a detailed note on application of mobile technology in construction Industry.

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) The person who ensures that systems are developed on time, within budget, and with acceptable quality is a _____.
   a) systems designer b) project manager
   c) systems owner d) systems builder

2) Internal information for MIS may come from any one of the following department _____.
   a) Customers care department b) HR department
   c) Marketing department d) Production department

3) KAIZEN Means _____.
   a) Quality improvement Technique
   b) Change to become good
   c) Achieving Quality
   d) None

4) The underlying cause(s) of TQM deficiencies is (are): _____.
   a) The failure of managers to understand the concept of quality
   b) Costly implementation of quality management system
   c) Lack of employee involvement
   d) All of the given option

5) Total quality costs include: _____.
   a) Prevention costs b) Appraisal costs
   c) Failure costs d) All of the given options

6) MIS structure is based on _____.
   a) Management Activity b) Population
   c) Both a) and b) d) None

7) ISO 9000 seek's standardization in terms of _____.
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   c) suppliers specifications d) procedures to manage quality

8) An _____ is a set of processes and procedures that transform data into information and knowledge.
   a) information system b) Knowledge system
   c) Database system d) Computer system

9) The objective of ISO-9000 family of Quality management is _____.
   a) Customer satisfaction b) Employee satisfaction
   c) Skill enhancement d) Environmental issues

10) TQM & ISO both focuses on _____.
   a) Customer b) Employee
   c) Supplier d) All of the above

SLR-FM-49

Seat No.	

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any four questions from Q. No.2.
2) Figures to right indicate full marks.

Q.2 Attempt any Four. **40**

a) What are the factors affecting the poor quality and Construction?

b) Differentiate between Quality Control and Quality Assurance.

c) Give Measures to overcome the causes responsible for poor quality of construction.

d) Discuss the advantages of implementing TQM in the Indian construction sector.

e) Define data and information. What are the major differences between them? Explain with the help of suitable Example.

f) What data information is required for planning of new road corridor between two megacities?

g) Write a detailed note on application of mobile technology in construction Industry.

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Total quality costs include: _____.
   a) Prevention costs b) Appraisal costs
   c) Failure costs d) All of the given options

2) MIS structure is based on _____.
   a) Management Activity b) Population
   c) Both a) and b) d) None

3) ISO 9000 seek's standardization in terms of _____.
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6) TQM & ISO both focuses on _____.
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   c) Supplier d) All of the above

7) The person who ensures that systems are developed on time, within budget, and with acceptable quality is a _____.
   a) systems designer b) project manager
   c) systems owner d) systems builder

8) Internal information for MIS may come from any one of the following department _____.
   a) Customers care department b) HR department
   c) Marketing department d) Production department

9) KAIZEN Means _____.
   a) Quality improvement Technique
   b) Change to become good
   c) Achieving Quality
   d) None

10) The underlying cause(s) of TQM deficiencies is (are): _____.
   a) The failure of managers to understand the concept of quality
   b) Costly implementation of quality management system
   c) Lack of employee involvement
   d) All of the given option

SLR-FM-49

Seat No.	

Set S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any four questions from Q. No.2.
2) Figures to right indicate full marks.

Q.2 Attempt any Four. **40**

a) What are the factors affecting the poor quality and Construction?

b) Differentiate between Quality Control and Quality Assurance.

c) Give Measures to overcome the causes responsible for poor quality of construction.

d) Discuss the advantages of implementing TQM in the Indian construction sector.

e) Define data and information. What are the major differences between them? Explain with the help of suitable Example.

f) What data information is required for planning of new road corridor between two megacities?

g) Write a detailed note on application of mobile technology in construction Industry.

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No. 1 MCQ is compulsory.
2) Figures to the right indicate full marks.
3) In section I, Q no. 2 is compulsory. Solve any two questions from remaining.
4) In section II, solve any three questions.
5) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Which one of the following doesn't fall under category of force method? 01
   a) Consistent deformation method
   b) Flexibility method
   c) Stiffness method
   d) Energy method

2) Compatibility conditions are essentially required to solve, _____. 01
   a) Substitute frame b) Complex frame
   c) Redundant frame d) Compound truss

3) Degree of static indeterminancy of frame shown in fig (3.0). 01

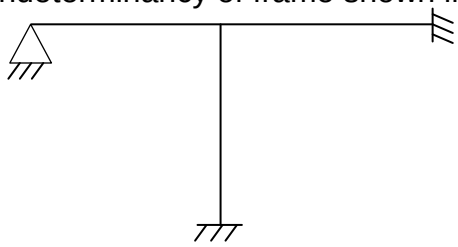


Fig. (3.0)

   a) 1 b) 5
   c) 4 d) 6

4) Degree of kinematic indeterminacy of beam shown in fig (4.0). 01

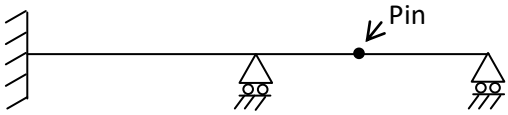


Fig. (4.0)

   a) 1 b) 3
   c) 2 d) 5

5) Strain energy due to bending is given by _____. 01

a) $\int \frac{M^2}{2EI} dx$ b) $\int \frac{M^2}{4EI} dx$

c) $\int \frac{M^2}{EI} dx$ d) $\int \frac{2M^2}{EI} dx$

6) The carry over factor for prismatic beam with far end fixed is _____. 01

a) 1 b) 0.5

c) -1 d) -0.5

7) Propped cantilever of span L carries UDL of w kN/m throughout, value of propped reaction is _____. 01

a) wL/4 b) 3wL/8

c) wL/3 d) 5wL/8

8) The size of stiffness matrix equals to _____. 01

a) DSI b) DKI

c) DSI+DKI d) DSI-DKI

9) Moment required to produce unit rotation is called _____. 01

a) Translational stiffness b) Axial stiffness

c) Rotational stiffness d) All of the above

10) Shape of ILD for fixed beam is _____. 01

a) Lineaer b) Parabolic

c) All of these d) None of these

11) The size of stiffness matrix for proped cantilever is _____. 01

a) 1 X 1 b) 2 X 2

c) 3 X 3 d) 4 X 4

12) The fixed end moment for fixed beam having udl thought span is _____. 01

a) $wl^2/24$ b) $wl^2/12$

c) $wl^2/16$ d) $wl^2/8$

13) Size of stiffness matrix for frame as shown in fig. is _____. 02

a) 3 X 3 b) 4 X 4

c) 2 X 2 d) 1 X 1

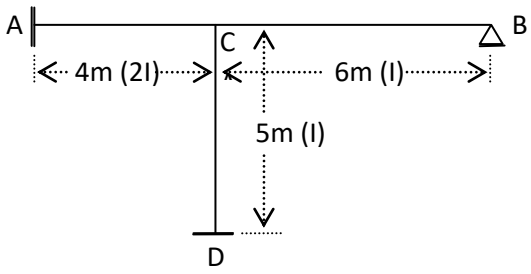


Fig.No.

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

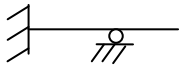
Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 2) Figures to the right indicate full marks.
3) In section I, Q no. 2 is compulsory. And solve any two questions from remaining.
4) In section II, Q. no. 9 is compulsory. And solve any two questions from remaining.
5) Assume additional data if required and mention it clearly.

Section – I

Q.2 Solve any four. **10**

a) Enlist properties of flexibility method.
b) Determine degree of kinematic indeterminacy of following structure.



c) Enlist various methods of force methods of analysis.
d) Differentiate between static and kinematic degree of indeterminancy.
e) Explain Castigliano's theorem.

Q.3 Analyze the beam using Consistent deformation method. Refer fig 3.1. **09**

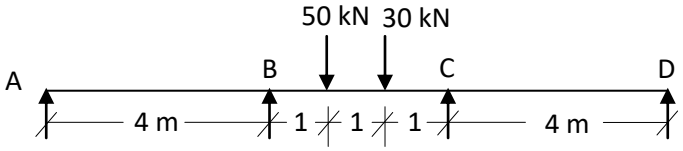


Fig (3.1)

Q.4 Draw SFD and BMD using Strain Energy method. Refer for 4.1. **09**

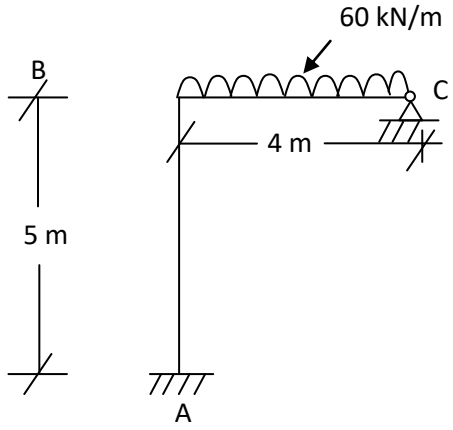


Fig (4.1)

Q.5 Analyze the beam using flexibility method. **09**

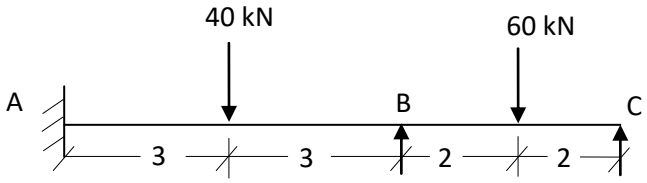


Fig (5.1)

Section – II

Q.6 A continuous beam ABC has its span AB=6 and BC=8m. Beam is fixed at end A and has simple supports at B and C. Span AB has a centrally applied load of 40KN and the span BC has uniformly distributed load of intensity 25 kN/m. If support C settles by an amount 2.5mm in relation to the supports A and B, analyze by moment distribution method. EI is constant throughout the beam and is equal to 30,000 KN-m^2. **09**

Q.7 Derive stiffness matrix for a beam as shown in fig no. 7.1 **09**

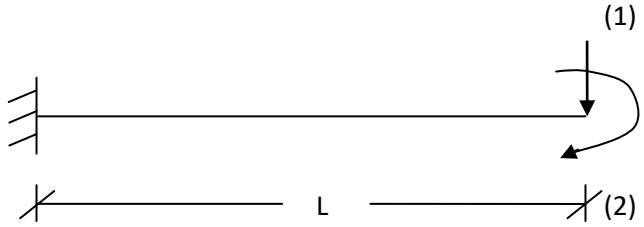


Fig (7.1)

Q.8 Draw ILD bending moment at D and reaction at A. as shown in fig no 8.1. Plot ordinate at 1m interval. D is a midpoint of span AB. **09**

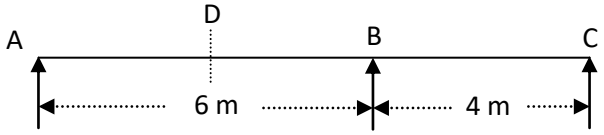


Fig (8.1)

Q.9 Draw bending moment diagram for structural frame as shown in fig. no. 9.1. Use stiffness approach for analysis. **10**

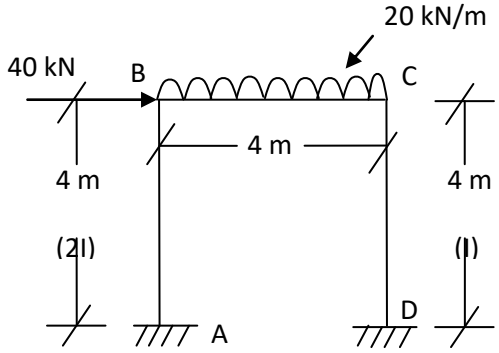


Fig (9.1)

SLR-FM-52

Seat No.	

Set Q

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No. 1 MCQ is compulsory.
2) Figures to the right indicate full marks.
3) In section I, Q no. 2 is compulsory. Solve any two questions from remaining.
4) In section II, solve any three questions.
5) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The size of stiffness matrix equals to _____. 01
   a) DSI b) DKI
   c) DSI+DKI d) DSI-DKI

2) Moment required to produce unit rotation is called _____. 01
   a) Translational stiffness b) Axial stiffness
   c) Rotational stiffness d) All of the above

3) Shape of ILD for fixed beam is _____. 01
   a) Lineaer b) Parabolic
   c) All of these d) None of these

4) The size of stiffness matrix for proped cantilever is _____. 01
   a) 1 X 1 b) 2 X 2
   c) 3 X 3 d) 4 X 4

5) The fixed end moment for fixed beam having udl thought span is _____. 01
   a) $wl^2/24$ b) $wl^2/12$
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6) Which one of the following doesn't fall under category of force method? 01
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   b) Flexibility method
   c) Stiffness method
   d) Energy method

7) Compatibility conditions are essentially required to solve, _____. 01
   a) Substitute frame b) Complex frame
   c) Redundant frame d) Compound truss

8) Degree of static indeterminancy of frame shown in fig (3.0). 01

Fig. (3.0)

a) 1 b) 5
c) 4 d) 6

9) Degree of kinematic indeterminacy of beam shown in fig (4.0). 01

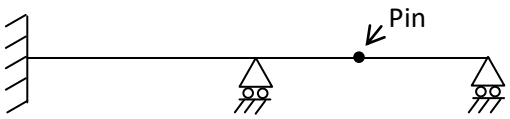

Fig. (4.0)

a) 1 b) 3
c) 2 d) 5

10) Strain energy due to bending is given by _____. 01

a) $\int \frac{M^2}{2EI} dx$ b) $\int \frac{M^2}{4EI} dx$

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12) Propped cantilever of span L carries UDL of w kN/m throughout, value of propped reaction is _____. 01

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c) wL/3 d) 5wL/8

13) Size of stiffness matrix for frame as shown in fig. is _____. 02

a) 3 X 3 b) 4 X 4
c) 2 X 2 d) 1 X 1

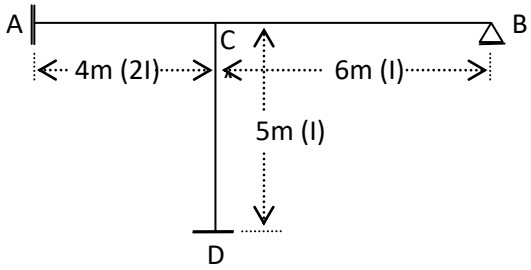


Fig.No.

SLR-FM-52

Seat No.	

Set Q

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

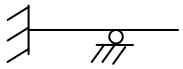
Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 2) Figures to the right indicate full marks.
3) In section I, Q no. 2 is compulsory. And solve any two questions from remaining.
4) In section II, Q. no. 9 is compulsory. And solve any two questions from remaining.
5) Assume additional data if required and mention it clearly.

Section – I

Q.2 Solve any four. **10**

a) Enlist properties of flexibility method.
b) Determine degree of kinematic indeterminacy of following structure.



c) Enlist various methods of force methods of analysis.
d) Differentiate between static and kinematic degree of indeterminancy.
e) Explain Castigliano's theorem.

Q.3 Analyze the beam using Consistent deformation method. Refer fig 3.1. **09**

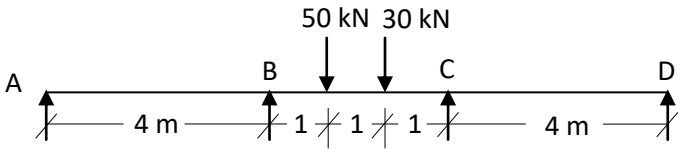


Fig (3.1)

Q.4 Draw SFD and BMD using Strain Energy method. Refer for 4.1. **09**

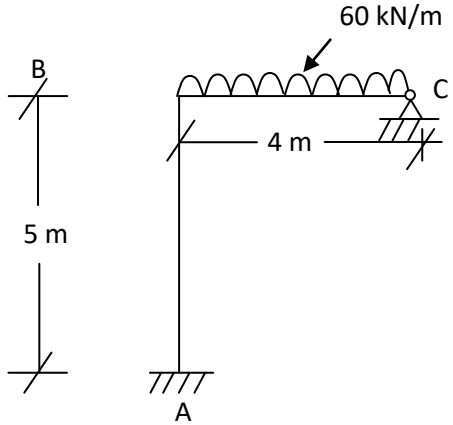


Fig (4.1)

Q.5 Analyze the beam using flexibility method. **09**

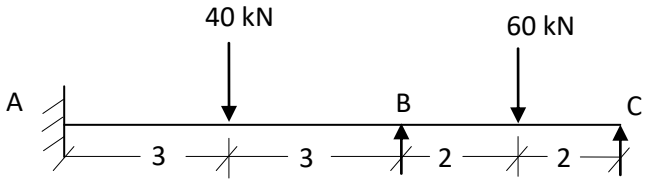


Fig (5.1)

Section – II

Q.6 A continuous beam ABC has its span AB=6 and BC=8m. Beam is fixed at end A and has simple supports at B and C. Span AB has a centrally applied load of 40KN and the span BC has uniformly distributed load of intensity 25 kN/m. If support C settles by an amount 2.5mm in relation to the supports A and B, analyze by moment distribution method. EI is constant throughout the beam and is equal to 30,000 KN-m^2. **09**

Q.7 Derive stiffness matrix for a beam as shown in fig no. 7.1 **09**

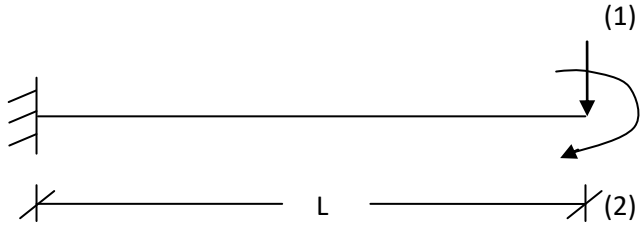


Fig (7.1)

Q.8 Draw ILD bending moment at D and reaction at A. as shown in fig no 8.1. Plot ordinate at 1m interval. D is a midpoint of span AB. **09**

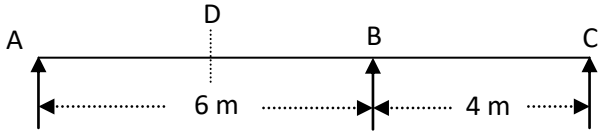


Fig (8.1)

Q.9 Draw bending moment diagram for structural frame as shown in fig. no. 9.1. Use stiffness approach for analysis. **10**

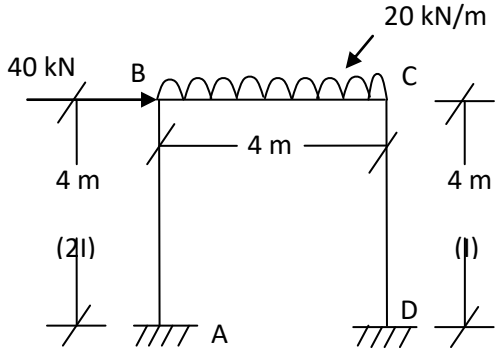


Fig (9.1)

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No. 1 MCQ is compulsory.
2) Figures to the right indicate full marks.
3) In section I, Q no. 2 is compulsory. Solve any two questions from remaining.
4) In section II, solve any three questions.
5) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The size of stiffness matrix for proped cantilever is _____. 01
   a) 1 X 1 b) 2 X 2
   c) 3 X 3 d) 4 X 4

2) The fixed end moment for fixed beam having udl thought span is _____. 01
   a) $wl^2/24$ b) $wl^2/12$
   c) $wl^2/16$ d) $wl^2/8$

3) Which one of the following doesn't fall under category of force method? 01
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   c) Stiffness method
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4) Compatibility conditions are essentially required to solve, _____. 01
   a) Substitute frame b) Complex frame
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5) Degree of static indeterminancy of frame shown in fig (3.0). 01

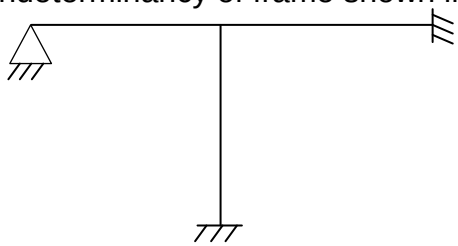

Fig. (3.0)

   a) 1 b) 5
   c) 4 d) 6

6) Degree of kinematic indeterminacy of beam shown in fig (4.0). 01

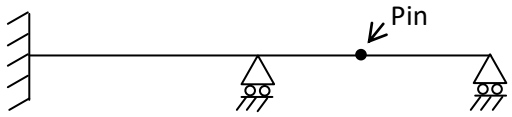

Fig. (4.0)

a) 1 b) 3
c) 2 d) 5

SLR-FM-52

Set R

7) Strain energy due to bending is given by _____. 01
a) $\int \frac{M^2}{2EI} dx$ b) $\int \frac{M^2}{4EI} dx$
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12) Shape of ILD for fixed beam is _____. 01
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c) All of these d) None of these

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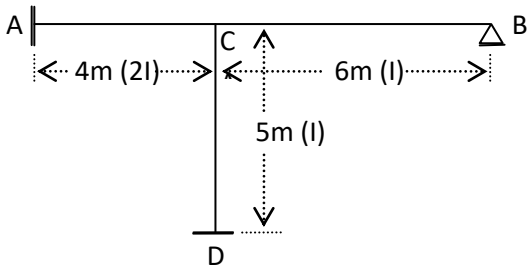

Fig.No.

SLR-FM-52

Seat No.	

Set R

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 2) Figures to the right indicate full marks.
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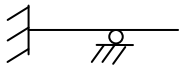
4) In section II, Q. no. 9 is compulsory. And solve any two questions from remaining.
5) Assume additional data if required and mention it clearly.

Section – I

Q.2 Solve any four. **10**

a) Enlist properties of flexibility method.
b) Determine degree of kinematic indeterminacy of following structure.



c) Enlist various methods of force methods of analysis.
d) Differentiate between static and kinematic degree of indeterminancy.
e) Explain Castigliano's theorem.

Q.3 Analyze the beam using Consistent deformation method. Refer fig 3.1. **09**

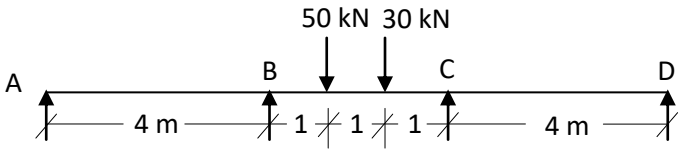


Fig (3.1)

Q.4 Draw SFD and BMD using Strain Energy method. Refer for 4.1. **09**

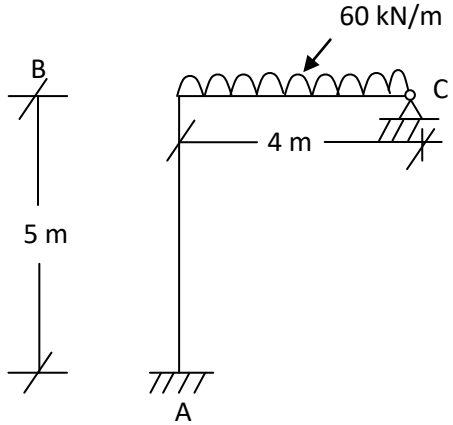


Fig (4.1)

Q.5 Analyze the beam using flexibility method. **09**

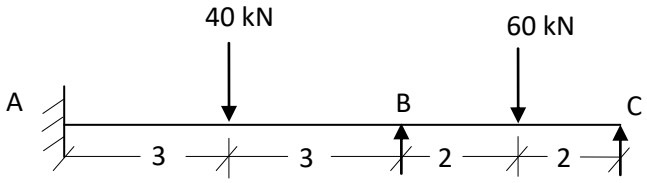


Fig (5.1)

Section – II

Q.6 A continuous beam ABC has its span AB=6 and BC=8m. Beam is fixed at end A and has simple supports at B and C. Span AB has a centrally applied load of 40KN and the span BC has uniformly distributed load of intensity 25 kN/m. If support C settles by an amount 2.5mm in relation to the supports A and B, analyze by moment distribution method. EI is constant throughout the beam and is equal to 30,000 KN-m^2. **09**

Q.7 Derive stiffness matrix for a beam as shown in fig no. 7.1 **09**

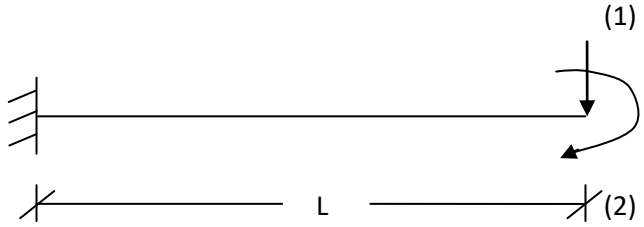


Fig (7.1)

Q.8 Draw ILD bending moment at D and reaction at A. as shown in fig no 8.1. Plot ordinate at 1m interval. D is a midpoint of span AB. **09**

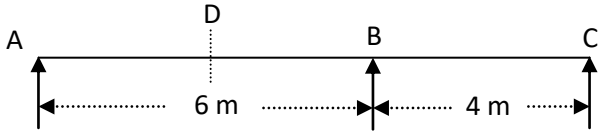


Fig (8.1)

Q.9 Draw bending moment diagram for structural frame as shown in fig. no. 9.1. Use stiffness approach for analysis. **10**

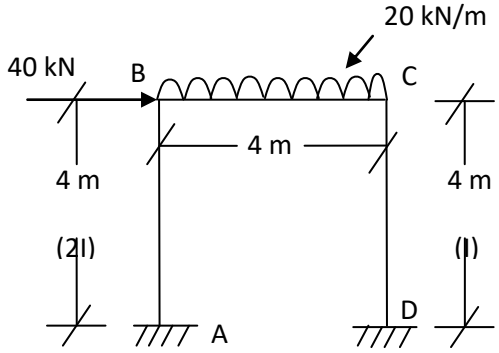


Fig (9.1)

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Question No. 1 MCQ is compulsory.
2) Figures to the right indicate full marks.
3) In section I, Q no. 2 is compulsory. Solve any two questions from remaining.
4) In section II, solve any three questions.
5) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The carry over factor for prismatic beam with far end fixed is _____. 01
   a) 1 b) 0.5
   c) -1 d) -0.5

2) Propped cantilever of span L carries UDL of w kN/m throughout, value of propped reaction is _____. 01
   a) wL/4 b) 3wL/8
   c) wL/3 d) 5wL/8

3) The size of stiffness matrix equals to _____. 01
   a) DSI b) DKI
   c) DSI+DKI d) DSI-DKI

4) Moment required to produce unit rotation is called _____. 01
   a) Translational stiffness b) Axial stiffness
   c) Rotational stiffness d) All of the above

5) Shape of ILD for fixed beam is _____. 01
   a) Lineaer b) Parabolic
   c) All of these d) None of these

6) The size of stiffness matrix for proped cantilever is _____. 01
   a) 1 X 1 b) 2 X 2
   c) 3 X 3 d) 4 X 4

7) The fixed end moment for fixed beam having udl thought span is _____. 01
   a) $wl^2/24$ b) $wl^2/12$
   c) $wl^2/16$ d) $wl^2/8$

8) Which one of the following doesn't fall under category of force method? 01
   a) Consistent deformation method
   b) Flexibility method
   c) Stiffness method
   d) Energy method

9) Compatibility conditions are essentially required to solve, _____. 01

a) Substitute frame b) Complex frame

c) Redundant frame d) Compound truss

10) Degree of static indeterminancy of frame shown in fig (3.0). 01

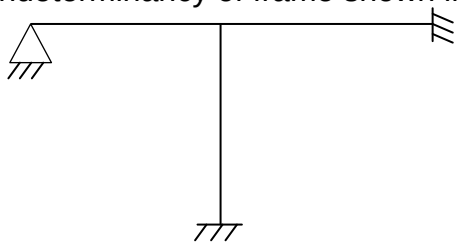


Fig. (3.0)

a) 1 b) 5

c) 4 d) 6

11) Degree of kinematic indeterminacy of beam shown in fig (4.0). 01

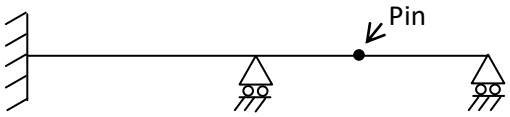


Fig. (4.0)

a) 1 b) 3

c) 2 d) 5

12) Strain energy due to bending is given by _____. 01

a) $\int \frac{M^2}{2EI} dx$ b) $\int \frac{M^2}{4EI} dx$

c) $\int \frac{M^2}{EI} dx$ d) $\int \frac{2M^2}{EI} dx$

13) Size of stiffness matrix for frame as shown in fig. is _____. 02

a) 3 X 3 b) 4 X 4

c) 2 X 2 d) 1 X 1

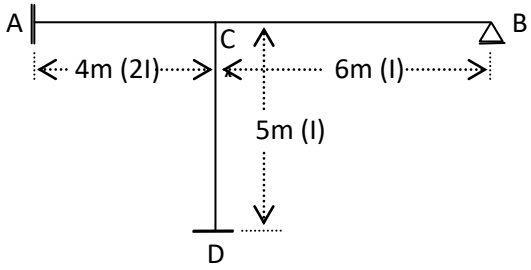


Fig.No.

SLR-FM-52

Seat No.	

Set S

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – III

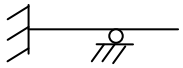
Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 2) Figures to the right indicate full marks.
3) In section I, Q no. 2 is compulsory. And solve any two questions from remaining.
4) In section II, Q. no. 9 is compulsory. And solve any two questions from remaining.
5) Assume additional data if required and mention it clearly.

Section – I

Q.2 Solve any four. **10**

a) Enlist properties of flexibility method.
b) Determine degree of kinematic indeterminacy of following structure.



c) Enlist various methods of force methods of analysis.
d) Differentiate between static and kinematic degree of indeterminancy.
e) Explain Castigliano's theorem.

Q.3 Analyze the beam using Consistent deformation method. Refer fig 3.1. **09**

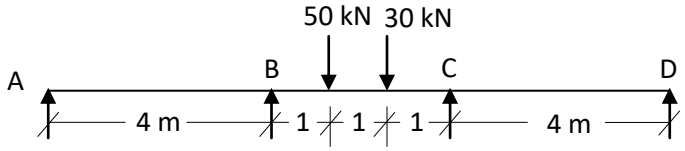


Fig (3.1)

Q.4 Draw SFD and BMD using Strain Energy method. Refer for 4.1. **09**

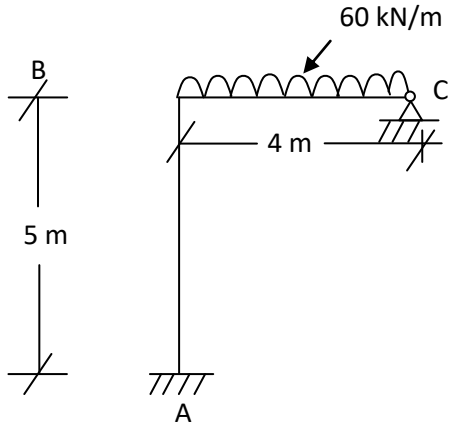


Fig (4.1)

Q.5 Analyze the beam using flexibility method. **09**

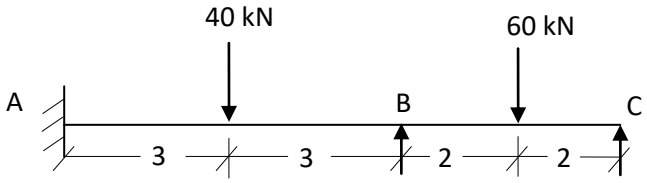


Fig (5.1)

Section – II

Q.6 A continuous beam ABC has its span AB=6 and BC=8m. Beam is fixed at end A and has simple supports at B and C. Span AB has a centrally applied load of 40KN and the span BC has uniformly distributed load of intensity 25 kN/m. If support C settles by an amount 2.5mm in relation to the supports A and B, analyze by moment distribution method. EI is constant throughout the beam and is equal to 30,000 KN-m^2. **09**

Q.7 Derive stiffness matrix for a beam as shown in fig no. 7.1 **09**

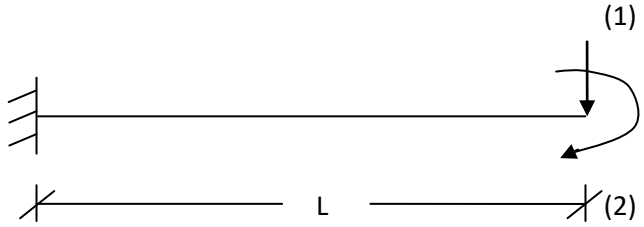


Fig (7.1)

Q.8 Draw ILD bending moment at D and reaction at A. as shown in fig no 8.1. Plot ordinate at 1m interval. D is a midpoint of span AB. **09**

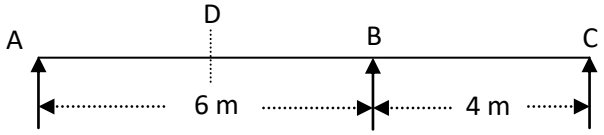


Fig (8.1)

Q.9 Draw bending moment diagram for structural frame as shown in fig. no. 9.1. Use stiffness approach for analysis. **10**

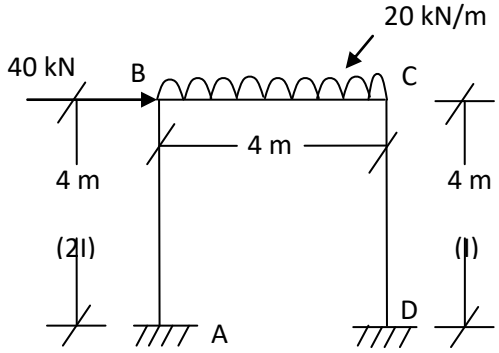


Fig (9.1)

SLR-FM-53

Seat No.	

Set P

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary but mention it clearly**.**
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Site investigation is necessary for _____.
   a) foundation design b) ground water studies
   c) construction planning d) All of these

2) In SPT, we terminate the test for no of blows which are obtained to drive the required 30 cm?
   a) 70 blows b) 80 blows
   c) 90 blows d) 100 blows

3) In shallow foundation if $Rw_1 = 1$ & $Rw_2 = 0.5$ than where the water table is _____.
   a) At base of footing b) Below the footing
   c) At the ground level d) Any where at the mid

4) A soil sample has external diameter as 7 cm and wall thickness of 2.5 mm. The area ratio in percentage will be _____.
   a) 12.88 b) 18.22
   c) 15.97 d) 16.85

5) Two columns carrying loads 500kN and 600 kN separated by 5.5m c/c, position of resultant column load with respect to heavier column load is _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) None

6) Position of centroid of trapezoidal footing having parallel sides 1m and 2m, distance between parallel sides 4.5m from the shorter side is _____.
   a) 2.5m b) 2m
   c) 3m d) None

7) Geophysical surveys are not useful for _____.
   a) large areas b) complex boundary layers
   c) underground cavities d) locating water tables

8) Failure usually observed in case of Infinite slope is _____.
   a) Translational b) Rotational
   c) Wedge d) None

9) The open caisson is _____.
   a) Open at top and closed at bottom
   b) Open at top and open at bottom
   c) Open at bottom and closed at top
   d) close at top and closed at bottom

10) In case of well foundation, grip length is defined as distance between _____.
   a) Top of well cap and cutting edge
   b) Bottom of well cap and cutting edge
   c) Bottom of well and minimum scour level
   d) Bottom of well and maximum scour level

11) Which of following is not a cellular type cofferdam 1.0?
   a) Braced
   b) Circular
   c) Diaphragm
   d) Clover leaf

12) If column carries heavy loads then which type of mat do you recommend ____.
   a) Slab type
   b) Slab thickened under column
   c) Cellular
   d) Beam and slab type

13) While analysing any strip of a mat by conventional method, column loads are multiplied by column load modification factor to _____.
   a) Make all column load on strip uniform
   b) To get uniform contact pressure
   c) To satisfy vertical equilibrium of load
   d) None

14) Negative skin friction on a pile under vertical compressive load acts ____.
   a) Downward and increase the capacity of pile.
   b) Downwards and reduce the capacity of pile.
   c) Upward and increase the capacity of pile.
   d) None of these

Seat No.	

Set **P**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) In section I, Q. no. 2 is compulsory. Solve any two from remaining.
4) In section II, Q. no. 6 is compulsory. Solve any two from remaining.

Section – I

Q.2 Attempt any two questions. **10**

a) Discuss the assumptions in the Terzaghi's bearing capacity analysis.
b) Explain the guidelines of IS code to conduct the plate load test.
c) Explain different types of augures with neat sketch.
d) Write on effect of water table on bearing capacity.

Q.3 A) Explain 'General shear failure' and 'Local shear failure'. How do you ascertain whether a foundation soil is likely to fail in General shear failure or Local shear failure? **04**

B) A circular footing is resting on a stiff saturated clay with unconfined compressive strength of 250 kN/m^2. The depth of foundation is 1.8 m. Determine the diameter of the footing if the column load is 800 kN. Assume a factor of safety as 3. The bulk unit weight of soil is 20 kN/m^3. **05**

Q.4 A) What do you mean by collapsible soil? What care has to be taken while doing construction in this type of soil? **05**

B) Explain in detail with neat sketch the application of geotextile for the embankment and the earth retainment. **04**

Q.5 a) Explain different types of settlement under the foundations. Write the equation of immediate elastic settlement and consolidation settlement stating the meaning of each term. **05**

b) A 30 cm square bearing plate settles by 8 mm in the plate load test on cohesion less soil, when the intensity of loading is 200 kN/ m^2. Estimate the settlement of the shallow foundation of 2 m x 2 m square under same intensity of loading. **04**

Section – II

Q.6 Attempt any two questions. **10**

a) Explain Hiley's formula for calculating capacity of pile also explain meaning of each term used in the equation along with the unit for each term.

b) Two plate load test with square plate were performed on a soil deposit for a 25mm settlement following loads were obtained. Determine the size of circular footing to carry a load of 700kN for a limiting settlement of 25mm.

Width of Plate (mm)	Load (kN)
300	70
600	120

c) Cantilever sheetpile wall of height 5.5 retain and embedded in granular soil having $\gamma = 20kN/m^3$ and $\varphi = 32^0$. Determine embedment depth by using approximate method.

d) Define tilt and shift of a well. Explain with neat sketch any four techniques of rectifying the tilt of well.

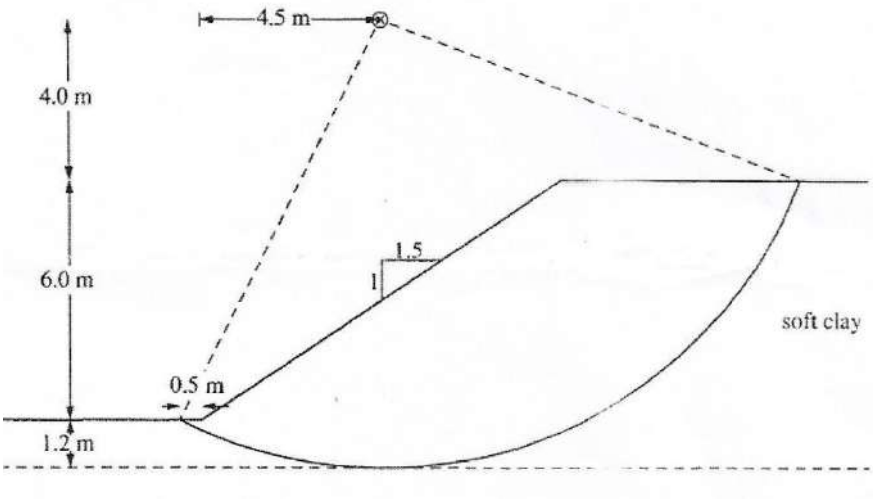
Q.7 **A)** With neat sketch explain when do you provide isolated footing, combined footing, strap footing and raft footing. **04**

B) Design footing for two columns by using following data. If size of each column is 0.5m X 0.5m draw plan, elevation, SFD and BMD showing all relevant calculations? **05**
Assume suitable data if required for design purpose. External column is at a clear distance of 0.2m from boundary of plot. External column load - 600kN, Internal column load - 900kN, spacing c/c, SBC of soil = 200kPa.

Q.8 **a)** Explain earth-fill cofferdam with a neat labeled sketch (plan and elevation). Following points need to be explained [suitability w.r.t. depth of water, one advantage, one disadvantage] **04**

b) Calculate ultimate capacity of octagonal pile of size 0.5m, length 8m embedded in cohesive soil having shear strength of 45 kN/m^2. Assume adhesion coefficient between pile and soil as 0.6 what will be the % contribution by bearing. **05**

Q.9 **a)** Analyse the slope shown below by using method of slices **06**
$\gamma = 18kN\ /\ m^3$, $\varphi\ =\ 250\ and\ c\ =\ 5kPa$. (Use minimum 8 slices)



b) List any six ideal requirement of a cofferdam. **03**

Seat No.	

Set **Q**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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1) Failure usually observed in case of Infinite slope is _____.
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4) Which of following is not a cellular type cofferdam 1.0?
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5) If column carries heavy loads then which type of mat do you recommend ____.
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6) While analysing any strip of a mat by conventional method, column loads are multiplied by column load modification factor to _____.
   a) Make all column load on strip uniform
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   c) To satisfy vertical equilibrium of load
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7) Negative skin friction on a pile under vertical compressive load acts ____.
   a) Downward and increase the capacity of pile.
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Seat No.	

Set **Q**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
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3) In section I, Q. no. 2 is compulsory. Solve any two from remaining.
4) In section II, Q. no. 6 is compulsory. Solve any two from remaining.

Section – I

Q.2 Attempt any two questions. **10**

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b) Explain the guidelines of IS code to conduct the plate load test.
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Q.4 A) What do you mean by collapsible soil? What care has to be taken while doing construction in this type of soil? **05**

B) Explain in detail with neat sketch the application of geotextile for the embankment and the earth retainment. **04**

Q.5 a) Explain different types of settlement under the foundations. Write the equation of immediate elastic settlement and consolidation settlement stating the meaning of each term. **05**

b) A 30 cm square bearing plate settles by 8 mm in the plate load test on cohesion less soil, when the intensity of loading is 200 kN/ m^2. Estimate the settlement of the shallow foundation of 2 m x 2 m square under same intensity of loading. **04**

Section – II

Q.6 Attempt any two questions. **10**

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d) Define tilt and shift of a well. Explain with neat sketch any four techniques of rectifying the tilt of well.

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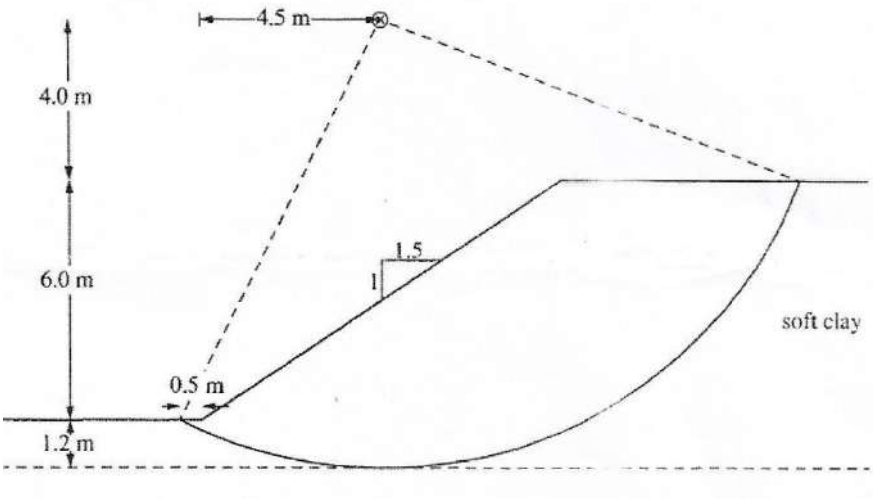
$\gamma = 18kN\ /\ m^3$, $\varphi\ =\ 250\ and\ c\ =\ 5kPa$. (Use minimum 8 slices)



b) List any six ideal requirement of a cofferdam. **03**

Seat No.	

Set **R**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary but mention it clearly**.**
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) Two columns carrying loads 500kN and 600 kN separated by 5.5m c/c, position of resultant column load with respect to heavier column load is _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) None

2) Position of centroid of trapezoidal footing having parallel sides 1m and 2m, distance between parallel sides 4.5m from the shorter side is _____.
   a) 2.5m b) 2m
   c) 3m d) None

3) Geophysical surveys are not useful for _____.
   a) large areas b) complex boundary layers
   c) underground cavities d) locating water tables

4) Failure usually observed in case of Infinite slope is _____.
   a) Translational b) Rotational
   c) Wedge d) None

5) The open caisson is _____.
   a) Open at top and closed at bottom
   b) Open at top and open at bottom
   c) Open at bottom and closed at top
   d) close at top and closed at bottom

6) In case of well foundation, grip length is defined as distance between _____.
   a) Top of well cap and cutting edge
   b) Bottom of well cap and cutting edge
   c) Bottom of well and minimum scour level
   d) Bottom of well and maximum scour level

7) Which of following is not a cellular type cofferdam 1.0?
   a) Braced b) Circular
   c) Diaphragm d) Clover leaf

8) If column carries heavy loads then which type of mat do you recommend ____.
   a) Slab type
   b) Slab thickened under column
   c) Cellular
   d) Beam and slab type

9) While analysing any strip of a mat by conventional method, column loads are multiplied by column load modification factor to _____.
   a) Make all column load on strip uniform
   b) To get uniform contact pressure
   c) To satisfy vertical equilibrium of load
   d) None

10) Negative skin friction on a pile under vertical compressive load acts ____.
   a) Downward and increase the capacity of pile.
   b) Downwards and reduce the capacity of pile.
   c) Upward and increase the capacity of pile.
   d) None of these

11) Site investigation is necessary for _____.
   a) foundation design
   b) ground water studies
   c) construction planning
   d) All of these

12) In SPT, we terminate the test for no of blows which are obtained to drive the required 30 cm?
   a) 70 blows
   b) 80 blows
   c) 90 blows
   d) 100 blows

13) In shallow foundation if $Rw_1 = 1$ & $Rw_2 = 0.5$ than where the water table is _____.
   a) At base of footing
   b) Below the footing
   c) At the ground level
   d) Any where at the mid

14) A soil sample has external diameter as 7 cm and wall thickness of 2.5 mm. The area ratio in percentage will be _____.
   a) 12.88
   b) 18.22
   c) 15.97
   d) 16.85

Seat No.	

Set **R**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) In section I, Q. no. 2 is compulsory. Solve any two from remaining.
4) In section II, Q. no. 6 is compulsory. Solve any two from remaining.

Section – I

Q.2 Attempt any two questions. **10**

a) Discuss the assumptions in the Terzaghi's bearing capacity analysis.
b) Explain the guidelines of IS code to conduct the plate load test.
c) Explain different types of augures with neat sketch.
d) Write on effect of water table on bearing capacity.

Q.3 A) Explain 'General shear failure' and 'Local shear failure'. How do you ascertain whether a foundation soil is likely to fail in General shear failure or Local shear failure? **04**

B) A circular footing is resting on a stiff saturated clay with unconfined compressive strength of 250 kN/m^2. The depth of foundation is 1.8 m. Determine the diameter of the footing if the column load is 800 kN. Assume a factor of safety as 3. The bulk unit weight of soil is 20 kN/m^3. **05**

Q.4 A) What do you mean by collapsible soil? What care has to be taken while doing construction in this type of soil? **05**

B) Explain in detail with neat sketch the application of geotextile for the embankment and the earth retainment. **04**

Q.5 a) Explain different types of settlement under the foundations. Write the equation of immediate elastic settlement and consolidation settlement stating the meaning of each term. **05**

b) A 30 cm square bearing plate settles by 8 mm in the plate load test on cohesion less soil, when the intensity of loading is 200 kN/ m^2. Estimate the settlement of the shallow foundation of 2 m x 2 m square under same intensity of loading. **04**

Section – II

Q.6 Attempt any two questions. **10**

a) Explain Hiley's formula for calculating capacity of pile also explain meaning of each term used in the equation along with the unit for each term.

b) Two plate load test with square plate were performed on a soil deposit for a 25mm settlement following loads were obtained. Determine the size of circular footing to carry a load of 700kN for a limiting settlement of 25mm.

Width of Plate (mm)	Load (kN)
300	70
600	120

c) Cantilever sheetpile wall of height 5.5 retain and embedded in granular soil having $\gamma = 20kN/m^3$ and $\varphi = 32^0$. Determine embedment depth by using approximate method.

d) Define tilt and shift of a well. Explain with neat sketch any four techniques of rectifying the tilt of well.

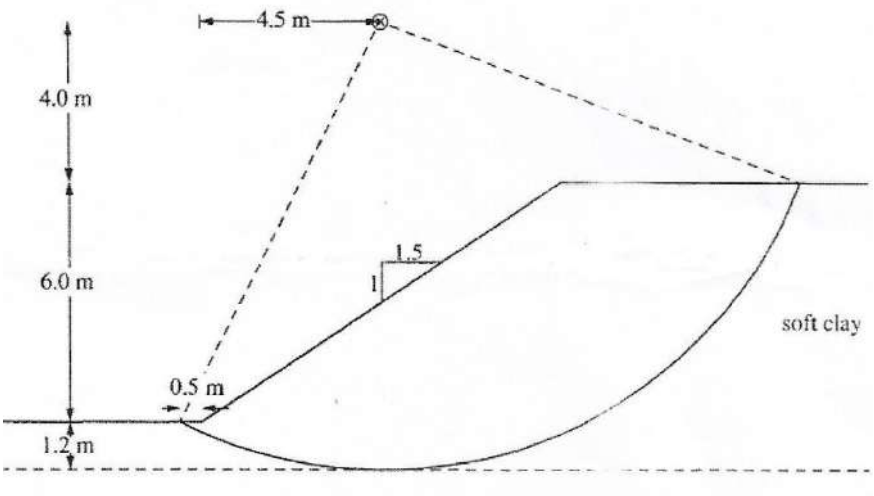
Q.7 **A)** With neat sketch explain when do you provide isolated footing, combined footing, strap footing and raft footing. **04**

B) Design footing for two columns by using following data. If size of each column is 0.5m X 0.5m draw plan, elevation, SFD and BMD showing all relevant calculations? **05**
Assume suitable data if required for design purpose. External column is at a clear distance of 0.2m from boundary of plot. External column load - 600kN, Internal column load - 900kN, spacing c/c, SBC of soil = 200kPa.

Q.8 **a)** Explain earth-fill cofferdam with a neat labeled sketch (plan and elevation). Following points need to be explained [suitability w.r.t. depth of water, one advantage, one disadvantage] **04**

b) Calculate ultimate capacity of octagonal pile of size 0.5m, length 8m embedded in cohesive soil having shear strength of 45 kN/m^2. Assume adhesion coefficient between pile and soil as 0.6 what will be the % contribution by bearing. **05**

Q.9 **a)** Analyse the slope shown below by using method of slices **06**
$\gamma = 18kN\ /\ m^3$, $\varphi\ =\ 250\ and\ c\ =\ 5kPa$. (Use minimum 8 slices)



b) List any six ideal requirement of a cofferdam. **03**

Seat No.	

Set **S**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary but mention it clearly**.**
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) In case of well foundation, grip length is defined as distance between _____.
   a) Top of well cap and cutting edge
   b) Bottom of well cap and cutting edge
   c) Bottom of well and minimum scour level
   d) Bottom of well and maximum scour level

2) Which of following is not a cellular type cofferdam 1.0?
   a) Braced b) Circular
   c) Diaphragm d) Clover leaf

3) If column carries heavy loads then which type of mat do you recommend ____.
   a) Slab type b) Slab thickened under column
   c) Cellular d) Beam and slab type

4) While analysing any strip of a mat by conventional method, column loads are multiplied by column load modification factor to _____.
   a) Make all column load on strip uniform
   b) To get uniform contact pressure
   c) To satisfy vertical equilibrium of load
   d) None

5) Negative skin friction on a pile under vertical compressive load acts ____.
   a) Downward and increase the capacity of pile.
   b) Downwards and reduce the capacity of pile.
   c) Upward and increase the capacity of pile.
   d) None of these

6) Site investigation is necessary for _____.
   a) foundation design b) ground water studies
   c) construction planning d) All of these

7) In SPT, we terminate the test for no of blows which are obtained to drive the required 30 cm?
   a) 70 blows b) 80 blows
   c) 90 blows d) 100 blows

8) In shallow foundation if $Rw_1 = 1$ & $Rw_2 = 0.5$ than where the water table is _____.
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   c) At the ground level
   d) Any where at the mid

9) A soil sample has external diameter as 7 cm and wall thickness of 2.5 mm. The area ratio in percentage will be _____.
   a) 12.88
   b) 18.22
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10) Two columns carrying loads 500kN and 600 kN separated by 5.5m c/c, position of resultant column load with respect to heavier column load is _____.
   a) 2.5m
   b) 3.5m
   c) 4.5m
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11) Position of centroid of trapezoidal footing having parallel sides 1m and 2m, distance between parallel sides 4.5m from the shorter side is _____.
   a) 2.5m
   b) 2m
   c) 3m
   d) None

12) Geophysical surveys are not useful for _____.
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   c) underground cavities
   d) locating water tables

13) Failure usually observed in case of Infinite slope is _____.
   a) Translational
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   c) Wedge
   d) None

14) The open caisson is _____.
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   b) Open at top and open at bottom
   c) Open at bottom and closed at top
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Seat No.	

Set | S

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) In section I, Q. no. 2 is compulsory. Solve any two from remaining.
4) In section II, Q. no. 6 is compulsory. Solve any two from remaining.

Section – I

Q.2 Attempt any two questions. **10**

a) Discuss the assumptions in the Terzaghi's bearing capacity analysis.
b) Explain the guidelines of IS code to conduct the plate load test.
c) Explain different types of augures with neat sketch.
d) Write on effect of water table on bearing capacity.

Q.3 A) Explain 'General shear failure' and 'Local shear failure'. How do you ascertain whether a foundation soil is likely to fail in General shear failure or Local shear failure? **04**

B) A circular footing is resting on a stiff saturated clay with unconfined compressive strength of 250 kN/m^2. The depth of foundation is 1.8 m. Determine the diameter of the footing if the column load is 800 kN. Assume a factor of safety as 3. The bulk unit weight of soil is 20 kN/m^3. **05**

Q.4 A) What do you mean by collapsible soil? What care has to be taken while doing construction in this type of soil? **05**

B) Explain in detail with neat sketch the application of geotextile for the embankment and the earth retainment. **04**

Q.5 a) Explain different types of settlement under the foundations. Write the equation of immediate elastic settlement and consolidation settlement stating the meaning of each term. **05**

b) A 30 cm square bearing plate settles by 8 mm in the plate load test on cohesion less soil, when the intensity of loading is 200 kN/ m^2. Estimate the settlement of the shallow foundation of 2 m x 2 m square under same intensity of loading. **04**

Section – II

Q.6 Attempt any two questions. **10**

a) Explain Hiley's formula for calculating capacity of pile also explain meaning of each term used in the equation along with the unit for each term.

b) Two plate load test with square plate were performed on a soil deposit for a 25mm settlement following loads were obtained. Determine the size of circular footing to carry a load of 700kN for a limiting settlement of 25mm.

Width of Plate (mm)	Load (kN)
300	70
600	120

c) Cantilever sheetpile wall of height 5.5 retain and embedded in granular soil having $\gamma = 20kN/m^3$ and $\varphi = 32^0$. Determine embedment depth by using approximate method.

d) Define tilt and shift of a well. Explain with neat sketch any four techniques of rectifying the tilt of well.

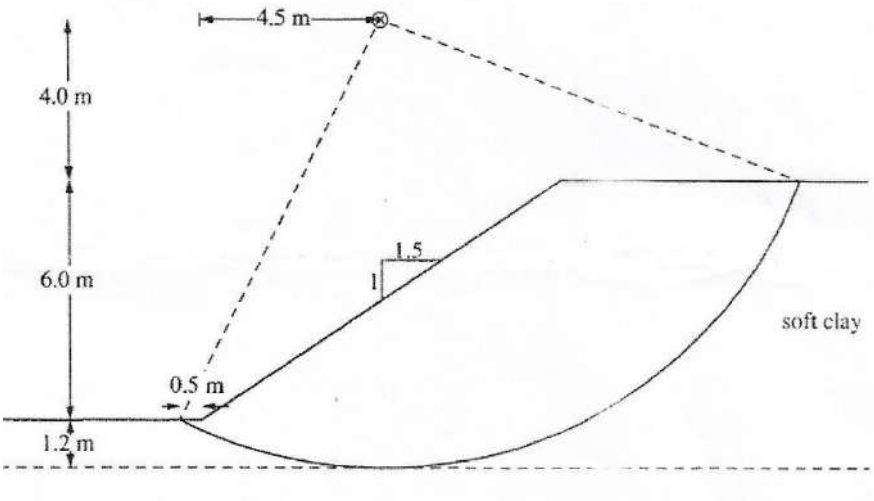
Q.7 **A)** With neat sketch explain when do you provide isolated footing, combined footing, strap footing and raft footing. **04**

B) Design footing for two columns by using following data. If size of each column is 0.5m X 0.5m draw plan, elevation, SFD and BMD showing all relevant calculations? **05**
Assume suitable data if required for design purpose. External column is at a clear distance of 0.2m from boundary of plot. External column load - 600kN, Internal column load - 900kN, spacing c/c, SBC of soil = 200kPa.

Q.8 **a)** Explain earth-fill cofferdam with a neat labeled sketch (plan and elevation). Following points need to be explained [suitability w.r.t. depth of water, one advantage, one disadvantage] **04**

b) Calculate ultimate capacity of octagonal pile of size 0.5m, length 8m embedded in cohesive soil having shear strength of 45 kN/m^2. Assume adhesion coefficient between pile and soil as 0.6 what will be the % contribution by bearing. **05**

Q.9 **a)** Analyse the slope shown below by using method of slices **06**
$\gamma = 18kN\ /\ m^3$, $\varphi\ =\ 250\ and\ c\ =\ 5kPa$. (Use minimum 8 slices)



b) List any six ideal requirement of a cofferdam. **03**

SLR-FM-54

Seat No.	

Set P

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGG. – II

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Standard BOD value is measured after _____ days and at _____°C temperature.
   a) 3,20 b) 5,30
   c) 5,20 d) 7,30

2) Determination of solids in wastewater sample is _____ procedure.
   a) Calorimetric b) Gravimetric
   c) Both a & b d) None of these

3) _____ system is unhygienic method.
   a) Water carriage b) Dry
   c) Storm water d) All of above

4) Function of screen chamber is to remove _____.
   a) Heavy solids b) Dissolved solids
   c) Volatile solids d) Large suspended solids

5) _____ treatment has endless ditch for higher aeration period.
   a) Oxidation pond b) Oxidation ditch
   c) Aerate lagoon d) All of above

6) Max. population that can be served by using septic tank is _____.
   a) 100 b) 200
   c) 300 d) 400

7) Example of attached growth process is/are _____.
   a) Trickling filter b) Rotating biological contactor
   c) Both a and b d) ASP

8) Due to incomplete combustion of fuels from petrol engines, the gas liberated is _____.
   a) Co_2 b) Co
   c) N_2 d) He

9) Electrostatic precipitator is a device to control _____.
   a) So_2 emission in water coagulation
   b) Particulate emission
   c) Both (a) & (b)
   d) Precipitation of $AI(OH)_3$

10) The effect of increasing diameter of sewer on the self cleansing velocity is ____.
   a) To decrease it
   b) To increase it
   c) Fluctuating it
   d) Nil

11) The most common method of wastewater disposal is _____.
   a) Evaporation
   b) Dilution in surface water
   c) Rapid infiltration
   d) application in irrigation

12) _____ pollution that originates from multiple sources over relatively large area.
   a) Point source
   b) None point source
   c) Influent source
   d) Effluent source

13) The Interplay between the deoxygenation and reaeration produces a well defined profile of _____ in stream.
   a) Self purification
   b) D.O.
   c) B.O.D
   d) Photosynthesis

14) Presence of _____ on surface of wastewater prevents oxygen to penetrate.
   a) Oil and grease
   b) Suspended solids
   c) Microorganism
   d) Calcium

Seat No.	

Set **P**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGG. – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 is Compulsory. Solve any two questions from Section – I.
2) Q. no.9 is compulsory. Solve any two questions from remaining question 6 to 8 from section - II.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Use of non programmable calculator is allowed.

Section – I

Q.2 **a)** Draw a general flowsheet for a sewage treatment plant for a city having population of 10 lacs. Write function of each unit in tabular format. **05**

b) Calculate BOD_3 at 27°C for a sewage sample whose standard BOD is 450 mg/Lit. Take k=0. 12/day (Base 10). **05**

Q.3 **a)** Compare conventional and high rate trickling filter. **04**

b) The total area of district is 15 ha. The following data shows various types of areas and the corresponding runoff coefficients of a town. Determine coefficient of runoff for the area. Also find maximum runoff by rational formula. Assume Rainfall intensity as R_i = 40 mm/hr. **05**

Type of surface	% of total area	Runoff coefficient
Roof surface	20	0.85
Unpaved street	15	0.25
Wooded area	10	0.15
Parks and lawns	40	0.20
Hard pavements	5	0.85
Macadam roads	10	0.30

Q.4 **a)** Explain 'bacteria-algal' symbiosis. **04**

b) Design aseptic tank for 200 users **05**

Q.5 **a)** **Write short note.** **09**
a) NRC equation
b) Classification of screens
c) Steps in anaerobic digestion process

Section – II

Q.6 **a)** Write Streeter- Phelp's equation and explain meaning of each and every term in it. **05**

b) Explain the functional elements of Municipal solid waste management with flow diagram? **05**

Q.7 **a)** A wastewater effluent of 560 l/s with a B.O.D of 50 mg/l, D.O. is 3 mg/l and Temperature of 23°C Enters a river where the flow is 28 m^3/s, and B.O.D is 4 mg/l, D.O. is 8.2 mg/l, temperature is of 17°C k_1 of waste is 0.10 per day at 20^o C. The velocity of water the river downstream is 0.18 m/s and depth of 1.2 m. determine the following after mixing of waste water with the river water. **05**

i) Combined Discharge
ii) BOD
iii) Do
iv) Temperature

b) Explain the Disposal of refuse by trenching method. Also give advantage of this method. **05**

Q.8 **a)** Give the causes of Air pollution? Explain it's general effect on human health. **05**

b) Define Inversion? Explain its types with neat diagram. **05**

Q.9 **Write short note. (Any Two)** **08**

a) D.O. Sag Curve
b) Indore Method of Composting
c) ESP

Seat No.	

Set **Q**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGG. – II

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Due to incomplete combustion of fuels from petrol engines, the gas liberated is _____.
   a) Co_2 b) Co
   c) N_2 d) He

2) Electrostatic precipitator is a device to control _____.
   a) So_2 emission in water coagulation
   b) Particulate emission
   c) Both (a) & (b)
   d) Precipitation of $AI(OH)_3$

3) The effect of increasing diameter of sewer on the self cleansing velocity is ____.
   a) To decrease it b) To increase it
   c) Fluctuating it d) Nil

4) The most common method of wastewater disposal is _____.
   a) Evaporation b) Dilution in surface water
   c) Rapid infiltration d) application in irrigation

5) _____ pollution that originates from multiple sources over relatively large area.
   a) Point source b) None point source
   c) Influent source d) Effluent source

6) The Interplay between the deoxygenation and reaeration produces a well defined profile of _____ in stream.
   a) Self purification b) D.O.
   c) B.O.D d) Photosynthesis

7) Presence of _____ on surface of wastewater prevents oxygen to penetrate.
   a) Oil and grease b) Suspended solids
   c) Microorganism d) Calcium

8) Standard BOD value is measured after _____ days and at _____°C temperature.
   a) 3,20 b) 5,30
   c) 5,20 d) 7,30

9) Determination of solids in wastewater sample is _____ procedure.
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11) Function of screen chamber is to remove _____.
   a) Heavy solids b) Dissolved solids
   c) Volatile solids d) Large suspended solids

12) _____ treatment has endless ditch for higher aeration period.
   a) Oxidation pond b) Oxidation ditch
   c) Aerate lagoon d) All of above

13) Max. population that can be served by using septic tank is _____.
   a) 100 b) 200
   c) 300 d) 400

14) Example of attached growth process is/are _____.
   a) Trickling filter b) Rotating biological contactor
   c) Both a and b d) ASP

Seat No.	

Set **Q**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGG. – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 is Compulsory. Solve any two questions from Section – I.
2) Q. no.9 is compulsory. Solve any two questions from remaining question 6 to 8 from section - II.
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4) Assume suitable data if necessary.
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Section – I

Q.2 **a)** Draw a general flowsheet for a sewage treatment plant for a city having population of 10 lacs. Write function of each unit in tabular format. **05**

b) Calculate BOD_3 at 27°C for a sewage sample whose standard BOD is 450 mg/Lit. Take k=0. 12/day (Base 10). **05**

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b) The total area of district is 15 ha. The following data shows various types of areas and the corresponding runoff coefficients of a town. Determine coefficient of runoff for the area. Also find maximum runoff by rational formula. Assume Rainfall intensity as R_i = 40 mm/hr. **05**

Type of surface	% of total area	Runoff coefficient
Roof surface	20	0.85
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Macadam roads	10	0.30

Q.4 **a)** Explain 'bacteria-algal' symbiosis. **04**

b) Design aseptic tank for 200 users **05**

Q.5 **a)** **Write short note.** **09**
a) NRC equation
b) Classification of screens
c) Steps in anaerobic digestion process

Section – II

Q.6 **a)** Write Streeter- Phelp's equation and explain meaning of each and every term in it. **05**

b) Explain the functional elements of Municipal solid waste management with flow diagram? **05**

Q.7 **a)** A wastewater effluent of 560 l/s with a B.O.D of 50 mg/l, D.O. is 3 mg/l and Temperature of 23°C Enters a river where the flow is 28 m^3/s, and B.O.D is 4 mg/l, D.O. is 8.2 mg/l, temperature is of 17°C k_1 of waste is 0.10 per day at 20^o C. The velocity of water the river downstream is 0.18 m/s and depth of 1.2 m. determine the following after mixing of waste water with the river water. **05**

i) Combined Discharge
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iv) Temperature

b) Explain the Disposal of refuse by trenching method. Also give advantage of this method. **05**

Q.8 **a)** Give the causes of Air pollution? Explain it's general effect on human health. **05**

b) Define Inversion? Explain its types with neat diagram. **05**

Q.9 **Write short note. (Any Two)** **08**

a) D.O. Sag Curve
b) Indore Method of Composting
c) ESP

Seat No.	

Set **R**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGG. – II

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) _____ treatment has endless ditch for higher aeration period.
   a) Oxidation pond b) Oxidation ditch
   c) Aerate lagoon d) All of above

2) Max. population that can be served by using septic tank is _____.
   a) 100 b) 200
   c) 300 d) 400

3) Example of attached growth process is/are _____.
   a) Trickling filter b) Rotating biological contactor
   c) Both a and b d) ASP

4) Due to incomplete combustion of fuels from petrol engines, the gas liberated is _____.
   a) Co_2 b) Co
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   a) 3,20 b) 5,30
   c) 5,20 d) 7,30

12) Determination of solids in wastewater sample is _____ procedure.
   a) Calorimetric b) Gravimetric
   c) Both a & b d) None of these

13) _____ system is unhygienic method.
   a) Water carriage b) Dry
   c) Storm water d) All of above

14) Function of screen chamber is to remove _____.
   a) Heavy solids b) Dissolved solids
   c) Volatile solids d) Large suspended solids

Seat No.	

Set **R**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGG. – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 is Compulsory. Solve any two questions from Section – I.
2) Q. no.9 is compulsory. Solve any two questions from remaining question 6 to 8 from section - II.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Use of non programmable calculator is allowed.

Section – I

Q.2 **a)** Draw a general flowsheet for a sewage treatment plant for a city having population of 10 lacs. Write function of each unit in tabular format. **05**

b) Calculate BOD_3 at 27°C for a sewage sample whose standard BOD is 450 mg/Lit. Take k=0. 12/day (Base 10). **05**

Q.3 **a)** Compare conventional and high rate trickling filter. **04**

b) The total area of district is 15 ha. The following data shows various types of areas and the corresponding runoff coefficients of a town. Determine coefficient of runoff for the area. Also find maximum runoff by rational formula. Assume Rainfall intensity as R_i = 40 mm/hr. **05**

Type of surface	% of total area	Runoff coefficient
Roof surface	20	0.85
Unpaved street	15	0.25
Wooded area	10	0.15
Parks and lawns	40	0.20
Hard pavements	5	0.85
Macadam roads	10	0.30

Q.4 **a)** Explain 'bacteria-algal' symbiosis. **04**

b) Design aseptic tank for 200 users **05**

Q.5 **a)** **Write short note.** **09**
a) NRC equation
b) Classification of screens
c) Steps in anaerobic digestion process

Section – II

Q.6 **a)** Write Streeter- Phelp's equation and explain meaning of each and every term in it. **05**

b) Explain the functional elements of Municipal solid waste management with flow diagram? **05**

Q.7 **a)** A wastewater effluent of 560 l/s with a B.O.D of 50 mg/l, D.O. is 3 mg/l and Temperature of 23°C Enters a river where the flow is 28 m^3/s, and B.O.D is 4 mg/l, D.O. is 8.2 mg/l, temperature is of 17°C k_1 of waste is 0.10 per day at 20^o C. The velocity of water the river downstream is 0.18 m/s and depth of 1.2 m. determine the following after mixing of waste water with the river water. **05**

i) Combined Discharge
ii) BOD
iii) Do
iv) Temperature

b) Explain the Disposal of refuse by trenching method. Also give advantage of this method. **05**

Q.8 **a)** Give the causes of Air pollution? Explain it's general effect on human health. **05**

b) Define Inversion? Explain its types with neat diagram. **05**

Q.9 **Write short note. (Any Two)** **08**

a) D.O. Sag Curve
b) Indore Method of Composting
c) ESP

Seat No.	

Set | S

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGG. – II

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The effect of increasing diameter of sewer on the self cleansing velocity is ____.
   a) To decrease it b) To increase it
   c) Fluctuating it d) Nil

2) The most common method of wastewater disposal is _____.
   a) Evaporation b) Dilution in surface water
   c) Rapid infiltration d) application in irrigation

3) _____ pollution that originates from multiple sources over relatively large area.
   a) Point source b) None point source
   c) Influent source d) Effluent source

4) The Interplay between the deoxygenation and reaeration produces a well defined profile of _____ in stream.
   a) Self purification b) D.O.
   c) B.O.D d) Photosynthesis

5) Presence of _____ on surface of wastewater prevents oxygen to penetrate.
   a) Oil and grease b) Suspended solids
   c) Microorganism d) Calcium

6) Standard BOD value is measured after _____ days and at _____°C temperature.
   a) 3,20 b) 5,30
   c) 5,20 d) 7,30

7) Determination of solids in wastewater sample is _____ procedure.
   a) Calorimetric b) Gravimetric
   c) Both a & b d) None of these

8) _____ system is unhygienic method.
   a) Water carriage b) Dry
   c) Storm water d) All of above

9) Function of screen chamber is to remove _____.
   a) Heavy solids
   b) Dissolved solids
   c) Volatile solids
   d) Large suspended solids

10) _____ treatment has endless ditch for higher aeration period.
   a) Oxidation pond
   b) Oxidation ditch
   c) Aerate lagoon
   d) All of above

11) Max. population that can be served by using septic tank is _____.
   a) 100
   b) 200
   c) 300
   d) 400

12) Example of attached growth process is/are _____.
   a) Trickling filter
   b) Rotating biological contactor
   c) Both a and b
   d) ASP

13) Due to incomplete combustion of fuels from petrol engines, the gas liberated is _____.
   a) Co_2
   b) Co
   c) N_2
   d) He

14) Electrostatic precipitator is a device to control _____.
   a) So_2 emission in water coagulation
   b) Particulate emission
   c) Both (a) & (b)
   d) Precipitation of $AI(OH)_3$

Seat No.	

Set **S**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGG. – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 is Compulsory. Solve any two questions from Section – I.
2) Q. no.9 is compulsory. Solve any two questions from remaining question 6 to 8 from section - II.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Use of non programmable calculator is allowed.

Section – I

Q.2 **a)** Draw a general flowsheet for a sewage treatment plant for a city having population of 10 lacs. Write function of each unit in tabular format. **05**

b) Calculate BOD_3 at 27°C for a sewage sample whose standard BOD is 450 mg/Lit. Take k=0. 12/day (Base 10). **05**

Q.3 **a)** Compare conventional and high rate trickling filter. **04**

b) The total area of district is 15 ha. The following data shows various types of areas and the corresponding runoff coefficients of a town. Determine coefficient of runoff for the area. Also find maximum runoff by rational formula. Assume Rainfall intensity as R_i = 40 mm/hr. **05**

Type of surface	% of total area	Runoff coefficient
Roof surface	20	0.85
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Parks and lawns	40	0.20
Hard pavements	5	0.85
Macadam roads	10	0.30

Q.4 **a)** Explain 'bacteria-algal' symbiosis. **04**

b) Design aseptic tank for 200 users **05**

Q.5 **a)** **Write short note.** **09**
a) NRC equation
b) Classification of screens
c) Steps in anaerobic digestion process

Section – II

Q.6 **a)** Write Streeter- Phelp's equation and explain meaning of each and every term in it. **05**

b) Explain the functional elements of Municipal solid waste management with flow diagram? **05**

Q.7 **a)** A wastewater effluent of 560 l/s with a B.O.D of 50 mg/l, D.O. is 3 mg/l and Temperature of 23°C Enters a river where the flow is 28 m^3/s, and B.O.D is 4 mg/l, D.O. is 8.2 mg/l, temperature is of 17°C k_1 of waste is 0.10 per day at 20^o C. The velocity of water the river downstream is 0.18 m/s and depth of 1.2 m. determine the following after mixing of waste water with the river water. **05**

i) Combined Discharge
ii) BOD
iii) Do
iv) Temperature

b) Explain the Disposal of refuse by trenching method. Also give advantage of this method. **05**

Q.8 **a)** Give the causes of Air pollution? Explain it's general effect on human health. **05**

b) Define Inversion? Explain its types with neat diagram. **05**

Q.9 **Write short note. (Any Two)** **08**

a) D.O. Sag Curve
b) Indore Method of Composting
c) ESP

SLR-FM-55

Seat No.	

Set P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figure to right indicate full marks.
3) Assume suitable data only if required but mention it clearly.
4) Use of only on programmable calculator is allowed.
5) Draw sketches wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) If activities in a network cannot be topologically ordered it indicates that _____.
   a) there is a redundancy in the project
   b) precedence relations are consistent
   c) a proper acyclic network cannot be drawn
   d) None of the above

2) A project with uncertain activity times has 2 parallel paths which have probabilities of 0.5 and 0.9 of being completed by the target date. The PERT and actual probabilities of project completion of the whole project by the target date are _____.
   a) 0.4, 0.9 b) 0.45, 0.5
   c) 0.5, 0.45 d) 0.9, 0.4

3) The concept of milestones on a project is relevant for _____.
   a) A-O-N networks b) A-O-A networks
   c) Precedence Networks d) None of the above

4) The best technique for handling consumable resources in a project is ___.
   a) Time/cost tradeoffs b) Resource leveling
   c) Resource allocation d) Resource aggregation

5) The process of utililizing activity floats to obtain an acceptable resource usage profile without increasing project duration is called _____.
   a) resource aggregation b) resource planning
   c) resource leveling d) resource allocation

6) The process of obtaining a minimum duration project schedule for a given set of resources is referred to as _____.
   a) resource aggregation b) critical path scheduling
   c) resource leveling d) resource allocation

7) If the activity time-cost tradeoffs are linear, the project cost duration efficient frontier is _____.
   a) linear b) piecewise linear convex
   c) piecewise linear concave d) non-linear

8) In recurring deposit scheme _____ factor will be used.
   a) USCRF b) USPWF
   c) USSFF d) None

9) Bank is interested to apply interest rate compounded _____ to the customer.
   a) Daily b) Monthly
   c) Quarterly d) Annually

10) 15% rate per year compounded monthly is _____ type of interest rate.
   a) Nominal b) Effective
   c) Simple d) None of these

11) The uniform amount to be invested at the end of each period in order to produce a fixed amount can be calculated using factor.
   a) USCAF b) USCRF
   c) USPWF d) USSFF

12) The method which has basis to return as the results of dividing the capital invested by the annual net profit is _____.
   a) Yield method b) Payback method
   c) PW method d) EUAC method

13) Annuity means _____.
   a) Payments of equal amount
   b) A series of payment
   c) equal payment at equal time interval
   d) b and c

14) Engineering Economics analysis is a method for _____.
   a) Cost analysis of various project alternatives
   b) Calculating duration of the project
   c) Doing the sensitivity analysis
   d) None of these

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 and Q.6 is compulsory.
2) Answer any two question out of Q.3 to Q.5
3) Answer any two questions out of Q.7 to Q.9
4) Figure to right indicate full marks.
5) Assume suitable data only if required but mention it clearly.
6) Use of only on programmable calculator is allowed.
7) Draw sketches wherever necessary.

Section – I

Q.2 **a)** Explain the Steps in Project Management. **04**

b) What is Fulkerson's Rule? Using the details shown below, Draw the CPM AOA network and do event numbering. Show critical Path and calculate Project duration. **08**

Activity	Duration (days)	Preceding Activity
A. Site selection	7	---
B. Digging well	3	A
C. Laying field channels	15	B
D. Procurement of Pump	7	A
E. Installation of pump	3	D, B
F. Test run	2	C, E

Q.3 Draw Critical Path and Project Duration. Assuming the activities are scheduled on the Earliest Start Time (EST) calculate the manpower requirement for the project with Histograph. **08**

Activity	Duration (days)	Preceding Activity	Manpower/day
A. Land preparation	3	----	4
B. Digging pits	5	A	4
C. Purchase saplings	3	A	2
D. Application of FYM	3	B	3
E. Transplants saplings	4	C,D	4

Q.4 For the project with data given in Table 2 **08**

a) Develop the A-O-A network

b) Under standard PERT assumptions determine the critical path

Table 2

Job	Predecessors	Duration (a,m,b)
A	--	2,5,8
B	--	2,2,14
C	A	3,6,9
D	A	2,8,14
E	A	2,8,14
F	B,C	3,6,15
G	D,F	6,15,24
H	D,F	1,4,7
I	E,H	1,7,13

Q.5 **a)** Explain the views available in MS Project software. **04**

b) Explain Role of information in decision making. **04**

Section – II

Q.6 **a)** What is cash flow diagram? Explain in details with example. **04**

b) Maintenance cost for new bridge with an expected 50 years life was estimated to be Rs.10000 each year for the first five years followed by a Rs.100000 expenditure in the 15^{th} year and Rs.100000 expenditure in 30^{th} year. If i = 10% per year, what is the equivalent uniform annual cost over the entire 50 year period? **06**

Q.7 **a)** Which are the various types of Single Payment factor? Explain any one of them. **05**

b) A father, on the day his son is born, wishes to determine what amount would have to be paid into an account now bearing interest at 12% compounded quarterly to provide payment of Rs.100000 on his sons 20^{th} birthday? Assist him to determine. **04**

Q.8 **a)** A project proposed for a new building involves capital investment of Rs.100000. It has salvage value of Rs. 20000 and annual receipts is Rs. 32200 & O&M cost is Rs. 22300. What is the internal rate of return, if the life of building is 12 years? **04**

b) What is time value of money? **05**

Q.9 **Write short notes.** **09**

a) Value engineering

b) BOT

c) Effective and Nominal interest rate

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figure to right indicate full marks.
3) Assume suitable data only if required but mention it clearly.
4) Use of only on programmable calculator is allowed.
5) Draw sketches wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) In recurring deposit scheme _____ factor will be used.
   a) USCRF b) USPWF
   c) USSFF d) None

2) Bank is interested to apply interest rate compounded _____ to the customer.
   a) Daily b) Monthly
   c) Quarterly d) Annually

3) 15% rate per year compounded monthly is _____ type of interest rate.
   a) Nominal b) Effective
   c) Simple d) None of these

4) The uniform amount to be invested at the end of each period in order to produce a fixed amount can be calculated using factor.
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5) The method which has basis to return as the results of dividing the capital invested by the annual net profit is _____.
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6) Annuity means _____.
   a) Payments of equal amount
   b) A series of payment
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   d) b and c

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   b) Calculating duration of the project
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9) A project with uncertain activity times has 2 parallel paths which have probabilities of 0.5 and 0.9 of being completed by the target date. The PERT and actual probabilities of project completion of the whole project by the target date are _____.
   a) 0.4, 0.9 b) 0.45, 0.5
   c) 0.5, 0.45 d) 0.9, 0.4

10) The concept of milestones on a project is relevant for _____.
   a) A-O-N networks b) A-O-A networks
   c) Precedence Networks d) None of the above

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12) The process of utililizing activity floats to obtain an acceptable resource usage profile without increasing project duration is called _____.
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13) The process of obtaining a minimum duration project schedule for a given set of resources is referred to as _____.
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14) If the activity time-cost tradeoffs are linear, the project cost duration efficient frontier is _____.
   a) linear b) piecewise linear convex
   c) piecewise linear concave d) non-linear

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 and Q.6 is compulsory.
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3) Answer any two questions out of Q.7 to Q.9
4) Figure to right indicate full marks.
5) Assume suitable data only if required but mention it clearly.
6) Use of only on programmable calculator is allowed.
7) Draw sketches wherever necessary.

Section – I

Q.2 **a)** Explain the Steps in Project Management. **04**

b) What is Fulkerson's Rule? Using the details shown below, Draw the CPM AOA network and do event numbering. Show critical Path and calculate Project duration. **08**

Activity	Duration (days)	Preceding Activity
A. Site selection	7	---
B. Digging well	3	A
C. Laying field channels	15	B
D. Procurement of Pump	7	A
E. Installation of pump	3	D, B
F. Test run	2	C, E

Q.3 Draw Critical Path and Project Duration. Assuming the activities are scheduled on the Earliest Start Time (EST) calculate the manpower requirement for the project with Histograph. **08**

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B. Digging pits	5	A	4
C. Purchase saplings	3	A	2
D. Application of FYM	3	B	3
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Q.4 For the project with data given in Table 2 **08**

a) Develop the A-O-A network

b) Under standard PERT assumptions determine the critical path

Table 2

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A	--	2,5,8
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G	D,F	6,15,24
H	D,F	1,4,7
I	E,H	1,7,13

Q.5 **a)** Explain the views available in MS Project software. **04**

b) Explain Role of information in decision making. **04**

Section – II

Q.6 **a)** What is cash flow diagram? Explain in details with example. **04**

b) Maintenance cost for new bridge with an expected 50 years life was estimated to be Rs.10000 each year for the first five years followed by a Rs.100000 expenditure in the 15^{th} year and Rs.100000 expenditure in 30^{th} year. If i = 10% per year, what is the equivalent uniform annual cost over the entire 50 year period? **06**

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b) A father, on the day his son is born, wishes to determine what amount would have to be paid into an account now bearing interest at 12% compounded quarterly to provide payment of Rs.100000 on his sons 20^{th} birthday? Assist him to determine. **04**

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b) What is time value of money? **05**

Q.9 **Write short notes.** **09**

a) Value engineering

b) BOT

c) Effective and Nominal interest rate

SLR-FM-55

Seat No.	

Set R

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figure to right indicate full marks.
3) Assume suitable data only if required but mention it clearly.
4) Use of only on programmable calculator is allowed.
5) Draw sketches wherever necessary.

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The process of utililizing activity floats to obtain an acceptable resource usage profile without increasing project duration is called _____.
   a) resource aggregation b) resource planning
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13) The concept of milestones on a project is relevant for _____.
   a) A-O-N networks b) A-O-A networks
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14) The best technique for handling consumable resources in a project is ___.
   a) Time/cost tradeoffs b) Resource leveling
   c) Resource allocation d) Resource aggregation

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 and Q.6 is compulsory.
2) Answer any two question out of Q.3 to Q.5
3) Answer any two questions out of Q.7 to Q.9
4) Figure to right indicate full marks.
5) Assume suitable data only if required but mention it clearly.
6) Use of only on programmable calculator is allowed.
7) Draw sketches wherever necessary.

Section – I

Q.2 **a)** Explain the Steps in Project Management. **04**

b) What is Fulkerson's Rule? Using the details shown below, Draw the CPM AOA network and do event numbering. Show critical Path and calculate Project duration. **08**

Activity	Duration (days)	Preceding Activity
A. Site selection	7	---
B. Digging well	3	A
C. Laying field channels	15	B
D. Procurement of Pump	7	A
E. Installation of pump	3	D, B
F. Test run	2	C, E

Q.3 Draw Critical Path and Project Duration. Assuming the activities are scheduled on the Earliest Start Time (EST) calculate the manpower requirement for the project with Histograph. **08**

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D. Application of FYM	3	B	3
E. Transplants saplings	4	C,D	4

Q.4 For the project with data given in Table 2 **08**

a) Develop the A-O-A network

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Table 2

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E	A	2,8,14
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H	D,F	1,4,7
I	E,H	1,7,13

Q.5 **a)** Explain the views available in MS Project software. **04**

b) Explain Role of information in decision making. **04**

Section – II

Q.6 **a)** What is cash flow diagram? Explain in details with example. **04**

b) Maintenance cost for new bridge with an expected 50 years life was estimated to be Rs.10000 each year for the first five years followed by a Rs.100000 expenditure in the 15^{th} year and Rs.100000 expenditure in 30^{th} year. If i = 10% per year, what is the equivalent uniform annual cost over the entire 50 year period? **06**

Q.7 **a)** Which are the various types of Single Payment factor? Explain any one of them. **05**

b) A father, on the day his son is born, wishes to determine what amount would have to be paid into an account now bearing interest at 12% compounded quarterly to provide payment of Rs.100000 on his sons 20^{th} birthday? Assist him to determine. **04**

Q.8 **a)** A project proposed for a new building involves capital investment of Rs.100000. It has salvage value of Rs. 20000 and annual receipts is Rs. 32200 & O&M cost is Rs. 22300. What is the internal rate of return, if the life of building is 12 years? **04**

b) What is time value of money? **05**

Q.9 **Write short notes.** **09**

a) Value engineering

b) BOT

c) Effective and Nominal interest rate

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
2) Figure to right indicate full marks.
3) Assume suitable data only if required but mention it clearly.
4) Use of only on programmable calculator is allowed.
5) Draw sketches wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) 15% rate per year compounded monthly is _____ type of interest rate.
   a) Nominal b) Effective
   c) Simple d) None of these

2) The uniform amount to be invested at the end of each period in order to produce a fixed amount can be calculated using factor.
   a) USCAF b) USCRF
   c) USPWF d) USSFF

3) The method which has basis to return as the results of dividing the capital invested by the annual net profit is _____.
   a) Yield method b) Payback method
   c) PW method d) EUAC method

4) Annuity means _____.
   a) Payments of equal amount
   b) A series of payment
   c) equal payment at equal time interval
   d) b and c

5) Engineering Economics analysis is a method for _____.
   a) Cost analysis of various project alternatives
   b) Calculating duration of the project
   c) Doing the sensitivity analysis
   d) None of these

6) If activities in a network cannot be topologically ordered it indicates that _____.
   a) there is a redundancy in the project
   b) precedence relations are consistent
   c) a proper acyclic network cannot be drawn
   d) None of the above

7) A project with uncertain activity times has 2 parallel paths which have probabilities of 0.5 and 0.9 of being completed by the target date. The PERT and actual probabilities of project completion of the whole project by the target date are _____.
   a) 0.4, 0.9 b) 0.45, 0.5
   c) 0.5, 0.45 d) 0.9, 0.4

8) The concept of milestones on a project is relevant for _____.
   a) A-O-N networks b) A-O-A networks
   c) Precedence Networks d) None of the above

9) The best technique for handling consumable resources in a project is ___.
   a) Time/cost tradeoffs b) Resource leveling
   c) Resource allocation d) Resource aggregation

10) The process of utililizing activity floats to obtain an acceptable resource usage profile without increasing project duration is called _____.
   a) resource aggregation b) resource planning
   c) resource leveling d) resource allocation

11) The process of obtaining a minimum duration project schedule for a given set of resources is referred to as _____.
   a) resource aggregation b) critical path scheduling
   c) resource leveling d) resource allocation

12) If the activity time-cost tradeoffs are linear, the project cost duration efficient frontier is _____.
   a) linear b) piecewise linear convex
   c) piecewise linear concave d) non-linear

13) In recurring deposit scheme _____ factor will be used.
   a) USCRF b) USPWF
   c) USSFF d) None

14) Bank is interested to apply interest rate compounded _____ to the customer.
   a) Daily b) Monthly
   c) Quarterly d) Annually

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 and Q.6 is compulsory.
2) Answer any two question out of Q.3 to Q.5
3) Answer any two questions out of Q.7 to Q.9
4) Figure to right indicate full marks.
5) Assume suitable data only if required but mention it clearly.
6) Use of only on programmable calculator is allowed.
7) Draw sketches wherever necessary.

Section – I

Q.2 **a)** Explain the Steps in Project Management. **04**

b) What is Fulkerson's Rule? Using the details shown below, Draw the CPM AOA network and do event numbering. Show critical Path and calculate Project duration. **08**

Activity	Duration (days)	Preceding Activity
A. Site selection	7	---
B. Digging well	3	A
C. Laying field channels	15	B
D. Procurement of Pump	7	A
E. Installation of pump	3	D, B
F. Test run	2	C, E

Q.3 Draw Critical Path and Project Duration. Assuming the activities are scheduled on the Earliest Start Time (EST) calculate the manpower requirement for the project with Histograph. **08**

Activity	Duration (days)	Preceding Activity	Manpower/day
A. Land preparation	3	----	4
B. Digging pits	5	A	4
C. Purchase saplings	3	A	2
D. Application of FYM	3	B	3
E. Transplants saplings	4	C,D	4

Q.4 For the project with data given in Table 2 **08**

a) Develop the A-O-A network

b) Under standard PERT assumptions determine the critical path

Table 2

Job	Predecessors	Duration (a,m,b)
A	--	2,5,8
B	--	2,2,14
C	A	3,6,9
D	A	2,8,14
E	A	2,8,14
F	B,C	3,6,15
G	D,F	6,15,24
H	D,F	1,4,7
I	E,H	1,7,13

Q.5 **a)** Explain the views available in MS Project software. **04**

b) Explain Role of information in decision making. **04**

Section – II

Q.6 **a)** What is cash flow diagram? Explain in details with example. **04**

b) Maintenance cost for new bridge with an expected 50 years life was estimated to be Rs.10000 each year for the first five years followed by a Rs.100000 expenditure in the 15^{th} year and Rs.100000 expenditure in 30^{th} year. If i = 10% per year, what is the equivalent uniform annual cost over the entire 50 year period? **06**

Q.7 **a)** Which are the various types of Single Payment factor? Explain any one of them. **05**

b) A father, on the day his son is born, wishes to determine what amount would have to be paid into an account now bearing interest at 12% compounded quarterly to provide payment of Rs.100000 on his sons 20^{th} birthday? Assist him to determine. **04**

Q.8 **a)** A project proposed for a new building involves capital investment of Rs.100000. It has salvage value of Rs. 20000 and annual receipts is Rs. 32200 & O&M cost is Rs. 22300. What is the internal rate of return, if the life of building is 12 years? **04**

b) What is time value of money? **05**

Q.9 **Write short notes.** **09**

a) Value engineering

b) BOT

c) Effective and Nominal interest rate

Seat No.	

Set | P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – II

Day & Date: Wednesday, 27-11-2019 Max. Marks: 100
Time: 10:00 AM To 01:00 PM

Instructions: 1) Assume suitable data wherever needed & mention it.
2) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 20

1) Check rails are provided on the curves to _____.
   a) Reduce the lateral wear on outer rail
   b) Prevent the outer wheel flange from mounting the outer rail
   c) Prevent the vehicles from derailment
   d) All the above

2) Coning of wheels prevents _____.
   a) Rubbing the inside face of the rail head
   b) Lateral movement of the axle with its wheels
   c) Both (a) and (b)
   d) None the above

3) The Signal which is provided next to Warner signal on the station yard is _____.
   a) Inner signal b) Outer signal
   c) Home signal d) None

4) The longitudinal movement of rails in a track is called as _____.
   a) Creep of rails b) Check of rails
   c) Hugging of rails d) None

5) When the crossing is seen standing at the toe of switch, the direction is called as _____.
   a) Facing direction b) Backing direction
   c) Reserve direction d) None

6) When the Railway line and road cross each other at the same level, it is called as _____.
   a) Road crossing b) Railway crossing
   c) Level crossing d) None

7) The maximum rising gradient which is provided keeping in view the power, of locomotive is _____.
   a) Exceptional gradient b) Ruling gradient
   c) Rising gradient d) None

8) Runway threshold is indicated by a series of parallel lines starting from a distance of _____.
   a) 3 m from runway end b) 6 m from runway end
   c) 10 m from runway end d) 15 m from runway end

9) For supersonic aircraft, the minimum turning radius of taxiway is _____.
   a) 60m b) 120m
   c) 180m d) 240m

10) The runway length after correcting the elevation and temperature is 2845m. If the effective gradient on runway is 0.5 percent then the revised runway length will be _____.
   a) 2845 m b) 2910 m
   c) 3030 m d) 3130 m

11) The construction in the form of a cluster of closely spaced piles is known as _____.
   a) Dolphins b) Piers
   c) Wharf d) Jetty

12) The permissible cross wind component does not exceed _____.
   a) 35 kmph b) 25 kmph
   c) 20 kmph d) 40 kmph

13) Gauge width for N.G. Track is _____.
   a) 1.67 m b) 1 m
   c) .762 m d) None

14) Which of the following is used for servicing and repair of aircraft?
   a) Apron b) terminal building
   c) holding apron d) hanger

15) According to ICAO, all marking on runways are.
   a) white b) black
   c) yellow d) green

16) Calm period is the percentage of time during which wind intensity is less than _____.
   a) 4.8 kmph b) 6.4 kmph
   c) 8 kmph d) 9.6 kmph

17) The minimum width of clearway is _____.
   a) 50m b) 100m
   c) 150m d) 250m

18) Usually jetties are constructed _____.
   a) Perpendicular to the shore b) Parallel to the shore
   c) Skew to the shore d) Both a) and b)

19) Buoys which support the cables to which vessels are attached are of _____.
   a) cylindrical shape b) drum
   c) pear shaped d) all of these

20) If F is the fetch, the straight line distance of open water available in kilometers, the height of the wave in meters is _____.
   a) 0.15 F b) 0.20 F
   c) 0.28 F d) 0.34 F

SLR-FM-56

Seat No.	

Set P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – II

Day & Date: Wednesday, 27-11-2019 Max. Marks: 80
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.
3) Assume suitable data wherever needed & mention it.

Section – I

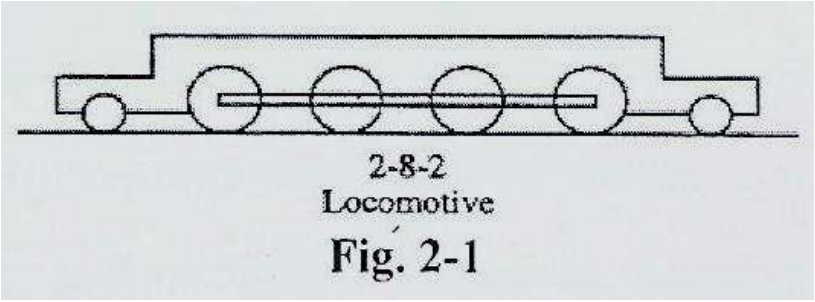
Q.2 Answer any there of the following questions. **24**

a) What do you understand by a railway track or a permanent way? Mention the requirements of an ideal permanent way.

b) Discuss the necessity and effects of coning of wheels.

c) Compare the characteristics of the different types of sleepers used in our country.

d) A locomotive as shown in fig. 2-1 is required to haul a train at 80 km p.h. The axle load of the driving wheels of the engine is 22.50 tonnes. The train is to run on a straight level track. Find the maximum permissible train load that the engine can pull.
If the train climbs a gradient of 1 in 200. how much of the speed should be reduced?



2-8-2
Locomotive
Fig. 2-1

Q.3 Answer any two of the following questions. **16**

a) Draw a neat sketch of a right hand turnout taking off from a straight broad gauge track and name thereon the various component parts and important terms connected with the layout.

b) Calculate the lead and radius of a 1 in 8.5 BG turnout for 90R rails using Cole's method. Assume G=1.676m, d=120mm, α=6°42'35".

c) Briefly describe the locations and purposes of the following signals.
1) Warner
2) Outer
3) Home
4) Starter
5) Advance starter

Section – II

Q.4 Answer any three of the following questions. **24**

a) What are the factors to be considered while selecting site for airport.

b) Draw cross-section of runway showing all component parts and explain it in detail.

c) At an airport site at sea level with standard atmospheric conditions, the runway lengths required for take-off and landing are 2000 m and 2400m respectively. The proposed airport is situated at an altitude of 150m. If the airport reference temperature is 25^0C and the effective runway gradient is 0.35 percent, calculate the length of runway to be provided.

d) Write a short note on wind rose diagram with neat sketch.

Q.5 Answer any two of the following questions. **16**

a) Define harbour? List different classes of harbour, explain any one with neat sketch.

b) What are fenders? Why are they used? Describe various types of fenders with sketches.

c) Why it is necessary to provide facilities like aprons, transit sheds and warehouses at the ports.

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – II

Day & Date: Wednesday, 27-11-2019 Max. Marks: 100
Time: 10:00 AM To 01:00 PM

Instructions: 1) Assume suitable data wherever needed & mention it.
2) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 20

1) When the Railway line and road cross each other at the same level, it is called as _____.
   a) Road crossing b) Railway crossing
   c) Level crossing d) None

2) The maximum rising gradient which is provided keeping in view the power, of locomotive is _____.
   a) Exceptional gradient b) Ruling gradient
   c) Rising gradient d) None

3) Runway threshold is indicated by a series of parallel lines starting from a distance of _____.
   a) 3 m from runway end b) 6 m from runway end
   c) 10 m from runway end d) 15 m from runway end

4) For supersonic aircraft, the minimum turning radius of taxiway is _____.
   a) 60m b) 120m
   c) 180m d) 240m

5) The runway length after correcting the elevation and temperature is 2845m. If the effective gradient on runway is 0.5 percent then the revised runway length will be _____.
   a) 2845 m b) 2910 m
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6) The construction in the form of a cluster of closely spaced piles is known as _____.
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   c) Wharf d) Jetty

7) The permissible cross wind component does not exceed _____.
   a) 35 kmph b) 25 kmph
   c) 20 kmph d) 40 kmph

8) Gauge width for N.G. Track is _____.
   a) 1.67 m b) 1 m
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15) If F is the fetch, the straight line distance of open water available in kilometers, the height of the wave in meters is _____.
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   a) Creep of rails b) Check of rails
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20) When the crossing is seen standing at the toe of switch, the direction is called as _____.
   a) Facing direction b) Backing direction
   c) Reserve direction d) None

SLR-FM-56

Seat No.	

Set Q

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – II

Day & Date: Wednesday, 27-11-2019 Max. Marks: 80
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.
3) Assume suitable data wherever needed & mention it.

Section – I

Q.2 Answer any there of the following questions. **24**

a) What do you understand by a railway track or a permanent way? Mention the requirements of an ideal permanent way.

b) Discuss the necessity and effects of coning of wheels.

c) Compare the characteristics of the different types of sleepers used in our country.

d) A locomotive as shown in fig. 2-1 is required to haul a train at 80 km p.h. The axle load of the driving wheels of the engine is 22.50 tonnes. The train is to run on a straight level track. Find the maximum permissible train load that the engine can pull.
If the train climbs a gradient of 1 in 200. how much of the speed should be reduced?

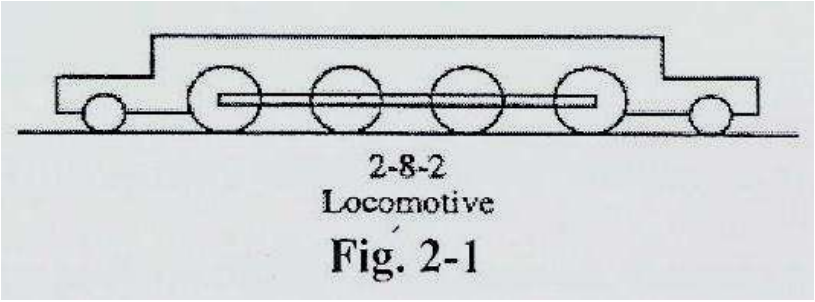

Fig. 2-1

Q.3 Answer any two of the following questions. **16**

a) Draw a neat sketch of a right hand turnout taking off from a straight broad gauge track and name thereon the various component parts and important terms connected with the layout.

b) Calculate the lead and radius of a 1 in 8.5 BG turnout for 90R rails using Cole's method. Assume G=1.676m, d=120mm, α=6°42'35".

c) Briefly describe the locations and purposes of the following signals.
1) Warner
2) Outer
3) Home
4) Starter
5) Advance starter

Section – II

Q.4 Answer any three of the following questions. **24**

a) What are the factors to be considered while selecting site for airport.

b) Draw cross-section of runway showing all component parts and explain it in detail.

c) At an airport site at sea level with standard atmospheric conditions, the runway lengths required for take-off and landing are 2000 m and 2400m respectively. The proposed airport is situated at an altitude of 150m. If the airport reference temperature is 25^0C and the effective runway gradient is 0.35 percent, calculate the length of runway to be provided.

d) Write a short note on wind rose diagram with neat sketch.

Q.5 Answer any two of the following questions. **16**

a) Define harbour? List different classes of harbour, explain any one with neat sketch.

b) What are fenders? Why are they used? Describe various types of fenders with sketches.

c) Why it is necessary to provide facilities like aprons, transit sheds and warehouses at the ports.

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – II

Day & Date: Wednesday, 27-11-2019 Max. Marks: 100
Time: 10:00 AM To 01:00 PM

Instructions: 1) Assume suitable data wherever needed & mention it.
2) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 20

1) The construction in the form of a cluster of closely spaced piles is known as _____.
   a) Dolphins b) Piers
   c) Wharf d) Jetty

2) The permissible cross wind component does not exceed _____.
   a) 35 kmph b) 25 kmph
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3) Gauge width for N.G. Track is _____.
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   a) white b) black
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7) The minimum width of clearway is _____.
   a) 50m b) 100m
   c) 150m d) 250m

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   a) 3 m from runway end b) 6 m from runway end
   c) 10 m from runway end d) 15 m from runway end

19) For supersonic aircraft, the minimum turning radius of taxiway is _____.
   a) 60m b) 120m
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20) The runway length after correcting the elevation and temperature is 2845m. If the effective gradient on runway is 0.5 percent then the revised runway length will be _____.
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SLR-FM-56

Seat No.	

Set R

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – II

Day & Date: Wednesday, 27-11-2019 Max. Marks: 80
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.
3) Assume suitable data wherever needed & mention it.

Section – I

Q.2 Answer any there of the following questions. **24**

a) What do you understand by a railway track or a permanent way? Mention the requirements of an ideal permanent way.

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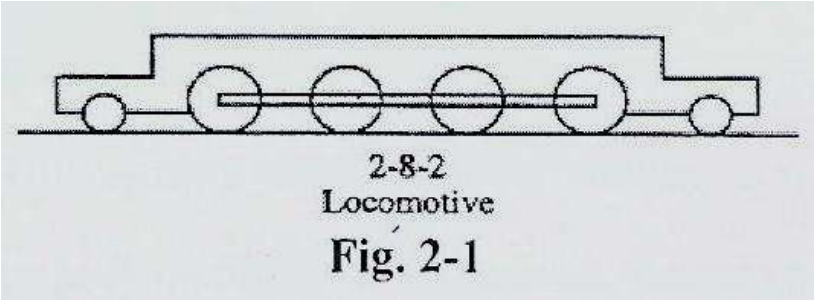
c) Compare the characteristics of the different types of sleepers used in our country.

d) A locomotive as shown in fig. 2-1 is required to haul a train at 80 km p.h. The axle load of the driving wheels of the engine is 22.50 tonnes. The train is to run on a straight level track. Find the maximum permissible train load that the engine can pull.
If the train climbs a gradient of 1 in 200. how much of the speed should be reduced?



2-8-2
Locomotive
Fig. 2-1

Q.3 Answer any two of the following questions. **16**

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c) Briefly describe the locations and purposes of the following signals.
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2) Outer
3) Home
4) Starter
5) Advance starter

Section – II

Q.4 Answer any three of the following questions. **24**

a) What are the factors to be considered while selecting site for airport.

b) Draw cross-section of runway showing all component parts and explain it in detail.

c) At an airport site at sea level with standard atmospheric conditions, the runway lengths required for take-off and landing are 2000 m and 2400m respectively. The proposed airport is situated at an altitude of 150m. If the airport reference temperature is 25^0C and the effective runway gradient is 0.35 percent, calculate the length of runway to be provided.

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Q.5 Answer any two of the following questions. **16**

a) Define harbour? List different classes of harbour, explain any one with neat sketch.

b) What are fenders? Why are they used? Describe various types of fenders with sketches.

c) Why it is necessary to provide facilities like aprons, transit sheds and warehouses at the ports.

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – II

Day & Date: Wednesday, 27-11-2019 Max. Marks: 100
Time: 10:00 AM To 01:00 PM

Instructions: 1) Assume suitable data wherever needed & mention it.
2) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 20

1) Calm period is the percentage of time during which wind intensity is less than _____.
   a) 4.8 kmph b) 6.4 kmph
   c) 8 kmph d) 9.6 kmph

2) The minimum width of clearway is _____.
   a) 50m b) 100m
   c) 150m d) 250m

3) Usually jetties are constructed _____.
   a) Perpendicular to the shore b) Parallel to the shore
   c) Skew to the shore d) Both a) and b)

4) Buoys which support the cables to which vessels are attached are of _____.
   a) cylindrical shape b) drum
   c) pear shaped d) all of these

5) If F is the fetch, the straight line distance of open water available in kilometers, the height of the wave in meters is _____.
   a) 0.15 F b) 0.20 F
   c) 0.28 F d) 0.34 F

6) Check rails are provided on the curves to _____.
   a) Reduce the lateral wear on outer rail
   b) Prevent the outer wheel flange from mounting the outer rail
   c) Prevent the vehicles from derailment
   d) All the above

7) Coning of wheels prevents _____.
   a) Rubbing the inside face of the rail head
   b) Lateral movement of the axle with its wheels
   c) Both (a) and (b)
   d) None the above

8) The Signal which is provided next to Warner signal on the station yard is _____.
   a) Inner signal b) Outer signal
   c) Home signal d) None

9) The longitudinal movement of rails in a track is called as _____.
   a) Creep of rails b) Check of rails
   c) Hugging of rails d) None

10) When the crossing is seen standing at the toe of switch, the direction is called as _____.
   a) Facing direction b) Backing direction
   c) Reserve direction d) None

11) When the Railway line and road cross each other at the same level, it is called as _____.
   a) Road crossing b) Railway crossing
   c) Level crossing d) None

12) The maximum rising gradient which is provided keeping in view the power, of locomotive is _____.
   a) Exceptional gradient b) Ruling gradient
   c) Rising gradient d) None

13) Runway threshold is indicated by a series of parallel lines starting from a distance of _____.
   a) 3 m from runway end b) 6 m from runway end
   c) 10 m from runway end d) 15 m from runway end

14) For supersonic aircraft, the minimum turning radius of taxiway is _____.
   a) 60m b) 120m
   c) 180m d) 240m

15) The runway length after correcting the elevation and temperature is 2845m. If the effective gradient on runway is 0.5 percent then the revised runway length will be _____.
   a) 2845 m b) 2910 m
   c) 3030 m d) 3130 m

16) The construction in the form of a cluster of closely spaced piles is known as _____.
   a) Dolphins b) Piers
   c) Wharf d) Jetty

17) The permissible cross wind component does not exceed _____.
   a) 35 kmph b) 25 kmph
   c) 20 kmph d) 40 kmph

18) Gauge width for N.G. Track is _____.
   a) 1.67 m b) 1 m
   c) .762 m d) None

19) Which of the following is used for servicing and repair of aircraft?
   a) Apron b) terminal building
   c) holding apron d) hanger

20) According to ICAO, all marking on runways are.
   a) white b) black
   c) yellow d) green

SLR-FM-56

Seat No.	

Set S

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – II

Day & Date: Wednesday, 27-11-2019 Max. Marks: 80
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.
3) Assume suitable data wherever needed & mention it.

Section – I

Q.2 Answer any there of the following questions. **24**

a) What do you understand by a railway track or a permanent way? Mention the requirements of an ideal permanent way.

b) Discuss the necessity and effects of coning of wheels.

c) Compare the characteristics of the different types of sleepers used in our country.

d) A locomotive as shown in fig. 2-1 is required to haul a train at 80 km p.h. The axle load of the driving wheels of the engine is 22.50 tonnes. The train is to run on a straight level track. Find the maximum permissible train load that the engine can pull.
If the train climbs a gradient of 1 in 200. how much of the speed should be reduced?

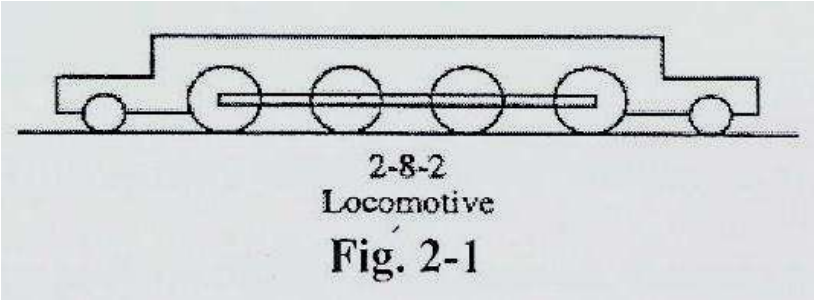

Fig. 2-1

Q.3 Answer any two of the following questions. **16**

a) Draw a neat sketch of a right hand turnout taking off from a straight broad gauge track and name thereon the various component parts and important terms connected with the layout.

b) Calculate the lead and radius of a 1 in 8.5 BG turnout for 90R rails using Cole's method. Assume G=1.676m, d=120mm, α=6°42'35".

c) Briefly describe the locations and purposes of the following signals.
1) Warner
2) Outer
3) Home
4) Starter
5) Advance starter

Section – II

Q.4 Answer any three of the following questions. **24**

a) What are the factors to be considered while selecting site for airport.

b) Draw cross-section of runway showing all component parts and explain it in detail.

c) At an airport site at sea level with standard atmospheric conditions, the runway lengths required for take-off and landing are 2000 m and 2400m respectively. The proposed airport is situated at an altitude of 150m. If the airport reference temperature is 25^0C and the effective runway gradient is 0.35 percent, calculate the length of runway to be provided.

d) Write a short note on wind rose diagram with neat sketch.

Q.5 Answer any two of the following questions. **16**

a) Define harbour? List different classes of harbour, explain any one with neat sketch.

b) What are fenders? Why are they used? Describe various types of fenders with sketches.

c) Why it is necessary to provide facilities like aprons, transit sheds and warehouses at the ports.

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Softening point of bitumen to be used for road construction at a place where maximum temperature is 40° should be _____.
   a) Less than 40° b) Greater than 40°
   c) Equal to 40° d) None of these

2) Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates, _____.
   a) Potholes b) Ravelling
   c) Edge breaking d) Rutting

3) Critical combination of stresses for corner region in cement concrete road is _____.
   a) Load stress + warping stress - frictional stress
   b) Load stress + warping stress + frictional stress
   c) Load stress + warping stress
   d) Load stress + frictional stress

4) In highway construction, rolling starts from _____.
   a) Sides and proceed to centre
   b) Centre and proceed to sides
   c) One side and proceed to other side
   d) Any of the above

5) When the bituminous surfacing is done on already existing black top road, the type of treatment to be given is _____.
   a) Seal coat b) Tack coat
   c) Prime coat d) Fog seal

6) The maximum spacing of contraction joints in rigid pavements is, _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) 5.5m

7) Maximum thickness of expansion joint in rigid pavement is _____.
   a) 10 mm b) 25 mm
   c) 50 mm d) 100 mm

8) Match List-I(Test) with List-II(Purpose) and select the correct answer using the codes: _____.

	List – I		List – II
A)	Impact test	1)	Bitumen
B)	Los Angeles abrasion test	2)	Toughness
C)	Crushing test	3)	Hardness
D)	Stripping test	4)	Strength

Codes:

	A	**B**	**C**	**D**
a)	2	3	4	1
b)	4	1	2	3
c)	4	3	2	1
d)	2	1	4	3

9) Most suitable material for highway embankment is _____.

a) Granular soil b) Organic clay
c) Silty soil d) Clayey soil

10) The most suitable equipment for compacting clayey soil is: _____.

a) Smooth wheeled roller b) Pneumatic tyred roller
c) Sheep foot roller d) Vibratory roller

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

Q.2 Answer any five questions. **40**

a) Discuss the importance of gross wheel load and contact pressure in stress distribution pattern and in pavement design. Illustrate with stress distribution diagram.

b) Explain the importance of:
i) Softening Point Test
ii) Ductility Test of Bitumen

c) Explain various types of joints provided in cement concrete pavement with neat sketches.

d) The number of commercial vehicles per day at present count is 6000. Design life is 15 years. Traffic growth rate is 8%, VDF is 4.5, lateral distribution factor for 6 lane divided highway is 0.6. Calculate the number of standard axles in the design life if the construction period is 2 years.

e) Mention the specifications of materials and construction steps for Wet Mix Macadam.

f) List the different distresses in flexible pavement. Explain any two distresses with suitable remedial measure.

g) Explain the causes of for mud pumping in CC pavements. Explain how this leads to failure of CC pavement slabs.

h) The plate bearing tests were conducted with 30cm plate diameter on soil subgrade and over a base course of thickness 45cm. The pressures yielded at 0.5cm deflection on the subgrade and base course were 1.25kg/cm^2 and 8.0kg/cm^2 respectively. Design the pavement section for 5100kg wheel load with tyre pressure of 7kg/cm^2 for an allowable deflection of 0.5cm using Burmister's two - layer deflection factor chart **(Use Figure-1).**

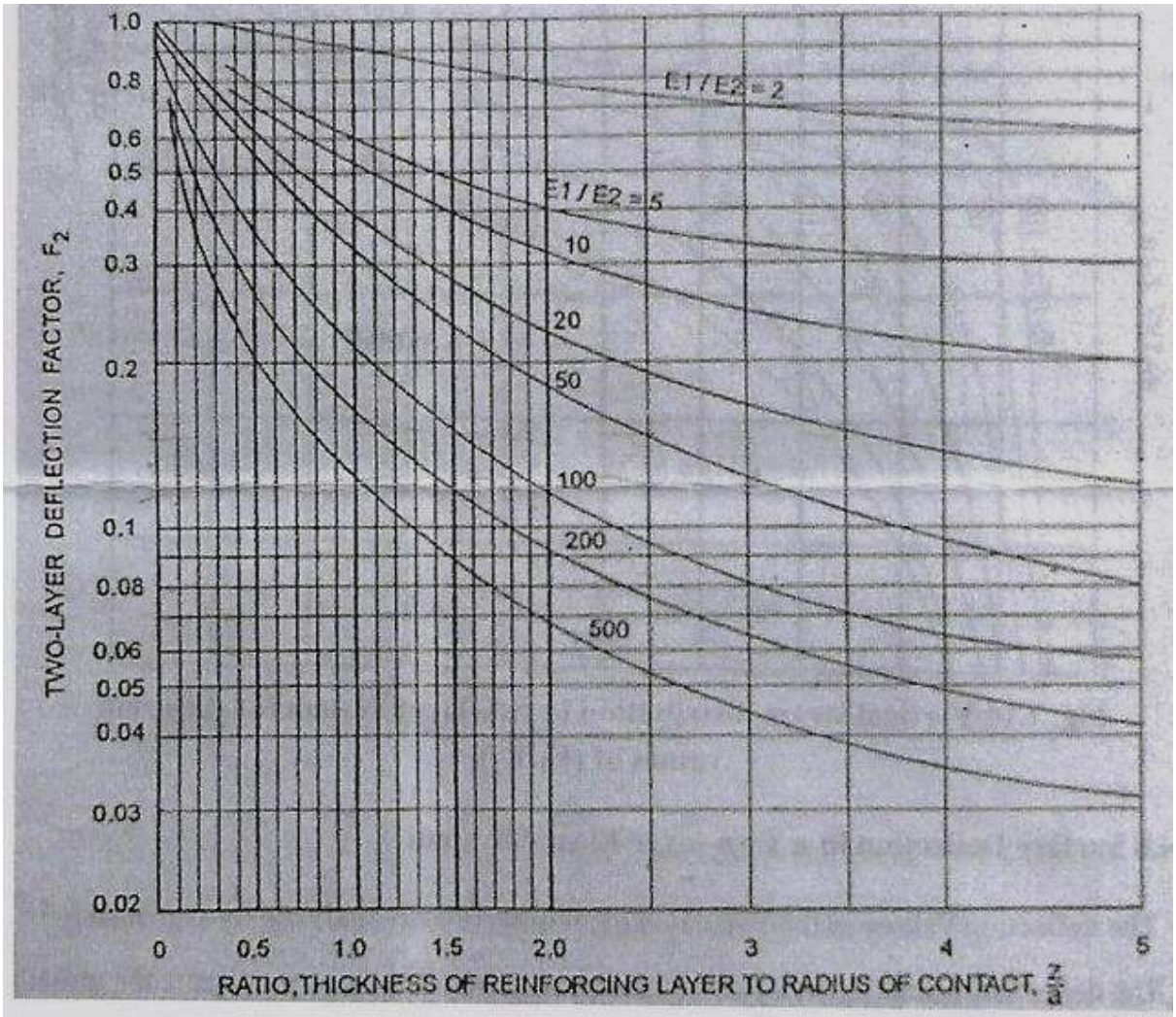

Figure-1-Burmister's two layer deflection factors

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) The maximum spacing of contraction joints in rigid pavements is, _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) 5.5m

2) Maximum thickness of expansion joint in rigid pavement is _____.
   a) 10 mm b) 25 mm
   c) 50 mm d) 100 mm

3) Match List-I(Test) with List-II(Purpose) and select the correct answer using the codes: _____.

	List – I		List – II
A)	Impact test	1)	Bitumen
B)	Los Angeles abrasion test	2)	Toughness
C)	Crushing test	3)	Hardness
D)	Stripping test	4)	Strength

Codes:

	A	**B**	**C**	**D**
a)	2	3	4	1
b)	4	1	2	3
c)	4	3	2	1
d)	2	1	4	3

4) Most suitable material for highway embankment is _____.
   a) Granular soil b) Organic clay
   c) Silty soil d) Clayey soil

5) The most suitable equipment for compacting clayey soil is: _____.
   a) Smooth wheeled roller b) Pneumatic tyred roller
   c) Sheep foot roller d) Vibratory roller

6) Softening point of bitumen to be used for road construction at a place where maximum temperature is 40° should be _____.
   a) Less than 40° b) Greater than 40°
   c) Equal to 40° d) None of these

7) Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates, _____.
   a) Potholes
   b) Ravelling
   c) Edge breaking
   d) Rutting

8) Critical combination of stresses for corner region in cement concrete road is _____.
   a) Load stress + warping stress - frictional stress
   b) Load stress + warping stress + frictional stress
   c) Load stress + warping stress
   d) Load stress + frictional stress

9) In highway construction, rolling starts from _____.
   a) Sides and proceed to centre
   b) Centre and proceed to sides
   c) One side and proceed to other side
   d) Any of the above

10) When the bituminous surfacing is done on already existing black top road, the type of treatment to be given is _____.
   a) Seal coat
   b) Tack coat
   c) Prime coat
   d) Fog seal

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

Q.2 Answer any five questions. **40**

a) Discuss the importance of gross wheel load and contact pressure in stress distribution pattern and in pavement design. Illustrate with stress distribution diagram.

b) Explain the importance of:
i) Softening Point Test
ii) Ductility Test of Bitumen

c) Explain various types of joints provided in cement concrete pavement with neat sketches.

d) The number of commercial vehicles per day at present count is 6000. Design life is 15 years. Traffic growth rate is 8%, VDF is 4.5, lateral distribution factor for 6 lane divided highway is 0.6. Calculate the number of standard axles in the design life if the construction period is 2 years.

e) Mention the specifications of materials and construction steps for Wet Mix Macadam.

f) List the different distresses in flexible pavement. Explain any two distresses with suitable remedial measure.

g) Explain the causes of for mud pumping in CC pavements. Explain how this leads to failure of CC pavement slabs.

h) The plate bearing tests were conducted with 30cm plate diameter on soil subgrade and over a base course of thickness 45cm. The pressures yielded at 0.5cm deflection on the subgrade and base course were 1.25kg/cm^2 and 8.0kg/cm^2 respectively. Design the pavement section for 5100kg wheel load with tyre pressure of 7kg/cm^2 for an allowable deflection of 0.5cm using Burmister's two - layer deflection factor chart **(Use Figure-1).**

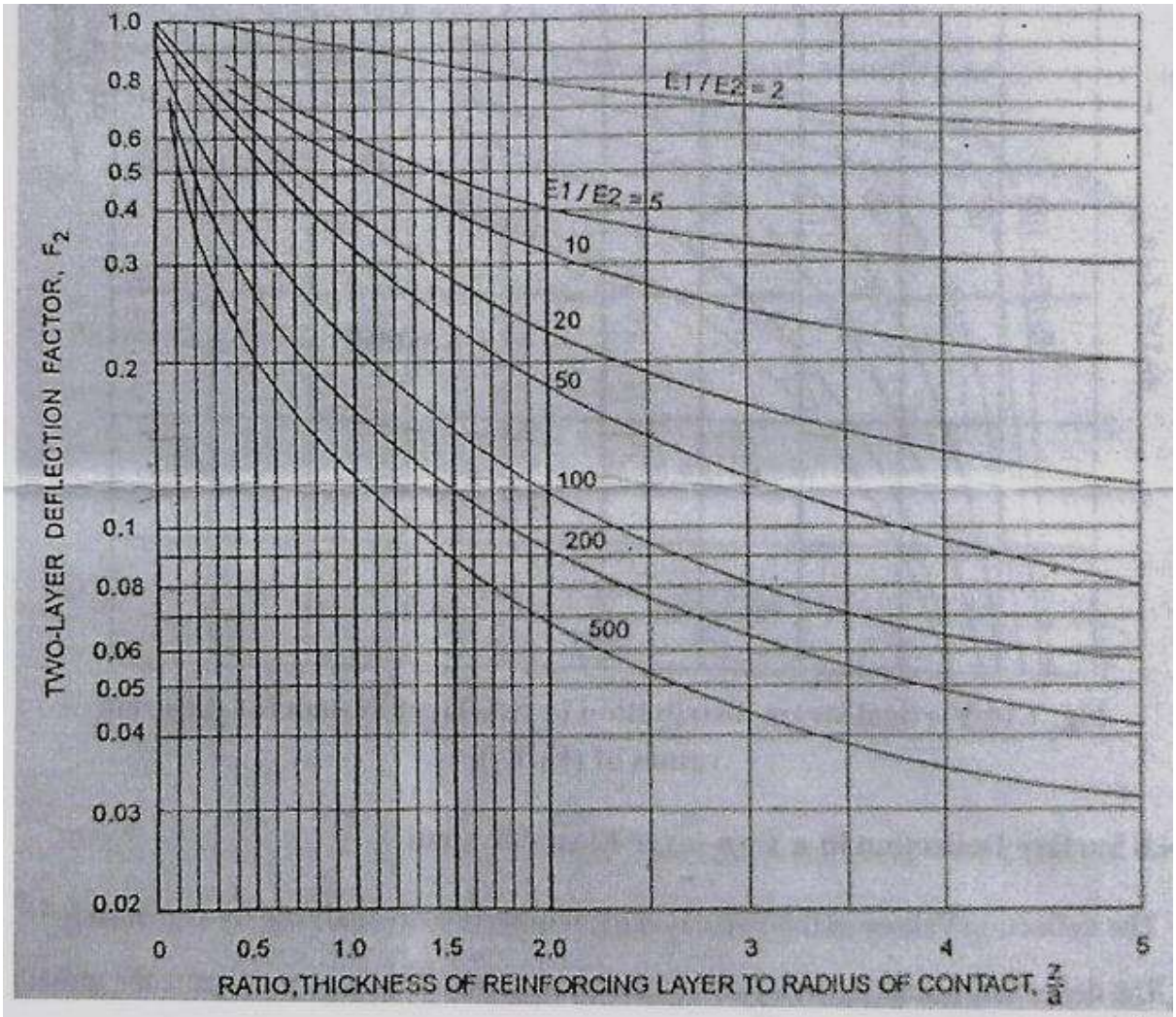

Figure-1-Burmister's two layer deflection factors

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Most suitable material for highway embankment is _____.
   a) Granular soil b) Organic clay
   c) Silty soil d) Clayey soil

2) The most suitable equipment for compacting clayey soil is: _____.
   a) Smooth wheeled roller b) Pneumatic tyred roller
   c) Sheep foot roller d) Vibratory roller

3) Softening point of bitumen to be used for road construction at a place where maximum temperature is 40° should be _____.
   a) Less than 40° b) Greater than 40°
   c) Equal to 40° d) None of these

4) Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates, _____.
   a) Potholes b) Ravelling
   c) Edge breaking d) Rutting

5) Critical combination of stresses for corner region in cement concrete road is _____.
   a) Load stress + warping stress - frictional stress
   b) Load stress + warping stress + frictional stress
   c) Load stress + warping stress
   d) Load stress + frictional stress

6) In highway construction, rolling starts from _____.
   a) Sides and proceed to centre
   b) Centre and proceed to sides
   c) One side and proceed to other side
   d) Any of the above

7) When the bituminous surfacing is done on already existing black top road, the type of treatment to be given is _____.
   a) Seal coat b) Tack coat
   c) Prime coat d) Fog seal

8) The maximum spacing of contraction joints in rigid pavements is, _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) 5.5m

9) Maximum thickness of expansion joint in rigid pavement is _____.
   a) 10 mm b) 25 mm
   c) 50 mm d) 100 mm

10) Match List-I(Test) with List-II(Purpose) and select the correct answer using the codes: _____.

	List – I		List – II
A)	Impact test	1)	Bitumen
B)	Los Angeles abrasion test	2)	Toughness
C)	Crushing test	3)	Hardness
D)	Stripping test	4)	Strength

Codes:

	A	**B**	**C**	**D**
a)	2	3	4	1
b)	4	1	2	3
c)	4	3	2	1
d)	2	1	4	3

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

Q.2 Answer any five questions. **40**

a) Discuss the importance of gross wheel load and contact pressure in stress distribution pattern and in pavement design. Illustrate with stress distribution diagram.

b) Explain the importance of:
i) Softening Point Test
ii) Ductility Test of Bitumen

c) Explain various types of joints provided in cement concrete pavement with neat sketches.

d) The number of commercial vehicles per day at present count is 6000. Design life is 15 years. Traffic growth rate is 8%, VDF is 4.5, lateral distribution factor for 6 lane divided highway is 0.6. Calculate the number of standard axles in the design life if the construction period is 2 years.

e) Mention the specifications of materials and construction steps for Wet Mix Macadam.

f) List the different distresses in flexible pavement. Explain any two distresses with suitable remedial measure.

g) Explain the causes of for mud pumping in CC pavements. Explain how this leads to failure of CC pavement slabs.

h) The plate bearing tests were conducted with 30cm plate diameter on soil subgrade and over a base course of thickness 45cm. The pressures yielded at 0.5cm deflection on the subgrade and base course were 1.25kg/cm^2 and 8.0kg/cm^2 respectively. Design the pavement section for 5100kg wheel load with tyre pressure of 7kg/cm^2 for an allowable deflection of 0.5cm using Burmister's two - layer deflection factor chart **(Use Figure-1).**

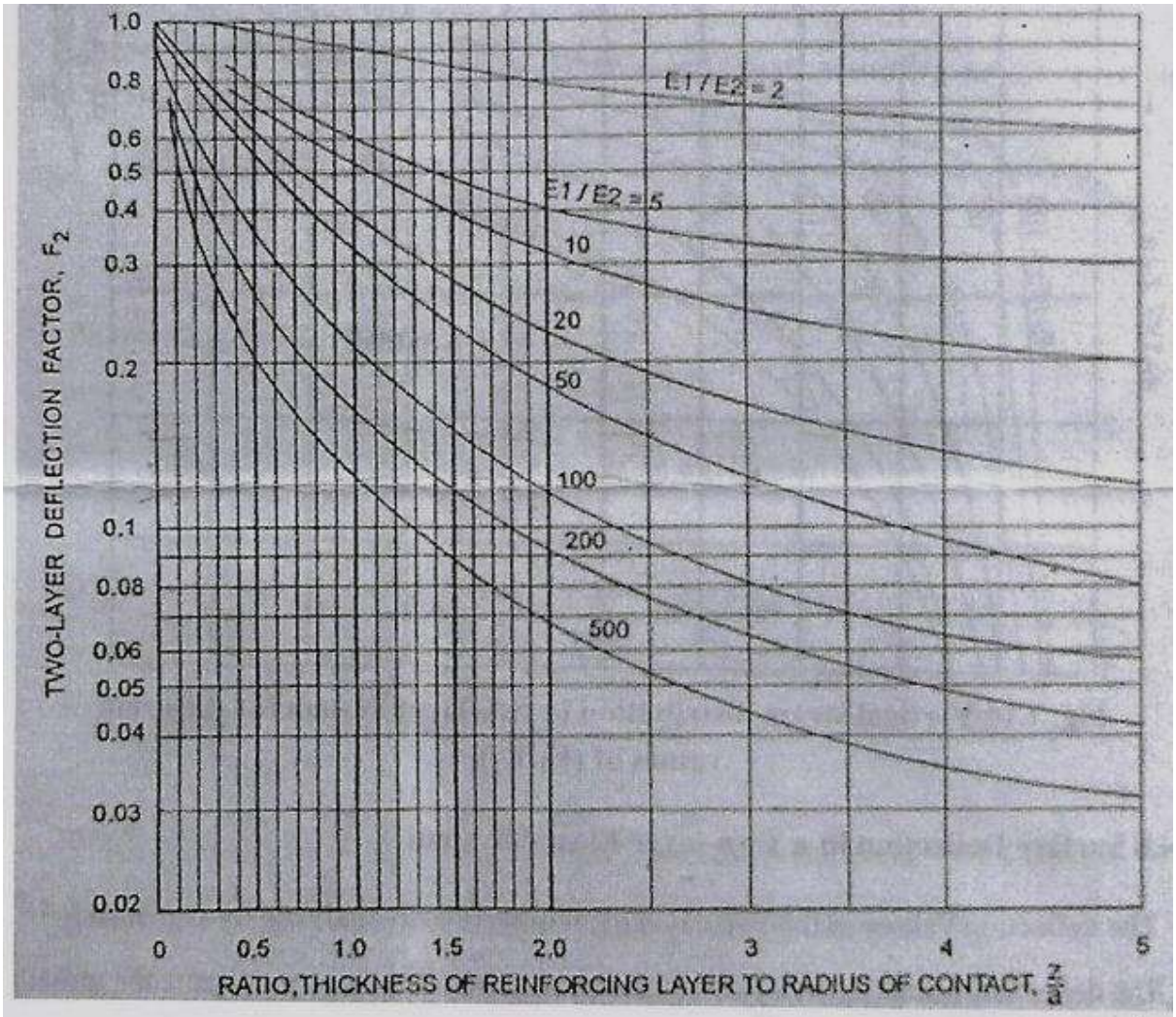

Figure-1-Burmister's two layer deflection factors

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Critical combination of stresses for corner region in cement concrete road is _____.
   a) Load stress + warping stress - frictional stress
   b) Load stress + warping stress + frictional stress
   c) Load stress + warping stress
   d) Load stress + frictional stress

2) In highway construction, rolling starts from _____.
   a) Sides and proceed to centre
   b) Centre and proceed to sides
   c) One side and proceed to other side
   d) Any of the above

3) When the bituminous surfacing is done on already existing black top road, the type of treatment to be given is _____.
   a) Seal coat b) Tack coat
   c) Prime coat d) Fog seal

4) The maximum spacing of contraction joints in rigid pavements is, _____.
   a) 2.5m b) 3.5m
   c) 4.5m d) 5.5m

5) Maximum thickness of expansion joint in rigid pavement is _____.
   a) 10 mm b) 25 mm
   c) 50 mm d) 100 mm

6) Match List-I(Test) with List-II(Purpose) and select the correct answer using the codes: _____.

	List – I		List – II
A)	Impact test	1)	Bitumen
B)	Los Angeles abrasion test	2)	Toughness
C)	Crushing test	3)	Hardness
D)	Stripping test	4)	Strength

Codes:

	A	**B**	**C**	**D**
a)	2	3	4	1
b)	4	1	2	3
c)	4	3	2	1
d)	2	1	4	3

7) Most suitable material for highway embankment is _____.

a) Granular soil b) Organic clay
c) Silty soil d) Clayey soil

8) The most suitable equipment for compacting clayey soil is: _____.

a) Smooth wheeled roller b) Pneumatic tyred roller
c) Sheep foot roller d) Vibratory roller

9) Softening point of bitumen to be used for road construction at a place where maximum temperature is 40° should be _____.

a) Less than 40° b) Greater than 40°
c) Equal to 40° d) None of these

10) Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates, _____.

a) Potholes b) Ravelling
c) Edge breaking d) Rutting

SLR-FM-57

Seat No.	

Set S

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PAVEMENT ANALYSIS AND DESIGN

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2.
2) Figures to right indicate full marks.
3) Assume suitable data, if required and state it clearly.

Q.2 Answer any five questions. **40**

a) Discuss the importance of gross wheel load and contact pressure in stress distribution pattern and in pavement design. Illustrate with stress distribution diagram.

b) Explain the importance of:
i) Softening Point Test
ii) Ductility Test of Bitumen

c) Explain various types of joints provided in cement concrete pavement with neat sketches.

d) The number of commercial vehicles per day at present count is 6000. Design life is 15 years. Traffic growth rate is 8%, VDF is 4.5, lateral distribution factor for 6 lane divided highway is 0.6. Calculate the number of standard axles in the design life if the construction period is 2 years.

e) Mention the specifications of materials and construction steps for Wet Mix Macadam.

f) List the different distresses in flexible pavement. Explain any two distresses with suitable remedial measure.

g) Explain the causes of for mud pumping in CC pavements. Explain how this leads to failure of CC pavement slabs.

h) The plate bearing tests were conducted with 30cm plate diameter on soil subgrade and over a base course of thickness 45cm. The pressures yielded at 0.5cm deflection on the subgrade and base course were 1.25kg/cm^2 and 8.0kg/cm^2 respectively. Design the pavement section for 5100kg wheel load with tyre pressure of 7kg/cm^2 for an allowable deflection of 0.5cm using Burmister's two - layer deflection factor chart **(Use Figure-1).**

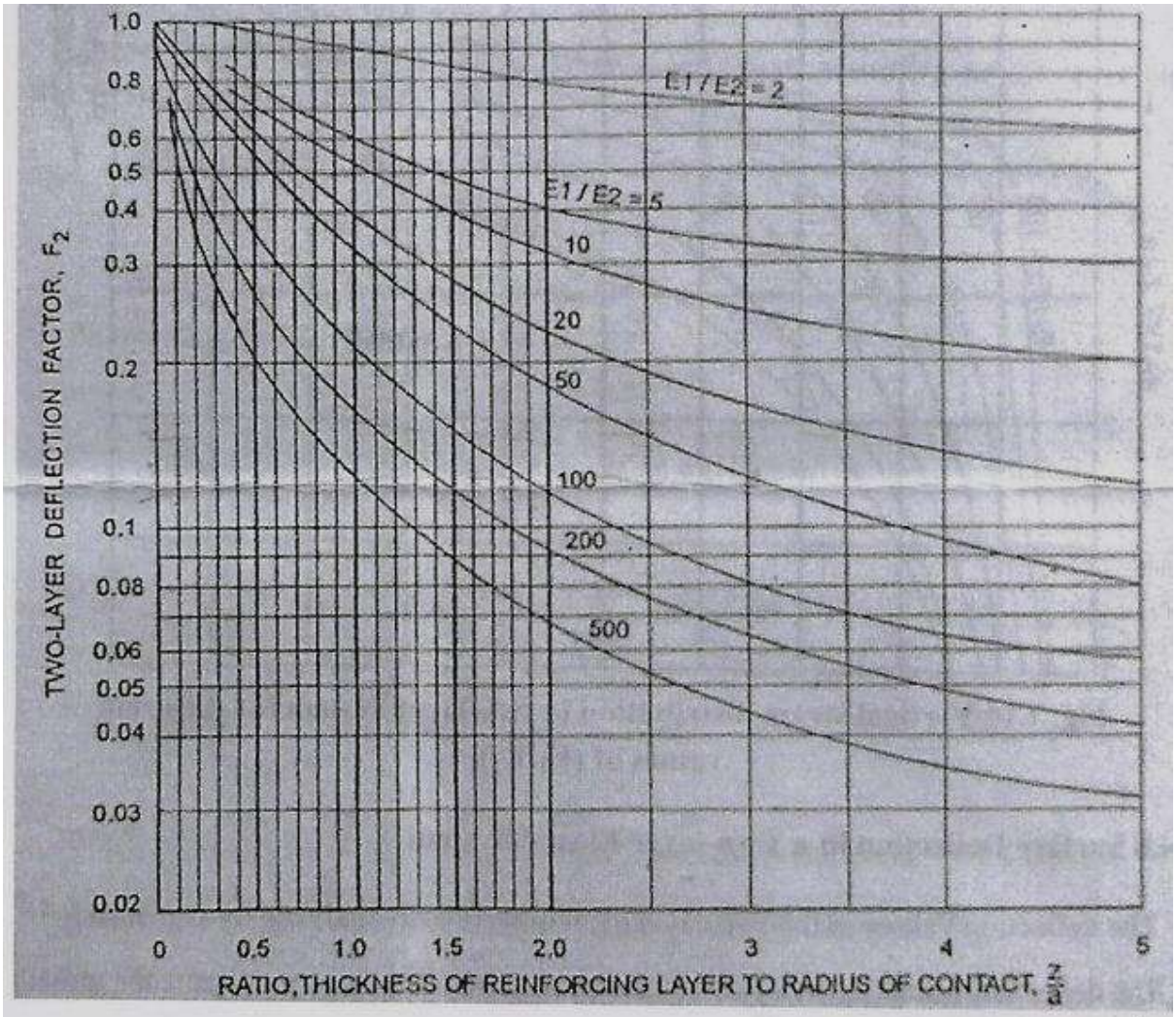

Figure-1-Burmister's two layer deflection factors

SLR-FM-58

Seat No.		Set	P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No.1 is compulsory and it should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume additional data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) To protect geosynthetic from UV exposure _____ is added to it.
   a) Plastic b) Carbon Black
   c) Benzene d) Cement

2) The shape of apertures in geonets is _____.
   a) Square b) Circular
   c) Triangular d) Diamond

3) A planar, polymeric product consisting of a mesh or net-like regular open network of intersecting tensile-resistant elements, integrally connected at the junctions, is called _____.
   a) Geotextile b) Geogrid
   c) Geonet d) Geocell

4) The materials used in the manufacturing of geosynthetics are primarily synthetic polymers generally derived from _____.
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

5) Indian standard for sampling of geosynthetic specimens is _____.
   a) IS 800 b) IS 14706
   c) IS 456 d) IS 2700

6) MFI is acronym for _____.
   a) Mount flow Instrument b) Money fix Installment
   c) Metal flow Index d) Melt flow Index

7) The core of GCL is made of _____.
   a) bentonite clay b) cement
   c) clay d) timber

8) Which of the following tests measures the toughness of road aggregates?
   a) Crushing strength test b) Abrasion test
   c) Impact test d) Shape test

9) The sum of flakiness index and elongation index should not exceed ____.
   a) 15 b) 20
   c) 30 d) 40

10) The width of grips for performing the grab tensile strength is, _____.
   a) 25 mm b) 10 mm
   c) 15 mm d) 35 mm

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume additional data, if required and state it clearly.

Q.2 Attempt any eight questions **40**

a) List the various functions performed by geosynthetics. Explain any one in detail.

b) Explain Geosynthtics application in pavement for separation and reinforcement.

c) Explain the process of construction of landfill using geosynthetics.

d) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier.

e) List the various processes by which,

i) non-woven geosynthetics
ii) geogrids are manufactured

f) What are the mechanical properties of geosynthetics?

g) How are impact and abrasion tests conducted?

h) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds.

i) With a neat sketch explain the procedure for
i) In plane permeability of geosynthetics.
ii) Grab tensile strength of geosynthetics.

j) What are the different construction factors that affect the performance of reinforced soil?

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No.1 is compulsory and it should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume additional data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) MFI is acronym for _____.
   a) Mount flow Instrument b) Money fix Installment
   c) Metal flow Index d) Melt flow Index

2) The core of GCL is made of _____.
   a) bentonite clay b) cement
   c) clay d) timber

3) Which of the following tests measures the toughness of road aggregates?
   a) Crushing strength test b) Abrasion test
   c) Impact test d) Shape test

4) The sum of flakiness index and elongation index should not exceed ____.
   a) 15 b) 20
   c) 30 d) 40

5) The width of grips for performing the grab tensile strength is, _____.
   a) 25 mm b) 10 mm
   c) 15 mm d) 35 mm

6) To protect geosynthetic from UV exposure _____ is added to it.
   a) Plastic b) Carbon Black
   c) Benzene d) Cement

7) The shape of apertures in geonets is _____.
   a) Square b) Circular
   c) Triangular d) Diamond

8) A planar, polymeric product consisting of a mesh or net-like regular open network of intersecting tensile-resistant elements, integrally connected at the junctions, is called _____.
   a) Geotextile b) Geogrid
   c) Geonet d) Geocell

9) The materials used in the manufacturing of geosynthetics are primarily synthetic polymers generally derived from _____.
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

10) Indian standard for sampling of geosynthetic specimens is _____.
   a) IS 800 b) IS 14706
   c) IS 456 d) IS 2700

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume additional data, if required and state it clearly.

Q.2 Attempt any eight questions **40**

a) List the various functions performed by geosynthetics. Explain any one in detail.

b) Explain Geosynthtics application in pavement for separation and reinforcement.

c) Explain the process of construction of landfill using geosynthetics.

d) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier.

e) List the various processes by which,

i) non-woven geosynthetics
ii) geogrids are manufactured

f) What are the mechanical properties of geosynthetics?

g) How are impact and abrasion tests conducted?

h) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds.

i) With a neat sketch explain the procedure for
i) In plane permeability of geosynthetics.
ii) Grab tensile strength of geosynthetics.

j) What are the different construction factors that affect the performance of reinforced soil?

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No.1 is compulsory and it should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume additional data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) The sum of flakiness index and elongation index should not exceed ____.
   a) 15 b) 20
   c) 30 d) 40

2) The width of grips for performing the grab tensile strength is, _____.
   a) 25 mm b) 10 mm
   c) 15 mm d) 35 mm

3) To protect geosynthetic from UV exposure _____ is added to it.
   a) Plastic b) Carbon Black
   c) Benzene d) Cement

4) The shape of apertures in geonets is _____.
   a) Square b) circular
   c) Triangular d) diamond

5) A planar, polymeric product consisting of a mesh or net-like regular open network of intersecting tensile-resistant elements, integrally connected at the junctions, is called _____.
   a) Geotextile b) Geogrid
   c) Geonet d) Geocell

6) The materials used in the manufacturing of geosynthetics are primarily synthetic polymers generally derived from _____.
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

7) Indian standard for sampling of geosynthetic specimens is _____.
   a) IS 800 b) IS 14706
   c) IS 456 d) IS 2700

8) MFI is acronym for _____.
   a) Mount flow Instrument b) Money fix Installment
   c) Metal flow Index d) Melt flow Index

9) The core of GCL is made of _____.
   a) bentonite clay b) cement
   c) clay d) timber

10) Which of the following tests measures the toughness of road aggregates?
   a) Crushing strength test b) Abrasion test
   c) Impact test d) Shape test

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume additional data, if required and state it clearly.

Q.2 Attempt any eight questions **40**

a) List the various functions performed by geosynthetics. Explain any one in detail.

b) Explain Geosynthtics application in pavement for separation and reinforcement.

c) Explain the process of construction of landfill using geosynthetics.

d) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier.

e) List the various processes by which,

i) non-woven geosynthetics
ii) geogrids are manufactured

f) What are the mechanical properties of geosynthetics?

g) How are impact and abrasion tests conducted?

h) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds.

i) With a neat sketch explain the procedure for
i) In plane permeability of geosynthetics.
ii) Grab tensile strength of geosynthetics.

j) What are the different construction factors that affect the performance of reinforced soil?

Seat No.		Set	S

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No.1 is compulsory and it should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.
3) Assume additional data, if required and state it clearly.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) A planar, polymeric product consisting of a mesh or net-like regular open network of intersecting tensile-resistant elements, integrally connected at the junctions, is called _____.
   a) Geotextile b) Geogrid
   c) Geonet d) Geocell

2) The materials used in the manufacturing of geosynthetics are primarily synthetic polymers generally derived from _____.
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

3) Indian standard for sampling of geosynthetic specimens is _____.
   a) IS 800 b) IS 14706
   c) IS 456 d) IS 2700

4) MFI is acronym for _____.
   a) Mount flow Instrument b) Money fix Installment
   c) Metal flow Index d) Melt flow Index

5) The core of GCL is made of _____.
   a) bentonite clay b) cement
   c) clay d) timber

6) Which of the following tests measures the toughness of road aggregates?
   a) Crushing strength test b) Abrasion test
   c) Impact test d) Shape test

7) The sum of flakiness index and elongation index should not exceed ____.
   a) 15 b) 20
   c) 30 d) 40

8) The width of grips for performing the grab tensile strength is, _____.
   a) 25 mm b) 10 mm
   c) 15 mm d) 35 mm

9) To protect geosynthetic from UV exposure _____ is added to it.
   a) Plastic b) Carbon Black
   c) Benzene d) Cement

10) The shape of apertures in geonets is _____.
   a) Square b) circular
   c) Triangular d) diamond

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOSYNTHETICS & REINFORCED SOIL STRUCTURES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume additional data, if required and state it clearly.

Q.2 Attempt any eight questions **40**

a) List the various functions performed by geosynthetics. Explain any one in detail.

b) Explain Geosynthtics application in pavement for separation and reinforcement.

c) Explain the process of construction of landfill using geosynthetics.

d) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier.

e) List the various processes by which,

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ii) geogrids are manufactured

f) What are the mechanical properties of geosynthetics?

g) How are impact and abrasion tests conducted?

h) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds.

i) With a neat sketch explain the procedure for
i) In plane permeability of geosynthetics.
ii) Grab tensile strength of geosynthetics.

j) What are the different construction factors that affect the performance of reinforced soil?

SLR-FM-59

Seat No.	

Set P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
PLANNING FOR SUSTAINABLE DEVELOPMENT

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume any suitable data if needed.

Attempt any five of the following question. (10 marks each) **50**

Q.1 Explain main principles of sustainable development.

Q.2 Write a short note on Innovation strategies & Environmental Management.

Q.3 What is institutional theory in sustainable development?

Q.4 Write a note on policy responses to environmental degradation.

Q.5 As a Civil Engineer discuss measures to be taken for sustainable development in civil engineering projects.

Q.6 Explain 'Squaring the circle' concept in sustainable management.

Q.7 How innovation contributes in sustainable development? Explain.

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) KAIZEN Means _____.
   a) Quality improvement Technique
   b) Change to become good
   c) Achieving Quality
   d) None

2) The underlying cause(s) of TQM deficiencies is (are): _____.
   a) The failure of managers to understand the concept of quality
   b) Costly implementation of quality management system
   c) Lack of employee involvement
   d) All of the given option

3) Total quality costs include: _____.
   a) Prevention costs b) Appraisal costs
   c) Failure costs d) All of the given options

4) MIS structure is based on _____.
   a) Management Activity b) Population
   c) Both a) and b) d) None

5) ISO 9000 seek's standardization in terms of _____.
   a) Products b) production procedures
   c) suppliers specifications d) procedures to manage quality

6) An _____ is a set of processes and procedures that transform data into information and knowledge.
   a) information system b) Knowledge system
   c) Database system d) Computer system

7) The objective of ISO-9000 family of Quality management is _____.
   a) Customer satisfaction b) Employee satisfaction
   c) Skill enhancement d) Environmental issues

8) TQM & ISO both focuses on _____.
   a) Customer b) Employee
   c) Supplier d) All of the above

9) The person who ensures that systems are developed on time, within budget, and with acceptable quality is a _____.
   a) systems designer
   b) project manager
   c) systems owner
   d) systems builder

10) Internal information for MIS may come from any one of the following department _____.
   a) Customers care department
   b) HR department
   c) Marketing department
   d) Production department

SLR-FM-60

Seat No.	

Set P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any four questions from Q. No.2.
2) Figures to right indicate full marks.

Q.2 Attempt any Four. **40**

a) What are the factors affecting the poor quality and Construction?

b) Differentiate between Quality Control and Quality Assurance.

c) Give Measures to overcome the causes responsible for poor quality of construction.

d) Discuss the advantages of implementing TQM in the Indian construction sector.

e) Define data and information. What are the major differences between them? Explain with the help of suitable Example.

f) What data information is required for planning of new road corridor between two megacities?

g) Write a detailed note on application of mobile technology in construction Industry.

SLR-FM-60

Seat No.	

Set Q

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) An _____ is a set of processes and procedures that transform data into information and knowledge.
   a) information system b) Knowledge system
   c) Database system d) Computer system

2) The objective of ISO-9000 family of Quality management is _____.
   a) Customer satisfaction b) Employee satisfaction
   c) Skill enhancement d) Environmental issues

3) TQM & ISO both focuses on _____.
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   c) Supplier d) All of the above

4) The person who ensures that systems are developed on time, within budget, and with acceptable quality is a _____.
   a) systems designer b) project manager
   c) systems owner d) systems builder

5) Internal information for MIS may come from any one of the following department _____.
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   c) Marketing department d) Production department

6) KAIZEN Means _____.
   a) Quality improvement Technique
   b) Change to become good
   c) Achieving Quality
   d) None

7) The underlying cause(s) of TQM deficiencies is (are): _____.
   a) The failure of managers to understand the concept of quality
   b) Costly implementation of quality management system
   c) Lack of employee involvement
   d) All of the given option

8) Total quality costs include: _____.
   a) Prevention costs b) Appraisal costs
   c) Failure costs d) All of the given options

9) MIS structure is based on _____.
   a) Management Activity b) Population
   c) Both a) and b) d) None

10) ISO 9000 seek's standardization in terms of _____.
   a) products b) production procedures
   c) suppliers specifications d) procedures to manage quality

SLR-FM-60

Seat No.	

Set Q

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any four questions from Q. No.2.
2) Figures to right indicate full marks.

Q.2 Attempt any Four. **40**

a) What are the factors affecting the poor quality and Construction?

b) Differentiate between Quality Control and Quality Assurance.

c) Give Measures to overcome the causes responsible for poor quality of construction.

d) Discuss the advantages of implementing TQM in the Indian construction sector.

e) Define data and information. What are the major differences between them? Explain with the help of suitable Example.

f) What data information is required for planning of new road corridor between two megacities?

g) Write a detailed note on application of mobile technology in construction Industry.

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) The person who ensures that systems are developed on time, within budget, and with acceptable quality is a _____.
   a) systems designer b) project manager
   c) systems owner d) systems builder

2) Internal information for MIS may come from any one of the following department _____.
   a) Customers care department b) HR department
   c) Marketing department d) Production department

3) KAIZEN Means _____.
   a) Quality improvement Technique
   b) Change to become good
   c) Achieving Quality
   d) None

4) The underlying cause(s) of TQM deficiencies is (are): _____.
   a) The failure of managers to understand the concept of quality
   b) Costly implementation of quality management system
   c) Lack of employee involvement
   d) All of the given option

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   a) Prevention costs b) Appraisal costs
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   c) Both a) and b) d) None

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   a) products b) production procedures
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8) An _____ is a set of processes and procedures that transform data into information and knowledge.
   a) information system b) Knowledge system
   c) Database system d) Computer system

9) The objective of ISO-9000 family of Quality management is _____.
   a) Customer satisfaction b) Employee satisfaction
   c) Skill enhancement d) Environmental issues

10) TQM & ISO both focuses on _____.
   a) Customer b) Employee
   c) Supplier d) All of the above

SLR-FM-60

Seat No.	

Set | **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any four questions from Q. No.2.
2) Figures to right indicate full marks.

Q.2 Attempt any Four. **40**

a) What are the factors affecting the poor quality and Construction?

b) Differentiate between Quality Control and Quality Assurance.

c) Give Measures to overcome the causes responsible for poor quality of construction.

d) Discuss the advantages of implementing TQM in the Indian construction sector.

e) Define data and information. What are the major differences between them? Explain with the help of suitable Example.

f) What data information is required for planning of new road corridor between two megacities?

g) Write a detailed note on application of mobile technology in construction Industry.

SLR-FM-60

Seat No.	

Set S

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Total quality costs include: _____.
   a) Prevention costs b) Appraisal costs
   c) Failure costs d) All of the given options

2) MIS structure is based on _____.
   a) Management Activity b) Population
   c) Both a) and b) d) None

3) ISO 9000 seek's standardization in terms of _____.
   a) products b) production procedures
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4) An _____ is a set of processes and procedures that transform data into information and knowledge.
   a) information system b) Knowledge system
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5) The objective of ISO-9000 family of Quality management is _____.
   a) Customer satisfaction b) Employee satisfaction
   c) Skill enhancement d) Environmental issues

6) TQM & ISO both focuses on _____.
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   c) Supplier d) All of the above

7) The person who ensures that systems are developed on time, within budget, and with acceptable quality is a _____.
   a) systems designer b) project manager
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8) Internal information for MIS may come from any one of the following department _____.
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   c) Marketing department d) Production department

9) KAIZEN Means _____.
   a) Quality improvement Technique
   b) Change to become good
   c) Achieving Quality
   d) None

10) The underlying cause(s) of TQM deficiencies is (are): _____.
   a) The failure of managers to understand the concept of quality
   b) Costly implementation of quality management system
   c) Lack of employee involvement
   d) All of the given option

SLR-FM-60

Seat No.	

Set S

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TQM AND MIS IN CIVIL ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any four questions from Q. No.2.
2) Figures to right indicate full marks.

Q.2 Attempt any Four. **40**

a) What are the factors affecting the poor quality and Construction?

b) Differentiate between Quality Control and Quality Assurance.

c) Give Measures to overcome the causes responsible for poor quality of construction.

d) Discuss the advantages of implementing TQM in the Indian construction sector.

e) Define data and information. What are the major differences between them? Explain with the help of suitable Example.

f) What data information is required for planning of new road corridor between two megacities?

g) Write a detailed note on application of mobile technology in construction Industry.

SLR-FM-61

Seat No.	

Set P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE RESISTANT NON ENGINEERED

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Assume suitable data if necessary and mention it clearly.
3) Solve any five questions.

Q.1	Explain the effects of an Earthquake.	**10**
Q.2	What are the causes of an Earthquake?	**10**
Q.3	Explain the different magnitude scales to measure an earthquake.	**10**
Q.4	What are causes of damages due to earthquake in the stone masonry construction?	**10**
Q.5	What is meant by Restoration of strength? What are techniques for restoration?	**10**
Q.6	Explain the soil liquefaction as an effect of earthquake.	**10**

SLR-FM-620

Seat No.	

Set P

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Answer MCQ/objectives type question on answer sheet.
3) Figure to the right indicate full marks.
4) Assume suitable data if required and mentioned clearly.
5) use of non-programmable calculator allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Consider the following statements regarding the Hydration of cement _____.
   i) It is a instantaneous one
   ii) Hydration is mainly contributed from the hydration of C_3S
   iii) Hydration process is slower in the early period and continues indefinitely at a increasing rate
   iv) Product of hydration is referred as C-S-H gel of these
   a) i, ii, iii are correct b) i, iii, iv are correct
   c) ii, iv alone is correct d) ii, iii alone is correct

2) The quantity of Gypsum added in cement varies from 2 to 3% will depend upon the quantity of _____.
   a) C_3A in cement b) C4AF in cement
   c) C_3S in cement d) C_3S & C_2S in cement

3) Gypsum consists of _____.
   a) H_2S and CO_2 b) $CaSO_4$
   c) Lime and H_2O d) CO_2 and calcium

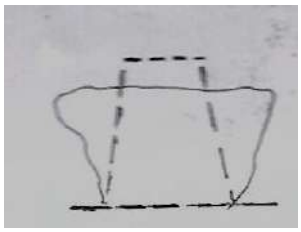
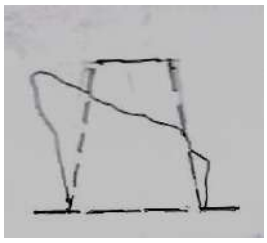
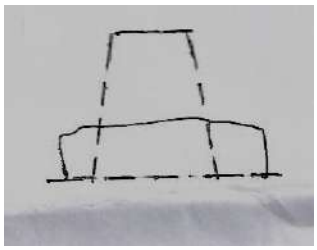
4) If 'P' is the standard consistency of cement, the amount of water used in conduction the initial setting time test on cement is _____.
   a) 0.65 P b) 0.85 P
   c) 0.6 P d) 0.8 P

5) The compressive strength of a standard 1:3 port land cement sand mortar after 28 days of curing should not be less than _____.
   a) 330 kg/cm^2 b) 115 kg/cm^2
   c) 175 kg/cm^2 d) 210 kg/cm^2

6) The maximum percentage of deleterious material permitted in aggregate is about _____.
   a) 10 b) 7
   c) 3 d) 1

7) For concrete mix pH value of water shall not be less than _____.
   a) 7 b) 6
   c) 8 d) 9

8) Consider the following statements: _____.
   i) Sea water accelerates the setting time of cement
   ii) Sea water accelerates the early strength of cement
   iii) Factor for corrosion is the use of sea water of these
   a) i, ii are wrong b) i alone wrong
   c) ii alone wrong d) All are correct

9) Which of the following fig. represents that the concrete is non-cohesive and shows the characteristic of segregation?
   a)  b) 
   c)  d)

10) The standard size of specimen for conducting the modulus of rupture of concrete _____.
   a) $15 \times 15 \times 50$ cm b) $15 \times 15 \times 60$ cm
   c) $15 \times 15 \times 70$ cm d) $15 \times 15 \times 75$ cm

11) The concrete mix of good workability should have a minimum water cement ratio of _____.
   a) 0.2 b) 0.4
   c) 0.6 d) 0.8

12) The factor which affects the design of concrete mix is _____.
   a) Fineness modulus b) Water-cement ratio
   c) Slump d) All the above

13) High degree of workability is required for _____.
   a) Heavily reinforced sections b) Mass concrete
   c) Hand placed pavements d) Tremie concrete

14) Calcium lignosulphate is an example of _____.
   a) Retarder b) Accelerator
   c) Dispersal agent d) Hardness agent

SLR-FM-620

Seat No.	

Set P

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator allowed.
4) Assume suitable data if required and mentioned clearly.

Section – I

Q.2 Write notes and draw sketches in support of your answer. (any three) **12**

a) Compounds of cement
b) Bulkage of fine aggregates
c) Initial setting time and final setting time of cement
d) Methods of curing

Q.3 Solve any three. **12**

a) Explain effect of temperature on strength of concrete.
b) Enlist methods of curing concrete.
c) Write a note on workability and its measure.
d) Write note on super plasticizers.

Q.4 Write about effect of shape of aggregate on performance of concrete. **04**

OR

Write on Plasticizers.

Section – II

Q.5 Solve any two. **12**

a) Define Durability and what are the factors affecting durability of concrete.
b) Write a note on ready mix concrete.
c) Explain durability of concrete.

Q.6 Design concrete mix of grade M20 by IS method by using following data. **10**

a) Design stipulations

1)	Character compressive strength required in the field at 28 days	20 MPa
2)	Maximum size of aggregate	20 mm (angular)
3)	Degree of workability	0.90 compacting factor
4)	Degree of quality control	Good
5)	Type of Exposure	Mild

b) Test data for Materials

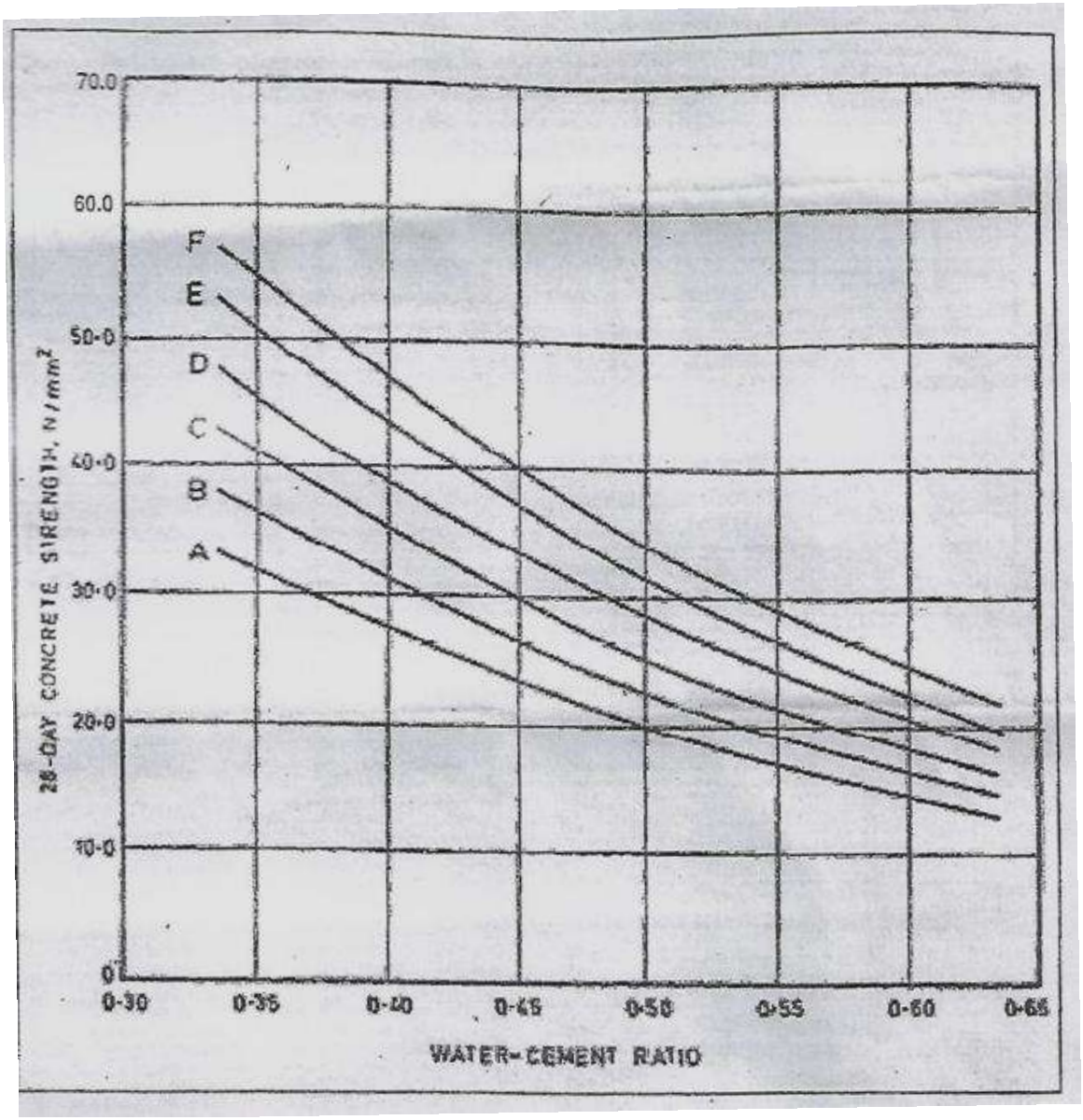
1)	Specific gravity of cement		3.15
2)	Compressive strength of cement at 7 days		Satisfies the requirement
3)	i)	Specific gravity of coarse aggregates	2.60
	ii)	Specific gravity of fine aggregates	2.60
4)	Water absorption		
	i)	Coarse aggregate	0.50%
	ii)	Fine aggregate	1.0%

5) Free (surface) moisture
   i) Coarse aggregate — Nil
   ii) Fine aggregate — 2.0%

Q.7 Write in details on high performance concrete. **06**

OR

Differentiate between design mix and nominal mix concrete along with the factors governing mix design. **06**



28-Day Strength of Cement, Tested According to IS 4031-1968

A = 31.9 – 36.8 N/mm^2 B = 36.8 – 41.7 N/mm^2
C = 41.7 – 46.6 N/mm^2 D = 46.6 – 51.5 N/mm^2
E = 51.5 – 56.4 N/mm^2 F = 56.4 – 61.3 N/mm^2

Fig.1 Relationship between Free Water-Cement Ratio and Concrete Strength for Different Cement Strengths (Ref : IS 10262-1982)

Table 1 Assumed Standard Deviation (Ref : IS 456-2002)		
Sl. No.	Grade of Concrete	Assumed Standard Deviation (N/mm²)
1	M 10	3.50
2	M 15	
3	M 20	4.0
4	M 25	
5	M 30	5.00
6	M 35	
7	M 40	
8	M 45	
9	M 50	
10	M 55	

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(Clauses 4.2, A-5 and B-5)

Sl No.	Nominal Maximum Size of Aggregate	Maximum Water Content [1]
	mm	kg
(1)	(2)	(3)
i)	10	208
ii)	20	186
iii)	40	165

NOTE — These quantities of mixing water are for use in computing cementitious material contents for trial batches.

[1] Water content corresponding to saturated surface dry aggregate.

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate

(Clauses 4.4, A-7 and B-7)

Sl No.	Nominal Maximum Size of Aggregate	Volume of Coarse Aggregate[1] per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
	mm	Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

[1] Volumes are based on aggregates in saturated surface dry condition.

Table 4 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	–	300	0.55	M 20 [2]
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

NOTES

1 Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2. The additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limits of pozzolona and slag specified in IS 1489 (Part 1) and IS 455 respectively.

2 Minimum grade for plain concrete under mild exposure condition is not specified.

	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4·75 mm	90-100	90-100	90-100	95-100
2·36 mm	60-95	75-100	85-100	95-100
1·18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

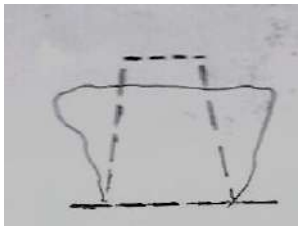
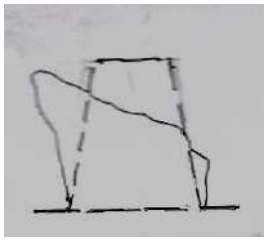
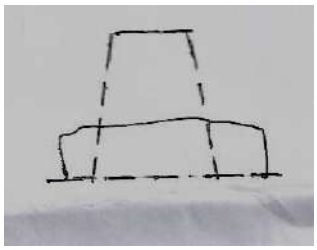
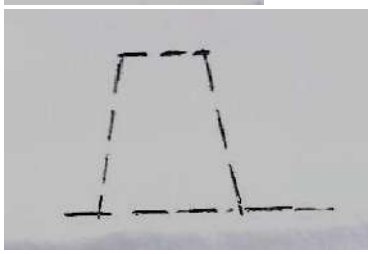
Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Answer MCQ/objectives type question on answer sheet.
3) Figure to the right indicate full marks.
4) Assume suitable data if required and mentioned clearly.
5) use of non-programmable calculator allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Consider the following statements: _____.
   i) Sea water accelerates the setting time of cement
   ii) Sea water accelerates the early strength of cement
   iii) Factor for corrosion is the use of sea water of these
   a) i, ii are wrong b) i alone wrong
   c) ii alone wrong d) All are correct

2) Which of the following fig. represents that the concrete is non-cohesive and shows the characteristic of segregation?
   a)  b) 
   c)  d) 

3) The standard size of specimen for conducting the modulus of rupture of concrete _____.
   a) $15 \times 15 \times 50$ cm b) $15 \times 15 \times 60$ cm
   c) $15 \times 15 \times 70$ cm d) $15 \times 15 \times 75$ cm

4) The concrete mix of good workability should have a minimum water cement ratio of _____.
   a) 0.2 b) 0.4
   c) 0.6 d) 0.8

5) The factor which affects the design of concrete mix is _____.
   a) Fineness modulus b) Water-cement ratio
   c) Slump d) All the above

6) High degree of workability is required for _____.
   a) Heavily reinforced sections b) Mass concrete
   c) Hand placed pavements d) Tremie concrete

7) Calcium lignosulphate is an example of _____.
   a) Retarder b) Accelerator
   c) Dispersal agent d) Hardness agent

8) Consider the following statements regarding the Hydration of cement _____.
   i) It is a instantaneous one
   ii) Hydration is mainly contributed from the hydration of C_3S
   iii) Hydration process is slower in the early period and continues indefinitely at a increasing rate
   iv) Product of hydration is referred as C-S-H gel of these
   a) i, ii, iii are correct b) i, iii, iv are correct
   c) ii, iv alone is correct d) ii, iii alone is correct

9) The quantity of Gypsum added in cement varies from 2 to 3% will depend upon the quantity of _____.
   a) C_3A in cement b) C4AF in cement
   c) C_3S in cement d) C_3S & C_2S in cement

10) Gypsum consists of _____.
   a) H_2S and CO_2 b) $CaSO_4$
   c) Lime and H_2O d) CO_2 and calcium

11) If ‘P’ is the standard consistency of cement, the amount of water used in conduction the initial setting time test on cement is _____.
   a) 0.65 P b) 0.85 P
   c) 0.6 P d) 0.8 P

12) The compressive strength of a standard 1:3 port land cement sand mortar after 28 days of curing should not be less than _____.
   a) 330 kg/cm^2 b) 115 kg/cm^2
   c) 175 kg/cm^2 d) 210 kg/cm^2

13) The maximum percentage of deleterious material permitted in aggregate is about _____.
   a) 10 b) 7
   c) 3 d) 1

14) For concrete mix pH value of water shall not be less than _____.
   a) 7 b) 6
   c) 8 d) 9

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator allowed.
4) Assume suitable data if required and mentioned clearly.

Section – I

Q.2 Write notes and draw sketches in support of your answer. (any three) **12**
- **a)** Compounds of cement
- **b)** Bulkage of fine aggregates
- **c)** Initial setting time and final setting time of cement
- **d)** Methods of curing

Q.3 Solve any three. **12**
- **a)** Explain effect of temperature on strength of concrete.
- **b)** Enlist methods of curing concrete.
- **c)** Write a note on workability and its measure.
- **d)** Write note on super plasticizers.

Q.4 Write about effect of shape of aggregate on performance of concrete. **04**

OR

Write on Plasticizers.

Section – II

Q.5 Solve any two. **12**
- **a)** Define Durability and what are the factors affecting durability of concrete.
- **b)** Write a note on ready mix concrete.
- **c)** Explain durability of concrete.

Q.6 Design concrete mix of grade M20 by IS method by using following data. **10**

a) Design stipulations

1)	Character compressive strength required in the field at 28 days	20 MPa
2)	Maximum size of aggregate	20 mm (angular)
3)	Degree of workability	0.90 compacting factor
4)	Degree of quality control	Good
5)	Type of Exposure	Mild

b) Test data for Materials

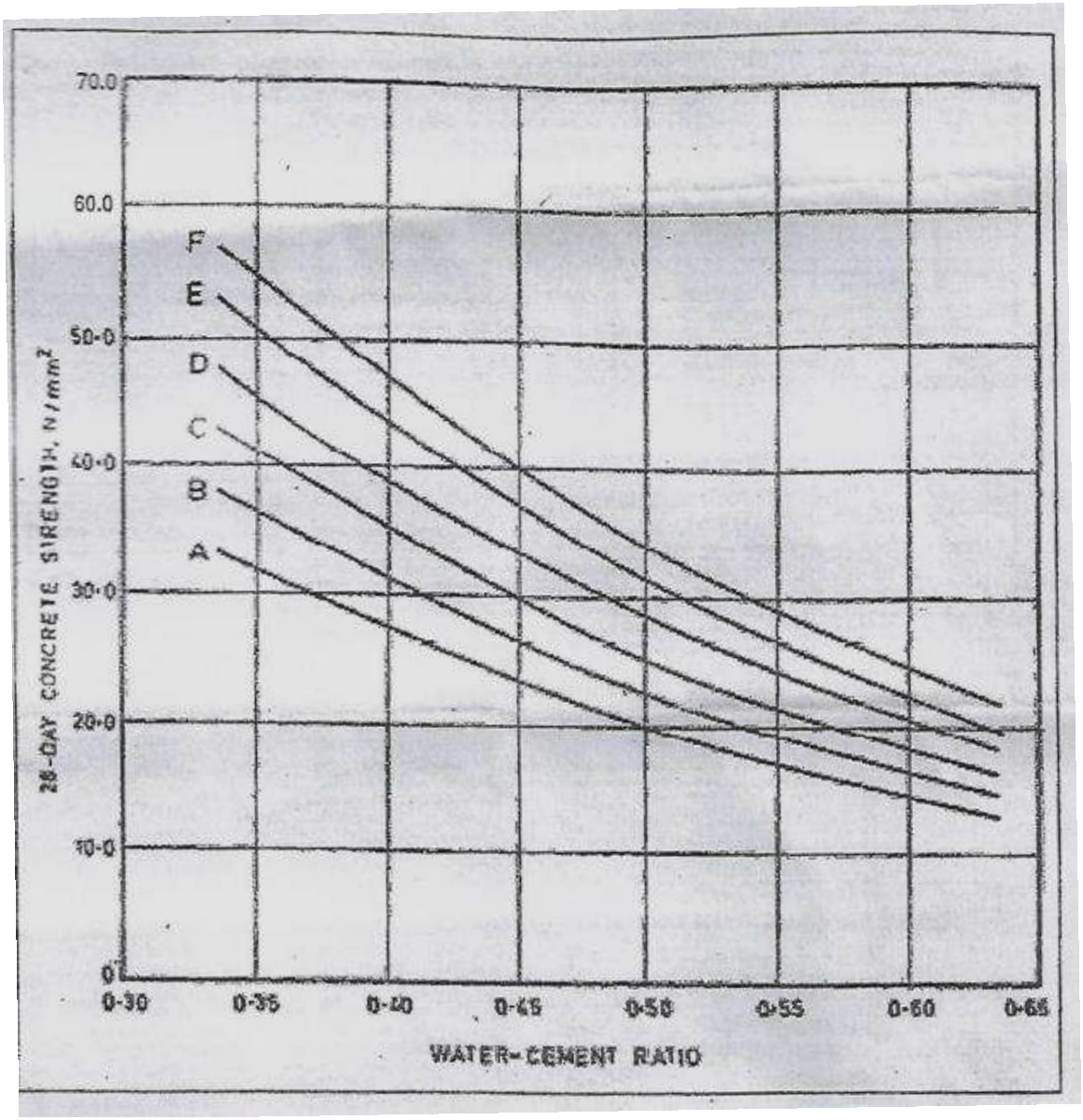
1)	Specific gravity of cement	3.15
2)	Compressive strength of cement at 7 days	Satisfies the requirement
3)	i) Specific gravity of coarse aggregates	2.60
	ii) Specific gravity of fine aggregates	2.60
4)	Water absorption	
	i) Coarse aggregate	0.50%
	ii) Fine aggregate	1.0%

5) Free (surface) moisture
   i) Coarse aggregate — Nil
   ii) Fine aggregate — 2.0%

Q.7 Write in details on high performance concrete. **06**

OR

Differentiate between design mix and nominal mix concrete along with the factors governing mix design. **06**



28-Day Strength of Cement, Tested According to IS 4031-1968

A = 31.9 – 36.8 N/mm^2 B = 36.8 – 41.7 N/mm^2
C = 41.7 – 46.6 N/mm^2 D = 46.6 – 51.5 N/mm^2
E = 51.5 – 56.4 N/mm^2 F = 56.4 – 61.3 N/mm^2

Fig.1 Relationship between Free Water-Cement Ratio and Concrete Strength for Different Cement Strengths (Ref : IS 10262-1982)

Table 1 Assumed Standard Deviation (Ref : IS 456-2002)		
Sl. No.	Grade of Concrete	Assumed Standard Deviation (N/mm²)
1	M 10	3.50
2	M 15	
3	M 20	4.0
4	M 25	
5	M 30	5.00
6	M 35	
7	M 40	
8	M 45	
9	M 50	
10	M 55	

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(Clauses 4.2, A-5 and B-5)

Sl No.	Nominal Maximum Size of Aggregate	Maximum Water Content [1]
	mm	kg
(1)	(2)	(3)
i)	10	208
ii)	20	186
iii)	40	165

NOTE — These quantities of mixing water are for use in computing cementitious material contents for trial batches.

[1] Water content corresponding to saturated surface dry aggregate.

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate

(Clauses 4.4, A-7 and B-7)

Sl No.	Nominal Maximum Size of Aggregate	Volume of Coarse Aggregate[1] per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
	mm	Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

[1] Volumes are based on aggregates in saturated surface dry condition.

Table 4 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	–	300	0.55	M 20 [2]
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

NOTES

1 Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2. The additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limits of pozzolona and slag specified in IS 1489 (Part 1) and IS 455 respectively.

2 Minimum grade for plain concrete under mild exposure condition is not specified.

	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4·75 mm	90-100	90-100	90-100	95-100
2·36 mm	60-95	75-100	85-100	95-100
1·18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Answer MCQ/objectives type question on answer sheet.
3) Figure to the right indicate full marks.
4) Assume suitable data if required and mentioned clearly.
5) use of non-programmable calculator allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

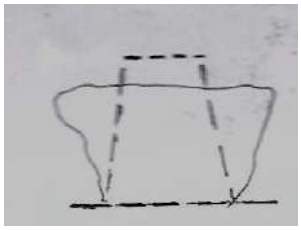
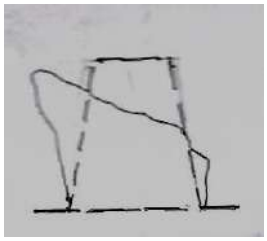
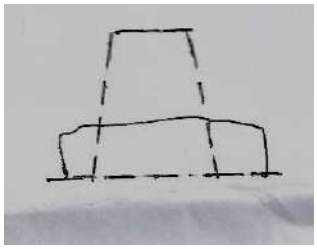
Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The compressive strength of a standard 1:3 port land cement sand mortar after 28 days of curing should not be less than _____.
   a) 330 kg/cm^2 b) 115 kg/cm^2
   c) 175 kg/cm^2 d) 210 kg/cm^2

2) The maximum percentage of deleterious material permitted in aggregate is about _____.
   a) 10 b) 7
   c) 3 d) 1

3) For concrete mix pH value of water shall not be less than _____.
   a) 7 b) 6
   c) 8 d) 9

4) Consider the following statements: _____.
   i) Sea water accelerates the setting time of cement
   ii) Sea water accelerates the early strength of cement
   iii) Factor for corrosion is the use of sea water of these
   a) i, ii are wrong b) i alone wrong
   c) ii alone wrong d) All are correct

5) Which of the following fig. represents that the concrete is non-cohesive and shows the characteristic of segregation?
   a)  b) 
   c)  d)

6) The standard size of specimen for conducting the modulus of rupture of concrete _____.
   a) $15 \times 15 \times 50$ cm b) $15 \times 15 \times 60$ cm
   c) $15 \times 15 \times 70$ cm d) $15 \times 15 \times 75$ cm

7) The concrete mix of good workability should have a minimum water cement ratio of _____.
   a) 0.2 b) 0.4
   c) 0.6 d) 0.8

8) The factor which affects the design of concrete mix is _____.
   a) Fineness modulus b) Water-cement ratio
   c) Slump d) All the above

9) High degree of workability is required for _____.
   a) Heavily reinforced sections b) Mass concrete
   c) Hand placed pavements d) Tremie concrete

10) Calcium lignosulphate is an example of _____.
   a) Retarder b) Accelerator
   c) Dispersal agent d) Hardness agent

11) Consider the following statements regarding the Hydration of cement _____.
   i) It is a instantaneous one
   ii) Hydration is mainly contributed from the hydration of C_3S
   iii) Hydration process is slower in the early period and continues indefinitely at a increasing rate
   iv) Product of hydration is referred as C-S-H gel of these
   a) i, ii, iii are correct b) i, iii, iv are correct
   c) ii, iv alone is correct d) ii, iii alone is correct

12) The quantity of Gypsum added in cement varies from 2 to 3% will depend upon the quantity of _____.
   a) C_3A in cement b) C4AF in cement
   c) C_3S in cement d) C_3S & C_2S in cement

13) Gypsum consists of _____.
   a) H_2S and CO_2 b) $CaSO_4$
   c) Lime and H_2O d) CO_2 and calcium

14) If ‘P’ is the standard consistency of cement, the amount of water used in conduction the initial setting time test on cement is _____.
   a) 0.65 P b) 0.85 P
   c) 0.6 P d) 0.8 P

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator allowed.
4) Assume suitable data if required and mentioned clearly.

Section – I

Q.2 Write notes and draw sketches in support of your answer. (any three) **12**

a) Compounds of cement
b) Bulkage of fine aggregates
c) Initial setting time and final setting time of cement
d) Methods of curing

Q.3 Solve any three. **12**

a) Explain effect of temperature on strength of concrete.
b) Enlist methods of curing concrete.
c) Write a note on workability and its measure.
d) Write note on super plasticizers.

Q.4 Write about effect of shape of aggregate on performance of concrete. **04**

OR

Write on Plasticizers.

Section – II

Q.5 Solve any two. **12**

a) Define Durability and what are the factors affecting durability of concrete.
b) Write a note on ready mix concrete.
c) Explain durability of concrete.

Q.6 Design concrete mix of grade M20 by IS method by using following data. **10**

a) Design stipulations

1)	Character compressive strength required in the field at 28 days	20 MPa
2)	Maximum size of aggregate	20 mm (angular)
3)	Degree of workability	0.90 compacting factor
4)	Degree of quality control	Good
5)	Type of Exposure	Mild

b) Test data for Materials

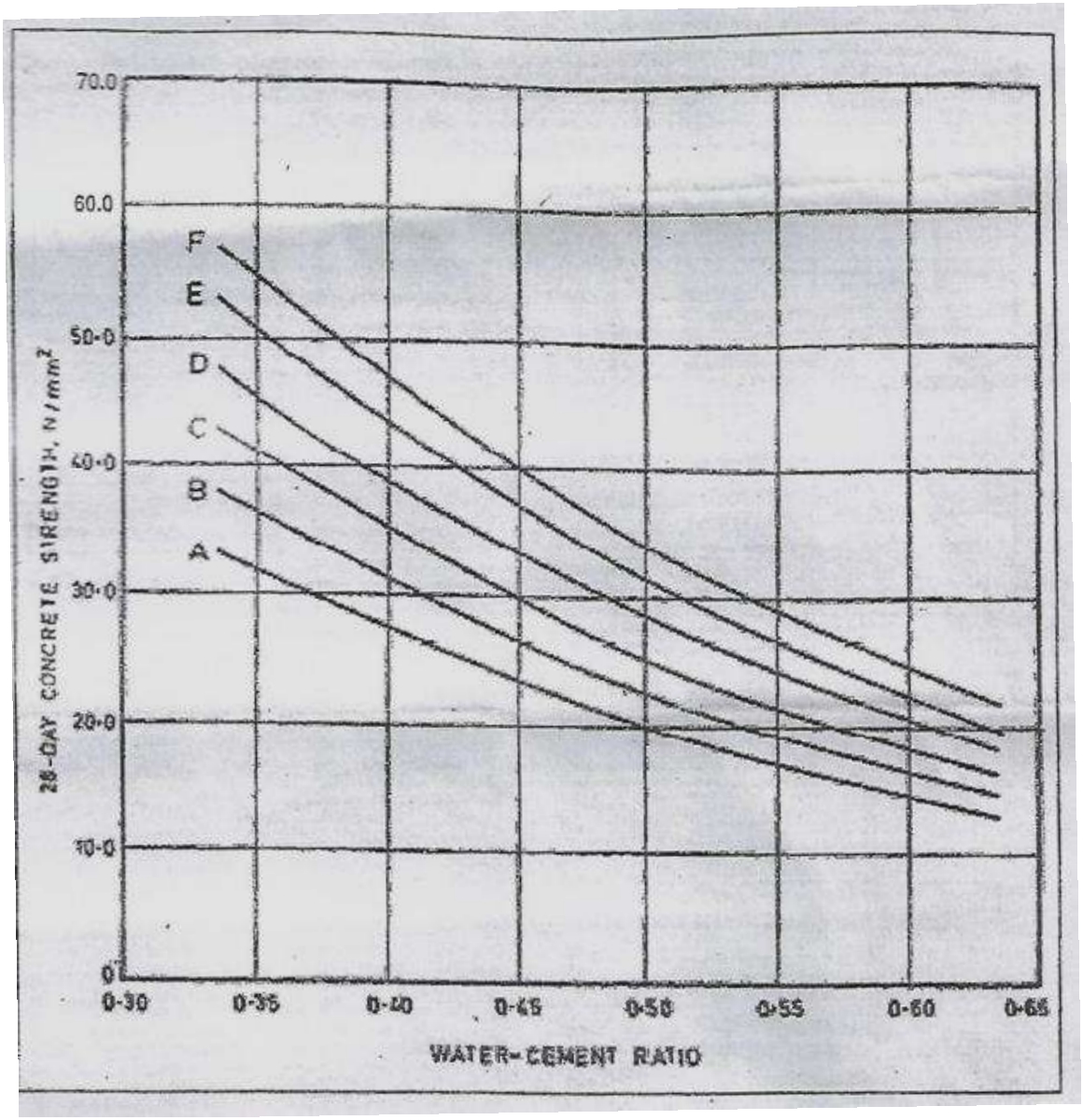
1)	Specific gravity of cement	3.15
2)	Compressive strength of cement at 7 days	Satisfies the requirement
3) i)	Specific gravity of coarse aggregates	2.60
ii)	Specific gravity of fine aggregates	2.60
4)	Water absorption	
i)	Coarse aggregate	0.50%
ii)	Fine aggregate	1.0%

5) Free (surface) moisture
   i) Coarse aggregate — Nil
   ii) Fine aggregate — 2.0%

Q.7 Write in details on high performance concrete. **06**

OR

Differentiate between design mix and nominal mix concrete along with the factors governing mix design. **06**



28-Day Strength of Cement, Tested According to IS 4031-1968

A = 31.9 – 36.8 N/mm^2 B = 36.8 – 41.7 N/mm^2
C = 41.7 – 46.6 N/mm^2 D = 46.6 – 51.5 N/mm^2
E = 51.5 – 56.4 N/mm^2 F = 56.4 – 61.3 N/mm^2

Fig.1 Relationship between Free Water-Cement Ratio and Concrete Strength for Different Cement Strengths (Ref : IS 10262-1982)

Table 1 Assumed Standard Deviation (Ref : IS 456-2002)		
Sl. No.	Grade of Concrete	Assumed Standard Deviation (N/mm²)
1	M 10	3.50
2	M 15	
3	M 20	4.0
4	M 25	
5	M 30	5.00
6	M 35	
7	M 40	
8	M 45	
9	M 50	
10	M 55	

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(Clauses 4.2, A-5 and B-5)

Sl No.	Nominal Maximum Size of Aggregate	Maximum Water Content [1]
	mm	kg
(1)	(2)	(3)
i)	10	208
ii)	20	186
iii)	40	165

NOTE — These quantities of mixing water are for use in computing cementitious material contents for trial batches.

[1] Water content corresponding to saturated surface dry aggregate.

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate

(Clauses 4.4, A-7 and B-7)

Sl No.	Nominal Maximum Size of Aggregate	Volume of Coarse Aggregate[1] per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
	mm	Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

[1] Volumes are based on aggregates in saturated surface dry condition.

Table 4 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	–	300	0.55	M 20 [2]
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

NOTES

1 Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2. The additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limits of pozzolona and slag specified in IS 1489 (Part 1) and IS 455 respectively.

2 Minimum grade for plain concrete under mild exposure condition is not specified.

	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4·75 mm	90-100	90-100	90-100	95-100
2·36 mm	60-95	75-100	85-100	95-100
1·18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Answer MCQ/objectives type question on answer sheet.
3) Figure to the right indicate full marks.
4) Assume suitable data if required and mentioned clearly.
5) use of non-programmable calculator allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The standard size of specimen for conducting the modulus of rupture of concrete _____.
   a) $15 \times 15 \times 50$ cm b) $15 \times 15 \times 60$ cm
   c) $15 \times 15 \times 70$ cm d) $15 \times 15 \times 75$ cm

2) The concrete mix of good workability should have a minimum water cement ratio of _____.
   a) 0.2 b) 0.4
   c) 0.6 d) 0.8

3) The factor which affects the design of concrete mix is _____.
   a) Fineness modulus b) Water-cement ratio
   c) Slump d) All the above

4) High degree of workability is required for _____.
   a) Heavily reinforced sections b) Mass concrete
   c) Hand placed pavements d) Tremie concrete

5) Calcium lignosulphate is an example of _____.
   a) Retarder b) Accelerator
   c) Dispersal agent d) Hardness agent

6) Consider the following statements regarding the Hydration of cement _____.
   i) It is a instantaneous one
   ii) Hydration is mainly contributed from the hydration of C_3S
   iii) Hydration process is slower in the early period and continues indefinitely at a increasing rate
   iv) Product of hydration is referred as C-S-H gel of these
   a) i, ii, iii are correct b) i, iii, iv are correct
   c) ii, iv alone is correct d) ii, iii alone is correct

7) The quantity of Gypsum added in cement varies from 2 to 3% will depend upon the quantity of _____.
   a) C_3A in cement b) C4AF in cement
   c) C_3S in cement d) C_3S & C_2S in cement

8) Gypsum consists of _____.
   a) H_2S and CO_2 b) $CaSO_4$
   c) Lime and H_2O d) CO_2 and calcium

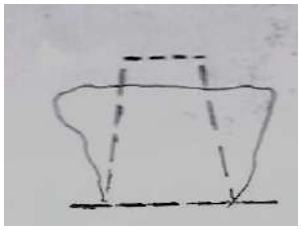
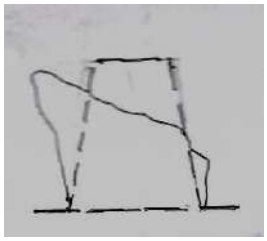
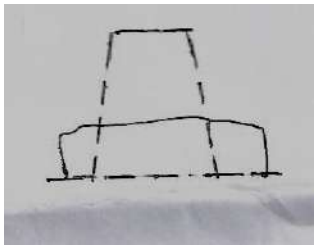
9) If 'P' is the standard consistency of cement, the amount of water used in conduction the initial setting time test on cement is _____.
   a) 0.65 P b) 0.85 P
   c) 0.6 P d) 0.8 P

10) The compressive strength of a standard 1:3 port land cement sand mortar after 28 days of curing should not be less than _____.
   a) 330 kg/cm^2 b) 115 kg/cm^2
   c) 175 kg/cm^2 d) 210 kg/cm^2

11) The maximum percentage of deleterious material permitted in aggregate is about _____.
   a) 10 b) 7
   c) 3 d) 1

12) For concrete mix pH value of water shall not be less than _____.
   a) 7 b) 6
   c) 8 d) 9

13) Consider the following statements: _____.
   i) Sea water accelerates the setting time of cement
   ii) Sea water accelerates the early strength of cement
   iii) Factor for corrosion is the use of sea water of these
   a) i, ii are wrong b) i alone wrong
   c) ii alone wrong d) All are correct

14) Which of the following fig. represents that the concrete is non-cohesive and shows the characteristic of segregation?
   a)  b) 
   c)  d)

SLR-FM-620

Seat No.	

Set S

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONCRETE TECHNOLOGY

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator allowed.
4) Assume suitable data if required and mentioned clearly.

Section – I

Q.2 Write notes and draw sketches in support of your answer. (any three) **12**

a) Compounds of cement
b) Bulkage of fine aggregates
c) Initial setting time and final setting time of cement
d) Methods of curing

Q.3 Solve any three. **12**

a) Explain effect of temperature on strength of concrete.
b) Enlist methods of curing concrete.
c) Write a note on workability and its measure.
d) Write note on super plasticizers.

Q.4 Write about effect of shape of aggregate on performance of concrete. **04**

OR

Write on Plasticizers.

Section – II

Q.5 Solve any two. **12**

a) Define Durability and what are the factors affecting durability of concrete.
b) Write a note on ready mix concrete.
c) Explain durability of concrete.

Q.6 Design concrete mix of grade M20 by IS method by using following data. **10**

a) Design stipulations

1)	Character compressive strength required in the field at 28 days	20 MPa
2)	Maximum size of aggregate	20 mm (angular)
3)	Degree of workability	0.90 compacting factor
4)	Degree of quality control	Good
5)	Type of Exposure	Mild

b) Test data for Materials

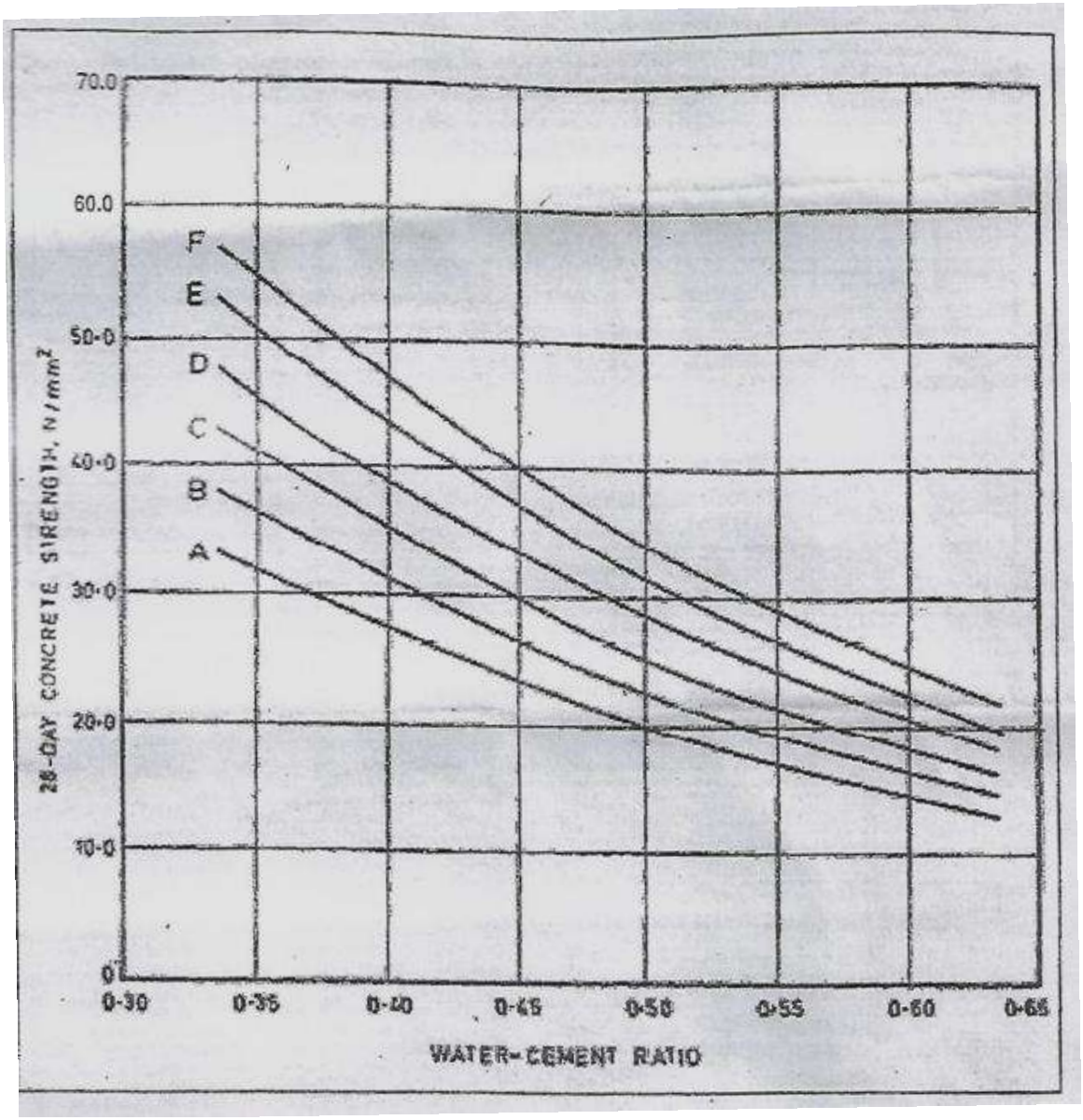
1)	Specific gravity of cement	3.15
2)	Compressive strength of cement at 7 days	Satisfies the requirement
3)	i) Specific gravity of coarse aggregates	2.60
	ii) Specific gravity of fine aggregates	2.60
4)	Water absorption	
	i) Coarse aggregate	0.50%
	ii) Fine aggregate	1.0%

5) Free (surface) moisture
   i) Coarse aggregate — Nil
   ii) Fine aggregate — 2.0%

Q.7 Write in details on high performance concrete. **06**

OR

Differentiate between design mix and nominal mix concrete along with the factors governing mix design. **06**



28-Day Strength of Cement, Tested According to IS 4031-1968

A = 31.9 – 36.8 N/mm^2 B = 36.8 – 41.7 N/mm^2
C = 41.7 – 46.6 N/mm^2 D = 46.6 – 51.5 N/mm^2
E = 51.5 – 56.4 N/mm^2 F = 56.4 – 61.3 N/mm^2

Fig.1 Relationship between Free Water-Cement Ratio and Concrete Strength for Different Cement Strengths (Ref : IS 10262-1982)

Table 1 Assumed Standard Deviation (Ref : IS 456-2002)		
Sl. No.	Grade of Concrete	Assumed Standard Deviation (N/mm²)
1	M 10	3.50
2	M 15	
3	M 20	4.0
4	M 25	
5	M 30	5.00
6	M 35	
7	M 40	
8	M 45	
9	M 50	
10	M 55	

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(Clauses 4.2, A-5 and B-5)

Sl No.	Nominal Maximum Size of Aggregate	Maximum Water Content [1]
	mm	kg
(1)	(2)	(3)
i)	10	208
ii)	20	186
iii)	40	165

NOTE — These quantities of mixing water are for use in computing cementitious material contents for trial batches.

[1] Water content corresponding to saturated surface dry aggregate.

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate

(Clauses 4.4, A-7 and B-7)

Sl No.	Nominal Maximum Size of Aggregate	Volume of Coarse Aggregate[1] per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
	mm	Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

[1] Volumes are based on aggregates in saturated surface dry condition.

Table 4 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	–	300	0.55	M 20 [2]
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

NOTES

1 Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2. The additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limits of pozzolona and slag specified in IS 1489 (Part 1) and IS 455 respectively.

2 Minimum grade for plain concrete under mild exposure condition is not specified.

	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4·75 mm	90-100	90-100	90-100	95-100
2·36 mm	60-95	75-100	85-100	95-100
1·18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS – I

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The bending equation is _____.
   a) $M/I = F/Y = E/R$ b) $I/M = F/Y = E/R$
   c) $M/I = R/E = F/Y$ d) $M/I = Y/E = E/R$

2) The strength of beams mainly depends on _____.
   a) bending moment b) c.g. of the section
   c) section modulus d) its weight

3) The Eccentric Vertical Load generates _____.
   a) Only Direct Stress
   b) Only Bending Stress
   c) Combined Bending and Direct Stress
   d) Shear Stress

4) For no tension in the section, the eccentricity must not exceed _____.
   a) k^2/d b) $2k^2/d$
   c) 4k2/d d) k^2/d^2
   d= depth of section, k= radius of gyration

5) When thin cylindrical shell is subjected to internal fluid pressure, which of the following stress is developed in its wall?
   a) Circumferential stress b) Longitudinal stress
   c) Both a & b d) None of the above

6) The angle of twist is _____ proportional to twisting moment.
   a) directly b) inversely
   c) both a & b d) none of the above

7) The strain energy stored by the body with in elastic limit when loaded externally is called as _____.
   a) resilience b) proof resilience
   c) modulus of resilience d) none of the above

8) In the case of an I-section beam maximum shear stress is at _____.
   a) the junction of the top flange and web
   b) at neutral axis
   c) either a or b
   d) none of the above

9) In flitched beam at same level strains in wood and steel should be kept _____.
   a) equal
   b) unequal
   c) both a and b
   d) can't say anything

10) The Internal resistance which the body offers to meet the external force or load is called as _____.
   a) stress
   b) strain
   c) pressure
   d) none of the above

11) The ratio of lateral strain to linear strain is known as _____.
   a) modulus of elasticity
   b) modulus of rigidity
   c) poisson's ratio
   d) elastic limit

12) The relation between E (modulus of elasticity) & C (modulus of rigidity) is given _____.
   a) $\mathrm{E} = \mathrm{C}(1 + 1/\mathrm{m})$
   b) $\mathrm{E} = 2\mathrm{C}\,(1 + 1/\mathrm{m})$
   c) $\mathrm{E} = \mathrm{C}(1 + 2/\mathrm{m})$
   d) None of these

13) The point of contra flexure is also called _____.
   a) the point of inflexion
   b) a virtual hinge
   c) both a and b
   d) none of the above

14) In a cantilever beam with uniformly distributed load shear force varies along the span with following relation _____.
   a) linear
   b) parabolic
   c) either of a and b
   d) cubic

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 and Q.No.6 are compulsory.
2) Solve any two question of each section.
2) Figures to the right indicate full marks.
3) Assume suitable data is necessary and mention it clearly

Section – I

Q.2 A rigid bar ABCD is supported and loaded as shown in Figure 1. The suspender rod PB is 3m long with 300mm^2 cross sectional area whereas suspender rod QC is 5 long with cross sectional area of 400mm^2. Find the stresses induced in the suspender rods. Assume that suspender rods are of same materials. **10**

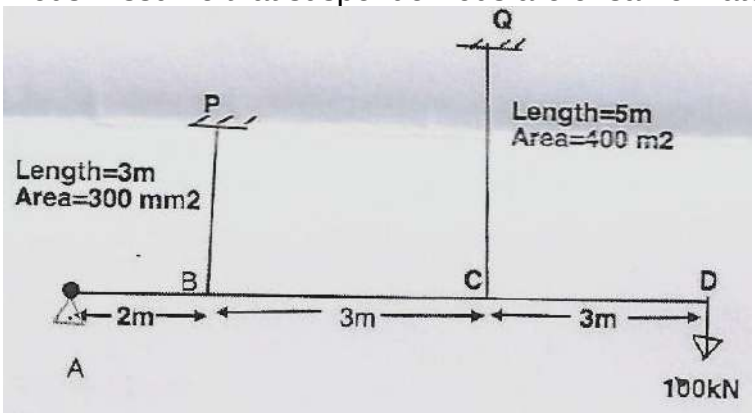


Figure 1

Q.3 Draw Shear Force and Bending Moment diagram for the Beam shown in Figure 2 below. Show all the Calculations. **09**

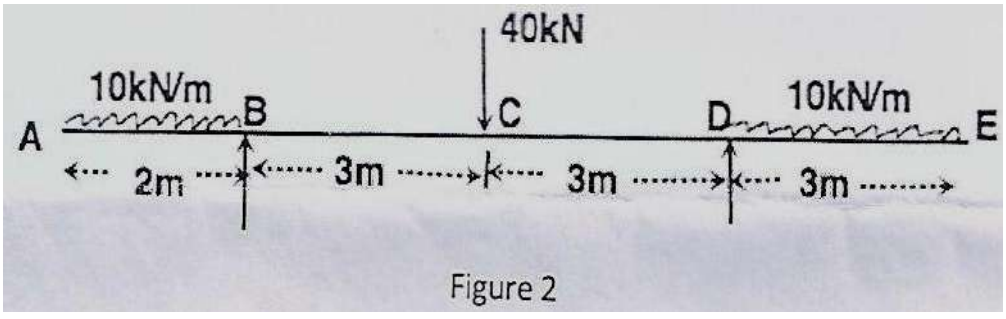


Figure 2

Q.4 If maximum permissible stress in the material is 30N/mm^2, Find the maximum UDL on a Simply Supported Beam of 5m long for the T-Section cross sectional details of beam given in Figure 3 below. **09**

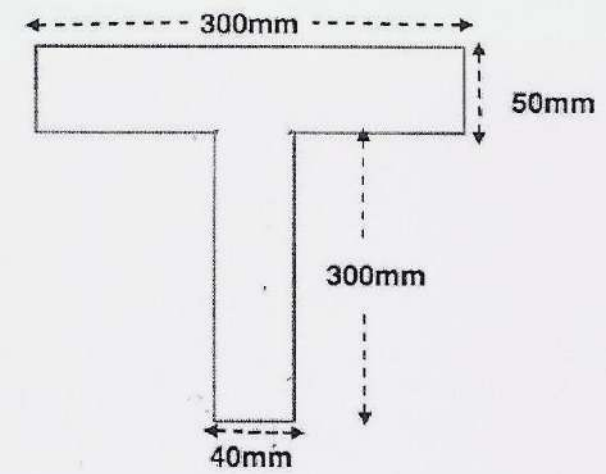


Figure 3

Q.5 Determine the maximum and minimum stresses at the base of dam. The masonry trapezoidal dam retains water on vertical face. The height of the dam is 5m and dam water level is upto 4.5m. Top width of the dam is 1m whereas bottom width is 3m. Take weight of water as 10kN/m^3 and masonry as 20kN/m^3. **09**

Section – II

Q.6 Answer the following questions. **10**

a) Flitched beam
b) Define terms proof resilience & modulus of resilience.
c) Explain the term equivalent section.
d) Circumferential and Longitudinal Stress in Thin Cylinders.
e) Expression for Strain Energy due to bending.

Q.7 A steel beam of I section shown in Figure 4 is 600 mm deep. Each flange is 250 mm wide & 25 mm thick. The web is 15 mm thick. The beam section is subjected to a shear force of 500 KN. Determine shear stress distribution for the beam section at various levels. **09**

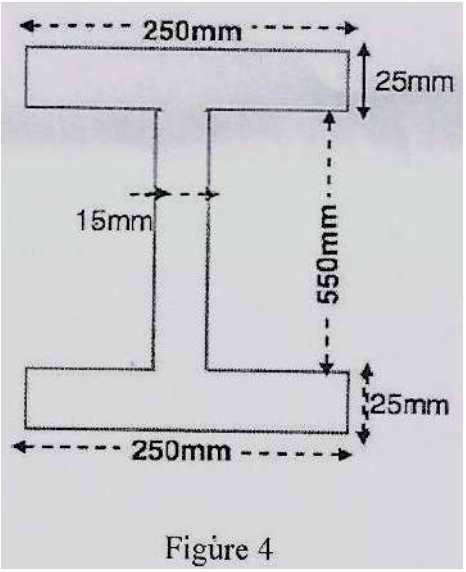


Figure 4

Q.8 A solid circular shaft transmits 75 KW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^0 in 2 meters length of the shaft & shear stress is limited to 50 N/mm^2, Take $C=100 \times 10^3 N/mm^2$ **09**

Q.9 Find the moment of resistance of a flitched beam with a Timber part of 200mm wide and 250mm deep reinforced with two flitches each side by 200mm by 15mm in section. Horizontal CG of timber and steel part passes through same line. Consider allowable stress in timber is 6.5 N/mm^2 and also find allowable stress in steel. Take $E_{steel}=20E_{timber}$ **09**

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In the case of an I-section beam maximum shear stress is at _____.
   a) the junction of the top flange and web
   b) at neutral axis
   c) either a or b
   d) none of the above

2) In flitched beam at same level strains in wood and steel should be kept _____.
   a) equal b) unequal
   c) both a and b d) can't say anything

3) The Internal resistance which the body offers to meet the external force or load is called as _____.
   a) stress b) strain
   c) pressure d) none of the above

4) The ratio of lateral strain to linear strain is known as _____.
   a) modulus of elasticity b) modulus of rigidity
   c) poisson's ratio d) elastic limit

5) The relation between E (modulus of elasticity) & C (modulus of rigidity) is given _____.
   a) $E = C(1 + 1/m)$ b) $E = 2C\,(1 + 1/m)$
   c) $E = C(1 + 2/m)$ d) None of these

6) The point of contra flexure is also called _____.
   a) the point of inflexion b) a virtual hinge
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7) In a cantilever beam with uniformly distributed load shear force varies along the span with following relation _____.
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8) The bending equation is _____.
   a) $M/I = F/Y = E/R$ b) $I/M = F/Y = E/R$
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9) The strength of beams mainly depends on _____.
   a) bending moment b) c.g. of the section
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10) The Eccentric Vertical Load generates _____.
   a) Only Direct Stress
   b) Only Bending Stress
   c) Combined Bending and Direct Stress
   d) Shear Stress

11) For no tension in the section, the eccentricity must not exceed _____.
   a) k^2/d b) $2k^2/d$
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   d= depth of section, k= radius of gyration

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Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

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Instructions: 1) Q. No.2 and Q.No.6 are compulsory.
2) Solve any two question of each section.
2) Figures to the right indicate full marks.
3) Assume suitable data is necessary and mention it clearly

Section – I

Q.2 A rigid bar ABCD is supported and loaded as shown in Figure 1. The suspender rod PB is 3m long with 300mm^2 cross sectional area whereas suspender rod QC is 5 long with cross sectional area of 400mm^2. Find the stresses induced in the suspender rods. Assume that suspender rods are of same materials. **10**

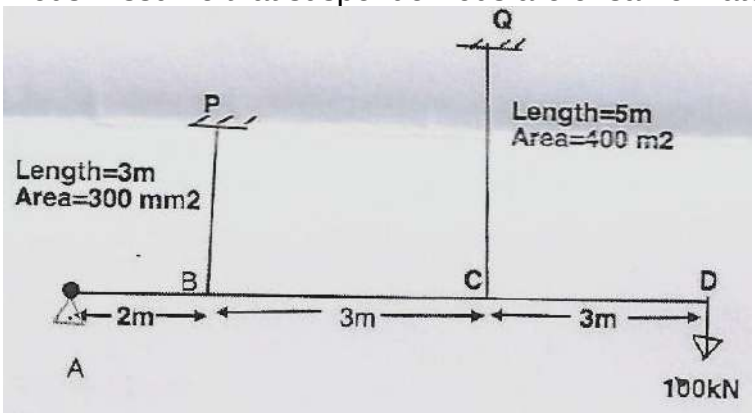

Figure 1

Q.3 Draw Shear Force and Bending Moment diagram for the Beam shown in Figure 2 below. Show all the Calculations. **09**

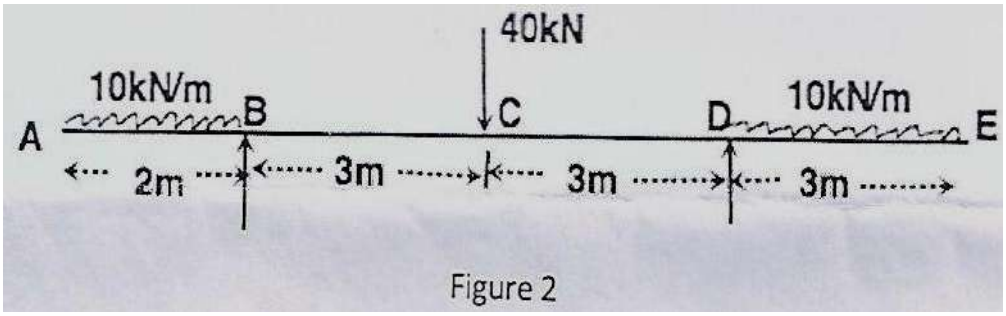

Figure 2

Q.4 If maximum permissible stress in the material is 30N/mm^2, Find the maximum UDL on a Simply Supported Beam of 5m long for the T-Section cross sectional details of beam given in Figure 3 below. **09**

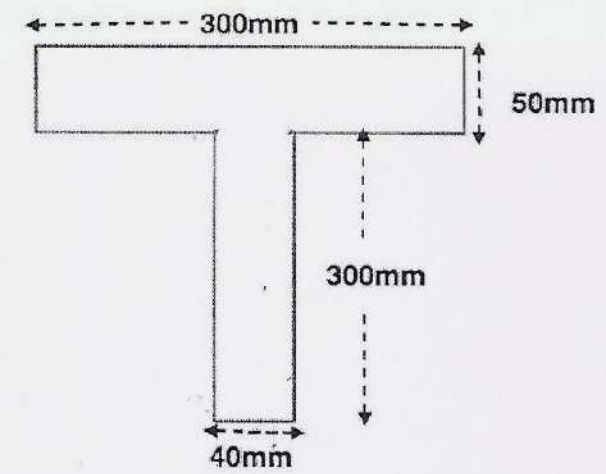

Figure 3

Q.5 Determine the maximum and minimum stresses at the base of dam. The masonry trapezoidal dam retains water on vertical face. The height of the dam is 5m and dam water level is upto 4.5m. Top width of the dam is 1m whereas bottom width is 3m. Take weight of water as 10kN/m^3 and masonry as 20kN/m^3. **09**

Section – II

Q.6 Answer the following questions. **10**

a) Flitched beam
b) Define terms proof resilience & modulus of resilience.
c) Explain the term equivalent section.
d) Circumferential and Longitudinal Stress in Thin Cylinders.
e) Expression for Strain Energy due to bending.

Q.7 A steel beam of I section shown in Figure 4 is 600 mm deep. Each flange is 250 mm wide & 25 mm thick. The web is 15 mm thick. The beam section is subjected to a shear force of 500 KN. Determine shear stress distribution for the beam section at various levels. **09**

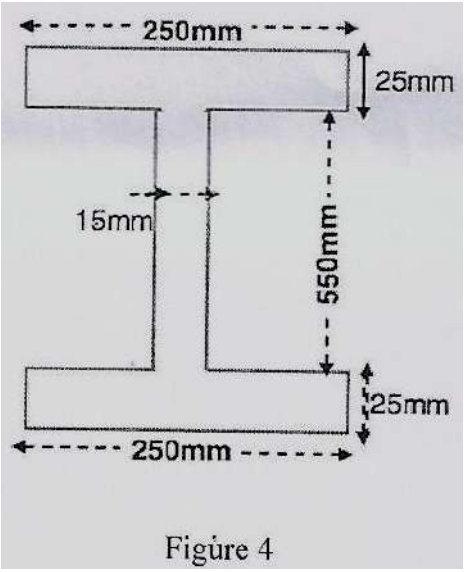

Figure 4

Q.8 A solid circular shaft transmits 75 KW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^0 in 2 meters length of the shaft & shear stress is limited to 50 N/mm^2, Take C=100 x $10^3 N/mm^2$ **09**

Q.9 Find the moment of resistance of a flitched beam with a Timber part of 200mm wide and 250mm deep reinforced with two flitches each side by 200mm by 15mm in section. Horizontal CG of timber and steel part passes through same line. Consider allowable stress in timber is 6.5 N/mm^2 and also find allowable stress in steel. Take $E_{steel}=20E_{timber}$ **09**

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) When thin cylindrical shell is subjected to internal fluid pressure, which of the following stress is developed in its wall?
   a) Circumferential stress b) Longitudinal stress
   c) Both a & b d) None of the above

2) The angle of twist is _____ proportional to twisting moment.
   a) directly b) inversely
   c) both a & b d) none of the above

3) The strain energy stored by the body with in elastic limit when loaded externally is called as _____.
   a) resilience b) proof resilience
   c) modulus of resilience d) none of the above

4) In the case of an I-section beam maximum shear stress is at _____.
   a) the junction of the top flange and web
   b) at neutral axis
   c) either a or b
   d) none of the above

5) In flitched beam at same level strains in wood and steel should be kept _____.
   a) equal b) unequal
   c) both a and b d) can't say anything

6) The Internal resistance which the body offers to meet the external force or load is called as _____.
   a) stress b) strain
   c) pressure d) none of the above

7) The ratio of lateral strain to linear strain is known as _____.
   a) modulus of elasticity b) modulus of rigidity
   c) poisson's ratio d) elastic limit

8) The relation between E (modulus of elasticity) & C (modulus of rigidity) is given _____.
   a) $\mathrm{E} = \mathrm{C}(1 + 1/\mathrm{m})$ b) $\mathrm{E} = 2\mathrm{C}\,(1 + 1/\mathrm{m})$
   c) $\mathrm{E} = \mathrm{C}(1 + 2/\mathrm{m})$ d) None of these

9) The point of contra flexure is also called _____.
   a) the point of inflexion
   b) a virtual hinge
   c) both a and b
   d) none of the above

10) In a cantilever beam with uniformly distributed load shear force varies along the span with following relation _____.
   a) linear
   b) parabolic
   c) either of a and b
   d) cubic

11) The bending equation is _____.
   a) $M/I = F/Y = E/R$
   b) $I/M = F/Y = E/R$
   c) $M/I = R/E = F/Y$
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12) The strength of beams mainly depends on _____.
   a) bending moment
   b) c.g. of the section
   c) section modulus
   d) its weight

13) The Eccentric Vertical Load generates _____.
   a) Only Direct Stress
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   c) Combined Bending and Direct Stress
   d) Shear Stress

14) For no tension in the section, the eccentricity must not exceed _____.
   a) k^2/d
   b) $2k^2/d$
   c) 4k2/d
   d) k^2/d^2

   d= depth of section, k= radius of gyration

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 and Q.No.6 are compulsory.
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Section – I

Q.2 A rigid bar ABCD is supported and loaded as shown in Figure 1. The suspender rod PB is 3m long with 300mm^2 cross sectional area whereas suspender rod QC is 5 long with cross sectional area of 400mm^2. Find the stresses induced in the suspender rods. Assume that suspender rods are of same materials. **10**

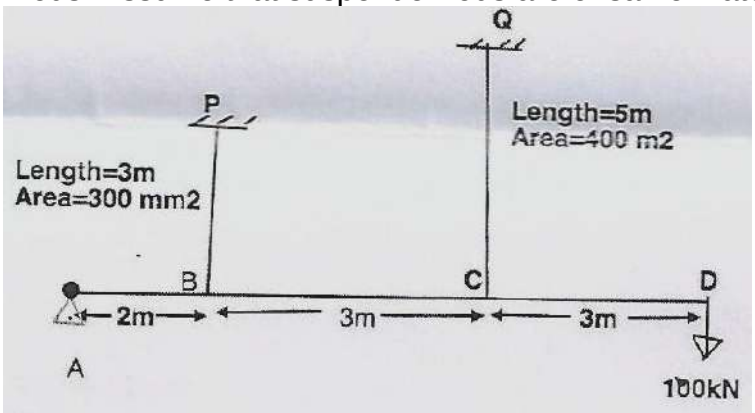

Figure 1

Q.3 Draw Shear Force and Bending Moment diagram for the Beam shown in Figure 2 below. Show all the Calculations. **09**

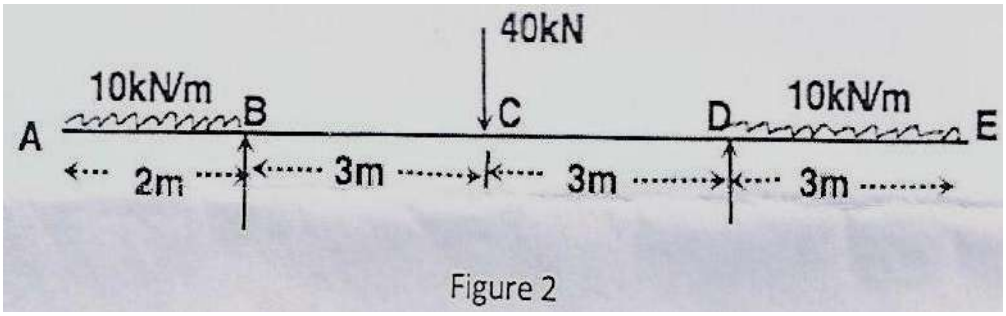

Figure 2

Q.4 If maximum permissible stress in the material is 30N/mm^2, Find the maximum UDL on a Simply Supported Beam of 5m long for the T-Section cross sectional details of beam given in Figure 3 below. **09**

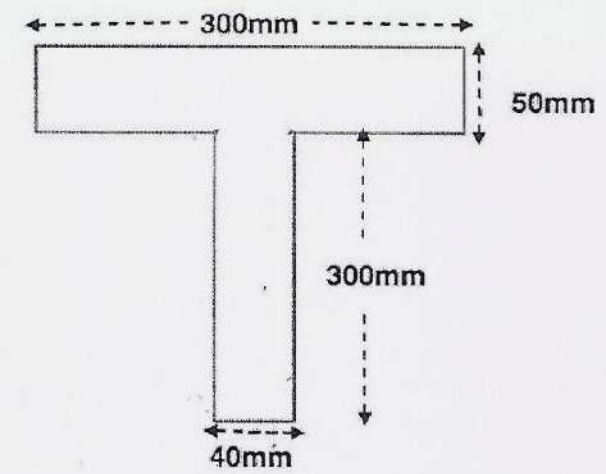

Figure 3

Q.5 Determine the maximum and minimum stresses at the base of dam. The masonry trapezoidal dam retains water on vertical face. The height of the dam is 5m and dam water level is upto 4.5m. Top width of the dam is 1m whereas bottom width is 3m. Take weight of water as 10kN/m^3 and masonry as 20kN/m^3. **09**

Section – II

Q.6 Answer the following questions. **10**

a) Flitched beam
b) Define terms proof resilience & modulus of resilience.
c) Explain the term equivalent section.
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e) Expression for Strain Energy due to bending.

Q.7 A steel beam of I section shown in Figure 4 is 600 mm deep. Each flange is 250 mm wide & 25 mm thick. The web is 15 mm thick. The beam section is subjected to a shear force of 500 KN. Determine shear stress distribution for the beam section at various levels. **09**

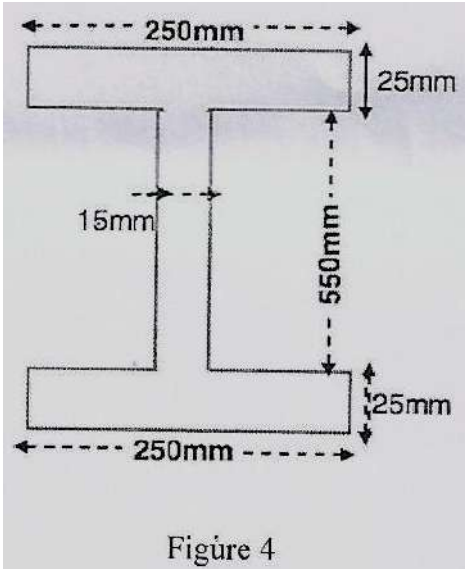

Figure 4

Q.8 A solid circular shaft transmits 75 KW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^0 in 2 meters length of the shaft & shear stress is limited to 50 N/mm^2, Take $C=100 \times 10^3 N/mm^2$ **09**

Q.9 Find the moment of resistance of a flitched beam with a Timber part of 200mm wide and 250mm deep reinforced with two flitches each side by 200mm by 15mm in section. Horizontal CG of timber and steel part passes through same line. Consider allowable stress in timber is 6.5 N/mm^2 and also find allowable stress in steel. Take $E_{steel}=20E_{timber}$ **09**

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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   a) stress b) strain
   c) pressure d) none of the above

2) The ratio of lateral strain to linear strain is known as _____.
   a) modulus of elasticity b) modulus of rigidity
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3) The relation between E (modulus of elasticity) & C (modulus of rigidity) is given _____.
   a) $E = C(1 + 1/m)$ b) $E = 2C\,(1 + 1/m)$
   c) $E = C(1 + 2/m)$ d) None of these

4) The point of contra flexure is also called _____.
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   c) $M/I = R/E = F/Y$ d) $M/I = Y/E = E/R$

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   c) section modulus d) its weight

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Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - I

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 and Q.No.6 are compulsory.
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Section – I

Q.2 A rigid bar ABCD is supported and loaded as shown in Figure 1. The suspender rod PB is 3m long with 300mm^2 cross sectional area whereas suspender rod QC is 5 long with cross sectional area of 400mm^2. Find the stresses induced in the suspender rods. Assume that suspender rods are of same materials. **10**

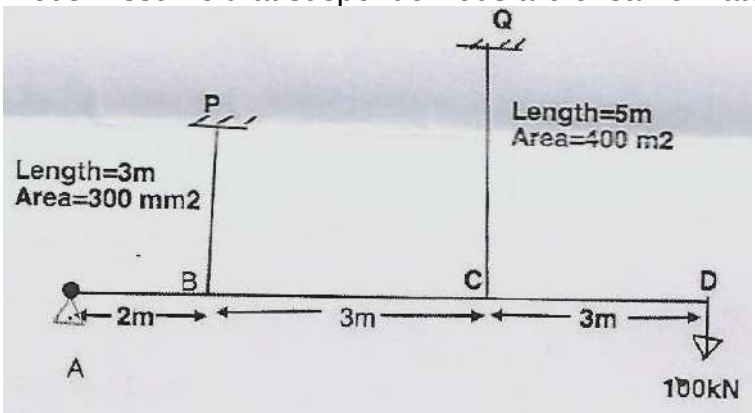

Figure 1

Q.3 Draw Shear Force and Bending Moment diagram for the Beam shown in Figure 2 below. Show all the Calculations. **09**

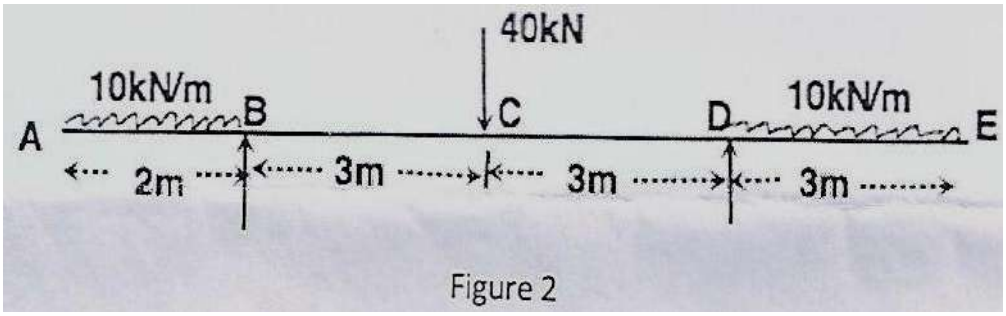

Figure 2

Q.4 If maximum permissible stress in the material is 30N/mm^2, Find the maximum UDL on a Simply Supported Beam of 5m long for the T-Section cross sectional details of beam given in Figure 3 below. **09**

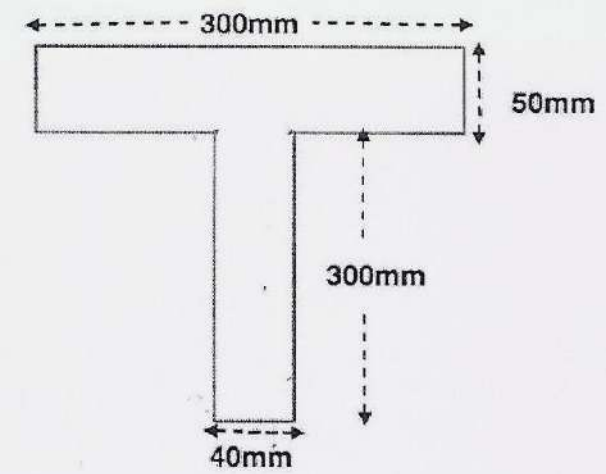

Figure 3

Q.5 Determine the maximum and minimum stresses at the base of dam. The masonry trapezoidal dam retains water on vertical face. The height of the dam is 5m and dam water level is upto 4.5m. Top width of the dam is 1m whereas bottom width is 3m. Take weight of water as 10kN/m^3 and masonry as 20kN/m^3. **09**

Section – II

Q.6 Answer the following questions. **10**

a) Flitched beam
b) Define terms proof resilience & modulus of resilience.
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e) Expression for Strain Energy due to bending.

Q.7 A steel beam of I section shown in Figure 4 is 600 mm deep. Each flange is 250 mm wide & 25 mm thick. The web is 15 mm thick. The beam section is subjected to a shear force of 500 KN. Determine shear stress distribution for the beam section at various levels. **09**

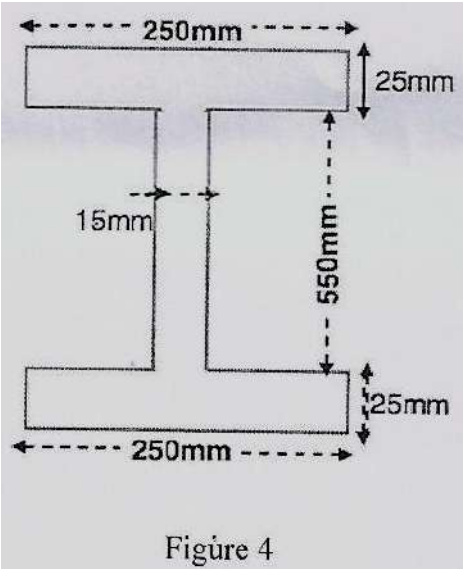

Figure 4

Q.8 A solid circular shaft transmits 75 KW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^0 in 2 meters length of the shaft & shear stress is limited to 50 N/mm^2, Take $C=100 \times 10^3 N/mm^2$ **09**

Q.9 Find the moment of resistance of a flitched beam with a Timber part of 200mm wide and 250mm deep reinforced with two flitches each side by 200mm by 15mm in section. Horizontal CG of timber and steel part passes through same line. Consider allowable stress in timber is 6.5 N/mm^2 and also find allowable stress in steel. Take $E_{steel}=20E_{timber}$ **09**

SLR-FM-622

Seat No.	

Set P

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary but mention it clearly.
3) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The value of the magnetic declination at a place is $7^0 20'$ W. which out of following will be true bearing of a line whose magnetic bearing is $S45^0 40'W$?
   a) $S53^0W$ b) $S38^0 20'W$
   c) $N53^0E$ d) None of the above

2) The operation of levelling across a river is termed as _____.
   a) Profile Levelling b) Reciprocal Levelling
   c) Simple Levelling d) Differential Levelling

3) The permissible angular error for a sixteen sided closed traverse with vernier theodolite having 20" least count will be _____.
   a) 320" b) 80"
   c) 160" d) None of the above

4) The nautical sextant is used for _____.
   a) Measurement of horizontal angle
   b) Measurement of vertical angle
   c) Measurement of magnetic bearing
   d) None of the above

5) If algebraic sum of latitude is negative, the correction in northing will be _____.
   a) positive b) negative
   c) Either positive or negative d) None of the above

6) During trigonometrical leveling, the horizontal and vertical angle measurements are essential, in case of _____.
   a) Object is accessible from theodolite station
   b) Object is inaccessible but object and both instrument stations are in same vertical plane
   c) Object is inaccessible but object and both instrument stations are in different vertical plane
   d) None of the above

7) Sounding rods are used in _____.
   a) Shallow depth of water b) Medium depth of water
   c) In deep water d) All of the above

8) Tellurometer is an electronic distance measuring device that employs the propagation of _____.
   a) Visible light waves b) Radio waves
   c) Both d) None of these

9) To avoid the effect of local attraction the plane table is oriented by _____.
   a) Magnetic compass b) Backsight
   c) Trial and error d) None of these

10) During orientation of plane table _____.
   a) the fartheset point is sighted b) the nearest point is sighted
   c) either (a) or (b) d) the previous station is sighted

11) In which of resection method an auxiliary station is not required?
   a) Two point problem b) Three point problem
   c) both a and b d) none of these

12) Contour lines of different Reduced levels meeting at a point indicate _____.
   a) vertical cliff b) overhanging cliff
   c) Horizontal surface d) All of these

13) One hectare of an area equivalent to _____.
   a) 10^2 m^2 b) 10^4 m^2
   c) 10^6 m^2 d) 10^3 m^2

14) To obtain the correct volume using the trapezoidal rule the prismoidal correction should always be _____.
   a) added b) subtracted
   c) multiplied d) both a or b

Seat No.	

Set **P**

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q no.2 and Q.No.6 are compulsory.
2) Attempt any two from the remaining questions of each section.
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4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.2 **a)** An observer standing on the deck of a ship just sees a light house; the top of the light house is 28m above the sea level and the height of the observer's eye 12m above the sea level. Find the distance of the observer from the light house. **04**

b) The following notes refer to the reciprocal levels taken with the level: **06**

Instrument station	Readings on		Remarks
	A	B	
A	1.029	1.634	Distance (AB)=800m
B	0.943	1.542	RL of A = 421.543

Find
i) the true R.L. of B
ii) combined corrections for curvature and refraction
iii) the error in collimation adjustment of the adjustment

Q.3 **a)** A theodolite was set up at a distance of 200m from a chimney and the angle of elevation to its top was $10^0 48'$. The staff reading on bench mark of reduced level 70.25m with telescope horizontal was 0.977. Find the Reduced level of top of the chimney. **04**

b) The following are the length and bearing of the sides of a closed transverse ABCDA. **05**

Line	Length(m)	Bearing
AB	78.2	$140^0 12'$
BC	198.0	$36^0 24'$
CD	37.8	$338^0 48'$
DA	?	?

Calculate the length and bearing of DA.

Q.4 **a)** The following table given the latitude and departure of the sides of a closed traverse ABCDA. **05**

Line	Latitude (m)		Departure (m)	
	N	S	E	W
AB	107.4		62.0	
BC		122.6	102.9	
CD		77.9		45
DA	93.1			119.9

Assuming independent coordinate of A as 200(N) and 100(E), calculate the independent coordinates of remaining stations.

b) What are the fundamental axes of vernier theodolite? State the desired relationship between them? **04**

Q.5 **Write short notes.** **09**

a) Sounding
b) Abony Level
c) Hand Level

Section – II

Q.6 **a)** Construction and use of total station. **04**

b) An embankment of width 10m of slide slopes 1½ : 1 is required to be made on ground which is level in a direction transeverse to the centre line. The central heights at 40m at interval as follows- **06**
0.90, 1.25, 2.15, 2.50, 1.85, 1.35 & 0.85 calculate the volume of earth work according to
1) The trapezoidal formula
2) The prismoidal formula

Q.7 **a)** What are the methods of plane tabling? Describe one of them with sketch. **05**

b) What is three point problems? How it is solved by Mechanical method. **04**

Q.8 **a)** What are the different methods of contouring? Describe any one method with neat sketch. **05**

b) The following perpendicular offsets were taken from chain line to hedge. **04**

Distance(m)	0	6	12	18	24	30	36
Offset(m)	5.40	4.50	3.60	2.70	1.80	2.25	3.15

Calculate the area enclosed between chain line and offsets by
1) trapezoidal rule
2) Simpson's rule

Q.9 **a)** Write short note on "co-ordinate method". **05**

b) Write note on Geodimeter. **04**

Seat No.	

Set **Q**

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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   c) multiplied d) both a or b

8) The value of the magnetic declination at a place is $7^0$20’ W. which out of following will be true bearing of a line whose magnetic bearing is S$45^0$40’W?
   a) S53^0W b) S$38^0$20’W
   c) N53^0E d) None of the above

9) The operation of levelling across a river is termed as _____.
   a) Profile Levelling b) Reciprocal Levelling
   c) Simple Levelling d) Differential Levelling

10) The permissible angular error for a sixteen sided closed traverse with vernier theodolite having 20” least count will be _____.
   a) 320” b) 80”
   c) 160” d) None of the above

11) The nautical sextant is used for _____.
   a) Measurement of horizontal angle
   b) Measurement of vertical angle
   c) Measurement of magnetic bearing
   d) None of the above

12) If algebraic sum of latitude is negative, the correction in northing will be _____.
   a) positive b) negative
   c) Either positive or negative d) None of the above

13) During trigonometrical leveling, the horizontal and vertical angle measurements are essential, in case of _____.
   a) Object is accessible from theodolite station
   b) Object is inaccessible but object and both instrument stations are in same vertical plane
   c) Object is inaccessible but object and both instrument stations are in different vertical plane
   d) None of the above

14) Sounding rods are used in _____.
   a) Shallow depth of water b) Medium depth of water
   c) In deep water d) All of the above

Seat No.	

Set **Q**

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q no.2 and Q.No.6 are compulsory.
2) Attempt any two from the remaining questions of each section.
3) Figures to right indicate full marks.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.2 **a)** An observer standing on the deck of a ship just sees a light house; the top of the light house is 28m above the sea level and the height of the observer's eye 12m above the sea level. Find the distance of the observer from the light house. **04**

b) The following notes refer to the reciprocal levels taken with the level: **06**

Instrument station	Readings on		Remarks
	A	B	
A	1.029	1.634	Distance (AB)=800m
B	0.943	1.542	RL of A = 421.543

Find
i) the true R.L. of B
ii) combined corrections for curvature and refraction
iii) the error in collimation adjustment of the adjustment

Q.3 **a)** A theodolite was set up at a distance of 200m from a chimney and the angle of elevation to its top was $10^0 48'$. The staff reading on bench mark of reduced level 70.25m with telescope horizontal was 0.977. Find the Reduced level of top of the chimney. **04**

b) The following are the length and bearing of the sides of a closed transverse ABCDA. **05**

Line	Length(m)	Bearing
AB	78.2	$140^0 12'$
BC	198.0	$36^0 24'$
CD	37.8	$338^0 48'$
DA	?	?

Calculate the length and bearing of DA.

Q.4 **a)** The following table given the latitude and departure of the sides of a closed traverse ABCDA. **05**

Line	Latitude (m)		Departure (m)	
	N	S	E	W
AB	107.4		62.0	
BC		122.6	102.9	
CD		77.9		45
DA	93.1			119.9

Assuming independent coordinate of A as 200(N) and 100(E), calculate the independent coordinates of remaining stations.

b) What are the fundamental axes of vernier theodolite? State the desired relationship between them? **04**

Q.5 **Write short notes.** **09**

a) Sounding
b) Abony Level
c) Hand Level

Section – II

Q.6 **a)** Construction and use of total station. **04**

b) An embankment of width 10m of slide slopes 1½ : 1 is required to be made on ground which is level in a direction transeverse to the centre line. The central heights at 40m at interval as follows- **06**
0.90, 1.25, 2.15, 2.50, 1.85, 1.35 & 0.85 calculate the volume of earth work according to
1) The trapezoidal formula
2) The prismoidal formula

Q.7 **a)** What are the methods of plane tabling? Describe one of them with sketch. **05**

b) What is three point problems? How it is solved by Mechanical method. **04**

Q.8 **a)** What are the different methods of contouring? Describe any one method with neat sketch. **05**

b) The following perpendicular offsets were taken from chain line to hedge. **04**

Distance(m)	0	6	12	18	24	30	36
Offset(m)	5.40	4.50	3.60	2.70	1.80	2.25	3.15

Calculate the area enclosed between chain line and offsets by
1) trapezoidal rule
2) Simpson's rule

Q.9 **a)** Write short note on "co-ordinate method". **05**

b) Write note on Geodimeter. **04**

Seat No.	

Set **R**

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary but mention it clearly.
3) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) If algebraic sum of latitude is negative, the correction in northing will be _____.
   a) positive b) negative
   c) Either positive or negative d) None of the above

2) During trigonometrical leveling, the horizontal and vertical angle measurements are essential, in case of _____.
   a) Object is accessible from theodolite station
   b) Object is inaccessible but object and both instrument stations are in same vertical plane
   c) Object is inaccessible but object and both instrument stations are in different vertical plane
   d) None of the above

3) Sounding rods are used in _____.
   a) Shallow depth of water b) Medium depth of water
   c) In deep water d) All of the above

4) Tellurometer is an electronic distance measuring device that employs the propagation of _____.
   a) Visible light waves b) Radio waves
   c) Both d) None of these

5) To avoid the effect of local attraction the plane table is oriented by _____.
   a) Magnetic compass b) Backsight
   c) Trial and error d) None of these

6) During orientation of plane table _____.
   a) the fartheset point is sighted b) the nearest point is sighted
   c) either (a) or (b) d) the previous station is sighted

7) In which of resection method an auxiliary station is not required?
   a) Two point problem b) Three point problem
   c) both a and b d) none of these

8) Contour lines of different Reduced levels meeting at a point indicate _____.
   a) vertical cliff b) overhanging cliff
   c) Horizontal surface d) All of these

9) One hectare of an area equivalent to _____.
   a) 10^2 m^2 b) 10^4 m^2
   c) 10^6 m^2 d) 10^3 m^2

10) To obtain the correct volume using the trapezoidal rule the prismoidal correction should always be _____.
   a) added b) subtracted
   c) multiplied d) both a or b

11) The value of the magnetic declination at a place is $7^0$20' W. which out of following will be true bearing of a line whose magnetic bearing is S$45^0$40'W?
   a) S53^0W b) S$38^0$20'W
   c) N53^0E d) None of the above

12) The operation of levelling across a river is termed as _____.
   a) Profile Levelling b) Reciprocal Levelling
   c) Simple Levelling d) Differential Levelling

13) The permissible angular error for a sixteen sided closed traverse with vernier theodolite having 20" least count will be _____.
   a) 320" b) 80"
   c) 160" d) None of the above

14) The nautical sextant is used for _____.
   a) Measurement of horizontal angle
   b) Measurement of vertical angle
   c) Measurement of magnetic bearing
   d) None of the above

Seat No.	

Set **R**

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q no.2 and Q.No.6 are compulsory.
2) Attempt any two from the remaining questions of each section.
3) Figures to right indicate full marks.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.2 **a)** An observer standing on the deck of a ship just sees a light house; the top of the light house is 28m above the sea level and the height of the observer's eye 12m above the sea level. Find the distance of the observer from the light house. **04**

b) The following notes refer to the reciprocal levels taken with the level: **06**

Instrument station	Readings on		Remarks
	A	B	
A	1.029	1.634	Distance (AB)=800m
B	0.943	1.542	RL of A = 421.543

Find
i) the true R.L. of B
ii) combined corrections for curvature and refraction
iii) the error in collimation adjustment of the adjustment

Q.3 **a)** A theodolite was set up at a distance of 200m from a chimney and the angle of elevation to its top was $10^0 48'$. The staff reading on bench mark of reduced level 70.25m with telescope horizontal was 0.977. Find the Reduced level of top of the chimney. **04**

b) The following are the length and bearing of the sides of a closed transverse ABCDA. **05**

Line	Length(m)	Bearing
AB	78.2	$140^0 12'$
BC	198.0	$36^0 24'$
CD	37.8	$338^0 48'$
DA	?	?

Calculate the length and bearing of DA.

Q.4 **a)** The following table given the latitude and departure of the sides of a closed traverse ABCDA. **05**

Line	Latitude (m)		Departure (m)	
	N	S	E	W
AB	107.4		62.0	
BC		122.6	102.9	
CD		77.9		45
DA	93.1			119.9

Assuming independent coordinate of A as 200(N) and 100(E), calculate the independent coordinates of remaining stations.

b) What are the fundamental axes of vernier theodolite? State the desired relationship between them? **04**

Q.5 **Write short notes.** **09**

a) Sounding
b) Abony Level
c) Hand Level

Section – II

Q.6 **a)** Construction and use of total station. **04**

b) An embankment of width 10m of slide slopes 1½ : 1 is required to be made on ground which is level in a direction transeverse to the centre line. The central heights at 40m at interval as follows- **06**
0.90, 1.25, 2.15, 2.50, 1.85, 1.35 & 0.85 calculate the volume of earth work according to
1) The trapezoidal formula
2) The prismoidal formula

Q.7 **a)** What are the methods of plane tabling? Describe one of them with sketch. **05**

b) What is three point problems? How it is solved by Mechanical method. **04**

Q.8 **a)** What are the different methods of contouring? Describe any one method with neat sketch. **05**

b) The following perpendicular offsets were taken from chain line to hedge. **04**

Distance(m)	0	6	12	18	24	30	36
Offset(m)	5.40	4.50	3.60	2.70	1.80	2.25	3.15

Calculate the area enclosed between chain line and offsets by
1) trapezoidal rule
2) Simpson's rule

Q.9 **a)** Write short note on "co-ordinate method". **05**

b) Write note on Geodimeter. **04**

Seat No.	

Set **S**

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary but mention it clearly.
3) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) During orientation of plane table _____.
   a) the fartheset point is sighted b) the nearest point is sighted
   c) either (a) or (b) d) the previous station is sighted

2) In which of resection method an auxiliary station is not required?
   a) Two point problem b) Three point problem
   c) both a and b d) none of these

3) Contour lines of different Reduced levels meeting at a point indicate _____.
   a) vertical cliff b) overhanging cliff
   c) Horizontal surface d) All of these

4) One hectare of an area equivalent to _____.
   a) 10^2 m^2 b) 10^4 m^2
   c) 10^6 m^2 d) 10^3 m^2

5) To obtain the correct volume using the trapezoidal rule the prismoidal correction should always be _____.
   a) added b) subtracted
   c) multiplied d) both a or b

6) The value of the magnetic declination at a place is $7^0$20' W. which out of following will be true bearing of a line whose magnetic bearing is S$45^0$40'W?
   a) S53^0W b) S$38^0$20'W
   c) N53^0E d) None of the above

7) The operation of levelling across a river is termed as _____.
   a) Profile Levelling b) Reciprocal Levelling
   c) Simple Levelling d) Differential Levelling

8) The permissible angular error for a sixteen sided closed traverse with vernier theodolite having 20" least count will be _____.
   a) 320" b) 80"
   c) 160" d) None of the above

9) The nautical sextant is used for _____.
   a) Measurement of horizontal angle
   b) Measurement of vertical angle
   c) Measurement of magnetic bearing
   d) None of the above

10) If algebraic sum of latitude is negative, the correction in northing will be _____.
   a) positive
   b) negative
   c) Either positive or negative
   d) None of the above

11) During trigonometrical leveling, the horizontal and vertical angle measurements are essential, in case of _____.
   a) Object is accessible from theodolite station
   b) Object is inaccessible but object and both instrument stations are in same vertical plane
   c) Object is inaccessible but object and both instrument stations are in different vertical plane
   d) None of the above

12) Sounding rods are used in _____.
   a) Shallow depth of water
   b) Medium depth of water
   c) In deep water
   d) All of the above

13) Tellurometer is an electronic distance measuring device that employs the propagation of _____.
   a) Visible light waves
   b) Radio waves
   c) Both
   d) None of these

14) To avoid the effect of local attraction the plane table is oriented by _____.
   a) Magnetic compass
   b) Backsight
   c) Trial and error
   d) None of these

Seat No.	

Set **S**

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – I

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q no.2 and Q.No.6 are compulsory.
2) Attempt any two from the remaining questions of each section.
3) Figures to right indicate full marks.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.2 **a)** An observer standing on the deck of a ship just sees a light house; the top of the light house is 28m above the sea level and the height of the observer's eye 12m above the sea level. Find the distance of the observer from the light house. **04**

b) The following notes refer to the reciprocal levels taken with the level: **06**

Instrument station	Readings on		Remarks
	A	B	
A	1.029	1.634	Distance (AB)=800m
B	0.943	1.542	RL of A = 421.543

Find
i) the true R.L. of B
ii) combined corrections for curvature and refraction
iii) the error in collimation adjustment of the adjustment

Q.3 **a)** A theodolite was set up at a distance of 200m from a chimney and the angle of elevation to its top was $10^0 48'$. The staff reading on bench mark of reduced level 70.25m with telescope horizontal was 0.977. Find the Reduced level of top of the chimney. **04**

b) The following are the length and bearing of the sides of a closed transverse ABCDA. **05**

Line	Length(m)	Bearing
AB	78.2	$140^0 12'$
BC	198.0	$36^0 24'$
CD	37.8	$338^0 48'$
DA	?	?

Calculate the length and bearing of DA.

Q.4 **a)** The following table given the latitude and departure of the sides of a closed traverse ABCDA. **05**

Line	Latitude (m)		Departure (m)	
	N	S	E	W
AB	107.4		62.0	
BC		122.6	102.9	
CD		77.9		45
DA	93.1			119.9

Assuming independent coordinate of A as 200(N) and 100(E), calculate the independent coordinates of remaining stations.

b) What are the fundamental axes of vernier theodolite? State the desired relationship between them? **04**

Q.5 **Write short notes.** **09**

a) Sounding
b) Abony Level
c) Hand Level

Section – II

Q.6 **a)** Construction and use of total station. **04**

b) An embankment of width 10m of slide slopes 1½ : 1 is required to be made on ground which is level in a direction transeverse to the centre line. The central heights at 40m at interval as follows- **06**
0.90, 1.25, 2.15, 2.50, 1.85, 1.35 & 0.85 calculate the volume of earth work according to
1) The trapezoidal formula
2) The prismoidal formula

Q.7 **a)** What are the methods of plane tabling? Describe one of them with sketch. **05**

b) What is three point problems? How it is solved by Mechanical method. **04**

Q.8 **a)** What are the different methods of contouring? Describe any one method with neat sketch. **05**

b) The following perpendicular offsets were taken from chain line to hedge. **04**

Distance(m)	0	6	12	18	24	30	36
Offset(m)	5.40	4.50	3.60	2.70	1.80	2.25	3.15

Calculate the area enclosed between chain line and offsets by
1) trapezoidal rule
2) Simpson's rule

Q.9 **a)** Write short note on "co-ordinate method". **05**

b) Write note on Geodimeter. **04**

SLR-FM-623

Seat No.	

Set P

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data whenever and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statement is correct or incorrect. **14**

1) Shallow foundation is suitable in black cotton soil.
2) The lowest part of a structure which transmits the load to the soil is known as super structure.
3) Standard size of brick is 19cmX9mX9cm.
4) Ashlar masonry is the type of brick masonry.
5) Rail is nothing but the top horizontal member of frame.
6) Mullion divides door or window vertically.
7) A sloping roof having slope in four directions is called Gambrel roof.
8) Rise is vertical member of step which connected to trades.
9) Height of plinth always kept less than 450mm for residential building.
10) Horn is extensions of post of frame below finished floor level.
11) Positive pressure is created on the windward side.
12) Frog is special surface texture provided to the stone in stone masonry.
13) The economical angle of inclination of louver is 30^0.
14) Construction speed of load bearing structure is more as compare to the framed structure.

SLR-FM-623

Seat No.	

Set P

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Section - I to be written in answer book.
3) Section - II to be drawn on half empirical drawing sheet. Use both sides of the sheet.
4) Retain all projection/construction lines on drawing sheet.
5) Assume suitable data wherever necessary and mention it clearly.
6) Figure to right indicate full marks.

Section – I

Q.2 Attempt any seven questions from following **28**

a) Write good requirements of stone and its properties.
b) Define foundation, enlist types of foundation and explain any one types of foundation.
c) Write note on brick masonry and its classification.
d) Write properties and uses of brick.
e) Discuss the functional requirements of building.
f) Compare the Load bearing structure and framed structure.
g) Explain the load transferring mechanism of framed structure.
h) Explain the factors of selection of flooring and enlist types of flooring.
i) Draw a detailed labeled diagram of arch and explain components of arch.
j) Explain types of Roofs.

Section – II

Q.3 Attempt any two questions from following. **28**

a) Design and draw doglegged staircase for residential building, use following details.
1) Width of flight 1000mm
2) Floor to floor height 3000 mm, assume suitable data and mention it clearly. Also mention step by step calculation.

b) Draw the front elevation and sectional plan of fully paneled door. Consider following details.
- Clearing opening 1000mm X 2100mm
- Frame 100mm X 85mm, Style 100mm X 30mm
- Top Rail 100mm X 30mm, Bottom rail 150mm X 30 mm,
- Lock rail 200mm X 30mm, Panel 25mm thick.

Assume suitable data and mention it clearly.

c) Draw elevation and plan (1, 3, 5... and 2, 4, 6... courses) of Flemish bond for L shaped $1\frac{1}{2}$ Brick thick Wall upto 8 courses. Use nominal size brick.

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data whenever and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statement is correct or incorrect. **14**

1) Rise is vertical member of step which connected to trades.
2) Height of plinth always kept less than 450mm for residential building.
3) Horn is extensions of post of frame below finished floor level.
4) Positive pressure is created on the windward side.
5) Frog is special surface texture provided to the stone in stone masonry.
6) The economical angle of inclination of louver is 30^0.
7) Construction speed of load bearing structure is more as compare to the framed structure.
8) Shallow foundation is suitable in black cotton soil.
9) The lowest part of a structure which transmits the load to the soil is known as super structure.
10) Standard size of brick is 19cmX9mX9cm.
11) Ashlar masonry is the type of brick masonry.
12) Rail is nothing but the top horizontal member of frame.
13) Mullion divides door or window vertically.
14) A sloping roof having slope in four directions is called Gambrel roof.

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Section - I to be written in answer book.
3) Section - II to be drawn on half empirical drawing sheet. Use both sides of the sheet.
4) Retain all projection/construction lines on drawing sheet.
5) Assume suitable data wherever necessary and mention it clearly.
6) Figure to right indicate full marks.

Section – I

Q.2 Attempt any seven questions from following **28**

a) Write good requirements of stone and its properties.
b) Define foundation, enlist types of foundation and explain any one types of foundation.
c) Write note on brick masonry and its classification.
d) Write properties and uses of brick.
e) Discuss the functional requirements of building.
f) Compare the Load bearing structure and framed structure.
g) Explain the load transferring mechanism of framed structure.
h) Explain the factors of selection of flooring and enlist types of flooring.
i) Draw a detailed labeled diagram of arch and explain components of arch.
j) Explain types of Roofs.

Section – II

Q.3 Attempt any two questions from following. **28**

a) Design and draw doglegged staircase for residential building, use following details.
1) Width of flight 1000mm
2) Floor to floor height 3000 mm, assume suitable data and mention it clearly. Also mention step by step calculation.

b) Draw the front elevation and sectional plan of fully paneled door. Consider following details.
- Clearing opening 1000mm X 2100mm
- Frame 100mm X 85mm, Style 100mm X 30mm
- Top Rail 100mm X 30mm, Bottom rail 150mm X 30 mm,
- Lock rail 200mm X 30mm, Panel 25mm thick.

Assume suitable data and mention it clearly.

c) Draw elevation and plan (1, 3, 5... and 2, 4, 6... courses) of Flemish bond for L shaped $1\frac{1}{2}$ Brick thick Wall upto 8 courses. Use nominal size brick.

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data whenever and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statement is correct or incorrect. **14**

1) Rail is nothing but the top horizontal member of frame.
2) Mullion divides door or window vertically.
3) A sloping roof having slope in four directions is called Gambrel roof.
4) Rise is vertical member of step which connected to trades.
5) Height of plinth always kept less than 450mm for residential building.
6) Horn is extensions of post of frame below finished floor level.
7) Positive pressure is created on the windward side.
8) Frog is special surface texture provided to the stone in stone masonry.
9) The economical angle of inclination of louver is 30^0.
10) Construction speed of load bearing structure is more as compare to the framed structure.
11) Shallow foundation is suitable in black cotton soil.
12) The lowest part of a structure which transmits the load to the soil is known as super structure.
13) Standard size of brick is 19cmX9mX9cm.
14) Ashlar masonry is the type of brick masonry.

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Section - I to be written in answer book.
3) Section - II to be drawn on half empirical drawing sheet. Use both sides of the sheet.
4) Retain all projection/construction lines on drawing sheet.
5) Assume suitable data wherever necessary and mention it clearly.
6) Figure to right indicate full marks.

Section – I

Q.2 Attempt any seven questions from following **28**

a) Write good requirements of stone and its properties.
b) Define foundation, enlist types of foundation and explain any one types of foundation.
c) Write note on brick masonry and its classification.
d) Write properties and uses of brick.
e) Discuss the functional requirements of building.
f) Compare the Load bearing structure and framed structure.
g) Explain the load transferring mechanism of framed structure.
h) Explain the factors of selection of flooring and enlist types of flooring.
i) Draw a detailed labeled diagram of arch and explain components of arch.
j) Explain types of Roofs.

Section – II

Q.3 Attempt any two questions from following. **28**

a) Design and draw doglegged staircase for residential building, use following details.
1) Width of flight 1000mm
2) Floor to floor height 3000 mm, assume suitable data and mention it clearly. Also mention step by step calculation.

b) Draw the front elevation and sectional plan of fully paneled door. Consider following details.
- Clearing opening 1000mm X 2100mm
- Frame 100mm X 85mm, Style 100mm X 30mm
- Top Rail 100mm X 30mm, Bottom rail 150mm X 30 mm,
- Lock rail 200mm X 30mm, Panel 25mm thick.

Assume suitable data and mention it clearly.

c) Draw elevation and plan (1, 3, 5... and 2, 4, 6... courses) of Flemish bond for L shaped $1\frac{1}{2}$ Brick thick Wall upto 8 courses. Use nominal size brick.

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 10:00 AM To 02:00 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data whenever and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statement is correct or incorrect. **14**

1) Horn is extensions of post of frame below finished floor level.
2) Positive pressure is created on the windward side.
3) Frog is special surface texture provided to the stone in stone masonry.
4) The economical angle of inclination of louver is 30^0.
5) Construction speed of load bearing structure is more as compare to the framed structure.
6) Shallow foundation is suitable in black cotton soil.
7) The lowest part of a structure which transmits the load to the soil is known as super structure.
8) Standard size of brick is 19cmX9mX9cm.
9) Ashlar masonry is the type of brick masonry.
10) Rail is nothing but the top horizontal member of frame.
11) Mullion divides door or window vertically.
12) A sloping roof having slope in four directions is called Gambrel roof.
13) Rise is vertical member of step which connected to trades.
14) Height of plinth always kept less than 450mm for residential building.

SLR-FM-623

Seat No.		Set	S

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Section - I to be written in answer book.
3) Section - II to be drawn on half empirical drawing sheet. Use both sides of the sheet.
4) Retain all projection/construction lines on drawing sheet.
5) Assume suitable data wherever necessary and mention it clearly.
6) Figure to right indicate full marks.

Section – I

Q.2 Attempt any seven questions from following **28**

a) Write good requirements of stone and its properties.
b) Define foundation, enlist types of foundation and explain any one types of foundation.
c) Write note on brick masonry and its classification.
d) Write properties and uses of brick.
e) Discuss the functional requirements of building.
f) Compare the Load bearing structure and framed structure.
g) Explain the load transferring mechanism of framed structure.
h) Explain the factors of selection of flooring and enlist types of flooring.
i) Draw a detailed labeled diagram of arch and explain components of arch.
j) Explain types of Roofs.

Section – II

Q.3 Attempt any two questions from following. **28**

a) Design and draw doglegged staircase for residential building, use following details.
1) Width of flight 1000mm
2) Floor to floor height 3000 mm, assume suitable data and mention it clearly. Also mention step by step calculation.

b) Draw the front elevation and sectional plan of fully paneled door. Consider following details.
- Clearing opening 1000mm X 2100mm
- Frame 100mm X 85mm, Style 100mm X 30mm
- Top Rail 100mm X 30mm, Bottom rail 150mm X 30 mm,
- Lock rail 200mm X 30mm, Panel 25mm thick.

Assume suitable data and mention it clearly.

c) Draw elevation and plan (1, 3, 5... and 2, 4, 6... courses) of Flemish bond for L shaped $1\frac{1}{2}$ Brick thick Wall upto 8 courses. Use nominal size brick.

SLR-FM-624

Seat No.	

Set P

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – I

Day & Date: Tuesday,17-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of nonprogrammable calculator is permitted.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Unit Of kinematic viscosity is _____.
   a) N/M b) m^2/s
   c) $N\text{-}m/s^2$ d) kg/m^3

2) The typical example of non-Newtonian fluid of pseudo plastic variety is _____.
   a) Water b) Blood
   c) Air d) Printing ink

3) The value of atmospheric pressure is _____.
   a) 750 mm of Hg b) 700 mm of Hg
   c) 10.33 ml. of H_2O d) 11.3 mt of H_2O

4) Centre of pressure $(\bar{h})$ in case of inclined immersed surface is given by _____.
   a) $\bar{h} = \frac{IG\sin\theta}{A\bar{X}} + \bar{X}$ b) $\bar{h} = \frac{IG^2\sin\theta}{A\bar{X}} + \bar{X}$
   c) $\bar{h} = \frac{IG\sin\theta}{A^2\bar{X}} + \bar{X}$ d) $\bar{h} = \frac{IG\sin^2\theta}{A\bar{X}} + \bar{X}$

5) If the position of metacenre (M) remains lower than c.g. of the body - G, the body will remain in state of _____.
   a) Stable equilibrium b) Neutral
   c) Unstable equilibrium d) None of the above

6) The path followed by fluid particle in motion is called _____.
   a) stream line b) streak line
   c) path line d) none of the above

7) The type of flow in which the velocity at any given time does not change with respect to space called _____.
   a) Steady flow b) Uniform flow
   c) compressible flow d) rotational now

8) Which of following is application of Bernoulli's equation?
   a) Venturi meter b) Pitot tube
   c) Orifice meter d) All

9) Coefficient of contraction (ϵ_c) is equal to _____.
   a) a_c/a b) $a \times a_c$
   c) a/a_c d) $\sqrt{a_c/a}$

10) The total energy represented by the Bernoulli's equation has the units _____.
   a) Nm/s b) Nm/m
   c) Ns/m d) Nm/N

11) Loss of head due to sudden enlargement is given as _____.
   a) $\frac{(V_1-V_2)3}{2g}$ b) $\frac{(V_1-V_2)2}{2g}$
   c) $\frac{(V_1-V_2)}{2g}$ d) None of these

12) Pipe network system solved by _____.
   a) Bernoulli's equation b) Hardy cross equation
   c) Stoke's equation d) Chery's equation

13) At the point of boundary layer separation _____.
   a) Velocity is negative b) Shear stress is maximum
   c) Shear stress is zero d) Pressure gradient is zero

14) The drag force on a body is _____.
   a) Net frictional force on the body
   b) Net pressure force on the body in direction of relative velocity
   c) The component of resultant force in the direction of relative velocity
   d) None of above

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – I

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.2 and Q.No.6 are compulsory. And solve any two question from remaining question from each section.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of nonprogrammable calculator is permitted.

Section – I

Q.2 **a)** State and prove hydrostatic law. **05**

b) Calculate the density, specific weight & weight of one litre of petrol of specific gravity 0.7. **04**

c) Show graphically different types of fluids. **01**

Q.3 **a)** An Inverted U-tube manometer is connected to two horizontal pipes 'A' & 'B' through which water is flowing. The vertical distance between the axes of these pipes is 30 cm. When an oil of sp.gr. 0.8 is used as a gauge fluid, the vertical heights of water columns in the two limbs of the inverted manometer (When measured from the respective centerlines of the pipes) are found to be same & equal to 35 cm. Determine the difference of pressure between the pipes. **05**

b) Prove that intensity of pressure at a point in a static fluid is equal in all directions. **04**

Q.4 **a)** **Define:** **04**
1) Centre of pressure
2) Metacentre
3) Buoyancy
4) Metacentric height

b) A stone weights 392.4 N in air & 196.2 N in water. Compute the volume of stone & its specific gravity. **05**

Q.5 **a)** **Define:** **04**
1) compressible flow
2) Rotational flow
3) 3-Dimensional flow
4) Uniform flow

b) A 25 cm diameter pipe carries oil of sp.gr. 0.9 at a velocity of 3m/sec. At another section the diameter is 20 cm. Find velocity at this section & also mass flow rate of oil. **05**

Section – II

Q.6 **a)** Derive an expression for Bernoulli's theorem from first principle and state the assumptions made for the derivation. **06**

b) A300mmx 150mm venturimeter is provided in a vertical pipeline carrying oil of specific gravity 0.9, flow being Upward. The difference in elevation of the throat section and entrance section of the venturimeter is 300mm. the differential U-tube mercury manometer shows a gauge deflection of 250mm. Calculate, **04**

1) The discharge of oil and
2) The difference between the entrance section and the throat section.

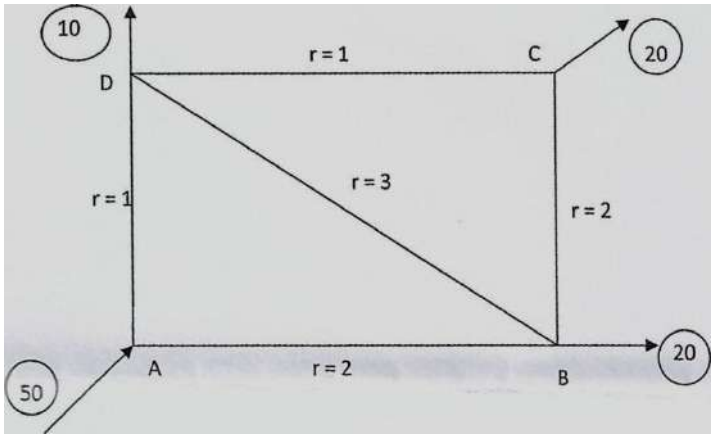
Take the coefficient of meter as 0.98 and specific gravity of mercury as 13.6.

Q.7 **a)** Derive Darcy-WeisBach equation and state assumptions made. **06**

d) Derive an expression for determination of coeff. Of velocity in orifice. **03**

Q.8 **a)** Explain with sketch water hammer and siphon pipe. **03**

b) Calculate discharge in each pipe of the network by Hardy cross method. If $h_f = rQ^2$. **06**



Q.9 **a)** Explain the concept of equivalent length and equivalent diameter of pipe. **03**

b) The velocity distribution in the boundary layer is given by is **06**

$$\frac{u}{U} = \left(\frac{y}{\delta}\right)^{1/7}$$

Calculate:

1) Displacement thickness
2) Momentum thickness
3) Energy thickness

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – I

Day & Date: Tuesday,17-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of nonprogrammable calculator is permitted.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Which of following is application of Bernoulli's equation?
   a) Venturi meter b) Pitot tube
   c) Orifice meter d) All

2) Coefficient of contraction (ϵ_c) is equal to _____.
   a) a_c/a b) $a \times a_c$
   c) a/a_c d) $\sqrt{a_c/a}$

3) The total energy represented by the Bernoulli's equation has the units _____.
   a) Nm/s b) Nm/m
   c) Ns/m d) Nm/N

4) Loss of head due to sudden enlargement is given as _____.
   a) $\frac{(V_1-V_2)3}{2g}$ b) $\frac{(V_1-V_2)2}{2g}$
   c) $\frac{(V_1-V_2)}{2g}$ d) None of these

5) Pipe network system solved by _____.
   a) Bernoulli's equation b) Hardy cross equation
   c) Stoke's equation d) Chery's equation

6) At the point of boundary layer separation _____.
   a) Velocity is negative b) Shear stress is maximum
   c) Shear stress is zero d) Pressure gradient is zero

7) The drag force on a body is _____.
   a) Net frictional force on the body
   b) Net pressure force on the body in direction of relative velocity
   c) The component of resultant force in the direction of relative velocity
   d) None of above

8) Unit Of kinematic viscosity is _____.
   a) N/M b) m^2/s
   c) $N\text{-}m/s^2$ d) kg/m^3

9) The typical example of non-Newtonian fluid of pseudo plastic variety is _____.
   a) Water
   b) Blood
   c) Air
   d) Printing ink

10) The value of atmospheric pressure is _____.
   a) 750 mm of Hg
   b) 700 mm of Hg
   c) 10.33 ml. of H_2O
   d) 11.3 mt of H_2O

11) Centre of pressure $(\bar{h})$ in case of inclined immersed surface is given by _____.
   a) $\bar{h} = \frac{IG\sin\theta}{A\bar{X}} + \bar{X}$
   b) $\bar{h} = \frac{IG^2\sin\theta}{A\bar{X}} + \bar{X}$
   c) $\bar{h} = \frac{IG\sin\theta}{A^2\bar{X}} + \bar{X}$
   d) $\bar{h} = \frac{IGSin^2\theta}{A\bar{X}} + \bar{X}$

12) If the position of metacenre (M) remains lower than c.g. of the body - G, the body will remain in state of _____.
   a) Stable equilibrium
   b) Neutral
   c) Unstable equilibrium
   d) None of the above

13) The path followed by fluid particle in motion is called _____.
   a) stream line
   b) streak line
   c) path line
   d) none of the above

14) The type of flow in which the velocity at any given time does not change with respect to space called _____.
   a) Steady flow
   b) Uniform flow
   c) compressible flow
   d) rotational now

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – I

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.2 and Q.No.6 are compulsory. And solve any two question from remaining question from each section.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of nonprogrammable calculator is permitted.

Section – I

Q.2 **a)** State and prove hydrostatic law. **05**

b) Calculate the density, specific weight & weight of one litre of petrol of specific gravity 0.7. **04**

c) Show graphically different types of fluids. **01**

Q.3 **a)** An Inverted U-tube manometer is connected to two horizontal pipes 'A' & 'B' through which water is flowing. The vertical distance between the axes of these pipes is 30 cm. When an oil of sp.gr. 0.8 is used as a gauge fluid, the vertical heights of water columns in the two limbs of the inverted manometer (When measured from the respective centerlines of the pipes) are found to be same & equal to 35 cm. Determine the difference of pressure between the pipes. **05**

b) Prove that intensity of pressure at a point in a static fluid is equal in all directions. **04**

Q.4 **a)** **Define:** **04**
1) Centre of pressure
2) Metacentre
3) Buoyancy
4) Metacentric height

b) A stone weights 392.4 N in air & 196.2 N in water. Compute the volume of stone & its specific gravity. **05**

Q.5 **a)** **Define:** **04**
1) compressible flow
2) Rotational flow
3) 3-Dimensional flow
4) Uniform flow

b) A 25 cm diameter pipe carries oil of sp.gr. 0.9 at a velocity of 3m/sec. At another section the diameter is 20 cm. Find velocity at this section & also mass flow rate of oil. **05**

Section – II

Q.6 **a)** Derive an expression for Bernoulli's theorem from first principle and state the assumptions made for the derivation. **06**

b) A300mmx 150mm venturimeter is provided in a vertical pipeline carrying oil of specific gravity 0.9, flow being Upward. The difference in elevation of the throat section and entrance section of the venturimeter is 300mm. the differential U-tube mercury manometer shows a gauge deflection of 250mm. Calculate, **04**

1) The discharge of oil and
2) The difference between the entrance section and the throat section.

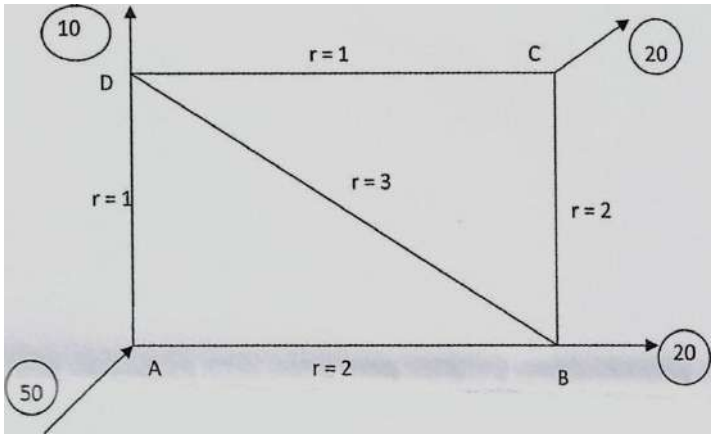
Take the coefficient of meter as 0.98 and specific gravity of mercury as 13.6.

Q.7 **a)** Derive Darcy-WeisBach equation and state assumptions made. **06**

d) Derive an expression for determination of coeff. Of velocity in orifice. **03**

Q.8 **a)** Explain with sketch water hammer and siphon pipe. **03**

b) Calculate discharge in each pipe of the network by Hardy cross method. If $h_f = rQ^2$. **06**



Q.9 **a)** Explain the concept of equivalent length and equivalent diameter of pipe. **03**

b) The velocity distribution in the boundary layer is given by is **06**

$$\frac{u}{U} = \left(\frac{y}{\delta}\right)^{1/7}$$

Calculate:

1) Displacement thickness
2) Momentum thickness
3) Energy thickness

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – I

Day & Date: Tuesday,17-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of nonprogrammable calculator is permitted.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) If the position of metacenre (M) remains lower than c.g. of the body - G, the body will remain in state of _____.
   a) Stable equilibrium b) Neutral
   c) Unstable equilibrium d) None of the above

2) The path followed by fluid particle in motion is called _____.
   a) stream line b) streak line
   c) path line d) none of the above

3) The type of flow in which the velocity at any given time does not change with respect to space called _____.
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4) Which of following is application of Bernoulli's equation?
   a) Venturi meter b) Pitot tube
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5) Coefficient of contraction (ϵ_c) is equal to _____.
   a) a_c/a b) $a \times a_c$
   c) a/a_c d) $\sqrt{a_c/a}$

6) The total energy represented by the Bernoulli's equation has the units _____.
   a) Nm/s b) Nm/m
   c) Ns/m d) Nm/N

7) Loss of head due to sudden enlargement is given as _____.
   a) $\frac{(V_1-V_2)3}{2g}$ b) $\frac{(V_1-V_2)2}{2g}$
   c) $\frac{(V_1-V_2)}{2g}$ d) None of these

8) Pipe network system solved by _____.
   a) Bernoulli's equation b) Hardy cross equation
   c) Stoke's equation d) Chery's equation

9) At the point of boundary layer separation _____.
   a) Velocity is negative
   b) Shear stress is maximum
   c) Shear stress is zero
   d) Pressure gradient is zero

10) The drag force on a body is _____.
   a) Net frictional force on the body
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11) Unit Of kinematic viscosity is _____.
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12) The typical example of non-Newtonian fluid of pseudo plastic variety is _____.
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   b) Blood
   c) Air
   d) Printing ink

13) The value of atmospheric pressure is _____.
   a) 750 mm of Hg
   b) 700 mm of Hg
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14) Centre of pressure $(\bar{h})$ in case of inclined immersed surface is given by _____.
   a) $\bar{h} = \frac{IG\sin\theta}{A\bar{X}} + \bar{X}$
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   c) $\bar{h} = \frac{IG\sin\theta}{A^2\bar{X}} + \bar{X}$
   d) $\bar{h} = \frac{IGSin^2\theta}{A\bar{X}} + \bar{X}$

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – I

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.2 and Q.No.6 are compulsory. And solve any two question from remaining question from each section.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of nonprogrammable calculator is permitted.

Section – I

Q.2 **a)** State and prove hydrostatic law. **05**

b) Calculate the density, specific weight & weight of one litre of petrol of specific gravity 0.7. **04**

c) Show graphically different types of fluids. **01**

Q.3 **a)** An Inverted U-tube manometer is connected to two horizontal pipes 'A' & 'B' through which water is flowing. The vertical distance between the axes of these pipes is 30 cm. When an oil of sp.gr. 0.8 is used as a gauge fluid, the vertical heights of water columns in the two limbs of the inverted manometer (When measured from the respective centerlines of the pipes) are found to be same & equal to 35 cm. Determine the difference of pressure between the pipes. **05**

b) Prove that intensity of pressure at a point in a static fluid is equal in all directions. **04**

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4) Uniform flow

b) A 25 cm diameter pipe carries oil of sp.gr. 0.9 at a velocity of 3m/sec. At another section the diameter is 20 cm. Find velocity at this section & also mass flow rate of oil. **05**

Section – II

Q.6 **a)** Derive an expression for Bernoulli's theorem from first principle and state the assumptions made for the derivation. **06**

b) A300mmx 150mm venturimeter is provided in a vertical pipeline carrying oil of specific gravity 0.9, flow being Upward. The difference in elevation of the throat section and entrance section of the venturimeter is 300mm. the differential U-tube mercury manometer shows a gauge deflection of 250mm. Calculate, **04**

1) The discharge of oil and
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Take the coefficient of meter as 0.98 and specific gravity of mercury as 13.6.

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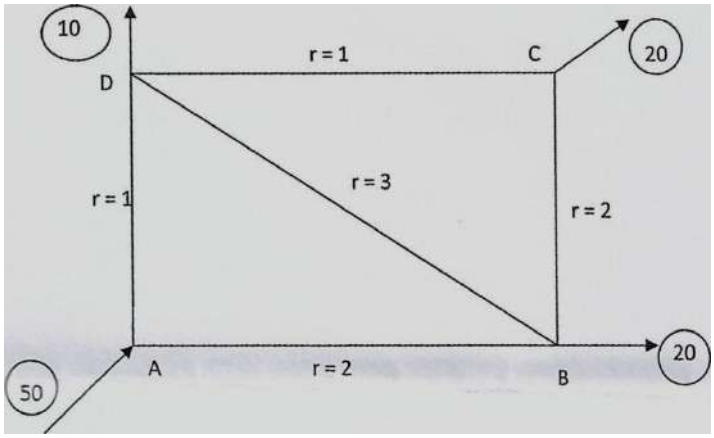
Q.8 **a)** Explain with sketch water hammer and siphon pipe. **03**

b) Calculate discharge in each pipe of the network by Hardy cross method. If $h_f = rQ^2$. **06**



Q.9 **a)** Explain the concept of equivalent length and equivalent diameter of pipe. **03**

b) The velocity distribution in the boundary layer is given by is **06**

$$\frac{u}{U} = \left(\frac{y}{\delta}\right)^{1/7}$$

Calculate:

1) Displacement thickness
2) Momentum thickness
3) Energy thickness

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – I

Day & Date: Tuesday,17-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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3) Figures to the right indicate full marks.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

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   a) Bernoulli's equation b) Hardy cross equation
   c) Stoke's equation d) Chery's equation

4) At the point of boundary layer separation _____.
   a) Velocity is negative b) Shear stress is maximum
   c) Shear stress is zero d) Pressure gradient is zero

5) The drag force on a body is _____.
   a) Net frictional force on the body
   b) Net pressure force on the body in direction of relative velocity
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6) Unit Of kinematic viscosity is _____.
   a) N/M b) m^2/s
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7) The typical example of non-Newtonian fluid of pseudo plastic variety is _____.
   a) Water b) Blood
   c) Air d) Printing ink

8) The value of atmospheric pressure is _____.
   a) 750 mm of Hg b) 700 mm of Hg
   c) 10.33 ml. of H_2O d) 11.3 mt of H_2O

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a) $\bar{h} = \frac{\mathrm{IGsin\ \theta}}{\mathrm{A\overline{X}}} + \overline{\mathrm{X}}$ b) $\bar{h} = \frac{\mathrm{IG^2 sin\,\theta}}{\mathrm{A\overline{X}}} + \overline{\mathrm{X}}$

c) $\bar{h} = \frac{\mathrm{IGsin\ \theta}}{\mathrm{A^2\overline{X}}} + \overline{\mathrm{X}}$ d) $\bar{h} = \frac{\mathrm{IGSin^2\theta}}{\mathrm{A\overline{X}}} + \overline{\mathrm{X}}$

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c) path line d) none of the above

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a) Steady flow b) Uniform flow

c) compressible flow d) rotational now

13) Which of following is application of Bernoulli's equation?

a) Venturi meter b) Pitot tube

c) Orifice meter d) All

14) Coefficient of contraction (ϵ_c) is equal to _____.

a) a_c/a b) $a \times a_c$

c) a/a_c d) $\sqrt{a_c/a}$

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – I

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.2 and Q.No.6 are compulsory. And solve any two question from remaining question from each section.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of nonprogrammable calculator is permitted.

Section – I

Q.2 **a)** State and prove hydrostatic law. **05**

b) Calculate the density, specific weight & weight of one litre of petrol of specific gravity 0.7. **04**

c) Show graphically different types of fluids. **01**

Q.3 **a)** An Inverted U-tube manometer is connected to two horizontal pipes 'A' & 'B' through which water is flowing. The vertical distance between the axes of these pipes is 30 cm. When an oil of sp.gr. 0.8 is used as a gauge fluid, the vertical heights of water columns in the two limbs of the inverted manometer (When measured from the respective centerlines of the pipes) are found to be same & equal to 35 cm. Determine the difference of pressure between the pipes. **05**

b) Prove that intensity of pressure at a point in a static fluid is equal in all directions. **04**

Q.4 **a)** **Define:** **04**
1) Centre of pressure
2) Metacentre
3) Buoyancy
4) Metacentric height

b) A stone weights 392.4 N in air & 196.2 N in water. Compute the volume of stone & its specific gravity. **05**

Q.5 **a)** **Define:** **04**
1) compressible flow
2) Rotational flow
3) 3-Dimensional flow
4) Uniform flow

b) A 25 cm diameter pipe carries oil of sp.gr. 0.9 at a velocity of 3m/sec. At another section the diameter is 20 cm. Find velocity at this section & also mass flow rate of oil. **05**

Section – II

Q.6 **a)** Derive an expression for Bernoulli's theorem from first principle and state the assumptions made for the derivation. **06**

b) A300mmx 150mm venturimeter is provided in a vertical pipeline carrying oil of specific gravity 0.9, flow being Upward. The difference in elevation of the throat section and entrance section of the venturimeter is 300mm. the differential U-tube mercury manometer shows a gauge deflection of 250mm. Calculate, **04**

1) The discharge of oil and
2) The difference between the entrance section and the throat section.

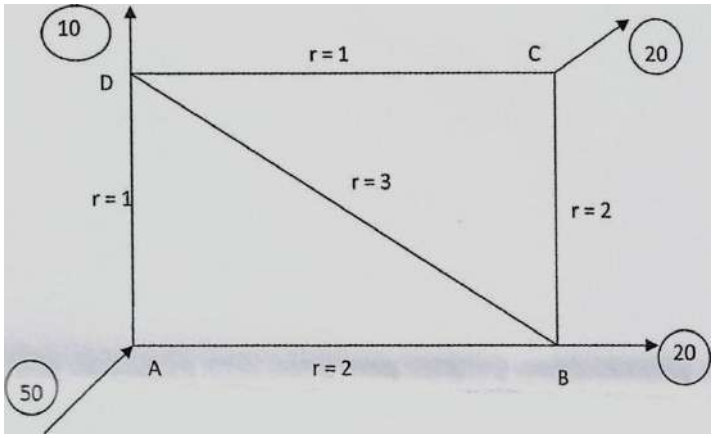
Take the coefficient of meter as 0.98 and specific gravity of mercury as 13.6.

Q.7 **a)** Derive Darcy-WeisBach equation and state assumptions made. **06**

d) Derive an expression for determination of coeff. Of velocity in orifice. **03**

Q.8 **a)** Explain with sketch water hammer and siphon pipe. **03**

b) Calculate discharge in each pipe of the network by Hardy cross method. If $h_f = rQ^2$. **06**



Q.9 **a)** Explain the concept of equivalent length and equivalent diameter of pipe. **03**

b) The velocity distribution in the boundary layer is given by is **06**

$$\frac{u}{U} = \left(\frac{y}{\delta}\right)^{1/7}$$

Calculate:

1) Displacement thickness
2) Momentum thickness
3) Energy thickness

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday,19-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Draw neat diagrams wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Metamorphic rock with alternating layers of light and dark minerals is called as a _____.
   a) schist b) gneiss
   c) slate d) phyllite

2) The crust of the earth is separated from mantle by _____ discontinuity.
   a) Gutenberg b) Mohorovicic
   c) Lehmann d) Conrad

3) Which one of the following is not a part of volcano?
   a) Crater b) Conduit
   c) Delta d) Dyke

4) A coarse grained sedimentary rock with rounded pebbles, cobbles is called as _____.
   a) breccia b) sandstone
   c) conglomerate d) basalt

5) In _____ fold, axial plane is horizontal.
   a) anticline b) asymmetrical
   c) overturned d) recumbent

6) Hardness of Corundum is _____.
   a) 1 b) 10
   c) 8 d) 9

7) The breaking of the rocks into smaller fragments by natural agents without change in their composition is called _____ weathering.
   a) chemical b) mechanical
   c) biological d) hydrolysis

8) Sloping surface of the valley upon which dam rests is known as _____.
   a) toe b) heel
   c) abutment d) pier

9) The primary force driving landslides is _____.
   a) solar b) gravitational
   c) geothermal d) tidal

10) The leakage of the water from the reservoir takes place when the water table is _____ type.
   a) effluent
   b) influent
   c) confluent
   d) all of these

11) Which of the following instrument records earthquake waves?
   a) Seismoscope
   b) Seismogram
   c) Seismograph
   d) Seismometer

12) The capacity of the rocks to withstand bending loads is called as _____.
   a) compressive strength
   b) tensile strength
   c) durability
   d) bulk density

13) The most efficient, cheaper and rapid method used for determination of sub-surface geology is _____.
   a) seismic method
   b) gravity method
   c) magnetic method
   d) electric resistivity method

14) Which of the following dam can be constructed on weak, unconsolidated foundation?
   a) Earthen dam
   b) Arch dam
   c) Gravity dam
   d) None of these

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday,19-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.5 and Q.9 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Define Fault. Describe elements of fault. **05**
b) Describe strike and dip joints. **04**

Q.3 **a)** Define Sedimentary rocks. Describe any two structures of Sedimentary rocks. **05**
b) Describe physical properties and chemical properties of silica group minerals. **04**

Q.4 **a)** Define Volcano. Describe Pyroclastic materials **05**
b) Describe physical features- Waterfall and Pot holes. **04**

Q.5 **Answer the following. (Any Five)** **10**
a) Explain Granitic texture
b) What is Non-conformity?
c) Describe Fold mountain.
d) Distinguish between acidic and basic igneous rocks.
e) Give any two sub-divisions of Geology.
f) Describe any two types of luster with examples.

Section – II

Q.6 **a)** Define Aquifer. Describe Confined aquifer. **05**
b) Define Landslides. Explain any two causes of Landslides. **04**

Q.7 **a)** Describe Primary and Secondary Seismic waves. **05**
b) Explain Calyx and Diamond drilling methods. **04**

Q.8 **a)** Define Dam. Describe desirable and undesirable conditions for construction of dams on folds. **05**
b) Explain tunneling through inclined beds. **04**

Q.9 **Answer the following. (Any Five)** **10**
a) What is Rain water harvesting?
b) Explain Arch dam.
c) Write note on – RQD.
d) Explain Silting process.
e) What is Crushing Strength of rocks?
f) Write note on – RIS.

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday,19-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Draw neat diagrams wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Sloping surface of the valley upon which dam rests is known as _____.
   a) toe b) heel
   c) abutment d) pier

2) The primary force driving landslides is _____.
   a) solar b) gravitational
   c) geothermal d) tidal

3) The leakage of the water from the reservoir takes place when the water table is _____ type.
   a) effluent b) influent
   c) confluent d) all of these

4) Which of the following instrument records earthquake waves?
   a) Seismoscope b) Seismogram
   c) Seismograph d) Seismometer

5) The capacity of the rocks to withstand bending loads is called as _____.
   a) compressive strength b) tensile strength
   c) durability d) bulk density

6) The most efficient, cheaper and rapid method used for determination of sub-surface geology is _____.
   a) seismic method b) gravity method
   c) magnetic method d) electric resistivity method

7) Which of the following dam can be constructed on weak, unconsolidated foundation?
   a) Earthen dam b) Arch dam
   c) Gravity dam d) None of these

8) Metamorphic rock with alternating layers of light and dark minerals is called as a _____.
   a) schist b) gneiss
   c) slate d) phyllite

9) The crust of the earth is separated from mantle by _____ discontinuity.
   a) Gutenberg b) Mohorovicic
   c) Lehmann d) Conrad

10) Which one of the following is not a part of volcano?
a) Crater b) Conduit
c) Delta d) Dyke

11) A coarse grained sedimentary rock with rounded pebbles, cobbles is called as _____.
a) breccia b) sandstone
c) conglomerate d) basalt

12) In _____ fold, axial plane is horizontal.
a) anticline b) asymmetrical
c) overturned d) recumbent

13) Hardness of Corundum is _____.
a) 1 b) 10
c) 8 d) 9

14) The breaking of the rocks into smaller fragments by natural agents without change in their composition is called _____ weathering.
a) chemical b) mechanical
c) biological d) hydrolysis

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday,19-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.5 and Q.9 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Define Fault. Describe elements of fault. **05**
b) Describe strike and dip joints. **04**

Q.3 **a)** Define Sedimentary rocks. Describe any two structures of Sedimentary rocks. **05**
b) Describe physical properties and chemical properties of silica group minerals. **04**

Q.4 **a)** Define Volcano. Describe Pyroclastic materials **05**
b) Describe physical features- Waterfall and Pot holes. **04**

Q.5 **Answer the following. (Any Five)** **10**
a) Explain Granitic texture
b) What is Non-conformity?
c) Describe Fold mountain.
d) Distinguish between acidic and basic igneous rocks.
e) Give any two sub-divisions of Geology.
f) Describe any two types of luster with examples.

Section – II

Q.6 **a)** Define Aquifer. Describe Confined aquifer. **05**
b) Define Landslides. Explain any two causes of Landslides. **04**

Q.7 **a)** Describe Primary and Secondary Seismic waves. **05**
b) Explain Calyx and Diamond drilling methods. **04**

Q.8 **a)** Define Dam. Describe desirable and undesirable conditions for construction of dams on folds. **05**
b) Explain tunneling through inclined beds. **04**

Q.9 **Answer the following. (Any Five)** **10**
a) What is Rain water harvesting?
b) Explain Arch dam.
c) Write note on – RQD.
d) Explain Silting process.
e) What is Crushing Strength of rocks?
f) Write note on – RIS.

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday,19-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Draw neat diagrams wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) In _____ fold, axial plane is horizontal.
   a) anticline b) asymmetrical
   c) overturned d) recumbent

2) Hardness of Corundum is _____.
   a) 1 b) 10
   c) 8 d) 9

3) The breaking of the rocks into smaller fragments by natural agents without change in their composition is called _____ weathering.
   a) chemical b) mechanical
   c) biological d) hydrolysis

4) Sloping surface of the valley upon which dam rests is known as _____.
   a) toe b) heel
   c) abutment d) pier

5) The primary force driving landslides is _____.
   a) solar b) gravitational
   c) geothermal d) tidal

6) The leakage of the water from the reservoir takes place when the water table is _____ type.
   a) effluent b) influent
   c) confluent d) all of these

7) Which of the following instrument records earthquake waves?
   a) Seismoscope b) Seismogram
   c) Seismograph d) Seismometer

8) The capacity of the rocks to withstand bending loads is called as _____.
   a) compressive strength b) tensile strength
   c) durability d) bulk density

9) The most efficient, cheaper and rapid method used for determination of sub-surface geology is _____.
   a) seismic method b) gravity method
   c) magnetic method d) electric resistivity method

10) Which of the following dam can be constructed on weak, unconsolidated foundation?
   a) Earthen dam
   b) Arch dam
   c) Gravity dam
   d) None of these

11) Metamorphic rock with alternating layers of light and dark minerals is called as a _____.
   a) schist
   b) gneiss
   c) slate
   d) phyllite

12) The crust of the earth is separated from mantle by _____ discontinuity.
   a) Gutenberg
   b) Mohorovicic
   c) Lehmann
   d) Conrad

13) Which one of the following is not a part of volcano?
   a) Crater
   b) Conduit
   c) Delta
   d) Dyke

14) A coarse grained sedimentary rock with rounded pebbles, cobbles is called as _____.
   a) breccia
   b) sandstone
   c) conglomerate
   d) basalt

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday,19-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.5 and Q.9 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Define Fault. Describe elements of fault. **05**
b) Describe strike and dip joints. **04**

Q.3 **a)** Define Sedimentary rocks. Describe any two structures of Sedimentary rocks. **05**
b) Describe physical properties and chemical properties of silica group minerals. **04**

Q.4 **a)** Define Volcano. Describe Pyroclastic materials **05**
b) Describe physical features- Waterfall and Pot holes. **04**

Q.5 **Answer the following. (Any Five)** **10**
a) Explain Granitic texture
b) What is Non-conformity?
c) Describe Fold mountain.
d) Distinguish between acidic and basic igneous rocks.
e) Give any two sub-divisions of Geology.
f) Describe any two types of luster with examples.

Section – II

Q.6 **a)** Define Aquifer. Describe Confined aquifer. **05**
b) Define Landslides. Explain any two causes of Landslides. **04**

Q.7 **a)** Describe Primary and Secondary Seismic waves. **05**
b) Explain Calyx and Diamond drilling methods. **04**

Q.8 **a)** Define Dam. Describe desirable and undesirable conditions for construction of dams on folds. **05**
b) Explain tunneling through inclined beds. **04**

Q.9 **Answer the following. (Any Five)** **10**
a) What is Rain water harvesting?
b) Explain Arch dam.
c) Write note on – RQD.
d) Explain Silting process.
e) What is Crushing Strength of rocks?
f) Write note on – RIS.

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday,19-12-2019 Max. Marks: 70
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Draw neat diagrams wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) The leakage of the water from the reservoir takes place when the water table is _____ type.
   a) effluent b) influent
   c) confluent d) all of these

2) Which of the following instrument records earthquake waves?
   a) Seismoscope b) Seismogram
   c) Seismograph d) Seismometer

3) The capacity of the rocks to withstand bending loads is called as _____.
   a) compressive strength b) tensile strength
   c) durability d) bulk density

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7) The crust of the earth is separated from mantle by _____ discontinuity.
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10) In _____ fold, axial plane is horizontal.
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c) overturned d) recumbent

11) Hardness of Corundum is _____.
a) 1 b) 10
c) 8 d) 9

12) The breaking of the rocks into smaller fragments by natural agents without change in their composition is called _____ weathering.
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c) biological d) hydrolysis

13) Sloping surface of the valley upon which dam rests is known as _____.
a) toe b) heel
c) abutment d) pier

14) The primary force driving landslides is _____.
a) solar b) gravitational
c) geothermal d) tidal

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Thursday,19-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.5 and Q.9 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Define Fault. Describe elements of fault. **05**
b) Describe strike and dip joints. **04**

Q.3 **a)** Define Sedimentary rocks. Describe any two structures of Sedimentary rocks. **05**
b) Describe physical properties and chemical properties of silica group minerals. **04**

Q.4 **a)** Define Volcano. Describe Pyroclastic materials **05**
b) Describe physical features- Waterfall and Pot holes. **04**

Q.5 **Answer the following. (Any Five)** **10**
a) Explain Granitic texture
b) What is Non-conformity?
c) Describe Fold mountain.
d) Distinguish between acidic and basic igneous rocks.
e) Give any two sub-divisions of Geology.
f) Describe any two types of luster with examples.

Section – II

Q.6 **a)** Define Aquifer. Describe Confined aquifer. **05**
b) Define Landslides. Explain any two causes of Landslides. **04**

Q.7 **a)** Describe Primary and Secondary Seismic waves. **05**
b) Explain Calyx and Diamond drilling methods. **04**

Q.8 **a)** Define Dam. Describe desirable and undesirable conditions for construction of dams on folds. **05**
b) Explain tunneling through inclined beds. **04**

Q.9 **Answer the following. (Any Five)** **10**
a) What is Rain water harvesting?
b) Explain Arch dam.
c) Write note on – RQD.
d) Explain Silting process.
e) What is Crushing Strength of rocks?
f) Write note on – RIS.

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 must be solved within first half an hour on the main answer sheet page No.3.
2) Use of non-programmable scientific calculator is allowed.
3) Use suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose correct alternative from the option and rewrite the sentence. 14

1) A column carries central vertical load Q. The stresses on the section of the column will be _____.
   a) Zero at one end and maximum at the other end
   b) Uniform
   c) Zero at the axis and maximum at the outer end
   d) Tensile on one end and compressive at the other end

2) The normal stress on an oblique plane is maximum, when θ is equal to _____.
   a) 0^0 b) 30^0
   c) 45^0 d) 90^0

3) Saint Venant theory is also known as, _____.
   a) Maximum Shear stress theory
   b) Maximum Strain energy theory
   c) Maximum Principal strain theory
   d) Maximum Principal stress theory

4) A circular shaft of diameter D, subjected to combined twisting moment (T) and bending moment (M) carries the maximum shear stress equal to, _____.
   a) $R\sqrt{M^2+T^2}/J$ b) $R(M^2+T^2)/J$
   c) $J\sqrt{M^2+T^2}/R$ d) $J(M^2+T^2)/R$

5) The normal stress on an oblique plane is minimum, when θ is equal to _____.
   a) 0^0 b) 45^0
   c) 30^0 d) 90^0

6) The Euler's empirical formula is useful for, _____.
   a) Long columns b) Both a) and b)
   c) Short columns d) None

7) A loaded column is having tendency to deflect on account of this tendency, the critical load, _____.
   a) Decreases with decrease is length
   b) First decreases then increases with decrease in length
   c) Decreases with increase in length
   d) First increases then decreases with decrease in length

8) The expression $EI\ (d^2y/dx^2)$ gives the value of _____.
   a) Slope
   b) Bending moment
   c) Shear force
   d) Rate of loading

9) Free end in actual beam is _____ in conjugate beam.
   a) Free
   b) Fixed
   c) Simply supported
   d) Roller

10) Slope at free end of a cantilever beam carrying point load W at free end is _____.
   a) (wl/EI)
   b) (wl^2/EI)
   c) $(wl^2/2EI)$
   d) (wl^3/EI)

11) Defection at center of a simply supported beam carrying UDL of $w\ kN/m$ over entire span is _____.
   a) $(5wl^4/374EI)$
   b) $(\ 5wl^4\ /\ 308EI)$
   c) $(5wl^4\ /\ 384EI)$
   d) $(\ 5wl^4\ /\ 388EI)$

12) Influence line diagrams are useful in analysis of _____.
   a) Beams in residential structure
   b) Beams in water tanks
   c) Beams in bridges
   d) None

13) Muller Breslau's principle is plotted for variation of _____ over entire span of beam.
   a) Point load
   b) UDL
   c) UVL
   d) None of the above

14) While converting a beam into its conjugate beam, end supports remain same. This statement is _____.
   a) Always true
   b) Always false
   c) Can't say
   d) Depends upon type of load

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and 6 are compulsory.
2) Solve any two questions from remaining in Section I.
3) Solve any two questions from remaining in Section II.
4) Assume suitable data if required and mention it clearly**.**

Section – I

Q.2 **a)** Enlist different end conditions of columns and state their effective lengths. Draw neat sketches of effective lengths. **03**

b) A 1.5 m long column has a circular cross section of 50 mm diameter. One of the ends of the column is fixed in direction and position and the other is free. Taking factor of safety as 3, calculate the safe load using: **07**

1) Rankine's formula with f_c = 560 N/mm^2 and a = $\frac{1}{1600}$ for pinned ends
2) Euler's formula with E for C. I. = 1.2 x 10^5 N/mm^2

Q.3 **a)** Explain 'Principal planes and principal stresses'. **02**

b) At a point in a strained material, the principal stresses are 100 N/mm^2 and 40 N/mm^2 both tensile. Find the normal, tangential and resultant stresses across a plane through the point at 48^0 to the major principal plane. Use Mohr's circle method. **07**

Q.4 **a)** Explain term 'Equivalent Torque'. **02**

b) A solid shaft of diameter 80 mm is subjected to a twisting moment of 8 MN-mm and a bending moment of 5 MN-mm at a point. Determine **07**

1) Principal stresses
2) Position of the plane on which they act

Q.5 **a)** State and explain maximum shear stress theory. **02**

b) A bolt is subjected to an axial pull of 9 kN, accompanied with transverse shear force of 4.5 kN. Elastic limit in tension is 225 N/mm^2, factor of safety =3 and Poisson's ratio =0.3. Find diameter of the bolt using maximum shear stress theory. **07**

Section – II

Q.6 **a)** Explain Double Integration Method for finding deflection with example of simply supported beam. **03**

b) A simply supported beam is having a span of 5m and subjected to a point load 20kN at centre of the beam. Using Moment Area Method determine deflection at centre of the beam if E is 2×10^5 N/mm^2 and MI as 3×10^{5}mm^4. **07**

Q.7 **a)** Write note on- Influence line Diagram **02**

b) A simply supported beam is having a span of 3m and subjected to a moving UDL of 18kN/m over span to 1m. Draw ILD for R_A, R_B, V_X and M_X at a section 2m from left support. **07**

Q.8 A simply supported beam is having a span of 5m and subjected to a point load 50kN at centre of the beam. Using conjugate beam method determines deflection at centre of the beam if E is $2x10^5$ N/mm^2 and MI as $8x10^4$ mm^4. **09**

Q.9 Determine the deflection for Cantilever beam at free end for following load cases by moment area method. **09**

a) Point load W at free end

b) UDL over entire span

c) Couple M at free end

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 must be solved within first half an hour on the main answer sheet page No.3.
2) Use of non-programmable scientific calculator is allowed.
3) Use suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose correct alternative from the option and rewrite the sentence. 14

1) The expression $EI\ (d^2y/dx^2)$ gives the value of _____.
   a) Slope b) Bending moment
   c) Shear force d) Rate of loading

2) Free end in actual beam is _____ in conjugate beam.
   a) Free b) Fixed
   c) Simply supported d) Roller

3) Slope at free end of a cantilever beam carrying point load W at free end is _____.
   a) (wl/EI) b) (wl^2/EI)
   c) $(wl^2/2EI)$ d) (wl^3/EI)

4) Defection at center of a simply supported beam carrying UDL of $w\ kN/m$ over entire span is _____.
   a) $(5wl^4/374EI)$ b) $(\ 5wl^4\ /\ 308EI)$
   c) $(5wl^4\ /\ 384EI)$ d) $(\ 5wl^4\ /\ 388EI)$

5) Influence line diagrams are useful in analysis of _____.
   a) Beams in residential structure
   b) Beams in water tanks
   c) Beams in bridges
   d) None

6) Muller Breslau's principle is plotted for variation of _____ over entire span of beam.
   a) Point load b) UDL
   c) UVL d) None of the above

7) While converting a beam into its conjugate beam, end supports remain same. This statement is _____.
   a) Always true b) Always false
   c) Can't say d) Depends upon type of load

8) A column carries central vertical load Q. The stresses on the section of the column will be _____.
   a) Zero at one end and maximum at the other end
   b) Uniform
   c) Zero at the axis and maximum at the outer end
   d) Tensile on one end and compressive at the other end

9) The normal stress on an oblique plane is maximum, when θ is equal to _____.

a) 0^0 b) 30^0
c) 45^0 d) 90^0

10) Saint Venant theory is also known as, _____.

a) Maximum Shear stress theory
b) Maximum Strain energy theory
c) Maximum Principal strain theory
d) Maximum Principal stress theory

11) A circular shaft of diameter D, subjected to combined twisting moment (T) and bending moment (M) carries the maximum shear stress equal to, _____.

a) $R\sqrt{M^2+T^2}/J$ b) $R(M^2+T^2)/J$
c) $J\sqrt{M^2+T^2}/R$ d) $J(M^2+T^2)/R$

12) The normal stress on an oblique plane is minimum, when θ is equal to _____.

a) 0^0 b) 45^0
c) 30^0 d) 90^0

13) The Euler's empirical formula is useful for, _____.

a) Long columns b) Both a) and b)
c) Short columns d) None

14) A loaded column is having tendency to deflect on account of this tendency, the critical load, _____.

a) Decreases with decrease is length
b) First decreases then increases with decrease in length
c) Decreases with increase in length
d) First increases then decreases with decrease in length

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and 6 are compulsory.
2) Solve any two questions from remaining in Section I.
3) Solve any two questions from remaining in Section II.
4) Assume suitable data if required and mention it clearly**.**

Section – I

Q.2 **a)** Enlist different end conditions of columns and state their effective lengths. Draw neat sketches of effective lengths. **03**

b) A 1.5 m long column has a circular cross section of 50 mm diameter. One of the ends of the column is fixed in direction and position and the other is free. Taking factor of safety as 3, calculate the safe load using: **07**

1) Rankine's formula with f_c = 560 N/mm^2 and a = $\frac{1}{1600}$ for pinned ends
2) Euler's formula with E for C. I. = 1.2 x 10^5 N/mm^2

Q.3 **a)** Explain 'Principal planes and principal stresses'. **02**

b) At a point in a strained material, the principal stresses are 100 N/mm^2 and 40 N/mm^2 both tensile. Find the normal, tangential and resultant stresses across a plane through the point at 48^0 to the major principal plane. Use Mohr's circle method. **07**

Q.4 **a)** Explain term 'Equivalent Torque'. **02**

b) A solid shaft of diameter 80 mm is subjected to a twisting moment of 8 MN-mm and a bending moment of 5 MN-mm at a point. Determine **07**

1) Principal stresses
2) Position of the plane on which they act

Q.5 **a)** State and explain maximum shear stress theory. **02**

b) A bolt is subjected to an axial pull of 9 kN, accompanied with transverse shear force of 4.5 kN. Elastic limit in tension is 225 N/mm^2, factor of safety =3 and Poisson's ratio =0.3. Find diameter of the bolt using maximum shear stress theory. **07**

Section – II

Q.6 **a)** Explain Double Integration Method for finding deflection with example of simply supported beam. **03**

b) A simply supported beam is having a span of 5m and subjected to a point load 20kN at centre of the beam. Using Moment Area Method determine deflection at centre of the beam if E is 2×10^5 N/mm^2 and MI as 3×10^{5}mm^4. **07**

Q.7 **a)** Write note on- Influence line Diagram **02**

b) A simply supported beam is having a span of 3m and subjected to a moving UDL of 18kN/m over span to 1m. Draw ILD for R_A, R_B, V_X and M_X at a section 2m from left support. **07**

Q.8 A simply supported beam is having a span of 5m and subjected to a point load 50kN at centre of the beam. Using conjugate beam method determines deflection at centre of the beam if E is $2x10^5$ N/mm^2 and MI as $8x10^4$ mm^4. **09**

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a) Point load W at free end

b) UDL over entire span

c) Couple M at free end

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 must be solved within first half an hour on the main answer sheet page No.3.
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3) Use suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose correct alternative from the option and rewrite the sentence. 14

1) The normal stress on an oblique plane is minimum, when θ is equal to _____.
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   c) 30^0 d) 90^0

2) The Euler's empirical formula is useful for, _____.
   a) Long columns b) Both a) and b)
   c) Short columns d) None

3) A loaded column is having tendency to deflect on account of this tendency, the critical load, _____.
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   b) First decreases then increases with decrease in length
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4) The expression $EI\ (d^2y/dx^2)$ gives the value of _____.
   a) Slope b) Bending moment
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5) Free end in actual beam is _____ in conjugate beam.
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6) Slope at free end of a cantilever beam carrying point load W at free end is _____.
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   c) $(wl^2/2EI)$ d) (wl^3/EI)

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8) Influence line diagrams are useful in analysis of _____.
   a) Beams in residential structure
   b) Beams in water tanks
   c) Beams in bridges
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9) Muller Breslau's principle is plotted for variation of _____ over entire span of beam.
   a) Point load
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10) While converting a beam into its conjugate beam, end supports remain same. This statement is _____.
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12) The normal stress on an oblique plane is maximum, when θ is equal to _____.
   a) 0^0
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   c) Maximum Principal strain theory
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14) A circular shaft of diameter D, subjected to combined twisting moment (T) and bending moment (M) carries the maximum shear stress equal to, _____.
   a) $R\sqrt{M^2+T^2}/J$
   b) $R(M^2+T^2)/J$
   c) $J\sqrt{M^2+T^2}/R$
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Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and 6 are compulsory.
2) Solve any two questions from remaining in Section I.
3) Solve any two questions from remaining in Section II.
4) Assume suitable data if required and mention it clearly**.**

Section – I

Q.2 **a)** Enlist different end conditions of columns and state their effective lengths. Draw neat sketches of effective lengths. **03**

b) A 1.5 m long column has a circular cross section of 50 mm diameter. One of the ends of the column is fixed in direction and position and the other is free. Taking factor of safety as 3, calculate the safe load using: **07**

1) Rankine's formula with f_c = 560 N/mm^2 and a = $\frac{1}{1600}$ for pinned ends
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b) At a point in a strained material, the principal stresses are 100 N/mm^2 and 40 N/mm^2 both tensile. Find the normal, tangential and resultant stresses across a plane through the point at 48^0 to the major principal plane. Use Mohr's circle method. **07**

Q.4 **a)** Explain term 'Equivalent Torque'. **02**

b) A solid shaft of diameter 80 mm is subjected to a twisting moment of 8 MN-mm and a bending moment of 5 MN-mm at a point. Determine **07**

1) Principal stresses
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Section – II

Q.6 **a)** Explain Double Integration Method for finding deflection with example of simply supported beam. **03**

b) A simply supported beam is having a span of 5m and subjected to a point load 20kN at centre of the beam. Using Moment Area Method determine deflection at centre of the beam if E is 2×10^5 N/mm^2 and MI as 3×10^{5}mm^4. **07**

Q.7 **a)** Write note on- Influence line Diagram **02**

b) A simply supported beam is having a span of 3m and subjected to a moving UDL of 18kN/m over span to 1m. Draw ILD for R_A, R_B, V_X and M_X at a section 2m from left support. **07**

Q.8 A simply supported beam is having a span of 5m and subjected to a point load 50kN at centre of the beam. Using conjugate beam method determines deflection at centre of the beam if E is $2x10^5$ N/mm^2 and MI as $8x10^4$ mm^4. **09**

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a) Point load W at free end

b) UDL over entire span

c) Couple M at free end

Seat No.		Set	S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 must be solved within first half an hour on the main answer sheet page No.3.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose correct alternative from the option and rewrite the sentence. 14

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   c) $(wl^2/2EI)$ d) (wl^3/EI)

2) Defection at center of a simply supported beam carrying UDL of $w\ kN/m$ over entire span is _____.
   a) $(5wl^4/374EI)$ b) $(\ 5wl^4\ /\ 308EI)$
   c) $(5wl^4\ /\ 384EI)$ d) $(\ 5wl^4\ /\ 388EI)$

3) Influence line diagrams are useful in analysis of _____.
   a) Beams in residential structure
   b) Beams in water tanks
   c) Beams in bridges
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4) Muller Breslau's principle is plotted for variation of _____ over entire span of beam.
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   c) Short columns
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13) The expression $EI\ (d^2y/dx^2)$ gives the value of _____.
   a) Slope
   b) Bending moment
   c) Shear force
   d) Rate of loading

14) Free end in actual beam is _____ in conjugate beam.
   a) Free
   b) Fixed
   c) Simply supported
   d) Roller

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
STRUCTURAL MECHANICS - II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and 6 are compulsory.
2) Solve any two questions from remaining in Section I.
3) Solve any two questions from remaining in Section II.
4) Assume suitable data if required and mention it clearly**.**

Section – I

Q.2 **a)** Enlist different end conditions of columns and state their effective lengths. Draw neat sketches of effective lengths. **03**

b) A 1.5 m long column has a circular cross section of 50 mm diameter. One of the ends of the column is fixed in direction and position and the other is free. Taking factor of safety as 3, calculate the safe load using: **07**

1) Rankine's formula with f_c = 560 N/mm^2 and a = $\frac{1}{1600}$ for pinned ends
2) Euler's formula with E for C. I. = 1.2 x 10^5 N/mm^2

Q.3 **a)** Explain 'Principal planes and principal stresses'. **02**

b) At a point in a strained material, the principal stresses are 100 N/mm^2 and 40 N/mm^2 both tensile. Find the normal, tangential and resultant stresses across a plane through the point at 48^0 to the major principal plane. Use Mohr's circle method. **07**

Q.4 **a)** Explain term 'Equivalent Torque'. **02**

b) A solid shaft of diameter 80 mm is subjected to a twisting moment of 8 MN-mm and a bending moment of 5 MN-mm at a point. Determine **07**

1) Principal stresses
2) Position of the plane on which they act

Q.5 **a)** State and explain maximum shear stress theory. **02**

b) A bolt is subjected to an axial pull of 9 kN, accompanied with transverse shear force of 4.5 kN. Elastic limit in tension is 225 N/mm^2, factor of safety =3 and Poisson's ratio =0.3. Find diameter of the bolt using maximum shear stress theory. **07**

Section – II

Q.6 **a)** Explain Double Integration Method for finding deflection with example of simply supported beam. **03**

b) A simply supported beam is having a span of 5m and subjected to a point load 20kN at centre of the beam. Using Moment Area Method determine deflection at centre of the beam if E is 2×10^5 N/mm^2 and MI as 3×10^{5}mm^4. **07**

Q.7 **a)** Write note on- Influence line Diagram **02**

b) A simply supported beam is having a span of 3m and subjected to a moving UDL of 18kN/m over span to 1m. Draw ILD for R_A, R_B, V_X and M_X at a section 2m from left support. **07**

Q.8 A simply supported beam is having a span of 5m and subjected to a point load 50kN at centre of the beam. Using conjugate beam method determines deflection at centre of the beam if E is $2x10^5$ N/mm^2 and MI as $8x10^4$ mm^4. **09**

Q.9 Determine the deflection for Cantilever beam at free end for following load cases by moment area method. **09**

a) Point load W at free end

b) UDL over entire span

c) Couple M at free end

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) GPS user segment consists of _____.
   a) Satellites b) Signal
   c) Receiver d) Atomic clock

2) Most important component of GPS signal is _____.
   a) Code b) Carrier
   c) Navigational data d) Ephemeris

3) Civil signal which provides least accurate position is _____
   a) C/A b) L1
   c) L2C d) L5

4) Fundamental type/s of GPS observables used for GPS positioning is/are _____.
   a) One b) Two
   c) Three d) four

5) GPS provides WGS84 coordinates in _____.
   a) Cartesian system b) Geodetic system
   c) Either system d) Both systems

6) Data for most precise position may be obtained from _____.
   a) Autonomous static method b) Relative static method
   c) DGPS method d) RTK method

7) Principle of GPS positioning is _____.
   a) Resection b) Intersection
   c) Analytical resection d) Radiation

8) The instruments which provide electromagnetic radiation of specified wave length or a band of wave lengths to illuminate the earth surface, are called _____.
   a) Passive sensors b) Active Sensors
   c) Scanner d) None of these

9) The arrangement of terrain features which provides the shape, size and texture of _____.
   a) Spectral variation b) Temporal variation
   c) Radiometric variation d) Spatial variation

10) The spectral region of the electromagnetic radiation which passes through the atmosphere without much attenuation is known as _____.
   a) Ozone hole
   b) Atmospheric window
   c) Ozone window
   d) Black hole

11) In remote sensing _____ resolution is used to distinguish closed spaced objects on an image.
   a) Radiometric Active Sensors
   b) Spatial
   c) Temporal
   d) Spectral

12) TIN is _____.
   a) Triangular Irregular Network
   b) Taxpayer Identification Number
   c) Triangulated Irregular Network
   d) Total Irregular Network

13) A plant with more chlorophyll will reflect more: _____.
   a) Ultraviolet energy
   b) Emitted energy
   c) Near-infrared
   d) Thermal infrared

14) The normal altitude of near polar orbiting remote sensing satellite is about: _____
   a) 20,200 km Ultraviolet energy
   b) 850 km Emitted energy
   c) 1050 km Near-infrared
   d) 2050 km Thermal infrared

Seat No.	

Set | P

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 is compulsory. Answer any two out of Q.3, to Q.5.
2) Q.6 is compulsory. Answer any two out of Q.7 to Q. 9.

Section – I

Q.2 Explain the sketch. **10**
- **a)** Subtense Bar method of Tacheometry.
- **b)** Compare the Chord produced method with the Rankines method.

Q.3 Solve.
- **a)** A tacheometer is placed at a station A and readings on a staff held vertical upon a B.M. of RL=100.0 meter and at station B are 0.640, 2.200, 3.760 and 0.010, 2.120, 4.230 m respectively. The angle of depression of the telescope in the first case is 6°19' and in the second case is 7°42'. Find the horizontal distance from A to B and the RL of station B, if the instrument has constants 100 and 0.5 **05**
- **b)** In a tangential method of tacheometry two vanes were fixed 2 m apart, the lower vane being 0.5 m above the foot of the staff held vertical at station A. The vertical angles measured are +1°12’ and -1°30’. Find the horizontal distance of A and reduced level of A, if the R.L. of the observation station is 101.365 m and height of instrument is 1.230 m. **04**

Q.4
- **a)** Define vertical curves. What is ideal shape for vertical curve and why? **04**
- **b)** Explain methods of calculating the length of transition curves. **05**

Q.5
- **a)** Explain the Differential Global Positioning System. **05**
- **b)** Explain the types of GPS receivers. **04**

Section – II

Q.6
- **a)** A pair of photographs are captured with an aerial camera from an altitude of 3000 m above MSL. The mean principal base measured is equal to 100 mm. The difference in parallax between two points is 3.48 mm. Find the difference in height between the two points if the elevation of the lower point is 600 m above datum. **05**
- **b)** A photograph is acquired from a height of 2000 m with a camera of focal length 20 cm. The height of a point above the datum is 2 m. The image coordinates of the point is (2, 4). Find the ground coordinates of the point. **05**

Q.7
- **a)** What are the uses of point, line and polygon layer in feature representation in geographic information system; explain with the help of suitable examples. **05**
- **b)** Explain the tools in Geographic Information System software. **04**

Q.8 Write detailed note on.
- **a)** Platforms in Remote Sensing. **05**
- **b)** Idealized remote sensing system. **04**

Q.9 Explain the Project Survey for.
- **a)** Culvert **05**
- **b)** Highway **04**

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The instruments which provide electromagnetic radiation of specified wave length or a band of wave lengths to illuminate the earth surface, are called _____.
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   c) Scanner d) None of these

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4) In remote sensing _____ resolution is used to distinguish closed spaced objects on an image.
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8) GPS user segment consists of _____.
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Seat No.	

Set | Q

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 is compulsory. Answer any two out of Q.3, to Q.5.
2) Q.6 is compulsory. Answer any two out of Q.7 to Q. 9.

Section – I

Q.2 Explain the sketch. **10**
- **a)** Subtense Bar method of Tacheometry.
- **b)** Compare the Chord produced method with the Rankines method.

Q.3 Solve.
- **a)** A tacheometer is placed at a station A and readings on a staff held vertical upon a B.M. of RL=100.0 meter and at station B are 0.640, 2.200, 3.760 and 0.010, 2.120, 4.230 m respectively. The angle of depression of the telescope in the first case is 6°19' and in the second case is 7°42'. Find the horizontal distance from A to B and the RL of station B, if the instrument has constants 100 and 0.5 **05**
- **b)** In a tangential method of tacheometry two vanes were fixed 2 m apart, the lower vane being 0.5 m above the foot of the staff held vertical at station A. The vertical angles measured are +1°12’ and -1°30’. Find the horizontal distance of A and reduced level of A, if the R.L. of the observation station is 101.365 m and height of instrument is 1.230 m. **04**

Q.4
- **a)** Define vertical curves. What is ideal shape for vertical curve and why? **04**
- **b)** Explain methods of calculating the length of transition curves. **05**

Q.5
- **a)** Explain the Differential Global Positioning System. **05**
- **b)** Explain the types of GPS receivers. **04**

Section – II

Q.6
- **a)** A pair of photographs are captured with an aerial camera from an altitude of 3000 m above MSL. The mean principal base measured is equal to 100 mm. The difference in parallax between two points is 3.48 mm. Find the difference in height between the two points if the elevation of the lower point is 600 m above datum. **05**
- **b)** A photograph is acquired from a height of 2000 m with a camera of focal length 20 cm. The height of a point above the datum is 2 m. The image coordinates of the point is (2, 4). Find the ground coordinates of the point. **05**

Q.7
- **a)** What are the uses of point, line and polygon layer in feature representation in geographic information system; explain with the help of suitable examples. **05**
- **b)** Explain the tools in Geographic Information System software. **04**

Q.8 Write detailed note on.
- **a)** Platforms in Remote Sensing. **05**
- **b)** Idealized remote sensing system. **04**

Q.9 Explain the Project Survey for.
- **a)** Culvert **05**
- **b)** Highway **04**

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) GPS provides WGS84 coordinates in _____.
   a) Cartesian system b) Geodetic system
   c) Either system d) Both systems

2) Data for most precise position may be obtained from _____.
   a) Autonomous static method b) Relative static method
   c) DGPS method d) RTK method

3) Principle of GPS positioning is _____.
   a) Resection b) Intersection
   c) Analytical resection d) Radiation

4) The instruments which provide electromagnetic radiation of specified wave length or a band of wave lengths to illuminate the earth surface, are called _____.
   a) Passive sensors b) Active Sensors
   c) Scanner d) None of these

5) The arrangement of terrain features which provides the shape, size and texture of _____.
   a) Spectral variation b) Temporal variation
   c) Radiometric variation d) Spatial variation

6) The spectral region of the electromagnetic radiation which passes through the atmosphere without much attenuation is known as _____.
   a) Ozone hole b) Atmospheric window
   c) Ozone window d) Black hole

7) In remote sensing _____ resolution is used to distinguish closed spaced objects on an image.
   a) Radiometric Active Sensors b) Spatial
   c) Temporal d) Spectral

8) TIN is _____.
   a) Triangular Irregular Network
   b) Taxpayer Identification Number
   c) Triangulated Irregular Network
   d) Total Irregular Network

9) A plant with more chlorophyll will reflect more: _____.
   a) Ultraviolet energy b) Emitted energy
   c) Near-infrared d) Thermal infrared

10) The normal altitude of near polar orbiting remote sensing satellite is about: _____
   a) 20,200 km Ultraviolet energy b) 850 km Emitted energy
   c) 1050 km Near-infrared d) 2050 km Thermal infrared

11) GPS user segment consists of _____.
   a) Satellites b) Signal
   c) Receiver d) Atomic clock

12) Most important component of GPS signal is _____.
   a) Code b) Carrier
   c) Navigational data d) Ephemeris

13) Civil signal which provides least accurate position is _____
   a) C/A b) L1
   c) L2C d) L5

14) Fundamental type/s of GPS observables used for GPS positioning is/are _____.
   a) One b) Two
   c) Three d) four

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 is compulsory. Answer any two out of Q.3, to Q.5.
2) Q.6 is compulsory. Answer any two out of Q.7 to Q. 9.

Section – I

Q.2 Explain the sketch. **10**
- **a)** Subtense Bar method of Tacheometry.
- **b)** Compare the Chord produced method with the Rankines method.

Q.3 Solve.
- **a)** A tacheometer is placed at a station A and readings on a staff held vertical upon a B.M. of RL=100.0 meter and at station B are 0.640, 2.200, 3.760 and 0.010, 2.120, 4.230 m respectively. The angle of depression of the telescope in the first case is 6°19' and in the second case is 7°42'. Find the horizontal distance from A to B and the RL of station B, if the instrument has constants 100 and 0.5 **05**
- **b)** In a tangential method of tacheometry two vanes were fixed 2 m apart, the lower vane being 0.5 m above the foot of the staff held vertical at station A. The vertical angles measured are +1°12’ and -1°30’. Find the horizontal distance of A and reduced level of A, if the R.L. of the observation station is 101.365 m and height of instrument is 1.230 m. **04**

Q.4
- **a)** Define vertical curves. What is ideal shape for vertical curve and why? **04**
- **b)** Explain methods of calculating the length of transition curves. **05**

Q.5
- **a)** Explain the Differential Global Positioning System. **05**
- **b)** Explain the types of GPS receivers. **04**

Section – II

Q.6
- **a)** A pair of photographs are captured with an aerial camera from an altitude of 3000 m above MSL. The mean principal base measured is equal to 100 mm. The difference in parallax between two points is 3.48 mm. Find the difference in height between the two points if the elevation of the lower point is 600 m above datum. **05**
- **b)** A photograph is acquired from a height of 2000 m with a camera of focal length 20 cm. The height of a point above the datum is 2 m. The image coordinates of the point is (2, 4). Find the ground coordinates of the point. **05**

Q.7
- **a)** What are the uses of point, line and polygon layer in feature representation in geographic information system; explain with the help of suitable examples. **05**
- **b)** Explain the tools in Geographic Information System software. **04**

Q.8 Write detailed note on.
- **a)** Platforms in Remote Sensing. **05**
- **b)** Idealized remote sensing system. **04**

Q.9 Explain the Project Survey for.
- **a)** Culvert **05**
- **b)** Highway **04**

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The spectral region of the electromagnetic radiation which passes through the atmosphere without much attenuation is known as _____.
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   c) Ozone window d) Black hole

2) In remote sensing _____ resolution is used to distinguish closed spaced objects on an image.
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   c) Temporal d) Spectral

3) TIN is _____.
   a) Triangular Irregular Network
   b) Taxpayer Identification Number
   c) Triangulated Irregular Network
   d) Total Irregular Network

4) A plant with more chlorophyll will reflect more: _____.
   a) Ultraviolet energy b) Emitted energy
   c) Near-infrared d) Thermal infrared

5) The normal altitude of near polar orbiting remote sensing satellite is about: _____
   a) 20,200 km Ultraviolet energy b) 850 km Emitted energy
   c) 1050 km Near-infrared d) 2050 km Thermal infrared

6) GPS user segment consists of _____.
   a) Satellites b) Signal
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7) Most important component of GPS signal is _____.
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8) Civil signal which provides least accurate position is _____
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   c) L2C d) L5

9) Fundamental type/s of GPS observables used for GPS positioning is/are _____.
   a) One b) Two
   c) Three d) four

10) GPS provides WGS84 coordinates in _____.
   a) Cartesian system b) Geodetic system
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11) Data for most precise position may be obtained from _____.
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12) Principle of GPS positioning is _____.
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13) The instruments which provide electromagnetic radiation of specified wave length or a band of wave lengths to illuminate the earth surface, are called _____.
   a) Passive sensors b) Active Sensors
   c) Scanner d) None of these

14) The arrangement of terrain features which provides the shape, size and texture of _____.
   a) Spectral variation b) Temporal variation
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Seat No.		Set	S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SURVEYING – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 is compulsory. Answer any two out of Q.3, to Q.5.
2) Q.6 is compulsory. Answer any two out of Q.7 to Q. 9.

Section – I

Q.2 Explain the sketch. **10**
- **a)** Subtense Bar method of Tacheometry.
- **b)** Compare the Chord produced method with the Rankines method.

Q.3 Solve.
- **a)** A tacheometer is placed at a station A and readings on a staff held vertical upon a B.M. of RL=100.0 meter and at station B are 0.640, 2.200, 3.760 and 0.010, 2.120, 4.230 m respectively. The angle of depression of the telescope in the first case is 6°19' and in the second case is 7°42'. Find the horizontal distance from A to B and the RL of station B, if the instrument has constants 100 and 0.5 **05**
- **b)** In a tangential method of tacheometry two vanes were fixed 2 m apart, the lower vane being 0.5 m above the foot of the staff held vertical at station A. The vertical angles measured are +1°12’ and -1°30’. Find the horizontal distance of A and reduced level of A, if the R.L. of the observation station is 101.365 m and height of instrument is 1.230 m. **04**

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- **a)** Define vertical curves. What is ideal shape for vertical curve and why? **04**
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- **a)** Explain the Differential Global Positioning System. **05**
- **b)** Explain the types of GPS receivers. **04**

Section – II

Q.6
- **a)** A pair of photographs are captured with an aerial camera from an altitude of 3000 m above MSL. The mean principal base measured is equal to 100 mm. The difference in parallax between two points is 3.48 mm. Find the difference in height between the two points if the elevation of the lower point is 600 m above datum. **05**
- **b)** A photograph is acquired from a height of 2000 m with a camera of focal length 20 cm. The height of a point above the datum is 2 m. The image coordinates of the point is (2, 4). Find the ground coordinates of the point. **05**

Q.7
- **a)** What are the uses of point, line and polygon layer in feature representation in geographic information system; explain with the help of suitable examples. **05**
- **b)** Explain the tools in Geographic Information System software. **04**

Q.8 Write detailed note on.
- **a)** Platforms in Remote Sensing. **05**
- **b)** Idealized remote sensing system. **04**

Q.9 Explain the Project Survey for.
- **a)** Culvert **05**
- **b)** Highway **04**

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Seat No.	

Set P

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Assume suitable data as per requirement and mention it.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area _____.
   a) $1/8^{th}$ b) $1/20^{th}$
   c) $1/5^{th}$ d) $1/10^{th}$

2) In assembly halls _____ M^3 fresh air exchange (Per person/hour) is recommended.
   a) $10m^3$ b) $20m^3$
   c) $28m^3$ d) $40m^3$

3) For National Highways in urban areas building line is located at distance of _____.
   a) 30m b) 45m
   c) 15m d) 25m

4) The minimum heights for habitable rooms _____.
   a) 2.75m b) 2.4m
   c) 2.6m d) 2.2m

5) Hot-Arid Zones is also called _____.
   a) Dry-Arid Zones b) Wet-Zones
   c) Wet-Arid Zones d) None of these

6) FSI means _____ in building planning.
   a) Fire to safety index b) Fuel space index
   c) Fire to smoke index d) Floor to space index

7) For kitchen cum dining room the minimum area should be _____.
   a) 5 Sq.m b) 9.5 Sq.m
   c) 6 Sq.m d) 15 Sq.m

8) System of air conditioning is _____.
   a) Central system b) Self-contained system
   c) Combined system d) All of the above

9) Height of the building is restricted by a line drawn from rear boundary of plot at angle of _____.

a) $33\frac{1^0}{2}$ b) $43\frac{1^0}{2}$

c) $53\frac{1^0}{2}$ d) $63\frac{1^0}{2}$

10) _____ means the movement space provided on the same floor either between the rooms or within the rooms.

a) Prospect b) Circulation

c) Grouping d) Flexibility

11) Ventilation involves placement of windows in both windward and leeward walls.

a) Lateral b) Diagonal

c) Cross d) Indirect

12) In a residential building corridors and passage require minimum _____ air change per hour.

a) One b) Two

c) Three d) Four

13) Residual Head in the water pipeline is the head available at the _____ the distribution system.

a) Beginning b) Tail end

c) Quarter length d) All of the above

14) The requirements for fitments for drainage and sanitation are given in _____.

a) IS: 1172:1963 b) IS: 774:1971

c) IS: 456:1972 d) IS: 962:1989

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.2 Design and Draw to scale of 1:50 a bungalow for an Executive Engineer Provide for the following areas/rooms.

1) A living room
2) A kitchen
3) Two Bed room
4) Sufficient toilet facility
5) Staircase

a) Draw typical plan, 1:50 & show all details. **14**

b) Draw sectional elevation for above mentioned plan, scale 1:50 & show all details. **14**

Q.3 Write any four of the following.

a) Explain Principles of Building Planning? **07**

b) Write importance of Maintenance. **07**

c) Draw sketches of **07**
1) S.W. pipe
2) A.C. down take pipe with bend?

d) Write a note on various defects in plastering? **07**

e) What is thermal insulation? Explain anyone method of thermal insulation? **07**

f) Explain system of Air – Conditioning in summer? **07**

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

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   a) $33\frac{1^0}{2}$ b) $43\frac{1^0}{2}$
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3) _____ means the movement space provided on the same floor either between the rooms or within the rooms.
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5) In a residential building corridors and passage require minimum _____ air change per hour.
   a) One b) Two
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6) Residual Head in the water pipeline is the head available at the _____ the distribution system.
   a) Beginning b) Tail end
   c) Quarter length d) All of the above

7) The requirements for fitments for drainage and sanitation are given in _____.
   a) IS: 1172:1963 b) IS: 774:1971
   c) IS: 456:1972 d) IS: 962:1989

8) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area _____.
   a) $1/8^{th}$ b) $1/20^{th}$
   c) $1/5^{th}$ d) $1/10^{th}$

9) In assembly halls _____ M^3 fresh air exchange (Per person/hour) is recommended.
   a) $10m^3$ b) $20m^3$
   c) $28m^3$ d) $40m^3$

10) For National Highways in urban areas building line is located at distance of _____.
   a) 30m b) 45m
   c) 15m d) 25m

11) The minimum heights for habitable rooms _____.
   a) 2.75m b) 2.4m
   c) 2.6m d) 2.2m

12) Hot-Arid Zones is also called _____.
   a) Dry-Arid Zones b) Wet-Zones
   c) Wet-Arid Zones d) None of these

13) FSI means _____ in building planning.
   a) Fire to safety index b) Fuel space index
   c) Fire to smoke index d) Floor to space index

14) For kitchen cum dining room the minimum area should be _____.
   a) 5 Sq.m b) 9.5 Sq.m
   c) 6 Sq.m d) 15 Sq.m

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

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b) Draw sectional elevation for above mentioned plan, scale 1:50 & show all details. **14**

Q.3 Write any four of the following.

a) Explain Principles of Building Planning? **07**

b) Write importance of Maintenance. **07**

c) Draw sketches of **07**
1) S.W. pipe
2) A.C. down take pipe with bend?

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e) What is thermal insulation? Explain anyone method of thermal insulation? **07**

f) Explain system of Air – Conditioning in summer? **07**

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Assume suitable data as per requirement and mention it.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Hot-Arid Zones is also called _____.
   a) Dry-Arid Zones b) Wet-Zones
   c) Wet-Arid Zones d) None of these

2) FSI means _____ in building planning.
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3) For kitchen cum dining room the minimum area should be _____.
   a) 5 Sq.m b) 9.5 Sq.m
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4) System of air conditioning is _____.
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5) Height of the building is restricted by a line drawn from rear boundary of plot at angle of _____.
   a) $33\frac{1^0}{2}$ b) $43\frac{1^0}{2}$
   c) $53\frac{1^0}{2}$ d) $63\frac{1^0}{2}$

6) _____ means the movement space provided on the same floor either between the rooms or within the rooms.
   a) Prospect b) Circulation
   c) Grouping d) Flexibility

7) Ventilation involves placement of windows in both windward and leeward walls.
   a) Lateral b) Diagonal
   c) Cross d) Indirect

8) In a residential building corridors and passage require minimum _____ air change per hour.
   a) One b) Two
   c) Three d) Four

9) Residual Head in the water pipeline is the head available at the _____ the distribution system.
   a) Beginning
   b) Tail end
   c) Quarter length
   d) All of the above

10) The requirements for fitments for drainage and sanitation are given in _____.
   a) IS: 1172:1963
   b) IS: 774:1971
   c) IS: 456:1972
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11) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area _____.
   a) $1/8^{th}$
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   c) $1/5^{th}$
   d) $1/10^{th}$

12) In assembly halls _____ M^3 fresh air exchange (Per person/hour) is recommended.
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13) For National Highways in urban areas building line is located at distance of _____.
   a) 30m
   b) 45m
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   d) 25m

14) The minimum heights for habitable rooms _____.
   a) 2.75m
   b) 2.4m
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   d) 2.2m

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

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e) What is thermal insulation? Explain anyone method of thermal insulation? **07**

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Seat No.	

Set | S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 70
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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   c) $1/5^{th}$ d) $1/10^{th}$

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   c) Fire to smoke index d) Floor to space index

12) For kitchen cum dining room the minimum area should be _____.
   a) 5 Sq.m b) 9.5 Sq.m
   c) 6 Sq.m d) 15 Sq.m

13) System of air conditioning is _____.
   a) Central system b) Self-contained system
   c) Combined system d) All of the above

14) Height of the building is restricted by a line drawn from rear boundary of plot at angle of _____.
   a) $33\frac{1^0}{2}$ b) $43\frac{1^0}{2}$
   c) $53\frac{1^0}{2}$ d) $63\frac{1^0}{2}$

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DESIGN

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.2 Design and Draw to scale of 1:50 a bungalow for an Executive Engineer Provide for the following areas/rooms.

1) A living room
2) A kitchen
3) Two Bed room
4) Sufficient toilet facility
5) Staircase

a) Draw typical plan, 1:50 & show all details. **14**

b) Draw sectional elevation for above mentioned plan, scale 1:50 & show all details. **14**

Q.3 Write any four of the following.

a) Explain Principles of Building Planning? **07**

b) Write importance of Maintenance. **07**

c) Draw sketches of **07**
1) S.W. pipe
2) A.C. down take pipe with bend?

d) Write a note on various defects in plastering? **07**

e) What is thermal insulation? Explain anyone method of thermal insulation? **07**

f) Explain system of Air – Conditioning in summer? **07**

SLR-FM-629

Seat No.		Set	P

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of non-programmable calculator is permitted.
3) Assume any other data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The channel whose boundary is not deformable is known as _____.
   a) Rigid channel b) Prismatic channel
   c) Mobile channel d) Boundary channel

2) In open channel the specific energy is _____.
   a) The total energy per unit discharge
   b) The total energy measured above a horizontal datum
   c) The total energy measured with respect to the channel bottom
   d) The Kinetic energy plotted above the free surface

3) Mannings and chezy's formule are valid for _____.
   a) Steady flow b) Steady uniform flow
   c) Steady non-uniform flow d) Unsteady uniform flow

4) When bottom slope is greater than critical slope the channel slope is termed as _____.
   a) Horizantal b) Mild
   c) Critical d) Steep

5) The article depth meter is used to measure _____.
   a) Velocity of flow in an open channel
   b) Depth of flow in an open channel
   c) Hydraulic Jump
   d) Depth of channel

6) The side slope of cipolletti weir is generally kept _____.
   a) 1 to 3 b) 1:5
   c) 1 to 4 d) 1 to 2

7) The ratio of the percentage error in the discharge and percentage error in the measurements of head over a triangular notch is _____.
   a) 2/3 b) 2/5
   c) 5/2 d) 3/2

8) The force exerted by a jet impinging normally on a fixed plate is _____
   a) $\frac{\varrho a v}{4}$ b) $\varrho a v$
   c) $\frac{\varrho a v^2}{4}$ d) $\varrho a v^2$

9) A Turbine is a device which convert _____.
   a) Kinetic energy into mechanical energy
   b) Mechanical energy into hydraulic energy
   c) Hydraulic energy into mechanical energy
   d) None of the above

10) A draft tube is not required for a _____.
   a) Francis turbine
   b) Kaplan turbine
   c) Pelton wheel turbine
   d) None of the above

11) Multi stage centrifugal pumps are used to _____.
   a) Give high discharge
   b) produce high heads
   c) Pump viscous fluids
   d) All the above

12) The monometric efficiency (η_{man}) of a centrifugal pump is given by ____.
   a) $\frac{H_m}{g.Vw_2.u_2}$
   b) $\frac{g.H_m}{Vw_2.u_2}$
   c) $\frac{Vw_2.u_2}{g.H_m}$
   d) $\frac{g.Vw_2.u_2}{H_m}$

13) Distorted models are required to be prepared for which of the following?
   a) River
   b) Dams across very wide rivers
   c) Harbours
   d) All of above

14) The specific speed for a turbine has the dimension of _____.
   a) T^{-1}
   b) Dimensionless
   c) $F^{1/2}\ L^{-3/4}\ J^{-3/2}$
   d) $F^{1/2}\ L^{-5/2}\ J^{-3/2}$

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 and Q.6 are compulsory.
2) Answer any two questions from each section.
3) Use of non- programmable calculator is permitted.
4) Neat diagram be drawn wherever required.
5) Assume any other data if necessary.

Section – I

Q.2 **a)** Explain the significance of channels of most efficient section. **03**

b) Derive the expression for loss of energy though hydraulic jump. **04**

c) Enlist the advantages of triangular notch over rectangular notch. **03**

Q.3 **a)** Derive on expression for the discharge thought a channel by chezy's formula. **03**

b) A rectangular channel 7.5m wide carries 12m^3 of water per second with a velocity of 1.5 m/sec. Compute the specific energy. Also find the depth of flow in the channel when the specific energy would be minimum. What will be the value of critical velocity as well as minimum specific energy? **06**

Q.4 **a)** Show that $\frac{y_2}{y_1} = \frac{1}{2}[\sqrt{1 + 8F_r^2} - 1]$ **05**
for a hydraulic jump in a rectangular channel (with figure).

b) In a rectangular channel a discharge of 2m^3/sec per meter width flows with Froudes no.5.0. If the hydraulic jump takes place. Calculate the energy loss per meter width of channel, due to jump. **04**

Q.5 **a)** Derive the expression for time required to empty the tank by rectangular notch. **04**

b) A cipolletti weir of crest length 80 cm discharges water. The head of water over the weir is 420 mm. Find the discharge over the weir if the channel is 100 cm wide and 70 cm deep. Take $C_d = 0.60$ **05**

Section – II

Q.6 **a)** Classify water turbines in detail. **03**

b) What is a primary of centrifugal pump? **03**

c) Distinguish between distorted models and undistorted models. **04**

Q.7 **a)** Explain the terms, Net head, Gross head, efficiency of turbine and draft-tube. **04**

b) A jet of water 75 mm diameter and with velocity of 20m/ sec flows tangentially on to a stationary vane which deflects the water through 120. What is the magnitude and direction of the resultant force on the vane? If the jet flows on to a series of vanes moving in the direction of the jet with velocity 12 m/sec. Find **05**

1) The force on the system of vanes in the direction of motion.
2) The work done per second
3) The efficiency

Q.8 a) Define the terms- **04**

1) Suction head
2) Delivery head
3) Static head
4) Manometric head

b) The outer diameter of an impeller of a centrifugal pump is 500 mm and outlet width is 50 mm. The pump is running at 1000 r.p.m. against head 12m. The vanes angle at outlet is 35^{o} and monometric efficiency is 80% determine. **05**

1) Velocity of flow at outlet
2) Velocity of water leaving the vane and
3) Angle made by the absolute velocity at outlet with the direction motion at outlet and
4) Discharge

Q.9 a) The frictional torque T of a disc of diameter D rotating at a speed N in a fluid of viscosity M and density ϱ in a turbulent. Flow is given by **04**

$$T = D^5 N^2 \varrho \phi \left[\frac{M}{D^2 N \varrho}\right]$$

Use Buckingham π theoram.

b) Find the form of the equation for discharge 'Q through a sharp- edged triangular notch assuming Q depends on the central angle $\propto$ of the notch, head H, gravitational acceleration 'g' and on the density ϱ, viscosity μ and surface tension 'σ' of the fluid. **05**

SLR-FM-629

Seat No.	

Set Q

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of non-programmable calculator is permitted.
3) Assume any other data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The force exerted by a jet impinging normally on a fixed plate is _____
   a) $\frac{\varrho av}{4}$ b) ϱav
   c) $\frac{\varrho av^2}{4}$ d) ϱav^2

2) A Turbine is a device which convert _____.
   a) Kinetic energy into mechanical energy
   b) Mechanical energy into hydraulic energy
   c) Hydraulic energy into mechanical energy
   d) None of the above

3) A draft tube is not required for a _____.
   a) Francis turbine b) Kaplan turbine
   c) Pelton wheel turbine d) None of the above

4) Multi stage centrifugal pumps are used to _____.
   a) Give high discharge b) produce high heads
   c) Pump viscous fluids d) All the above

5) The monometric efficiency (η_{man}) of a centrifugal pump is given by ____.
   a) $\frac{H_m}{g.Vw_2.u_2}$ b) $\frac{g.H_m}{Vw_2.u_2}$
   c) $\frac{Vw_2.u_2}{g.H_m}$ d) $\frac{g.Vw_2.u_2}{H_m}$

6) Distorted models are required to be prepared for which of the following?
   a) River
   b) Dams across very wide rivers
   c) Harbours
   d) All of above

7) The specific speed for a turbine has the dimension of _____.
   a) T^{-1} b) Dimensionless
   c) $F^{1/2}\ L^{-3/4}\ J^{-3/2}$ d) $F^{1/2}\ L^{-5/2}\ J^{-3/2}$

8) The channel whose boundary is not deformable is known as _____.
   a) Rigid channel b) Prismatic channel
   c) Mobile channel d) Boundary channel

9) In open channel the specific energy is _____.
   a) The total energy per unit discharge
   b) The total energy measured above a horizontal datum
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   d) The Kinetic energy plotted above the free surface

10) Mannings and chezy's formule are valid for _____.
   a) Steady flow
   b) Steady uniform flow
   c) Steady non-uniform flow
   d) Unsteady uniform flow

11) When bottom slope is greater than critical slope the channel slope is termed as _____.
   a) Horizantal
   b) Mild
   c) Critical
   d) Steep

12) The article depth meter is used to measure _____.
   a) Velocity of flow in an open channel
   b) Depth of flow in an open channel
   c) Hydraulic Jump
   d) Depth of channel

13) The side slope of cipolletti weir is generally kept _____.
   a) 1 to 3
   b) 1:5
   c) 1 to 4
   d) 1 to 2

14) The ratio of the percentage error in the discharge and percentage error in the measurements of head over a triangular notch is _____.
   a) 2/3
   b) 2/5
   c) 5/2
   d) 3/2

SLR-FM-629

Seat No.	

Set Q

Q

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 and Q.6 are compulsory.
2) Answer any two questions from each section.
3) Use of non- programmable calculator is permitted.
4) Neat diagram be drawn wherever required.
5) Assume any other data if necessary.

Section – I

Q.2 **a)** Explain the significance of channels of most efficient section. **03**

b) Derive the expression for loss of energy though hydraulic jump. **04**

c) Enlist the advantages of triangular notch over rectangular notch. **03**

Q.3 **a)** Derive on expression for the discharge thought a channel by chezy's formula. **03**

b) A rectangular channel 7.5m wide carries 12m^3 of water per second with a velocity of 1.5 m/sec. Compute the specific energy. Also find the depth of flow in the channel when the specific energy would be minimum. What will be the value of critical velocity as well as minimum specific energy? **06**

Q.4 **a)** Show that $\frac{y_2}{y_1} = \frac{1}{2}[\sqrt{1 + 8F_r^2} - 1]$ **05**
for a hydraulic jump in a rectangular channel (with figure).

b) In a rectangular channel a discharge of 2m^3/sec per meter width flows with Froudes no.5.0. If the hydraulic jump takes place. Calculate the energy loss per meter width of channel, due to jump. **04**

Q.5 **a)** Derive the expression for time required to empty the tank by rectangular notch. **04**

b) A cipolletti weir of crest length 80 cm discharges water. The head of water over the weir is 420 mm. Find the discharge over the weir if the channel is 100 cm wide and 70 cm deep. Take $C_d = 0.60$ **05**

Section – II

Q.6 **a)** Classify water turbines in detail. **03**

b) What is a primary of centrifugal pump? **03**

c) Distinguish between distorted models and undistorted models. **04**

Q.7 **a)** Explain the terms, Net head, Gross head, efficiency of turbine and draft-tube. **04**

b) A jet of water 75 mm diameter and with velocity of 20m/ sec flows tangentially on to a stationary vane which deflects the water through 120. What is the magnitude and direction of the resultant force on the vane? If the jet flows on to a series of vanes moving in the direction of the jet with velocity 12 m/sec. Find **05**

1) The force on the system of vanes in the direction of motion.
2) The work done per second
3) The efficiency

Q.8 a) Define the terms- **04**

1) Suction head
2) Delivery head
3) Static head
4) Manometric head

b) The outer diameter of an impeller of a centrifugal pump is 500 mm and outlet width is 50 mm. The pump is running at 1000 r.p.m. against head 12m. The vanes angle at outlet is 35^{o} and monometric efficiency is 80% determine. **05**

1) Velocity of flow at outlet
2) Velocity of water leaving the vane and
3) Angle made by the absolute velocity at outlet with the direction motion at outlet and
4) Discharge

Q.9 a) The frictional torque T of a disc of diameter D rotating at a speed N in a fluid of viscosity M and density ϱ in a turbulent. Flow is given by **04**

$$T = D^5 N^2 \varrho \phi \left[\frac{M}{D^2 N \varrho}\right]$$

Use Buckingham π theoram.

b) Find the form of the equation for discharge 'Q through a sharp- edged triangular notch assuming Q depends on the central angle $\propto$ of the notch, head H, gravitational acceleration 'g' and on the density ϱ, viscosity μ and surface tension 'σ' of the fluid. **05**

SLR-FM-629

Seat No.	

Set R

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of non-programmable calculator is permitted.
3) Assume any other data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The article depth meter is used to measure _____.
   a) Velocity of flow in an open channel
   b) Depth of flow in an open channel
   c) Hydraulic Jump
   d) Depth of channel

2) The side slope of cipolletti weir is generally kept _____.
   a) 1 to 3 b) 1:5
   c) 1 to 4 d) 1 to 2

3) The ratio of the percentage error in the discharge and percentage error in the measurements of head over a triangular notch is _____.
   a) 2/3 b) 2/5
   c) 5/2 d) 3/2

4) The force exerted by a jet impinging normally on a fixed plate is _____
   a) $\frac{\varrho av}{4}$ b) ϱav
   c) $\frac{\varrho av^2}{4}$ d) ϱav^2

5) A Turbine is a device which convert _____.
   a) Kinetic energy into mechanical energy
   b) Mechanical energy into hydraulic energy
   c) Hydraulic energy into mechanical energy
   d) None of the above

6) A draft tube is not required for a _____.
   a) Francis turbine b) Kaplan turbine
   c) Pelton wheel turbine d) None of the above

7) Multi stage centrifugal pumps are used to _____.
   a) Give high discharge b) produce high heads
   c) Pump viscous fluids d) All the above

8) The monometric efficiency (η_{man}) of a centrifugal pump is given by ____.
   a) $\frac{H_m}{g.Vw_2.u_2}$ b) $\frac{g.H_m}{Vw_2.u_2}$
   c) $\frac{Vw_2.u_2}{g.H_m}$ d) $\frac{g.Vw_2.u_2}{H_m}$

9) Distorted models are required to be prepared for which of the following?
   a) River
   b) Dams across very wide rivers
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   d) All of above

10) The specific speed for a turbine has the dimension of _____.
   a) T^{-1} b) Dimensionless
   c) $F^{1/2}\ L^{-3/4}\ J^{-3/2}$ d) $F^{1/2}\ L^{-5/2}\ J^{-3/2}$

11) The channel whose boundary is not deformable is known as _____.
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12) In open channel the specific energy is _____.
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   b) The total energy measured above a horizontal datum
   c) The total energy measured with respect to the channel bottom
   d) The Kinetic energy plotted above the free surface

13) Mannings and chezy's formule are valid for _____.
   a) Steady flow b) Steady uniform flow
   c) Steady non-uniform flow d) Unsteady uniform flow

14) When bottom slope is greater than critical slope the channel slope is termed as _____.
   a) Horizantal b) Mild
   c) Critical d) Steep

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 and Q.6 are compulsory.
2) Answer any two questions from each section.
3) Use of non- programmable calculator is permitted.
4) Neat diagram be drawn wherever required.
5) Assume any other data if necessary.

Section – I

Q.2 **a)** Explain the significance of channels of most efficient section. **03**

b) Derive the expression for loss of energy though hydraulic jump. **04**

c) Enlist the advantages of triangular notch over rectangular notch. **03**

Q.3 **a)** Derive on expression for the discharge thought a channel by chezy's formula. **03**

b) A rectangular channel 7.5m wide carries 12m^3 of water per second with a velocity of 1.5 m/sec. Compute the specific energy. Also find the depth of flow in the channel when the specific energy would be minimum. What will be the value of critical velocity as well as minimum specific energy? **06**

Q.4 **a)** Show that $\frac{y_2}{y_1} = \frac{1}{2}[\sqrt{1 + 8F_r^2} - 1]$ **05**
for a hydraulic jump in a rectangular channel (with figure).

b) In a rectangular channel a discharge of 2m^3/sec per meter width flows with Froudes no.5.0. If the hydraulic jump takes place. Calculate the energy loss per meter width of channel, due to jump. **04**

Q.5 **a)** Derive the expression for time required to empty the tank by rectangular notch. **04**

b) A cipolletti weir of crest length 80 cm discharges water. The head of water over the weir is 420 mm. Find the discharge over the weir if the channel is 100 cm wide and 70 cm deep. Take $C_d = 0.60$ **05**

Section – II

Q.6 **a)** Classify water turbines in detail. **03**

b) What is a primary of centrifugal pump? **03**

c) Distinguish between distorted models and undistorted models. **04**

Q.7 **a)** Explain the terms, Net head, Gross head, efficiency of turbine and draft-tube. **04**

b) A jet of water 75 mm diameter and with velocity of 20m/ sec flows tangentially on to a stationary vane which deflects the water through 120. What is the magnitude and direction of the resultant force on the vane? If the jet flows on to a series of vanes moving in the direction of the jet with velocity 12 m/sec. Find **05**

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b) The outer diameter of an impeller of a centrifugal pump is 500 mm and outlet width is 50 mm. The pump is running at 1000 r.p.m. against head 12m. The vanes angle at outlet is 35^{o} and monometric efficiency is 80% determine. **05**

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Q.9 **a)** The frictional torque T of a disc of diameter D rotating at a speed N in a fluid of viscosity M and density ϱ in a turbulent. Flow is given by **04**

$$T = D^5 N^2 \varrho \phi \left[\frac{M}{D^2 N \varrho}\right]$$

Use Buckingham π theoram.

b) Find the form of the equation for discharge 'Q through a sharp- edged triangular notch assuming Q depends on the central angle $\propto$ of the notch, head H, gravitational acceleration 'g' and on the density ϱ, viscosity μ and surface tension 'σ' of the fluid. **05**

SLR-FM-629

Seat No.	

Set S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of non-programmable calculator is permitted.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) A draft tube is not required for a _____.
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SLR-FM-629

Seat No.	

Set S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
FLUID MECHANICS – II

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 and Q.6 are compulsory.
2) Answer any two questions from each section.
3) Use of non- programmable calculator is permitted.
4) Neat diagram be drawn wherever required.
5) Assume any other data if necessary.

Section – I

Q.2 **a)** Explain the significance of channels of most efficient section. **03**

b) Derive the expression for loss of energy though hydraulic jump. **04**

c) Enlist the advantages of triangular notch over rectangular notch. **03**

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b) A rectangular channel 7.5m wide carries 12m^3 of water per second with a velocity of 1.5 m/sec. Compute the specific energy. Also find the depth of flow in the channel when the specific energy would be minimum. What will be the value of critical velocity as well as minimum specific energy? **06**

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for a hydraulic jump in a rectangular channel (with figure).

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b) A cipolletti weir of crest length 80 cm discharges water. The head of water over the weir is 420 mm. Find the discharge over the weir if the channel is 100 cm wide and 70 cm deep. Take $C_d = 0.60$ **05**

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b) What is a primary of centrifugal pump? **03**

c) Distinguish between distorted models and undistorted models. **04**

Q.7 **a)** Explain the terms, Net head, Gross head, efficiency of turbine and draft-tube. **04**

b) A jet of water 75 mm diameter and with velocity of 20m/ sec flows tangentially on to a stationary vane which deflects the water through 120. What is the magnitude and direction of the resultant force on the vane? If the jet flows on to a series of vanes moving in the direction of the jet with velocity 12 m/sec. Find **05**

1) The force on the system of vanes in the direction of motion.
2) The work done per second
3) The efficiency

Q.8 a) Define the terms- **04**

1) Suction head
2) Delivery head
3) Static head
4) Manometric head

b) The outer diameter of an impeller of a centrifugal pump is 500 mm and outlet width is 50 mm. The pump is running at 1000 r.p.m. against head 12m. The vanes angle at outlet is 35^{o} and monometric efficiency is 80% determine. **05**

1) Velocity of flow at outlet
2) Velocity of water leaving the vane and
3) Angle made by the absolute velocity at outlet with the direction motion at outlet and
4) Discharge

Q.9 a) The frictional torque T of a disc of diameter D rotating at a speed N in a fluid of viscosity M and density ϱ in a turbulent. Flow is given by **04**

$$T = D^5 N^2 \varrho \phi \left[\frac{M}{D^2 N \varrho}\right]$$

Use Buckingham π theoram.

b) Find the form of the equation for discharge 'Q through a sharp- edged triangular notch assuming Q depends on the central angle $\propto$ of the notch, head H, gravitational acceleration 'g' and on the density ϱ, viscosity μ and surface tension 'σ' of the fluid. **05**

SLR-FM-63

Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Non programmable calculator is allowed.
4) Assume suitable data if required and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In case of over reinforced section which element fails first _____. 01
   a) Both steel and concrete simultaneously
   b) Neither steel or concrete
   c) Steel
   d) Concrete

2) The shear failure can be due to _____. 01
   a) Shear-tension b) Shear-bond
   c) Over reinforced section d) All of these

3) According to IS 456:2000, the maximum diameter of reinforcing bars shall not exceed _____. 01
   a) One-fourth of the total thickness of the slab
   b) One-sixth o f the total thickness of the slab
   c) One-eighth of the total thickness of the slab
   d) One-tenth of the total thickness of the slab

4) For a shear force, Vus for which vertical shear reinforcement is to be provided, the ratio of Vus and effective depth (d) of beam is dependent on _____. 01
   a) Shear reinforcement b) Spacing of shear reinforcement
   c) Grade of steel d) All of these

5) The rectangular beam of width, 250 mm is having effective depth of 327 mm. The concrete grade is M_{20} and the grade of reinforcing steel is Fe_{415}. The tensile reinforcement is provided by 2-16 mm dia bars. As per limit state method, the moment of resistance due to steel is equal to ____. 02
   a) 21.315 kNm b) 31.973 kNm
   c) 42.550 kNm d) 53.288 kNm

6) In a two way restrained slab, the width of each edge strip is considered as _____. 01
   a) One-eighth of the width of the slab
   b) One-quarter of the width of the slab
   c) Half of the width of the slab
   d) Three-quarter of the width of the slab

7) Torsion reinforcement shall be provided _____. 01
   a) At the middle-strip of the slab
   b) At edge-strips of the slab
   c) At any corner where the slab is simply supported on both edges meeting at that comer
   d) At any comer where the slab is continuous on both edges meeting at that corner

8) For a rectangular column of size 400mm×450mm, the value of p/fck is taken as 0.10 for using interaction curve of columns as given in SP-16. The grade of concrete is M_{20} and the grade of steel is Fe_{415}. The area of steel will be equal to _____. 02
   a) 4500.0mm^2 b) 2700.0mm^2
   c) 3600.0mm^2 d) 1800.0mm^2

9) A flanged beam is having the following dimension: width of flange, bf = 1000mm depth of flange, Df = 125mm, width of web, bw = 250mm and overall depth of beam, D = 250 mm The concrete grade is M_{20} and the grade of reinforcing steel is Fe_{145}. The clear cover is 25mm. The area of steel required in balanced condition is equal to _____. 02
   a) 1029 mm^2 b) 2572 mm^2
   c) 2058 mm^2 d) None of the above

10) A square column with 5.0m unsupported length, restrained in its position and direction at both ends. It carries a design axial load of 1200kN. What would be the dimension of the column (to the nearest multiple of 5)? Assume concrete grade M20, steel grade Fe415, area of steel 1.0% of its gross cross-sectional area and it is perfectly axially loaded. 02
   a) 310mm × 310mm b) 335mm × 335mm
   c) 360mm × 360mm d) 385mm × 385mm

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

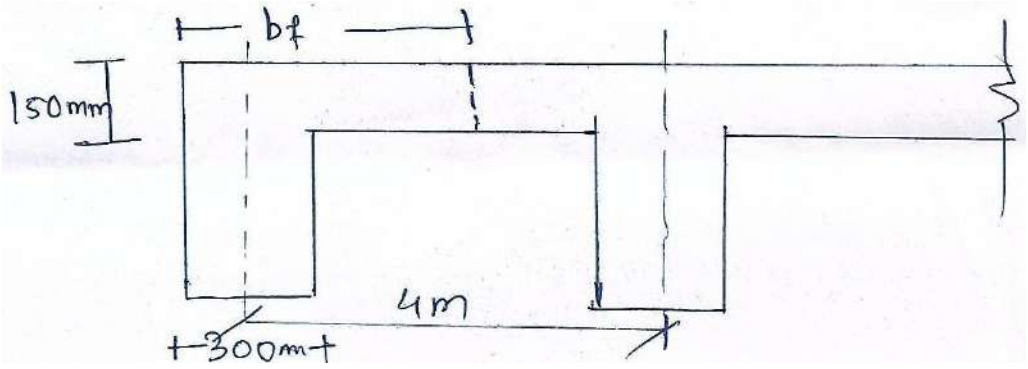
Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and 6 are compulsory.
2) Solve any two questions from each section.
2) Use of IS 456:2000 original and non programmable calculator is allowed.
3) Figure to the right indicates full marks.
4) Assume additional suitable data if necessary and state it clearly.
5) Draw neat sketch of reinforcement details.

Section – I

Q.2 A beam 250 mm x 550 mm effective is subjected to a factored moment of 300 kNm. Determine the area of steel required. Use M_{20} concrete and Fe_{415} steel. Assume d' = 50mm. **08**

Q.3 Design the edge beam for the slab beam system as shown in Fig. No. 1. Clear span of beams are 7m. Live load on the beam is 4kN/m^2. Use M_{20} concrete and Fe_{500} steel. **10**



Q.4 Design a simply supported roof slab for a room 7.5m x 3.5m clear size. The slab is carrying an imposed load of 4kN/m^2 . Use M_{20} concrete and Fe_{415} steel. **10**

Q.5 A rectangular reinforced concrete beam is simply supported on two masonry walls 230mm thick and 6m apart. The beam is carrying an imposed load of 15 kN/m. Design the beam. Use M_{25} concrete and Fe_{415} steel. **10**

Section – II

Q.6 Design the reinforcement for a short axially loaded square column of size 420 mm x 420 mm to support a load of 1000 kN. Use M_{20} concrete and Fe_{500} steel. **08**

Q.7 Design a rectangular beam, continuous over four column supports with effective span 6m each. The beam is subjected to an imposed load of 10 kN/m and live load of 15 kN/m. Use M_{25} concrete and Fe_{500} steel. **10**

Q.8 Determine reinforcement required for a beam size 300 mm x 600 mm subjected to factored bending moment of 150 kNm, factored shear force 100 kN and factored torsional moment of 50 kNm. Use M_{20} concrete and Fe_{500} steel. **10**

Q.9 a) Design a circular column of diameter 400 mm with helical reinforcement subjected to a load of 1200 kN. Use M_{25} concrete and Fe_{415} steel. The column has unsupported length of 3 m and is effectively held in position at both ends but not restrained against rotation. **07**

b) Write an “Interaction diagrams” for column stating their salient features. **03**

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Non programmable calculator is allowed.
4) Assume suitable data if required and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In a two way restrained slab, the width of each edge strip is considered as _____. 01
   a) One-eighth of the width of the slab
   b) One-quarter of the width of the slab
   c) Half of the width of the slab
   d) Three-quarter of the width of the slab

2) Torsion reinforcement shall be provided _____. 01
   a) At the middle-strip of the slab
   b) At edge-strips of the slab
   c) At any corner where the slab is simply supported on both edges meeting at that comer
   d) At any comer where the slab is continuous on both edges meeting at that corner

3) For a rectangular column of size 400mm×450mm, the value of p/fck is taken as 0.10 for using interaction curve of columns as given in SP-16. The grade of concrete is M_{20} and the grade of steel is Fe_{415}. The area of steel will be equal to _____. 02
   a) 4500.0mm^2 b) 2700.0mm^2
   c) 3600.0mm^2 d) 1800.0mm^2

4) A flanged beam is having the following dimension: width of flange, bf = 1000mm depth of flange, Df = 125mm, width of web, bw = 250mm and overall depth of beam, D = 250 mm The concrete grade is M_{20} and the grade of reinforcing steel is Fe_{145}. The clear cover is 25mm. The area of steel required in balanced condition is equal to _____. 02
   a) 1029 mm^2 b) 2572 mm^2
   c) 2058 mm^2 d) None of the above

5) A square column with 5.0m unsupported length, restrained in its position and direction at both ends. It carries a design axial load of 1200kN. What would be the dimension of the column (to the nearest multiple of 5)? Assume concrete grade M20, steel grade Fe415, area of steel 1.0% of its gross cross-sectional area and it is perfectly axially loaded. 02
   a) 310mm × 310mm b) 335mm × 335mm
   c) 360mm × 360mm d) 385mm × 385mm

6) In case of over reinforced section which element fails first _____. 01
   a) Both steel and concrete simultaneously
   b) Neither steel or concrete
   c) Steel
   d) Concrete

7) The shear failure can be due to _____. 01
   a) Shear-tension b) Shear-bond
   c) Over reinforced section d) All of these

8) According to IS 456:2000, the maximum diameter of reinforcing bars shall not exceed _____. 01
   a) One-fourth of the total thickness of the slab
   b) One-sixth o f the total thickness of the slab
   c) One-eighth of the total thickness of the slab
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9) For a shear force, Vus for which vertical shear reinforcement is to be provided, the ratio of Vus and effective depth (d) of beam is dependent on _____. 01
   a) Shear reinforcement b) Spacing of shear reinforcement
   c) Grade of steel d) All of these

10) The rectangular beam of width, 250 mm is having effective depth of 327 mm. The concrete grade is M_{20} and the grade of reinforcing steel is Fe_{415}. The tensile reinforcement is provided by 2-16 mm dia bars. As per limit state method, the moment of resistance due to steel is equal to ____. 02
   a) 21.315 kNm b) 31.973 kNm
   c) 42.550 kNm d) 53.288 kNm

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

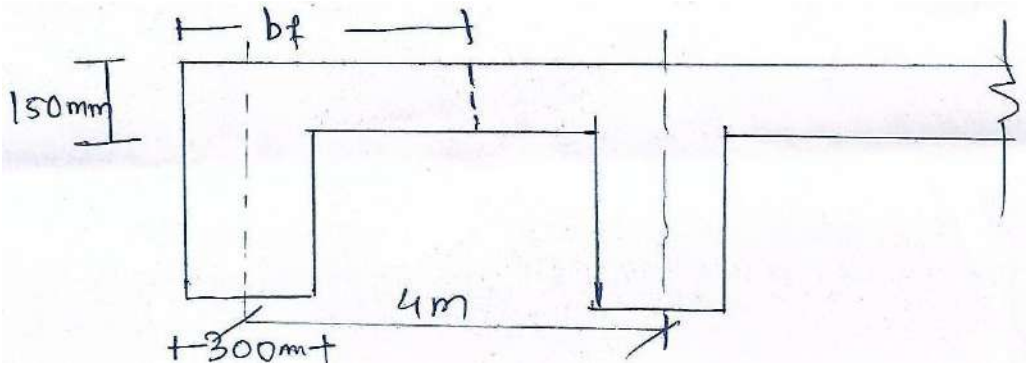
Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and 6 are compulsory.
2) Solve any two questions from each section.
2) Use of IS 456:2000 original and non programmable calculator is allowed.
3) Figure to the right indicates full marks.
4) Assume additional suitable data if necessary and state it clearly.
5) Draw neat sketch of reinforcement details.

Section – I

Q.2 A beam 250 mm x 550 mm effective is subjected to a factored moment of 300 kNm. Determine the area of steel required. Use M_{20} concrete and Fe_{415} steel. Assume d' = 50mm. **08**

Q.3 Design the edge beam for the slab beam system as shown in Fig. No. 1. Clear span of beams are 7m. Live load on the beam is 4kN/m^2. Use M_{20} concrete and Fe_{500} steel. **10**



Q.4 Design a simply supported roof slab for a room 7.5m x 3.5m clear size. The slab is carrying an imposed load of 4kN/m^2 . Use M_{20} concrete and Fe_{415} steel. **10**

Q.5 A rectangular reinforced concrete beam is simply supported on two masonry walls 230mm thick and 6m apart. The beam is carrying an imposed load of 15 kN/m. Design the beam. Use M_{25} concrete and Fe_{415} steel. **10**

Section – II

Q.6 Design the reinforcement for a short axially loaded square column of size 420 mm x 420 mm to support a load of 1000 kN. Use M_{20} concrete and Fe_{500} steel. **08**

Q.7 Design a rectangular beam, continuous over four column supports with effective span 6m each. The beam is subjected to an imposed load of 10 kN/m and live load of 15 kN/m. Use M_{25} concrete and Fe_{500} steel. **10**

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Q.9 a) Design a circular column of diameter 400 mm with helical reinforcement subjected to a load of 1200 kN. Use M_{25} concrete and Fe_{415} steel. The column has unsupported length of 3 m and is effectively held in position at both ends but not restrained against rotation. **07**

b) Write an “Interaction diagrams” for column stating their salient features. **03**

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Non programmable calculator is allowed.
4) Assume suitable data if required and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) A flanged beam is having the following dimension: width of flange, bf = 1000mm depth of flange, Df = 125mm, width of web, bw = 250mm and overall depth of beam, D = 250 mm The concrete grade is M_{20} and the grade of reinforcing steel is Fe_{145}. The clear cover is 25mm. The area of steel required in balanced condition is equal to _____. 02
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   c) 2058 mm^2 d) None of the above

2) A square column with 5.0m unsupported length, restrained in its position and direction at both ends. It carries a design axial load of 1200kN. What would be the dimension of the column (to the nearest multiple of 5)? Assume concrete grade M20, steel grade Fe415, area of steel 1.0% of its gross cross-sectional area and it is perfectly axially loaded. 02
   a) 310mm × 310mm b) 335mm × 335mm
   c) 360mm × 360mm d) 385mm × 385mm

3) In case of over reinforced section which element fails first _____. 01
   a) Both steel and concrete simultaneously
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   d) Concrete

4) The shear failure can be due to _____. 01
   a) Shear-tension b) Shear-bond
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5) According to IS 456:2000, the maximum diameter of reinforcing bars shall not exceed _____. 01
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   c) One-eighth of the total thickness of the slab
   d) One-tenth of the total thickness of the slab

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c) Grade of steel
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a) 21.315 kNm
b) 31.973 kNm
c) 42.550 kNm
d) 53.288 kNm

8) In a two way restrained slab, the width of each edge strip is considered as _____. 01

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b) One-quarter of the width of the slab
c) Half of the width of the slab
d) Three-quarter of the width of the slab

9) Torsion reinforcement shall be provided _____. 01

a) At the middle-strip of the slab
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c) At any corner where the slab is simply supported on both edges meeting at that comer
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10) For a rectangular column of size 400mm×450mm, the value of p/fck is taken as 0.10 for using interaction curve of columns as given in SP-16. The grade of concrete is M_{20} and the grade of steel is Fe_{415}. The area of steel will be equal to _____. 02

a) 4500.0mm^2
b) 2700.0mm^2
c) 3600.0mm^2
d) 1800.0mm^2

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

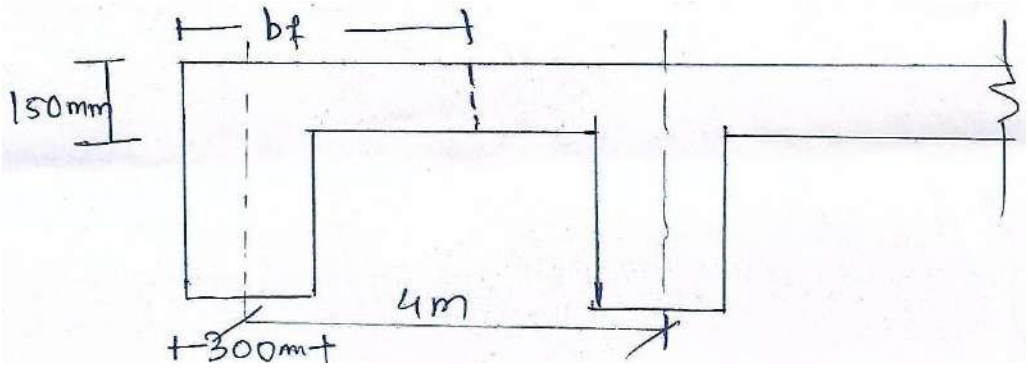
Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and 6 are compulsory.
2) Solve any two questions from each section.
2) Use of IS 456:2000 original and non programmable calculator is allowed.
3) Figure to the right indicates full marks.
4) Assume additional suitable data if necessary and state it clearly.
5) Draw neat sketch of reinforcement details.

Section – I

Q.2 A beam 250 mm x 550 mm effective is subjected to a factored moment of 300 kNm. Determine the area of steel required. Use M_{20} concrete and Fe_{415} steel. Assume d' = 50mm. **08**

Q.3 Design the edge beam for the slab beam system as shown in Fig. No. 1. Clear span of beams are 7m. Live load on the beam is 4kN/m^2. Use M_{20} concrete and Fe_{500} steel. **10**



Q.4 Design a simply supported roof slab for a room 7.5m x 3.5m clear size. The slab is carrying an imposed load of 4kN/m^2 . Use M_{20} concrete and Fe_{415} steel. **10**

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Section – II

Q.6 Design the reinforcement for a short axially loaded square column of size 420 mm x 420 mm to support a load of 1000 kN. Use M_{20} concrete and Fe_{500} steel. **08**

Q.7 Design a rectangular beam, continuous over four column supports with effective span 6m each. The beam is subjected to an imposed load of 10 kN/m and live load of 15 kN/m. Use M_{25} concrete and Fe_{500} steel. **10**

Q.8 Determine reinforcement required for a beam size 300 mm x 600 mm subjected to factored bending moment of 150 kNm, factored shear force 100 kN and factored torsional moment of 50 kNm. Use M_{20} concrete and Fe_{500} steel. **10**

Q.9 a) Design a circular column of diameter 400 mm with helical reinforcement subjected to a load of 1200 kN. Use M_{25} concrete and Fe_{415} steel. The column has unsupported length of 3 m and is effectively held in position at both ends but not restrained against rotation. **07**

b) Write an “Interaction diagrams” for column stating their salient features. **03**

SLR-FM-63

Seat No.		Set	S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Non programmable calculator is allowed.
4) Assume suitable data if required and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

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3) The rectangular beam of width, 250 mm is having effective depth of 327 mm. The concrete grade is M_{20} and the grade of reinforcing steel is Fe_{415}. The tensile reinforcement is provided by 2-16 mm dia bars. As per limit state method, the moment of resistance due to steel is equal to ____. 02
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8) A square column with 5.0m unsupported length, restrained in its position and direction at both ends. It carries a design axial load of 1200kN. What would be the dimension of the column (to the nearest multiple of 5)? Assume concrete grade M20, steel grade Fe415, area of steel 1.0% of its gross cross-sectional area and it is perfectly axially loaded. 02

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9) In case of over reinforced section which element fails first _____. 01

a) Both steel and concrete simultaneously
b) Neither steel or concrete
c) Steel
d) Concrete

10) The shear failure can be due to _____. 01

a) Shear-tension b) Shear-bond
c) Over reinforced section d) All of these

SLR-FM-63

Seat No.	

Set S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

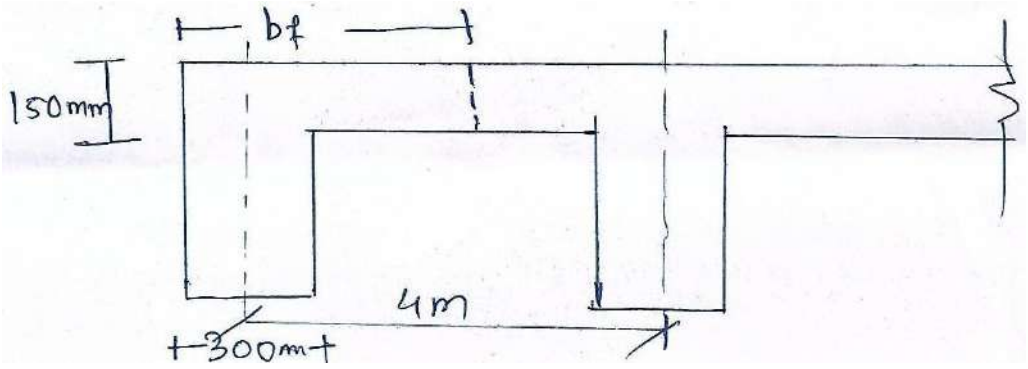
Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question No. 2 and 6 are compulsory.
2) Solve any two questions from each section.
2) Use of IS 456:2000 original and non programmable calculator is allowed.
3) Figure to the right indicates full marks.
4) Assume additional suitable data if necessary and state it clearly.
5) Draw neat sketch of reinforcement details.

Section – I

Q.2 A beam 250 mm x 550 mm effective is subjected to a factored moment of 300 kNm. Determine the area of steel required. Use M_{20} concrete and Fe_{415} steel. Assume d' = 50mm. **08**

Q.3 Design the edge beam for the slab beam system as shown in Fig. No. 1. Clear span of beams are 7m. Live load on the beam is 4kN/m^2. Use M_{20} concrete and Fe_{500} steel. **10**



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Section – II

Q.6 Design the reinforcement for a short axially loaded square column of size 420 mm x 420 mm to support a load of 1000 kN. Use M_{20} concrete and Fe_{500} steel. **08**

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b) Write an “Interaction diagrams” for column stating their salient features. **03**

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 02:30 PM To 5:30 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Rainfall mass cure is variation of _____.
   a) Rainfall intensity with time
   b) Rainfall intensity with cumulative rainfall
   c) Rainfall excess with time
   d) Cumulative rainfall with time

2) Flow duration cure is plot of _____.
   a) Accumulated flow against time
   b) Discharge against time in chronological order
   c) The base flow against the percentage of times the flow exceeded
   d) The stream discharge against the percentage of times the flow is equaled or exceeded

3) Which of the following formations neither contains water nor transmits it?
   a) Aquiclude b) Aquifer
   c) Aquifuge d) Aquitard

4) If e_w and e_a are the saturated vapour pressure of the water surface and air respectively, the Daltons law for evaporation EL in unit time is given by EL= _____.
   a) $(e_w - e_a)$ b) $K\ e_w e_a$
   c) $K\ (e_w - e_a)$ d) $K(e_w + e_a)$

5) Interception losses _____.
   a) Includes evaporation through flow and stream flow
   b) Consists only evaporation loss
   c) Includes evaporation and transpiration losses
   d) Consists only stream flow

6) The percentage of total quantity of fresh water in the world available in the liquid form _____.
   a) 30% b) 70%
   c) 11 % d) 51%

7) The dilution method of stream gauging is ideally suited for measuring discharge in _____.
   a) A large alluvial rivers
   b) Flood flow in mountain stream
   c) Steady flow in a small turbulent stream
   d) A stretch of river having heavy industrial pollution load

8) The most economical method of soil conservation is to _____.
   a) construct check dams
   b) construct contour bunds
   c) Drain the soil
   d) Aforest the soil

9) Consumptive use of water for a crop represents _____.
   a) Transpiration needs of the crop
   b) Evaporation needs of the cropped area
   c) Evapotranspiration needs of the cropped area plus the minor quantity required in plant metabolism.
   d) None of the above

10) The method of growing crops on ridges, running on the sides of water ditches is known as _____.
   a) Flood irrigation
   b) Furrow irrigation
   c) Check irrigation
   d) None of them

11) If the depth is 8.64cm on a field over a base period of 10 days, then the duty is _____.
   a) 10 ha/cumec
   b) 100 ha/cumec
   c) 864 ha/cumec
   d) 1000 ha/cumec

12) Irrigation potential of the country is about _____.
   a) 87 Mha
   b) 100 Mha
   c) 113 Mha
   d) 125 Mha

13) Lift irrigation is flow _____.
   a) by gravity
   b) from lower level to higher level
   c) in delta region
   d) through sprinkler heads

14) The best method of applying water to sandy undulating area is _____.
   a) Free flooding
   b) Furrow method
   c) Subsurface irrigation
   d) Sprinkler irrigation

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 5:30 PM

Instructions: 1) Q. No. 3 and 8 compulsory. Attempt any two question out of Q.No.2,4, and 5 from Section I and Attempt any two question out of Q.No.6,7,and 9 from section II
2) Assume suitable data wherever necessary and mention it clearly**.**
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 A) Briefly discuss the factors affecting evaporation. What are the methods used to control evaporation from reservoir. **05**

B) A precipitation station 'X' was inoperative for some time during which a storm occurred. The storm totals at three stations A, B, C surrounding station 'X' were respectively 6.60, 4.80 & 3.70 cm. The normal annual precipitation amounts at stations X, A, B, & C are 65.60, 72.60, 51.80 & 38.20 cm respectively. Estimate the storm precipitation for station 'X'. **04**

Q.3 A) What is meant by runoff? Explain methods of separation of base flow. **05**

B) The ordinates of 3-hr unit hydrograph are given as below. Using this data derive the ordinates of 6-hr unit hydrograph for the same basin analytically. What is peak value of discharge in this unit hydrograph? **05**

Time in Hrs	0	3	6	9	12	15	18	21	24	27	30
Ordinates(m^3/sec)	0	10	25	20	16	12	9	7	5	3	0

Q.4 A) What is flood and discuss the various factors affecting flood? **04**

B) Estimate the stream flow for the measurement data as given. **05**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m/s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m/s)	0	0.2	0.3	0.35	0.4	0.45	0.4	0.5	0.4	0.2	0

Q.5 A) Enlist, classify and discuss in brief geological formation where round water occurs. **05**

B) A tube well of 30 cm diameter penetrates fully in an artesion aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters. **04**

Section – II

Q.6 A) Write a detailed note on "National Perspective Plan" of National Water Development Academy for inter-basin transfer of water in India. **04**

B) The following data pertains to the healthy growth of a crop. **05**

i) Field capacity of soil = 30%
ii) Permanent Wilting point = 11%
iii) Density of soil = 1300 kg/m^3
iv) Effective depth of root zone = 700mm
v) Daily consumptive use of water = 12mm

For healthy growth, moisture content must not fall below 25% of the water holding capacity and the permanent wilting point. Determine the watering interval in days.

Q.7 A) Define the following terms: **05**

i) Gross command area
ii) Crop period and base period
iii) Capacity factor
iv) Kor- watering and Kor-depth

B) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given in the following table. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **04**

Crop	Base period (days)	Duty at field (ha/cumec)	Area under the crop (ha)
Wheat	120	1800	4800
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Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

Q.8 A) Classify Indian soils according to their origin and their suitability for various crops. **04**

B) Discuss economic feasibility of Lift irrigation schemes. Compare lift irrigation and canal irrigation from various aspects. **06**

Q.9 A) Write a short note on - Kolhapur type Weir **05**

B) Discuss various methods of assessment of irrigation water. Discuss in specific the shortcomings of volumetric assessment methods. **04**

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 02:30 PM To 5:30 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The most economical method of soil conservation is to _____.
   a) construct check dams b) construct contour bunds
   c) Drain the soil d) Aforest the soil

2) Consumptive use of water for a crop represents _____.
   a) Transpiration needs of the crop
   b) Evaporation needs of the cropped area
   c) Evapotranspiration needs of the cropped area plus the minor quantity required in plant metabolism.
   d) None of the above

3) The method of growing crops on ridges, running on the sides of water ditches is known as _____.
   a) Flood irrigation b) Furrow irrigation
   c) Check irrigation d) None of them

4) If the depth is 8.64cm on a field over a base period of 10 days, then the duty is _____.
   a) 10 ha/cumec b) 100 ha/cumec
   c) 864 ha/cumec d) 1000 ha/cumec

5) Irrigation potential of the country is about _____.
   a) 87 Mha b) 100 Mha
   c) 113 Mha d) 125 Mha

6) Lift irrigation is flow _____.
   a) by gravity b) from lower level to higher level
   c) in delta region d) through sprinkler heads

7) The best method of applying water to sandy undulating area is _____.
   a) Free flooding b) Furrow method
   c) Subsurface irrigation d) Sprinkler irrigation

8) Rainfall mass cure is variation of _____.
   a) Rainfall intensity with time
   b) Rainfall intensity with cumulative rainfall
   c) Rainfall excess with time
   d) Cumulative rainfall with time

9) Flow duration cure is plot of _____.
   a) Accumulated flow against time
   b) Discharge against time in chronological order
   c) The base flow against the percentage of times the flow exceeded
   d) The stream discharge against the percentage of times the flow is equaled or exceeded

10) Which of the following formations neither contains water nor transmits it?
   a) Aquiclude
   b) Aquifer
   c) Aquifuge
   d) Aquitard

11) If e_w and e_a are the saturated vapour pressure of the water surface and air respectively, the Daltons law for evaporation EL in unit time is given by EL= _____.
   a) $(e_w - e_a)$
   b) $K\ e_w e_a$
   c) $K\ (e_w - e_a)$
   d) $K(e_w + e_a)$

12) Interception losses _____.
   a) Includes evaporation through flow and stream flow
   b) Consists only evaporation loss
   c) Includes evaporation and transpiration losses
   d) Consists only stream flow

13) The percentage of total quantity of fresh water in the world available in the liquid form _____.
   a) 30%
   b) 70%
   c) 11 %
   d) 51%

14) The dilution method of stream gauging is ideally suited for measuring discharge in _____.
   a) A large alluvial rivers
   b) Flood flow in mountain stream
   c) Steady flow in a small turbulent stream
   d) A stretch of river having heavy industrial pollution load

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 5:30 PM

Instructions: 1) Q. No. 3 and 8 compulsory. Attempt any two question out of Q.No.2,4, and 5 from Section I and Attempt any two question out of Q.No.6,7,and 9 from section II
2) Assume suitable data wherever necessary and mention it clearly**.**
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 A) Briefly discuss the factors affecting evaporation. What are the methods used to control evaporation from reservoir. **05**

B) A precipitation station 'X' was inoperative for some time during which a storm occurred. The storm totals at three stations A, B, C surrounding station 'X' were respectively 6.60, 4.80 & 3.70 cm. The normal annual precipitation amounts at stations X, A, B, & C are 65.60, 72.60, 51.80 & 38.20 cm respectively. Estimate the storm precipitation for station 'X'. **04**

Q.3 A) What is meant by runoff? Explain methods of separation of base flow. **05**

B) The ordinates of 3-hr unit hydrograph are given as below. Using this data derive the ordinates of 6-hr unit hydrograph for the same basin analytically. What is peak value of discharge in this unit hydrograph? **05**

Time in Hrs	0	3	6	9	12	15	18	21	24	27	30
Ordinates(m^3/sec)	0	10	25	20	16	12	9	7	5	3	0

Q.4 A) What is flood and discuss the various factors affecting flood? **04**

B) Estimate the stream flow for the measurement data as given. **05**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m/s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m/s)	0	0.2	0.3	0.35	0.4	0.45	0.4	0.5	0.4	0.2	0

Q.5 A) Enlist, classify and discuss in brief geological formation where round water occurs. **05**

B) A tube well of 30 cm diameter penetrates fully in an artesion aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters. **04**

Section – II

Q.6 **A)** Write a detailed note on "National Perspective Plan" of National Water Development Academy for inter-basin transfer of water in India. **04**

B) The following data pertains to the healthy growth of a crop. **05**

i) Field capacity of soil = 30%
ii) Permanent Wilting point = 11%
iii) Density of soil = 1300 kg/m^3
iv) Effective depth of root zone = 700mm
v) Daily consumptive use of water = 12mm

For healthy growth, moisture content must not fall below 25% of the water holding capacity and the permanent wilting point. Determine the watering interval in days.

Q.7 **A)** Define the following terms: **05**

i) Gross command area
ii) Crop period and base period
iii) Capacity factor
iv) Kor- watering and Kor-depth

B) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given in the following table. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **04**

Crop	Base period (days)	Duty at field (ha/cumec)	Area under the crop (ha)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

Q.8 **A)** Classify Indian soils according to their origin and their suitability for various crops. **04**

B) Discuss economic feasibility of Lift irrigation schemes. Compare lift irrigation and canal irrigation from various aspects. **06**

Q.9 **A)** Write a short note on - Kolhapur type Weir **05**

B) Discuss various methods of assessment of irrigation water. Discuss in specific the shortcomings of volumetric assessment methods. **04**

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 02:30 PM To 5:30 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Interception losses _____.
   a) Includes evaporation through flow and stream flow
   b) Consists only evaporation loss
   c) Includes evaporation and transpiration losses
   d) Consists only stream flow

2) The percentage of total quantity of fresh water in the world available in the liquid form _____.
   a) 30% b) 70%
   c) 11 % d) 51%

3) The dilution method of stream gauging is ideally suited for measuring discharge in _____.
   a) A large alluvial rivers
   b) Flood flow in mountain stream
   c) Steady flow in a small turbulent stream
   d) A stretch of river having heavy industrial pollution load

4) The most economical method of soil conservation is to _____.
   a) construct check dams b) construct contour bunds
   c) Drain the soil d) Aforest the soil

5) Consumptive use of water for a crop represents _____.
   a) Transpiration needs of the crop
   b) Evaporation needs of the cropped area
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   d) None of the above

6) The method of growing crops on ridges, running on the sides of water ditches is known as _____.
   a) Flood irrigation b) Furrow irrigation
   c) Check irrigation d) None of them

7) If the depth is 8.64cm on a field over a base period of 10 days, then the duty is _____.
   a) 10 ha/cumec b) 100 ha/cumec
   c) 864 ha/cumec d) 1000 ha/cumec

8) Irrigation potential of the country is about _____.
   a) 87 Mha b) 100 Mha
   c) 113 Mha d) 125 Mha

9) Lift irrigation is flow _____.
   a) by gravity b) from lower level to higher level
   c) in delta region d) through sprinkler heads

10) The best method of applying water to sandy undulating area is _____.
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11) Rainfall mass cure is variation of _____.
   a) Rainfall intensity with time
   b) Rainfall intensity with cumulative rainfall
   c) Rainfall excess with time
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12) Flow duration cure is plot of _____.
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   b) Discharge against time in chronological order
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13) Which of the following formations neither contains water nor transmits it?
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14) If e_w and e_a are the saturated vapour pressure of the water surface and air respectively, the Daltons law for evaporation EL in unit time is given by EL= _____.
   a) $(e_w - e_a)$ b) $K\ e_w e_a$
   c) $K\ (e_w - e_a)$ d) $K(e_w + e_a)$

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 5:30 PM

Instructions: 1) Q. No. 3 and 8 compulsory. Attempt any two question out of Q.No.2,4, and 5 from Section I and Attempt any two question out of Q.No.6,7,and 9 from section II
2) Assume suitable data wherever necessary and mention it clearly**.**
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 A) Briefly discuss the factors affecting evaporation. What are the methods used to control evaporation from reservoir. **05**

B) A precipitation station 'X' was inoperative for some time during which a storm occurred. The storm totals at three stations A, B, C surrounding station 'X' were respectively 6.60, 4.80 & 3.70 cm. The normal annual precipitation amounts at stations X, A, B, & C are 65.60, 72.60, 51.80 & 38.20 cm respectively. Estimate the storm precipitation for station 'X'. **04**

Q.3 A) What is meant by runoff? Explain methods of separation of base flow. **05**

B) The ordinates of 3-hr unit hydrograph are given as below. Using this data derive the ordinates of 6-hr unit hydrograph for the same basin analytically. What is peak value of discharge in this unit hydrograph? **05**

Time in Hrs	0	3	6	9	12	15	18	21	24	27	30
Ordinates(m^3/sec)	0	10	25	20	16	12	9	7	5	3	0

Q.4 A) What is flood and discuss the various factors affecting flood? **04**

B) Estimate the stream flow for the measurement data as given. **05**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m/s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m/s)	0	0.2	0.3	0.35	0.4	0.45	0.4	0.5	0.4	0.2	0

Q.5 A) Enlist, classify and discuss in brief geological formation where round water occurs. **05**

B) A tube well of 30 cm diameter penetrates fully in an artesion aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters. **04**

Section – II

Q.6 A) Write a detailed note on "National Perspective Plan" of National Water Development Academy for inter-basin transfer of water in India. **04**

B) The following data pertains to the healthy growth of a crop. **05**

i) Field capacity of soil = 30%
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Q.7 A) Define the following terms: **05**

i) Gross command area
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Q.8 A) Classify Indian soils according to their origin and their suitability for various crops. **04**

B) Discuss economic feasibility of Lift irrigation schemes. Compare lift irrigation and canal irrigation from various aspects. **06**

Q.9 A) Write a short note on - Kolhapur type Weir **05**

B) Discuss various methods of assessment of irrigation water. Discuss in specific the shortcomings of volumetric assessment methods. **04**

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 70
Time: 02:30 PM To 5:30 PM

Instructions: 1) Assume suitable data if necessary but mention it clearly**.**
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The method of growing crops on ridges, running on the sides of water ditches is known as _____.
   a) Flood irrigation b) Furrow irrigation
   c) Check irrigation d) None of them

2) If the depth is 8.64cm on a field over a base period of 10 days, then the duty is _____.
   a) 10 ha/cumec b) 100 ha/cumec
   c) 864 ha/cumec d) 1000 ha/cumec

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   a) 87 Mha b) 100 Mha
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   a) Free flooding b) Furrow method
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6) Rainfall mass cure is variation of _____.
   a) Rainfall intensity with time
   b) Rainfall intensity with cumulative rainfall
   c) Rainfall excess with time
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   a) Accumulated flow against time
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   c) The base flow against the percentage of times the flow exceeded
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12) The dilution method of stream gauging is ideally suited for measuring discharge in _____.
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Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – I

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 5:30 PM

Instructions: 1) Q. No. 3 and 8 compulsory. Attempt any two question out of Q.No.2,4, and 5 from Section I and Attempt any two question out of Q.No.6,7,and 9 from section II
2) Assume suitable data wherever necessary and mention it clearly**.**
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

Section – I

Q.2 A) Briefly discuss the factors affecting evaporation. What are the methods used to control evaporation from reservoir. **05**

B) A precipitation station 'X' was inoperative for some time during which a storm occurred. The storm totals at three stations A, B, C surrounding station 'X' were respectively 6.60, 4.80 & 3.70 cm. The normal annual precipitation amounts at stations X, A, B, & C are 65.60, 72.60, 51.80 & 38.20 cm respectively. Estimate the storm precipitation for station 'X'. **04**

Q.3 A) What is meant by runoff? Explain methods of separation of base flow. **05**

B) The ordinates of 3-hr unit hydrograph are given as below. Using this data derive the ordinates of 6-hr unit hydrograph for the same basin analytically. What is peak value of discharge in this unit hydrograph? **05**

Time in Hrs	0	3	6	9	12	15	18	21	24	27	30
Ordinates(m^3/sec)	0	10	25	20	16	12	9	7	5	3	0

Q.4 A) What is flood and discuss the various factors affecting flood? **04**

B) Estimate the stream flow for the measurement data as given. **05**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m/s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m/s)	0	0.2	0.3	0.35	0.4	0.45	0.4	0.5	0.4	0.2	0

Q.5 A) Enlist, classify and discuss in brief geological formation where round water occurs. **05**

B) A tube well of 30 cm diameter penetrates fully in an artesion aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters. **04**

Section – II

Q.6 A) Write a detailed note on "National Perspective Plan" of National Water Development Academy for inter-basin transfer of water in India. **04**

B) The following data pertains to the healthy growth of a crop. **05**

i) Field capacity of soil = 30%
ii) Permanent Wilting point = 11%
iii) Density of soil = 1300 kg/m^3
iv) Effective depth of root zone = 700mm
v) Daily consumptive use of water = 12mm

For healthy growth, moisture content must not fall below 25% of the water holding capacity and the permanent wilting point. Determine the watering interval in days.

Q.7 A) Define the following terms: **05**

i) Gross command area
ii) Crop period and base period
iii) Capacity factor
iv) Kor- watering and Kor-depth

B) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given in the following table. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **04**

Crop	Base period (days)	Duty at field (ha/cumec)	Area under the crop (ha)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

Q.8 A) Classify Indian soils according to their origin and their suitability for various crops. **04**

B) Discuss economic feasibility of Lift irrigation schemes. Compare lift irrigation and canal irrigation from various aspects. **06**

Q.9 A) Write a short note on - Kolhapur type Weir **05**

B) Discuss various methods of assessment of irrigation water. Discuss in specific the shortcomings of volumetric assessment methods. **04**

SLR-FM-631

Seat No.	

Set P

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday, 28-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book.
2) Use of calculator is allowed.
3) Figures to the right indicate full marks.s

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the answers. 14

1) $L^{-1}\left\{\frac{1}{(s+100)^2}\right\} =$ _____.

a) $e^{-100t}t$ b) $e^{100t}t$
c) $\frac{e^{-100t}}{t}$ d) $\frac{e^{100t}}{t}$

2) The value of the integral $\int_0^\infty e^{-3t}\ t\sin t\,dt$ is _____.

a) $\frac{1}{50}$ b) $\frac{2}{55}$
c) $\frac{3}{50}$ d) $\frac{4}{55}$

3) The solution of $q = e^{-p/m}$ is _____.

a) $z = ax + e^{a/m}y + c$
b) $z = ax + e^{-a/m}y + c$
c) $z = ax + e^{-m/a}y + c$
d) $z = ax + e^{m/a}y + c$

4) The solution of $yzp + zxq = xy$ is _____.

a) $\phi[x^2 + y^2, y^2 + z^2] = 0$ b) $\phi[x^3 + y^3, y^3 + z^3] = 0$
c) $\phi[x^2 - y^2, y^2 - z^2] = 0$ d) None of these

5) The general solution of $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 0$ is _____.

a) $y = c_1 + e^x$ b) $y = c_1 + c_2x^2$
c) $y = c_1x + c_2$ d) $y = c_1 + c_2\log x$

6) The particular integral of $\frac{d^4y}{dx^4} - a^4y = \sin ax$ is _____.

a) $\frac{x\sin ax}{4a^3}$ b) $\frac{x\cos ax}{4a^3}$
c) $\frac{-x\sin ax}{4a^3}$ d) $\frac{-x\cos ax}{4a^3}$

7) The complementary function of $(D^3 - D^2 - 6D)y = x^2 + 1$ is _____.
   a) $y_c = c_1 + c_2e^{-2x} + c_3e^{-3x}$ b) $y_c = c_1x + c_2e^{-2x} + c_3e^{-3x}$
   c) $y_c = c_1 + c_2e^{2x} + c_3e^{3x}$ d) None of these

8) If $\bar{F} = (x + 3y)i + (y - 2z)j + (x + az)k$ is Solenoidal then $a =$.
   a) 0 b) 1
   c) 2 d) -2

9) If $\bar{r} = xi + yj + zk \; and \; \bar{a}$ is a constant vector then $\nabla(\bar{a}.\bar{r}) =$ _____.
   a) $\bar{a}$ b) $2\bar{a}$
   c) $\bar{r}$ d) r

10) Fourier expansion of _____.
    $f(x) = \begin{matrix} -x & -2 \le x \le 0 \\ x & 0 \le x \le 2 \end{matrix}$ in the interval [-2, 2] has _____.
    a) no cosine terms b) no sine terms
    c) Both sine and cosine terms d) none of these

11) In the interval $[0, \pi]$ the constant term in the cosine series of $f(x) = x$ is _____.
    a) π b) 0
    c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

12) The value of coefficient of correlation r lies between _____.
    a) 0 and 1 b) 1 and 2
    c) -1 and 1 d) -1 and 0

13) If mean of x is 3 and mean of y is -1, the regression coefficient of y on x is 3 then the line of regression of y on x is _____.
    a) $3x - y = 10$ b) $x + 3y = 10$
    c) $x - 3y = 6$ d) $3x - y = 70$

14) The variance for a binomial distribution is _____.
    a) np b) $\sqrt{np}$
    c) npq d) $\sqrt{npq}$

Seat No.		Set	P

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday, 28-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 and Q.9 is compulsory.
1) Attempt any two questions from the remaining questions of each section.
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Section – I

Q.2 **a)** Solve $(D^2+g)y = e^x - \cos 2x$. **03**

b) Solve $(D^2-2D+1)y = \frac{3e^x}{x^2}$ **03**

c) Solve $(D^2+3D+2)y = e^{ex}$ **04**

OR

c) Solve $(D^2+a^2)y = x\sin ax$ **04**

Q.3 **a)** Solve $(x^2D^2-3xD+1)y = \frac{\sin(log\ x)+1}{x}$ **04**

b) The differential equation of a beam uniformly loaded with one end fixed and second subjected to a compressive force is given by. **05**

$EI\frac{d^2y}{dx^2} + Py = -\frac{1}{2}Wx^2$ where E, P, I and W are constants. If $y = 0$ and $\frac{dy}{dx} = 0$ at $x = 0$, prove that

$y = -\frac{W}{Pn^2}\cos nx - \frac{W}{2P}(x^2 - \frac{2}{n^2})$

Where $n^2 = \frac{P}{EI}$

Q.4 **a)** Solve $p^2 - q^2 = zp$ **03**

b) Solve $\left(\frac{1}{z}-\frac{1}{y}\right)p + \left(\frac{1}{x}-\frac{1}{z}\right)q = \left(\frac{1}{y}-\frac{1}{x}\right)$ **03**

c) Solve the following differential equation **03**

$\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ by the method of separation of variables.

Q.5 **Attempt any three** **09**

a) Find inverse Laplace transform of the following by convolution theorem.

$\frac{1}{(s+3)(s-1)}$

b) Find $L^{-1}\left\{\frac{s+2}{s^2-4s+13}\right\}$

c) Find $L\left\{\frac{1}{t}(e^{-3t}\sin 2t)\right\}$

d) Using Laplace transform solve the following differential equation with the given conditions.

$\frac{d^2y}{dx^2} + 2\frac{dy}{dx} - 3y = 0$ at $x = 0, y = 0, \frac{dy}{dx} = 4$

Section - II

Q.6 **a)** Find the Fourier series expansion of **05**

$f(x) = x + \frac{x^2}{4}, -\pi < x < \pi$

b) Find half-range cosine series for **04**

$$f(x) = kx \qquad 0 \le x \le l/2$$
$$= k(l-x) \quad l/2 \le x \le l$$

OR

b) Find the Fourier series expansion of **04**

$$f(x) = x^2 - 2, \quad -2 \le x \le 2$$

Q.7 **a)** Find the angle between the tangents to the curve **03**
$\overline{r} = t^2 i + 2tj - t^3 k$ at the points $t = \pm 1$

b) Find the Divergence and Curl of the vector. **03**
$\overline{v} = (xyz)i + (3x^2 y)j + (xz^2 - y^2 z)k$ at the point $(2, -1, 1)$

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Q.8 **a)** Fit a Straight line to the following data. **03**

x:	0	1	2	3	4
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b) The probabilities of a Poisson variate taking the values 3 and 4 are equal. **03**
Calculate the probabilities of the variable taking the values 0 and 2.

c) A random variable X has the following function. **03**

x :	0	1	2	3	4	5	6	7
$P(x)$:	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

1) Find K
2) Evaluate $P(X < 6), P(3 < X \le 6)$

Q.9 **a)** The mean yield per plot of a crop is 17kg and standard deviation is 3kg. If the distribution of yield per plot is normal, find the percentage of plots given yields. **05**

1) Between 15.5 kg and 20 kg
2) More than 20 kg

[Given for S.N.V.Z area from $z = 0$ & 0.5 is 0.1915 and that from $z = 0$ & $z = 1$ is 0.3413]

b) In a partially destroyed laboratory record of an analysis of a correlation data, the following results are only eligible variance of $x = 9$. **05**
Regression equations: $8x - 10y + 66 = 0$, $40x - 18y = 214$
What were:

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Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday, 28-11-2019 Max. Marks: 70
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Seat No.	

Set **Q**

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Civil Engineering
ENGINEERING MATHEMATICS – III

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b) Find the Fourier series expansion of **04**

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Calculate the probabilities of the variable taking the values 0 and 2.

c) A random variable X has the following function. **03**

x :	0	1	2	3	4	5	6	7
$P(x)$:	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

1) Find K
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[Given for S.N.V.Z area from $z = 0$ & 0.5 is 0.1915 and that from $z = 0$ & $z = 1$ is 0.3413]

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Seat No.	

Set **R**

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Civil Engineering
ENGINEERING MATHEMATICS – III

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Duration: 30 Minutes Marks: 14

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2) The particular integral of $\frac{d^4y}{dx^4}-a^4y=\sin ax$ is _____.
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   c) $\frac{-x\sin ax}{4a^3}$ d) $\frac{-x\cos ax}{4a^3}$

3) The complementary function of $(D^3-D^2-6D)y=x^2+1$ is _____.
   a) $y_c=c_1+c_2e^{-2x}+c_3e^{-3x}$ b) $y_c=c_1x+c_2e^{-2x}+c_3e^{-3x}$
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4) If $\bar{F}=(x+3y)i+(y-2z)j+(x+az)k$ is Solenoidal then $a=$.
   a) 0 b) 1
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5) If $\bar{r}=xi+yj+zk\ and\ \bar{a}$ is a constant vector then $\nabla(\bar{a}.\bar{r})=$ _____.
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   $f(x)=\begin{matrix}-x & -2\le x\le 0\\ x & 0\le x\le 2\end{matrix}$ in the interval [-2, 2] has _____.
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Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday, 28-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 and Q.9 is compulsory.
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Section – I

Q.2 **a)** Solve $(D^2+g)y = e^x - \cos 2x$. **03**

b) Solve $(D^2-2D+1)y = \frac{3e^x}{x^2}$ **03**

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Q.3 **a)** Solve $(x^2D^2-3xD+1)y = \frac{\sin(log\ x)+1}{x}$ **04**

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$y = -\frac{W}{Pn^2}\cos nx - \frac{W}{2P}(x^2 - \frac{2}{n^2})$

Where $n^2 = \frac{P}{EI}$

Q.4 **a)** Solve $p^2 - q^2 = zp$ **03**

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c) Solve the following differential equation **03**

$\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ by the method of separation of variables.

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a) Find inverse Laplace transform of the following by convolution theorem.

$\frac{1}{(s+3)(s-1)}$

b) Find $L^{-1}\left\{\frac{s+2}{s^2-4s+13}\right\}$

c) Find $L\left\{\frac{1}{t}(e^{-3t}\sin 2t)\right\}$

d) Using Laplace transform solve the following differential equation with the given conditions.

$\frac{d^2y}{dx^2} + 2\frac{dy}{dx} - 3y = 0$ at $x = 0, y = 0, \frac{dy}{dx} = 4$

Section - II

Q.6 **a)** Find the Fourier series expansion of **05**

$f(x) = x + \frac{x^2}{4}, -\pi < x < \pi$

b) Find half-range cosine series for **04**

$$f(x) = kx \qquad 0 \le x \le l/2$$
$$= k(l-x) \quad l/2 \le x \le l$$

OR

b) Find the Fourier series expansion of **04**

$$f(x) = x^2 - 2, \quad -2 \le x \le 2$$

Q.7 **a)** Find the angle between the tangents to the curve **03**
$\overline{r} = t^2 i + 2tj - t^3 k$ at the points $t = \pm 1$

b) Find the Divergence and Curl of the vector. **03**
$\overline{v} = (xyz)i + (3x^2 y)j + (xz^2 - y^2 z)k$ at the point $(2, -1, 1)$

c) If $\overline{r} = xi + yj + zk$, prove that $\frac{\overline{r}}{r^3}$ is Solenoidal. **03**

Q.8 **a)** Fit a Straight line to the following data. **03**

x:	0	1	2	3	4
y:	1	2.9	4.8	6.7	8.6

b) The probabilities of a Poisson variate taking the values 3 and 4 are equal. **03**
Calculate the probabilities of the variable taking the values 0 and 2.

c) A random variable X has the following function. **03**

x :	0	1	2	3	4	5	6	7
$P(x)$:	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

1) Find K
2) Evaluate $P(X < 6), P(3 < X \le 6)$

Q.9 **a)** The mean yield per plot of a crop is 17kg and standard deviation is 3kg. If the distribution of yield per plot is normal, find the percentage of plots given yields. **05**
1) Between 15.5 kg and 20 kg
2) More than 20 kg

[Given for S.N.V.Z area from $z = 0$ & 0.5 is 0.1915 and that from $z = 0$ & $z = 1$ is 0.3413]

b) In a partially destroyed laboratory record of an analysis of a correlation data, the following results are only eligible variance of $x = 9$. **05**
Regression equations: $8x - 10y + 66 = 0$, $40x - 18y = 214$
What were:
1) The mean values of x and y
2) The standard deviation of y
3) Correlation of coefficient between x and y

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday, 28-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book.
2) Use of calculator is allowed.
3) Figures to the right indicate full marks.s

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the answers. 14

1) Fourier expansion of _____.
$f(x) = \begin{matrix} -x & -2 \le x \le 0 \\ x & 0 \le x \le 2 \end{matrix}$ in the interval [-2, 2] has _____.
a) no cosine terms b) no sine terms
c) Both sine and cosine terms d) none of these

2) In the interval $[0, \pi]$ the constant term in the cosine series of $f(x) = x$ is _____.
a) π b) 0
c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

3) The value of coefficient of correlation r lies between _____.
a) 0 and 1 b) 1 and 2
c) -1 and 1 d) -1 and 0

4) If mean of x is 3 and mean of y is -1, the regression coefficient of y on x is 3 then the line of regression of y on x is _____.
a) $3x - y = 10$ b) $x + 3y = 10$
c) $x - 3y = 6$ d) $3x - y = 70$

5) The variance for a binomial distribution is _____.
a) np b) $\sqrt{np}$
c) npq d) $\sqrt{npq}$

6) $L^{-1}\left\{\frac{1}{(s+100)^2}\right\} =$ _____.
a) $e^{-100t}t$ b) $e^{100t}t$
c) $\frac{e^{-100t}}{t}$ d) $\frac{e^{100t}}{t}$

7) The value of the integral $\int_0^\infty e^{-3t}\ t \sin t\, dt$ is _____.
a) $\frac{1}{50}$ b) $\frac{2}{55}$
c) $\frac{3}{50}$ d) $\frac{4}{55}$

8) The solution of $q = e^{-p/m}$ is _____.
   a) $z = ax + e^{a/m}y + c$
   b) $z = ax + e^{-a/m}y + c$
   c) $z = ax + e^{-m/a}y + c$
   d) $z = ax + e^{m/a}y + c$

9) The solution of $yzp + zxq = xy$ is _____.
   a) $\phi[x^2 + y^2, y^2 + z^2] = 0$
   b) $\phi[x^3 + y^3, y^3 + z^3] = 0$
   c) $\phi[x^2 - y^2, y^2 - z^2] = 0$
   d) None of these

10) The general solution of $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 0$ is _____.
   a) $y = c_1 + e^x$
   b) $y = c_1 + c_2x^2$
   c) $y = c_1x + c_2$
   d) $y = c_1 + c_2\log x$

11) The particular integral of $\frac{d^4y}{dx^4} - a^4y = \sin ax$ is _____.
   a) $\frac{x\sin ax}{4a^3}$
   b) $\frac{x\cos ax}{4a^3}$
   c) $\frac{-x\sin ax}{4a^3}$
   d) $\frac{-x\cos ax}{4a^3}$

12) The complementary function of $(D^3 - D^2 - 6D)y = x^2 + 1$ is _____.
   a) $y_c = c_1 + c_2e^{-2x} + c_3e^{-3x}$
   b) $y_c = c_1x + c_2e^{-2x} + c_3e^{-3x}$
   c) $y_c = c_1 + c_2e^{2x} + c_3e^{3x}$
   d) None of these

13) If $\bar{F} = (x + 3y)i + (y - 2z)j + (x + az)k$ is Solenoidal then $a =$.
   a) 0
   b) 1
   c) 2
   d) -2

14) If $\bar{r} = xi + yj + zk\ and\ \bar{a}$ is a constant vector then $\nabla(\bar{a}.\bar{r}) =$ _____.
   a) $\bar{a}$
   b) $2\bar{a}$
   c) $\bar{r}$
   d) r

Seat No.		Set	S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Thursday, 28-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.2 and Q.9 is compulsory.
1) Attempt any two questions from the remaining questions of each section.
2) Figures to the right indicate full marks.
3) Use of calculator is allowed.

Section – I

Q.2 **a)** Solve $(D^2+g)y = e^x - \cos 2x$. **03**

b) Solve $(D^2-2D+1)y = \frac{3e^x}{x^2}$ **03**

c) Solve $(D^2+3D+2)y = e^{ex}$ **04**

OR

c) Solve $(D^2+a^2)y = x\sin ax$ **04**

Q.3 **a)** Solve $(x^2D^2-3xD+1)y = \frac{\sin(log\ x)+1}{x}$ **04**

b) The differential equation of a beam uniformly loaded with one end fixed and second subjected to a compressive force is given by. **05**

$EI\frac{d^2y}{dx^2} + Py = -\frac{1}{2}Wx^2$ where E, P, I and W are constants. If $y = 0$ and $\frac{dy}{dx} = 0$ at $x = 0$, prove that

$y = -\frac{W}{Pn^2}\cos nx - \frac{W}{2P}(x^2 - \frac{2}{n^2})$

Where $n^2 = \frac{P}{EI}$

Q.4 **a)** Solve $p^2 - q^2 = zp$ **03**

b) Solve $\left(\frac{1}{z}-\frac{1}{y}\right)p + \left(\frac{1}{x}-\frac{1}{z}\right)q = \left(\frac{1}{y}-\frac{1}{x}\right)$ **03**

c) Solve the following differential equation **03**

$\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ by the method of separation of variables.

Q.5 **Attempt any three** **09**

a) Find inverse Laplace transform of the following by convolution theorem.

$\frac{1}{(s+3)(s-1)}$

b) Find $L^{-1}\left\{\frac{s+2}{s^2-4s+13}\right\}$

c) Find $L\left\{\frac{1}{t}(e^{-3t}\sin 2t)\right\}$

d) Using Laplace transform solve the following differential equation with the given conditions.

$\frac{d^2y}{dx^2} + 2\frac{dy}{dx} - 3y = 0$ at $x = 0, y = 0, \frac{dy}{dx} = 4$

Section - II

Q.6 **a)** Find the Fourier series expansion of **05**

$f(x) = x + \frac{x^2}{4}, -\pi < x < \pi$

b) Find half-range cosine series for **04**

$$f(x) = kx \qquad 0 \le x \le l/2$$
$$= k(l-x) \quad l/2 \le x \le l$$

OR

b) Find the Fourier series expansion of **04**

$$f(x) = x^2 - 2, \quad -2 \le x \le 2$$

Q.7 **a)** Find the angle between the tangents to the curve **03**
$\overline{r} = t^2 i + 2tj - t^3 k$ at the points $t = \pm 1$

b) Find the Divergence and Curl of the vector. **03**
$\overline{v} = (xyz)i + (3x^2 y)j + (xz^2 - y^2 z)k$ at the point $(2, -1, 1)$

c) If $\overline{r} = xi + yj + zk$, prove that $\frac{\overline{r}}{r^3}$ is Solenoidal. **03**

Q.8 **a)** Fit a Straight line to the following data. **03**

x:	0	1	2	3	4
y:	1	2.9	4.8	6.7	8.6

b) The probabilities of a Poisson variate taking the values 3 and 4 are equal. **03**
Calculate the probabilities of the variable taking the values 0 and 2.

c) A random variable X has the following function. **03**

x :	0	1	2	3	4	5	6	7
$P(x)$:	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

1) Find K
2) Evaluate $P(X < 6), P(3 < X \le 6)$

Q.9 **a)** The mean yield per plot of a crop is 17kg and standard deviation is 3kg. If the distribution of yield per plot is normal, find the percentage of plots given yields. **05**

1) Between 15.5 kg and 20 kg
2) More than 20 kg

[Given for S.N.V.Z area from $z = 0$ & 0.5 is 0.1915 and that from $z = 0$ & $z = 1$ is 0.3413]

b) In a partially destroyed laboratory record of an analysis of a correlation data, the following results are only eligible variance of $x = 9$. **05**
Regression equations: $8x - 10y + 66 = 0$, $40x - 18y = 214$
What were:

1) The mean values of x and y
2) The standard deviation of y
3) Correlation of coefficient between x and y

Seat No.	

Set **P**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
3) Use of scientific non programmable calculator is allowed.
4) Figures to the right indicate full marks.
5) Assume suitable data if necessary and mention it clearly before the Solution.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The collapse load for a cantilever beam of span l subjected to uniformly distributed load is _____.
   a) 0.414 Mp/l b) 7.67 Mp/l
   c) 11.656 Mp/l d) none of the above

2) The thickness of base plate s determined from the _____.
   a) flexural strength of the plate
   b) shear strength of plate
   c) bearing strength of concrete pedestal
   d) punching criteria

3) The best arrangement to provide unified behavior in built up steel column is by _____.
   a) lacing b) battening
   c) tie plates d) perforated cover plates

4) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability respectively _____.
   a) 1 and 1.5 b) 1.2 and 1.0
   c) 1.0 and 1.0 d) 1.2 and 1.5

5) The economical spacing of a roof truss depends upon the _____.
   a) cost of purlin and cost of roof covering
   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

6) A gusset plate is subjected to _____.
   a) direct stress b) shear stress
   c) bending stress d) all of the above

7) A beam section is selected and provided on the basis of _____.
   a) section modulus b) deflection
   c) shear d) all of the above

8) The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to _____.
   a) Lo/10 b) Lo/15
   c) Lo/20 d) Lo

9) Battening is preferred when the _____.
   a) column carries axial load only
   b) space between two main components is not very large
   c) both a & b
   d) none of the above

10) The thickness of double flat lacing should not be less than _____.
   a) $1/30^{th}$ length between inner rivets
   b) $1/40^{th}$ length between inner rivets
   c) $1/50^{th}$ length between inner rivets
   d) $1/60^{th}$ length between inner rivets

11) The number of possible plastic hinges for a propped cantilever beam is _____.
   a) 2 b) 1
   c) 3 d) zero

12) The length of the plastic hinge for a simply supported beam of span L subjected to a central point load is of rectangular section.
   a) L/3 b) 2L/3
   c) L/2 d) none of the above

13) Design of beam is governed by shear _____.
   a) When the depth of the beam section is small
   b) when the large concentrated loads are placed near beam supports
   c) both a & b
   d) none of the above is correct

14) The thickness of battens flat should not be less than _____.
   a) $1/30^{th}$ length between inner line of rivets
   b) $1/40^{th}$ length between inner line of rivets
   c) $1/50^{th}$ length between inner line of rivets
   d) $1/60^{th}$ length between inner line of rivets

Seat No.	

Set **P**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 4 is compulsory and attempt any two from Section – I.
2) Q. No. 7 is compulsory and attempt any two from Section – II.
3) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
4) Use of scientific non programmable calculator is allowed.
5) Figures to the right indicate full marks.
6) Assume suitable data if necessary and mention it clearly before the Solution.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Determine the tensile strength of an ISMC 175 when it is connected to gusset plate through the two flanges by two rows of 16mm bolts with a connection length of 200 mm. **09**

Q.3 Design single angle section to carry a axial compression of 90KN. The centre to centre distance between end connection is 2.1m. Assume end connection is done by at least two bolts. Design end connection also. **09**

Q.4 Design a built up column with channel back to back to carry an axial factored load of 2100KN. The column has unsupported length of 7m and is effectively held in position at both ends but restrained against rotation at one end only. Design the suitable lacing system for the same. **10**

Q.5 **Attempt the following.** **09**
a) Salient features of limit state method of design of steel structures.
b) Advantages and disadvantages of welded connection over bolted connection.
c) Behaviour of bolted joints.

Section – II

Q.6 A fixed beam of 6m carries a uniformly distributed load of 60 KN/m on right hand 4.5m. The load factor is 1.15, yield stress is 23.2 KN/m^2, calculate the section modulus of the beam and locate the position of plastic hinges. **09**

Q.7 Design steel beam section for supporting roof of a big hall for the following data and apply the usual checks. Assume steel grade Fe410. **10**

Clear span = 6.5m
End bearing = 150mm
c/c spacing of beams = 3m
Imposed load on beam = 10 KN/m^2
Dead load = 4 KN/m^2
Restriction on beam depth 375mm

The compression flange of the beam is laterally supported throughout.

Q.8 Design I section purlin to support galvanized corrugated iron sheet roof. The purlins are 1.25 m apart over roof trusses spaced 5m centre to centre. The roof surface has inclination of 30° to the horizontal. The weight of corrugated iron sheet is 0.133KN/m^2, the weight of fixtures is 0.05KN/m^2. The design wind pressure for medium permeability is 1.25KN/m^2(outward) parallel to the ridge. **09**

Q.9 Design gusseted base for built up column consisting of 2nos ISMB 400 at a c/c distance of 300mm. It carries axial load of 1200KN. Use M20 grade of concrete for pedestal. **09**

Seat No.	

Set **Q**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
3) Use of scientific non programmable calculator is allowed.
4) Figures to the right indicate full marks.
5) Assume suitable data if necessary and mention it clearly before the Solution.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to _____.
   a) Lo/10 b) Lo/15
   c) Lo/20 d) Lo

2) Battening is preferred when the _____.
   a) column carries axial load only
   b) space between two main components is not very large
   c) both a & b
   d) none of the above

3) The thickness of double flat lacing should not be less than _____.
   a) $1/30^{th}$ length between inner rivets
   b) $1/40^{th}$ length between inner rivets
   c) $1/50^{th}$ length between inner rivets
   d) $1/60^{th}$ length between inner rivets

4) The number of possible plastic hinges for a propped cantilever beam is _____.
   a) 2 b) 1
   c) 3 d) zero

5) The length of the plastic hinge for a simply supported beam of span L subjected to a central point load is of rectangular section.
   a) L/3 b) 2L/3
   c) L/2 d) none of the above

6) Design of beam is governed by shear _____.
   a) When the depth of the beam section is small
   b) when the large concentrated loads are placed near beam supports
   c) both a & b
   d) none of the above is correct

7) The thickness of battens flat should not be less than _____.
   a) $1/30^{th}$ length between inner line of rivets
   b) $1/40^{th}$ length between inner line of rivets
   c) $1/50^{th}$ length between inner line of rivets
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8) The collapse load for a cantilever beam of span l subjected to uniformly distributed load is _____.
   a) 0.414 Mp/l
   b) 7.67 Mp/l
   c) 11.656 Mp/l
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   a) flexural strength of the plate
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   c) bearing strength of concrete pedestal
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10) The best arrangement to provide unified behavior in built up steel column is by _____.
   a) lacing
   b) battening
   c) tie plates
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11) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability respectively _____.
   a) 1 and 1.5
   b) 1.2 and 1.0
   c) 1.0 and 1.0
   d) 1.2 and 1.5

12) The economical spacing of a roof truss depends upon the _____.
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   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

13) A gusset plate is subjected to _____.
   a) direct stress
   b) shear stress
   c) bending stress
   d) all of the above

14) A beam section is selected and provided on the basis of _____.
   a) section modulus
   b) deflection
   c) shear
   d) all of the above

Seat No.	

Set **Q**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 4 is compulsory and attempt any two from Section – I.
2) Q. No. 7 is compulsory and attempt any two from Section – II.
3) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
4) Use of scientific non programmable calculator is allowed.
5) Figures to the right indicate full marks.
6) Assume suitable data if necessary and mention it clearly before the Solution.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Determine the tensile strength of an ISMC 175 when it is connected to gusset plate through the two flanges by two rows of 16mm bolts with a connection length of 200 mm. **09**

Q.3 Design single angle section to carry a axial compression of 90KN. The centre to centre distance between end connection is 2.1m. Assume end connection is done by at least two bolts. Design end connection also. **09**

Q.4 Design a built up column with channel back to back to carry an axial factored load of 2100KN. The column has unsupported length of 7m and is effectively held in position at both ends but restrained against rotation at one end only. Design the suitable lacing system for the same. **10**

Q.5 **Attempt the following.** **09**
a) Salient features of limit state method of design of steel structures.
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Section – II

Q.6 A fixed beam of 6m carries a uniformly distributed load of 60 KN/m on right hand 4.5m. The load factor is 1.15, yield stress is 23.2 KN/m^2, calculate the section modulus of the beam and locate the position of plastic hinges. **09**

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Q.9 Design gusseted base for built up column consisting of 2nos ISMB 400 at a c/c distance of 300mm. It carries axial load of 1200KN. Use M20 grade of concrete for pedestal. **09**

Seat No.	

Set **R**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
3) Use of scientific non programmable calculator is allowed.
4) Figures to the right indicate full marks.
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6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The economical spacing of a roof truss depends upon the _____.
   a) cost of purlin and cost of roof covering
   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

2) A gusset plate is subjected to _____.
   a) direct stress b) shear stress
   c) bending stress d) all of the above

3) A beam section is selected and provided on the basis of _____.
   a) section modulus b) deflection
   c) shear d) all of the above

4) The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to _____.
   a) Lo/10 b) Lo/15
   c) Lo/20 d) Lo

5) Battening is preferred when the _____.
   a) column carries axial load only
   b) space between two main components is not very large
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   d) none of the above

6) The thickness of double flat lacing should not be less than _____.
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   c) $1/50^{th}$ length between inner rivets
   d) $1/60^{th}$ length between inner rivets

7) The number of possible plastic hinges for a propped cantilever beam is _____.
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8) The length of the plastic hinge for a simply supported beam of span L subjected to a central point load is of rectangular section.
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   c) $1/50^{th}$ length between inner line of rivets
   d) $1/60^{th}$ length between inner line of rivets

11) The collapse load for a cantilever beam of span l subjected to uniformly distributed load is _____.
   a) 0.414 Mp/l
   b) 7.67 Mp/l
   c) 11.656 Mp/l
   d) none of the above

12) The thickness of base plate s determined from the _____.
   a) flexural strength of the plate
   b) shear strength of plate
   c) bearing strength of concrete pedestal
   d) punching criteria

13) The best arrangement to provide unified behavior in built up steel column is by _____.
   a) lacing
   b) battening
   c) tie plates
   d) perforated cover plates

14) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability respectively _____.
   a) 1 and 1.5
   b) 1.2 and 1.0
   c) 1.0 and 1.0
   d) 1.2 and 1.5

Seat No.	

Set **R**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 4 is compulsory and attempt any two from Section – I.
2) Q. No. 7 is compulsory and attempt any two from Section – II.
3) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
4) Use of scientific non programmable calculator is allowed.
5) Figures to the right indicate full marks.
6) Assume suitable data if necessary and mention it clearly before the Solution.
7) Draw the appropriate sketches whenever necessary.

Section – I

Q.2 Determine the tensile strength of an ISMC 175 when it is connected to gusset plate through the two flanges by two rows of 16mm bolts with a connection length of 200 mm. **09**

Q.3 Design single angle section to carry a axial compression of 90KN. The centre to centre distance between end connection is 2.1m. Assume end connection is done by at least two bolts. Design end connection also. **09**

Q.4 Design a built up column with channel back to back to carry an axial factored load of 2100KN. The column has unsupported length of 7m and is effectively held in position at both ends but restrained against rotation at one end only. Design the suitable lacing system for the same. **10**

Q.5 **Attempt the following.** **09**
a) Salient features of limit state method of design of steel structures.
b) Advantages and disadvantages of welded connection over bolted connection.
c) Behaviour of bolted joints.

Section – II

Q.6 A fixed beam of 6m carries a uniformly distributed load of 60 KN/m on right hand 4.5m. The load factor is 1.15, yield stress is 23.2 KN/m^2, calculate the section modulus of the beam and locate the position of plastic hinges. **09**

Q.7 Design steel beam section for supporting roof of a big hall for the following data and apply the usual checks. Assume steel grade Fe410. **10**

Clear span = 6.5m
End bearing = 150mm
c/c spacing of beams = 3m
Imposed load on beam = 10 KN/m^2
Dead load = 4 KN/m^2
Restriction on beam depth 375mm

The compression flange of the beam is laterally supported throughout.

Q.8 Design I section purlin to support galvanized corrugated iron sheet roof. The purlins are 1.25 m apart over roof trusses spaced 5m centre to centre. The roof surface has inclination of 30° to the horizontal. The weight of corrugated iron sheet is 0.133KN/m^2, the weight of fixtures is 0.05KN/m^2. The design wind pressure for medium permeability is 1.25KN/m^2(outward) parallel to the ridge. **09**

Q.9 Design gusseted base for built up column consisting of 2nos ISMB 400 at a c/c distance of 300mm. It carries axial load of 1200KN. Use M20 grade of concrete for pedestal. **09**

Seat No.	

Set **S**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
3) Use of scientific non programmable calculator is allowed.
4) Figures to the right indicate full marks.
5) Assume suitable data if necessary and mention it clearly before the Solution.
6) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The thickness of double flat lacing should not be less than _____.
   a) $1/30^{th}$ length between inner rivets
   b) $1/40^{th}$ length between inner rivets
   c) $1/50^{th}$ length between inner rivets
   d) $1/60^{th}$ length between inner rivets

2) The number of possible plastic hinges for a propped cantilever beam is _____.
   a) 2 b) 1
   c) 3 d) zero

3) The length of the plastic hinge for a simply supported beam of span L subjected to a central point load is of rectangular section.
   a) L/3 b) 2L/3
   c) L/2 d) none of the above

4) Design of beam is governed by shear _____.
   a) When the depth of the beam section is small
   b) when the large concentrated loads are placed near beam supports
   c) both a & b
   d) none of the above is correct

5) The thickness of battens flat should not be less than _____.
   a) $1/30^{th}$ length between inner line of rivets
   b) $1/40^{th}$ length between inner line of rivets
   c) $1/50^{th}$ length between inner line of rivets
   d) $1/60^{th}$ length between inner line of rivets

6) The collapse load for a cantilever beam of span l subjected to uniformly distributed load is _____.
   a) 0.414 Mp/l b) 7.67 Mp/l
   c) 11.656 Mp/l d) none of the above

7) The thickness of base plate s determined from the _____.
   a) flexural strength of the plate
   b) shear strength of plate
   c) bearing strength of concrete pedestal
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8) The best arrangement to provide unified behavior in built up steel column is by _____.
   a) lacing
   b) battening
   c) tie plates
   d) perforated cover plates

9) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability respectively _____.
   a) 1 and 1.5
   b) 1.2 and 1.0
   c) 1.0 and 1.0
   d) 1.2 and 1.5

10) The economical spacing of a roof truss depends upon the _____.
   a) cost of purlin and cost of roof covering
   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

11) A gusset plate is subjected to _____.
   a) direct stress
   b) shear stress
   c) bending stress
   d) all of the above

12) A beam section is selected and provided on the basis of _____.
   a) section modulus
   b) deflection
   c) shear
   d) all of the above

13) The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to _____.
   a) Lo/10
   b) Lo/15
   c) Lo/20
   d) Lo

14) Battening is preferred when the _____.
   a) column carries axial load only
   b) space between two main components is not very large
   c) both a & b
   d) none of the above

Seat No.	

Set **S**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF STEEL STRUCTURES

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 4 is compulsory and attempt any two from Section – I.
2) Q. No. 7 is compulsory and attempt any two from Section – II.
3) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
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6) Assume suitable data if necessary and mention it clearly before the Solution.
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Section – I

Q.2 Determine the tensile strength of an ISMC 175 when it is connected to gusset plate through the two flanges by two rows of 16mm bolts with a connection length of 200 mm. **09**

Q.3 Design single angle section to carry a axial compression of 90KN. The centre to centre distance between end connection is 2.1m. Assume end connection is done by at least two bolts. Design end connection also. **09**

Q.4 Design a built up column with channel back to back to carry an axial factored load of 2100KN. The column has unsupported length of 7m and is effectively held in position at both ends but restrained against rotation at one end only. Design the suitable lacing system for the same. **10**

Q.5 **Attempt the following.** **09**
a) Salient features of limit state method of design of steel structures.
b) Advantages and disadvantages of welded connection over bolted connection.
c) Behaviour of bolted joints.

Section – II

Q.6 A fixed beam of 6m carries a uniformly distributed load of 60 KN/m on right hand 4.5m. The load factor is 1.15, yield stress is 23.2 KN/m^2, calculate the section modulus of the beam and locate the position of plastic hinges. **09**

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End bearing = 150mm
c/c spacing of beams = 3m
Imposed load on beam = 10 KN/m^2
Dead load = 4 KN/m^2
Restriction on beam depth 375mm

The compression flange of the beam is laterally supported throughout.

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Q.9 Design gusseted base for built up column consisting of 2nos ISMB 400 at a c/c distance of 300mm. It carries axial load of 1200KN. Use M20 grade of concrete for pedestal. **09**

Seat No.	

Set **P**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) If solid portion and void portion in a given mass of soil is same then porosity for this soil is _____.
   a) 1 b) 0.75
   c) 0.50 d) 0.25

2) Which factors do not affect the permeability of soil _____.
   a) Shape of soil particle b) Size of soil particle
   c) Specific gravity d) Porosity

3) Optimum moisture content of which soil is more at a given compaction effort _____.
   a) Silt b) Clay
   c) Sand d) Sandy clay

4) Which roller is most suitable for compacting clayey soil?
   a) Pneumatic b) Vibratory
   c) Sheep foot d) smooth wheel

5) Coefficient of volume compressibility is the slope of which of following curve _____.
   a) e - p curve b) e - log p curve
   c) flow curve d) None of these

6) If the soil is dry then percentage air void for this soil is _____.
   a) 1 b) 0
   c) 0.50 d) None of these

7) Permeability of the soil is more when the degree of saturation of soil is __.
   a) 0% b) 25%
   c) 50% d) 100%

8) In compaction test graph is plotted between water content and _____ density of soil.
   a) Bulk b) Submerged
   c) Dry d) Soil solid

9) Process of removal of water from the soil is called _____.
   a) compaction b) consolidation
   c) compression d) none of these

10) Graphical method for finding earth pressure is given by _____.
   a) Terzaghi b) Cassagrande
   c) Boussinesq d) Culman

11) Vane shear test is commonly used to find shear strength of _____ soil.
   a) Clayey b) Sandy
   c) Silty d) Soft clayey soil

12) Height of fall of rammer in modified compaction test is _____.
   a) 250mm b) 310mm
   c) 400mm d) 450mm

13) Which of following shear strength test is quick one?
   a) UU test b) CU test
   c) CD test d) None of these

14) Standard size of soil sample used for conducting unconfined compression test is _____.
   a) 30mm dia. and 60mm height b) 38mm dia. and 76mm height
   c) 50 cm dia and 100 cm length d) 10 cm dia and 20 cm length

Seat No.	

Set **P**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q N 2 is compulsory and Q N 6 is compulsory and attempt any two question from each section.
2) Reinforce your answer with illustrative sketches where-ever possible.
3) Assume suitable data if required
4) Do write units for the calculated quantities.

Section - I

Q.2 Answer any four questions: **08**

a) Draw grain size distribution curve and show D_{10}, D_{30} and D_{60} on it.
b) Name two soil belonging to Fine grained soil and that belonging to coarse grained soil.
c) Define air content and degree of saturation.
d) Draw labelled sketch of triaxial shear apparatus (minimum four parts labeled).
e) Draw graph used to calculate liquid limit for soil and show liquid limit on it.

Q.3 a) With suitable notation prove the relation $e = \frac{wG}{S_r}$ **05**

b) A soil sample has equal amounts of voids and solids, and also amount of air and water in terms of volume is same; for this soil find **05**
1) void ratio of the soil
2) porosity
3) air content
4) % air void and
5) degree of saturation

Q.4 a) What is permeability of soil? Explain any four factors affecting permeability of soil. **05**

b) Soil strata of 3 layers of thickness 1, 1.5, and 2.0 m having the coefficient permeability of $2X10^{-3}$, $1.5X10^{-3}$ and $3X10^{-3}$ cm/s respectively. Estimate the average coefficient of permeability in the direction of **05**
1) Parallel to the bedding plane
2) Normal to the bedding plane

Q.5 a) What are different types of shear test based on drainage of soil? **05**

b) Consolidated undrained test were carried out on a soil sample and following observations were recorded. **05**

Test	Cell pressure (kPa)	Deviator stress at failure (kPa)
1	250	179
2	350	242

Determine shear parameters of soil both in terms of total stress and effective stress, if another identical soil specimen was tested at a cell pressure of 400kPa, what would be deviator stress at failure.

Section – II

Q.6 Answer any four questions: **08**

a) Define Maximum dry density and optimum moisture content.

b) Define over-consolidation ratio and how it is used to classify the soil.

c) Draw compaction curve along with zero air void line (label all parts).

d) Draw typical e - p curve and label various parts of it.

e) Write any four analogy between spring model and saturated soil (consolidation).

Q.7 a) Explain step wise procedure for field compaction of soil. **05**

b) The following are the results of a standard compaction test performed on a sample of soil. **05**

Moisture content (%)	7.7	11.5	14.6	17.5	19.7	21.2
Mass of wet soil (kg)	1.7	1.89	2.05	1.99	1.96	1.92

1) Plot compaction curve and hence find OMC and MDD
2) Plot 10% air void line
3) What is the air content and degree of saturation corresponding to MDD?

Q.8 a) Explain e- log p curve and derive the coefficient associated with it. **05**

b) A clay specimen was tested in a laboratory consolidation device, which was 12.7 mm thick and the top and the bottom boundaries were drained. A 50% consolidation time on the specimen was obtained as 28.4 minutes. Determine the following: **05**

1) Time for 50% consolidation in the field with this soil with a 2.5 m thickness where only the top layer is drained
2) Time for 90% consolidation in the field with this soil with a 2.5 m thickness where only the top layer is drained

Q.9 a) Enlist the assumptions of Rankine's Theory of earth pressure. **05**

b) Calculate total active earth pressure and its position with respect to bottom of wall acting on a retaining wall of height 9m retaining two layered soil on back side of it. Top layer 4.2m thick having Υ=18kN/m^3, c = 0 and $\varphi = 27^0$ followed by second layer having Υ=19kN/m^3, c = 0 and $\varphi = 30^0$. **05**

Seat No.	

Set **Q**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In compaction test graph is plotted between water content and _____ density of soil.
   a) Bulk b) Submerged
   c) Dry d) Soil solid

2) Process of removal of water from the soil is called _____.
   a) compaction b) consolidation
   c) compression d) none of these

3) Graphical method for finding earth pressure is given by _____.
   a) Terzaghi b) Cassagrande
   c) Boussinesq d) Culman

4) Vane shear test is commonly used to find shear strength of _____ soil.
   a) Clayey b) Sandy
   c) Silty d) Soft clayey soil

5) Height of fall of rammer in modified compaction test is _____.
   a) 250mm b) 310mm
   c) 400mm d) 450mm

6) Which of following shear strength test is quick one?
   a) UU test b) CU test
   c) CD test d) None of these

7) Standard size of soil sample used for conducting unconfined compression test is _____.
   a) 30mm dia. and 60mm height b) 38mm dia. and 76mm height
   c) 50 cm dia and 100 cm length d) 10 cm dia and 20 cm length

8) If solid portion and void portion in a given mass of soil is same then porosity for this soil is _____.
   a) 1 b) 0.75
   c) 0.50 d) 0.25

9) Which factors do not affect the permeability of soil _____.
   a) Shape of soil particle b) Size of soil particle
   c) Specific gravity d) Porosity

10) Optimum moisture content of which soil is more at a given compaction effort _____.
   a) Silt b) Clay
   c) Sand d) Sandy clay

11) Which roller is most suitable for compacting clayey soil?
   a) Pneumatic b) Vibratory
   c) Sheep foot d) smooth wheel

12) Coefficient of volume compressibility is the slope of which of following curve _____.
   a) e - p curve b) e - log p curve
   c) flow curve d) None of these

13) If the soil is dry then percentage air void for this soil is _____.
   a) 1 b) 0
   c) 0.50 d) None of these

14) Permeability of the soil is more when the degree of saturation of soil is __.
   a) 0% b) 25%
   c) 50% d) 100%

Seat No.	

Set **Q**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q N 2 is compulsory and Q N 6 is compulsory and attempt any two question from each section.
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3) Assume suitable data if required
4) Do write units for the calculated quantities.

Section - I

Q.2 Answer any four questions: **08**

a) Draw grain size distribution curve and show D_{10}, D_{30} and D_{60} on it.
b) Name two soil belonging to Fine grained soil and that belonging to coarse grained soil.
c) Define air content and degree of saturation.
d) Draw labelled sketch of triaxial shear apparatus (minimum four parts labeled).
e) Draw graph used to calculate liquid limit for soil and show liquid limit on it.

Q.3 a) With suitable notation prove the relation $e = \frac{wG}{S_r}$ **05**

b) A soil sample has equal amounts of voids and solids, and also amount of air and water in terms of volume is same; for this soil find **05**
1) void ratio of the soil
2) porosity
3) air content
4) % air void and
5) degree of saturation

Q.4 a) What is permeability of soil? Explain any four factors affecting permeability of soil. **05**

b) Soil strata of 3 layers of thickness 1, 1.5, and 2.0 m having the coefficient permeability of $2X10^{-3}$, $1.5X10^{-3}$ and $3X10^{-3}$ cm/s respectively. Estimate the average coefficient of permeability in the direction of **05**
1) Parallel to the bedding plane
2) Normal to the bedding plane

Q.5 a) What are different types of shear test based on drainage of soil? **05**

b) Consolidated undrained test were carried out on a soil sample and following observations were recorded. **05**

Test	Cell pressure (kPa)	Deviator stress at failure (kPa)
1	250	179
2	350	242

Determine shear parameters of soil both in terms of total stress and effective stress, if another identical soil specimen was tested at a cell pressure of 400kPa, what would be deviator stress at failure.

Section – II

Q.6 Answer any four questions: **08**

a) Define Maximum dry density and optimum moisture content.

b) Define over-consolidation ratio and how it is used to classify the soil.

c) Draw compaction curve along with zero air void line (label all parts).

d) Draw typical e - p curve and label various parts of it.

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Q.9 a) Enlist the assumptions of Rankine's Theory of earth pressure. **05**

b) Calculate total active earth pressure and its position with respect to bottom of wall acting on a retaining wall of height 9m retaining two layered soil on back side of it. Top layer 4.2m thick having Υ=18kN/m^3, c = 0 and $\varphi = 27^0$ followed by second layer having Υ=19kN/m^3, c = 0 and $\varphi = 30^0$. **05**

Seat No.	

Set **R**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

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Seat No.	

Set **R**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

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Section - I

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4) % air void and
5) degree of saturation

Q.4 a) What is permeability of soil? Explain any four factors affecting permeability of soil. **05**

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Section – II

Q.6 Answer any four questions: **08**

a) Define Maximum dry density and optimum moisture content.

b) Define over-consolidation ratio and how it is used to classify the soil.

c) Draw compaction curve along with zero air void line (label all parts).

d) Draw typical e - p curve and label various parts of it.

e) Write any four analogy between spring model and saturated soil (consolidation).

Q.7 a) Explain step wise procedure for field compaction of soil. **05**

b) The following are the results of a standard compaction test performed on a sample of soil. **05**

Moisture content (%)	7.7	11.5	14.6	17.5	19.7	21.2
Mass of wet soil (kg)	1.7	1.89	2.05	1.99	1.96	1.92

1) Plot compaction curve and hence find OMC and MDD
2) Plot 10% air void line
3) What is the air content and degree of saturation corresponding to MDD?

Q.8 a) Explain e- log p curve and derive the coefficient associated with it. **05**

b) A clay specimen was tested in a laboratory consolidation device, which was 12.7 mm thick and the top and the bottom boundaries were drained. A 50% consolidation time on the specimen was obtained as 28.4 minutes. Determine the following: **05**

1) Time for 50% consolidation in the field with this soil with a 2.5 m thickness where only the top layer is drained
2) Time for 90% consolidation in the field with this soil with a 2.5 m thickness where only the top layer is drained

Q.9 a) Enlist the assumptions of Rankine's Theory of earth pressure. **05**

b) Calculate total active earth pressure and its position with respect to bottom of wall acting on a retaining wall of height 9m retaining two layered soil on back side of it. Top layer 4.2m thick having Υ=18kN/m^3, c = 0 and $\varphi = 27^0$ followed by second layer having Υ=19kN/m^3, c = 0 and $\varphi = 30^0$. **05**

Seat No.	

Set **S**

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions:1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Graphical method for finding earth pressure is given by _____.
   a) Terzaghi b) Cassagrande
   c) Boussinesq d) Culman

2) Vane shear test is commonly used to find shear strength of _____ soil.
   a) Clayey b) Sandy
   c) Silty d) Soft clayey soil

3) Height of fall of rammer in modified compaction test is _____.
   a) 250mm b) 310mm
   c) 400mm d) 450mm

4) Which of following shear strength test is quick one?
   a) UU test b) CU test
   c) CD test d) None of these

5) Standard size of soil sample used for conducting unconfined compression test is _____.
   a) 30mm dia. and 60mm height b) 38mm dia. and 76mm height
   c) 50 cm dia and 100 cm length d) 10 cm dia and 20 cm length

6) If solid portion and void portion in a given mass of soil is same then porosity for this soil is _____.
   a) 1 b) 0.75
   c) 0.50 d) 0.25

7) Which factors do not affect the permeability of soil _____.
   a) Shape of soil particle b) Size of soil particle
   c) Specific gravity d) Porosity

8) Optimum moisture content of which soil is more at a given compaction effort _____.
   a) Silt b) Clay
   c) Sand d) Sandy clay

9) Which roller is most suitable for compacting clayey soil?
   a) Pneumatic b) Vibratory
   c) Sheep foot d) smooth wheel

10) Coefficient of volume compressibility is the slope of which of following curve _____.
   a) e - p curve
   b) e - log p curve
   c) flow curve
   d) None of these

11) If the soil is dry then percentage air void for this soil is _____.
   a) 1
   b) 0
   c) 0.50
   d) None of these

12) Permeability of the soil is more when the degree of saturation of soil is __.
   a) 0%
   b) 25%
   c) 50%
   d) 100%

13) In compaction test graph is plotted between water content and _____ density of soil.
   a) Bulk
   b) Submerged
   c) Dry
   d) Soil solid

14) Process of removal of water from the soil is called _____.
   a) compaction
   b) consolidation
   c) compression
   d) none of these

Seat No.		Set	S

T.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GEOTECHNICAL ENGINEERING - I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q N 2 is compulsory and Q N 6 is compulsory and attempt any two question from each section.
2) Reinforce your answer with illustrative sketches where-ever possible.
3) Assume suitable data if required
4) Do write units for the calculated quantities.

Section - I

Q.2 Answer any four questions: **08**

a) Draw grain size distribution curve and show D_{10}, D_{30} and D_{60} on it.
b) Name two soil belonging to Fine grained soil and that belonging to coarse grained soil.
c) Define air content and degree of saturation.
d) Draw labelled sketch of triaxial shear apparatus (minimum four parts labeled).
e) Draw graph used to calculate liquid limit for soil and show liquid limit on it.

Q.3 a) With suitable notation prove the relation $e = \frac{wG}{S_r}$ **05**

b) A soil sample has equal amounts of voids and solids, and also amount of air and water in terms of volume is same; for this soil find **05**
1) void ratio of the soil
2) porosity
3) air content
4) % air void and
5) degree of saturation

Q.4 a) What is permeability of soil? Explain any four factors affecting permeability of soil. **05**

b) Soil strata of 3 layers of thickness 1, 1.5, and 2.0 m having the coefficient permeability of $2X10^{-3}$, $1.5X10^{-3}$ and $3X10^{-3}$ cm/s respectively. Estimate the average coefficient of permeability in the direction of **05**
1) Parallel to the bedding plane
2) Normal to the bedding plane

Q.5 a) What are different types of shear test based on drainage of soil? **05**

b) Consolidated undrained test were carried out on a soil sample and following observations were recorded. **05**

Test	Cell pressure (kPa)	Deviator stress at failure (kPa)
1	250	179
2	350	242

Determine shear parameters of soil both in terms of total stress and effective stress, if another identical soil specimen was tested at a cell pressure of 400kPa, what would be deviator stress at failure.

Section – II

Q.6 Answer any four questions: **08**

a) Define Maximum dry density and optimum moisture content.

b) Define over-consolidation ratio and how it is used to classify the soil.

c) Draw compaction curve along with zero air void line (label all parts).

d) Draw typical e - p curve and label various parts of it.

e) Write any four analogy between spring model and saturated soil (consolidation).

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Q.9 a) Enlist the assumptions of Rankine's Theory of earth pressure. **05**

b) Calculate total active earth pressure and its position with respect to bottom of wall acting on a retaining wall of height 9m retaining two layered soil on back side of it. Top layer 4.2m thick having Υ=18kN/m^3, c = 0 and $\varphi = 27^0$ followed by second layer having Υ=19kN/m^3, c = 0 and $\varphi = 30^0$. **05**

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever required and mention it clearly.
4) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Acidity in water is caused due to _____.
   a) Mineral acids b) Iron sulphate
   c) Free CO_2 d) All of the above

2) Turbidity of raw water is a measure of _____.
   a) Suspended solids b) B. O. D.
   c) Acidity of water d) None of these

3) Hardness of water is caused due to ____.
   a) Calcium sulphate b) Calcium Nitrates
   c) Magnesium sulphate d) None of the above

4) Mostly used coagulant, is _____.
   a) Chlorine b) Lime
   c) Alum d) Bleaching Powder

5) Aeration process is useful for the removal of _____.
   a) Odour b) Suspended solids
   c) Total solids d) All of the above

6) Carbonates in water produce _____.
   a) temporary hardness b) permanent hardness
   c) acidity d) Alkanity

7) _____ is determined by titrating with standard EDTA solution & Eriochrome black T- indicator.
   a) Nitrates b) Hardness
   c) Chlorides d) Turbidity

8) For a city developed haphazardly, the layout of distribution pipes preferred to, is _____.
   a) Radial system b) Ring system
   c) Dead end system d) Iron grid system

9) Water losses in water supply is assumed as _____.
   a) Test pressure b) Working pressure
   c) Pipe pressure d) Design pressure

10) _____ is the pipe connecting to storage tank various fixtures and taps.
   a) Distributing pipe b) Supply pipe
   c) Antisiphonage pipe d) Service pipe

11) _____ can follow direct routes and require shorter length of conduits.
   a) Gravity conduit b) Aqueduct
   c) Tunnels d) Pressure conduits

12) To control the wastage of water _____ measures are taken.
   a) Pipe joints b) Water taps
   c) Zoning system d) All of the above

13) Generally _____ supply will reduce.
   a) Continuous b) Intermittent
   c) Both a) and b) d) None of these

14) Analysis of pipe networks of distribution system is calculated by _____.
   a) Discharge in pipelines b) Equivalent pipe method
   c) Computation of pressure d) Mass curve method

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Solve any two from the remaining questions from each section.
3) Figure to the right indicates full marks
4) Assume suitable data wherever required and mention it clearly.
5) Use of non – programmable calculator is allowed.

Section – I

Q.2 a) Write the values of drinking water standards. **03**
1) pH
2) Akalinty
3) Hardness
4) Turbidity
5) Colour
6) Chlorides

b) Population of 5 decades is given below: **07**

Year	1960	1970	1980	1990	2000
Population	35000	38000	40000	42000	49000

Determine the population in year 2020 by geometrical increase method and incremental increase method.

Q.3 a) Which equation to be used to find settling velocity? Derive the formula for the same. **04**

b) A settling tank is designed for an overflow rate of 6000 lit/m^2/hr. What percentage of particles of diameter. **05**
1) 0.06mm and
2) 0.03mm will be removed in this tank?
Temperature of water is 27^0C and Sp. Gr. of particle are 2.65.

Q.4 a) Differentiate slow sand and rapid sand filter with respect to following points. **03**

b) Design a Flocullator for a flow of 7 MLD. Assume suitable data. **06**

Q.5 Write a short note on (any three) **09**
a) Chemistry of chlorination
b) Zeolite method
c) Coagulation
d) Aeration

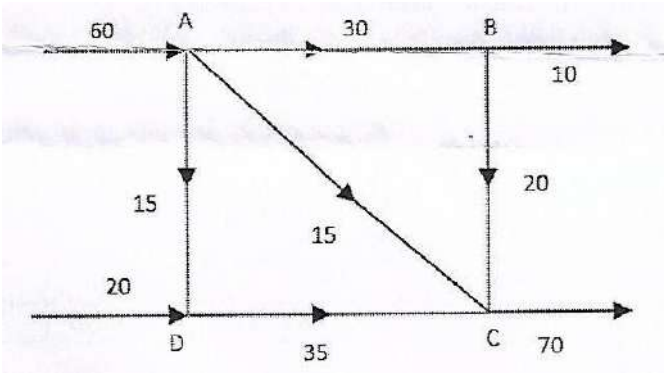
Section - II

Q.6 **a)** Explain with neat sketch dead end system of distribution system. **05**

b) Give drawbacks of intermittent system. **05**

Q.7 **a)** Explain the analytical method of fixing the capacity of service reservoir. **03**

b) Calculate discharge through various pipes using Hardy cross method if the K values in the expression for loss head $h_f = kQ^2, \& \ AB, BC, AC, AD, DC$ are 4,1,3,2 & 1 respectively, find discharge through each pipe & indicate direction of flow. Take two trials. **06**

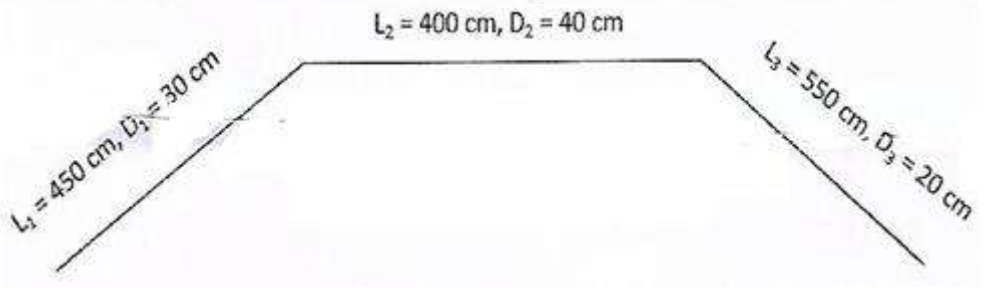


Q.8 **a)** Enumerate various corrosion control methods. **04**

b) Find the equivalent of 30cm equivalent diameter pipe of the network shown below by **05**

1) Darcy Weisbach equation
2) Hazen William's formula

Note: L_1, L_2, L_3 are lengths & D_1, D_2, D_3 are diameters.



Q.9 Write short notes on any three of the following: **09**

a) Check valve
b) Advantages of pressurized water supply system
c) Water meter
d) Fire demand

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever required and mention it clearly.
4) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) For a city developed haphazardly, the layout of distribution pipes preferred to, is _____.
   a) Radial system b) Ring system
   c) Dead end system d) Iron grid system

2) Water losses in water supply is assumed as _____.
   a) Test pressure b) Working pressure
   c) Pipe pressure d) Design pressure

3) _____ is the pipe connecting to storage tank various fixtures and taps.
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   c) Antisiphonage pipe d) Service pipe

4) _____ can follow direct routes and require shorter length of conduits.
   a) Gravity conduit b) Aqueduct
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5) To control the wastage of water _____ measures are taken.
   a) Pipe joints b) Water taps
   c) Zoning system d) All of the above

6) Generally _____ supply will reduce.
   a) Continuous b) Intermittent
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9) Turbidity of raw water is a measure of _____.
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   c) Acidity of water d) None of these

10) Hardness of water is caused due to ____.
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   c) Magnesium sulphate d) None of the above

11) Mostly used coagulant, is _____.
   a) Chlorine b) Lime
   c) Alum d) Bleaching Powder

12) Aeration process is useful for the removal of _____.
   a) Odour b) Suspended solids
   c) Total solids d) All of the above

13) Carbonates in water produce _____.
   a) temporary hardness b) permanent hardness
   c) acidity d) Alkanity

14) _____ is determined by titrating with standard EDTA solution & Eriochrome black T- indicator.
   a) Nitrates b) Hardness
   c) Chlorides d) Turbidity

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
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Section – I

Q.2 a) Write the values of drinking water standards. **03**
1) pH
2) Akalinty
3) Hardness
4) Turbidity
5) Colour
6) Chlorides

b) Population of 5 decades is given below: **07**

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Population	35000	38000	40000	42000	49000

Determine the population in year 2020 by geometrical increase method and incremental increase method.

Q.3 a) Which equation to be used to find settling velocity? Derive the formula for the same. **04**

b) A settling tank is designed for an overflow rate of 6000 lit/m^2/hr. What percentage of particles of diameter. **05**
1) 0.06mm and
2) 0.03mm will be removed in this tank?
Temperature of water is 27^0C and Sp. Gr. of particle are 2.65.

Q.4 a) Differentiate slow sand and rapid sand filter with respect to following points. **03**

b) Design a Flocullator for a flow of 7 MLD. Assume suitable data. **06**

Q.5 Write a short note on (any three) **09**
a) Chemistry of chlorination
b) Zeolite method
c) Coagulation
d) Aeration

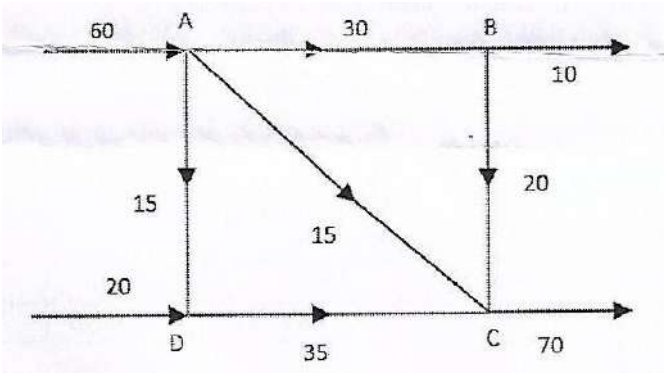
Section - II

Q.6 **a)** Explain with neat sketch dead end system of distribution system. **05**

b) Give drawbacks of intermittent system. **05**

Q.7 **a)** Explain the analytical method of fixing the capacity of service reservoir. **03**

b) Calculate discharge through various pipes using Hardy cross method if the K values in the expression for loss head $h_f = kQ^2$, & AB, BC, AC, AD, DC are 4,1,3,2 & 1 respectively, find discharge through each pipe & indicate direction of flow. Take two trials. **06**



Q.8 **a)** Enumerate various corrosion control methods. **04**

b) Find the equivalent of 30cm equivalent diameter pipe of the network shown below by **05**

1) Darcy Weisbach equation
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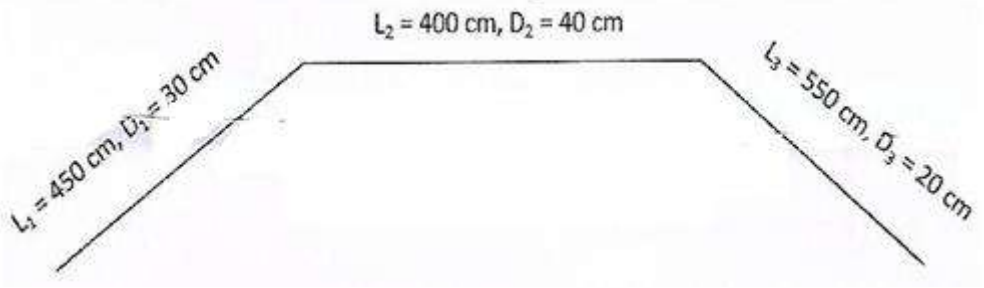

Q.9 Write short notes on any three of the following: **09**

a) Check valve
b) Advantages of pressurized water supply system
c) Water meter
d) Fire demand

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Aeration process is useful for the removal of _____.
   a) Odour b) Suspended solids
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2) Carbonates in water produce _____.
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3) _____ is determined by titrating with standard EDTA solution & Eriochrome black T- indicator.
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4) For a city developed haphazardly, the layout of distribution pipes preferred to, is _____.
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14) Mostly used coagulant, is _____.
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Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
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Section – I

Q.2 a) Write the values of drinking water standards. **03**
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b) Population of 5 decades is given below: **07**

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b) Design a Flocullator for a flow of 7 MLD. Assume suitable data. **06**

Q.5 Write a short note on (any three) **09**
a) Chemistry of chlorination
b) Zeolite method
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d) Aeration

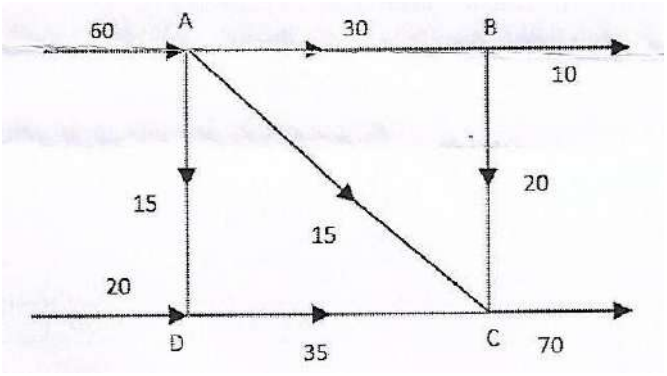
Section - II

Q.6 **a)** Explain with neat sketch dead end system of distribution system. **05**

b) Give drawbacks of intermittent system. **05**

Q.7 **a)** Explain the analytical method of fixing the capacity of service reservoir. **03**

b) Calculate discharge through various pipes using Hardy cross method if the K values in the expression for loss head $h_f = kQ^2, \& \ AB, BC, AC, AD, DC$ are 4,1,3,2 & 1 respectively, find discharge through each pipe & indicate direction of flow. Take two trials. **06**



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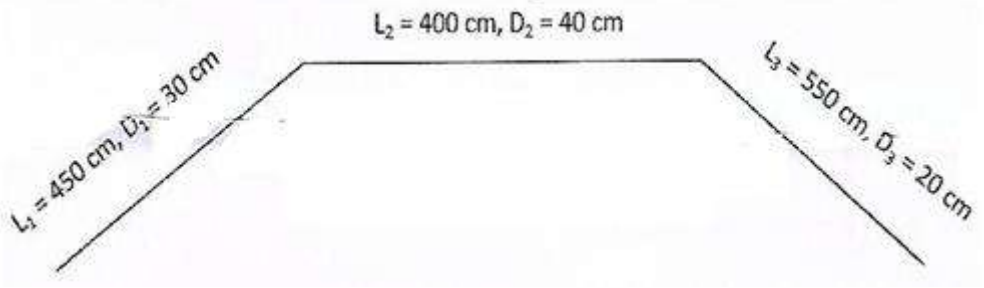

Q.9 Write short notes on any three of the following: **09**

a) Check valve
b) Advantages of pressurized water supply system
c) Water meter
d) Fire demand

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 70
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) _____ is the pipe connecting to storage tank various fixtures and taps.
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2) _____ can follow direct routes and require shorter length of conduits.
   a) Gravity conduit b) Aqueduct
   c) Tunnels d) Pressure conduits

3) To control the wastage of water _____ measures are taken.
   a) Pipe joints b) Water taps
   c) Zoning system d) All of the above

4) Generally _____ supply will reduce.
   a) Continuous b) Intermittent
   c) Both a) and b) d) None of these

5) Analysis of pipe networks of distribution system is calculated by _____.
   a) Discharge in pipelines b) Equivalent pipe method
   c) Computation of pressure d) Mass curve method

6) Acidity in water is caused due to _____.
   a) Mineral acids b) Iron sulphate
   c) Free CO_2 d) All of the above

7) Turbidity of raw water is a measure of _____.
   a) Suspended solids b) B. O. D.
   c) Acidity of water d) None of these

8) Hardness of water is caused due to ____.
   a) Calcium sulphate b) Calcium Nitrates
   c) Magnesium sulphate d) None of the above

9) Mostly used coagulant, is _____.
   a) Chlorine b) Lime
   c) Alum d) Bleaching Powder

10) Aeration process is useful for the removal of _____.
   a) Odour b) Suspended solids
   c) Total solids d) All of the above

11) Carbonates in water produce _____.
   a) temporary hardness b) permanent hardness
   c) acidity d) Alkanity

12) _____ is determined by titrating with standard EDTA solution & Eriochrome black T- indicator.
   a) Nitrates b) Hardness
   c) Chlorides d) Turbidity

13) For a city developed haphazardly, the layout of distribution pipes preferred to, is _____.
   a) Radial system b) Ring system
   c) Dead end system d) Iron grid system

14) Water losses in water supply is assumed as _____.
   a) Test pressure b) Working pressure
   c) Pipe pressure d) Design pressure

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENVIRONMENTAL ENGINEERING – I

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
Time 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 6 are compulsory.
2) Solve any two from the remaining questions from each section.
3) Figure to the right indicates full marks
4) Assume suitable data wherever required and mention it clearly.
5) Use of non – programmable calculator is allowed.

Section – I

Q.2 a) Write the values of drinking water standards. **03**
1) pH
2) Akalinty
3) Hardness
4) Turbidity
5) Colour
6) Chlorides

b) Population of 5 decades is given below: **07**

Year	1960	1970	1980	1990	2000
Population	35000	38000	40000	42000	49000

Determine the population in year 2020 by geometrical increase method and incremental increase method.

Q.3 a) Which equation to be used to find settling velocity? Derive the formula for the same. **04**

b) A settling tank is designed for an overflow rate of 6000 lit/m^2/hr. What percentage of particles of diameter. **05**
1) 0.06mm and
2) 0.03mm will be removed in this tank?
Temperature of water is 27^0C and Sp. Gr. of particle are 2.65.

Q.4 a) Differentiate slow sand and rapid sand filter with respect to following points. **03**

b) Design a Flocullator for a flow of 7 MLD. Assume suitable data. **06**

Q.5 Write a short note on (any three) **09**
a) Chemistry of chlorination
b) Zeolite method
c) Coagulation
d) Aeration

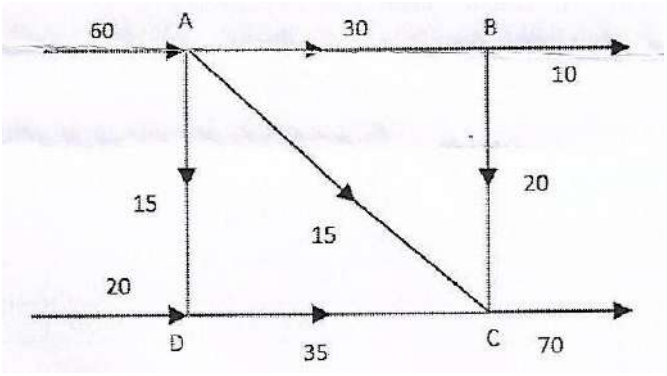
Section - II

Q.6 **a)** Explain with neat sketch dead end system of distribution system. **05**

b) Give drawbacks of intermittent system. **05**

Q.7 **a)** Explain the analytical method of fixing the capacity of service reservoir. **03**

b) Calculate discharge through various pipes using Hardy cross method if the K values in the expression for loss head $h_f = kQ^2, \& \ AB, BC, AC, AD, DC$ are 4,1,3,2 & 1 respectively, find discharge through each pipe & indicate direction of flow. Take two trials. **06**

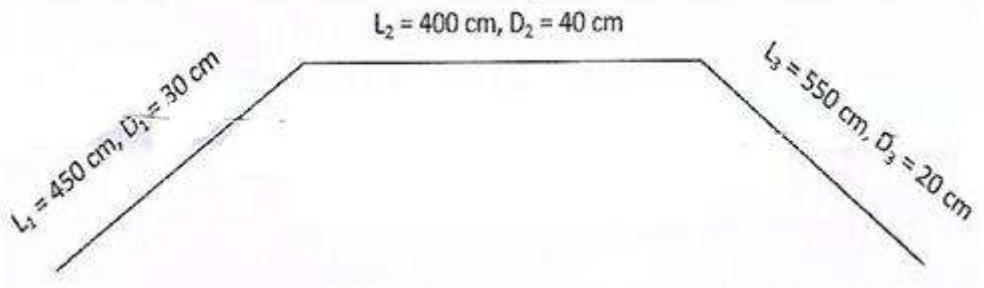


Q.8 **a)** Enumerate various corrosion control methods. **04**

b) Find the equivalent of 30cm equivalent diameter pipe of the network shown below by **05**

1) Darcy Weisbach equation
2) Hazen William's formula

Note: L_1, L_2, L_3 are lengths & D_1, D_2, D_3 are diameters.



Q.9 Write short notes on any three of the following: **09**

a) Check valve
b) Advantages of pressurized water supply system
c) Water meter
d) Fire demand

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Acceptance quality level for inspection in stored normally range between _____.
   a) 0 - 0.5% b) 0.5 - 3%
   c) 20 - 50% d) 50 - 100%

2) Lead time is the time between _____.
   a) Order and receipt
   b) Receipt of material and its consumption
   c) Order and consumption
   d) Dispatch and receipt

3) If 'h' is arrival rate 'w' is waiting time then expected no. of customer 'L' will be _____.
   a) $L = \lambda w$ b) $L = \lambda / w$
   c) $L = w / \lambda$ d) $L = w + \lambda$

4) In a dustbin opening from top queue discipline is normally _____.
   a) FIFO b) LIFO
   c) Random d) None of these

5) The cost of keeping items in inventory is called _____.
   a) Set up cost b) Holding cost
   c) Shortage cost d) None of these

6) Moderate inventory control is sufficient for _____.
   a) A class items b) B class items
   c) C class items d) All of these

7) In Dynamic Programming Policy is defined as _____.
   a) Point where decision is made
   b) Information describing problem at each stage
   c) Decision making rule
   d) Optimal policy

8) Hungerian trial and error method is suitable for solving _____.
   a) Transportation problem b) Assignment problem
   c) Two person zero sum game d) Decision tree

9) The solution of decision tree is obtained by _____.
   a) Folding back method
   b) Games theory
   c) Laplace criteria
   d) Dynamic programming

10) The biological process of mutation has inspired _____.
   a) Artificial Neural Network
   b) Fuzzy logic
   c) Genetic Algorithm
   d) Dynamic programming

11) Linear programming deals with the optimization of a function of variable is known as _____.
   a) Subjective function
   b) Objective function
   c) Constraints
   d) All of these

12) Allocation of units is not dependent on transport cost in _____.
   a) VAM method
   b) NW corner method
   c) Both of these
   d) None of these

13) EOQ model helps to find _____.
   a) Optimum size of order
   b) Time interval between order
   c) Both a) and b)
   d) None of these

14) Games without a saddle point require player to play _____.
   a) Mixed strategies
   b) Pure strategies
   c) Dominated strategies
   d) None of these

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT - I

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.
3) Use of non-programmable calculator is allowed.

Section – I

Q.2 Answer any three **24**

a) Explain with example Formal and Informal organization.

b) Find IBFS of the following transportation problem using Least Cost Method.

					Supply
	19	30	50	10	7
	70	30	40	60	9
	40	08	70	20	18
Demand	5	8	7	14	

c) Certain equipment needs 5 repair jobs which have to be assigned to 5 machines. The estimated time in hours that each machine requires to complete the repair job is given in following table.

Job / Machine	J1	J2	J3	J4	J5
M1	7	5	9	8	11
M2	9	12	7	11	10
M3	8	5	4	6	9
M4	7	3	6	9	5
M5	4	6	7	5	11

Assuming that each machine can be assigned one job, determine minimum time of assignment.

d) Write notes on.
1) Monte Carlo Simulation
2) Queuing line theory

e) Find the value of the game

	B's strategy		
A's strategy		B1	B2
	A1	8	-7
	A2	-6	4

Q.3 Write notes. **04**

a) Decision under uncertainty

b) ANN

Section – II

Q.4 Answer any four **28**

a) Derive the formula for EOQ & explain each term.

b) Explain the importance of ABC analysis with graph.

c) What is BEP? How it is carried out? How it is used?

d) Write a note on Quality control chart.

e) Write note on Profit & loss account and Balance sheet.

f) Write a note various types inventory cost.

g) ABC corporation has got a demand for particular part at 10000 units per year. The cost per unit is Rs 2 and it cost Rs 36 to place an order and to process the delivery. The inventory carrying cost is estimated at 9 percent of average inventory investment. Determine

1) EOQ
2) Optimum number of orders to be placed per annum
3) Total cost of inventory per annum.

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Hungerian trial and error method is suitable for solving _____.
   a) Transportation problem b) Assignment problem
   c) Two person zero sum game d) Decision tree

2) The solution of decision tree is obtained by _____.
   a) Folding back method b) Games theory
   c) Laplace criteria d) Dynamic programming

3) The biological process of mutation has inspired _____.
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6) EOQ model helps to find _____.
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   a) Order and receipt
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13) Moderate inventory control is sufficient for _____.
   a) A class items b) B class items
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14) In Dynamic Programming Policy is defined as _____.
   a) Point where decision is made
   b) Information describing problem at each stage
   c) Decision making rule
   d) Optimal policy

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT - I

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.
3) Use of non-programmable calculator is allowed.

Section – I

Q.2 Answer any three **24**

a) Explain with example Formal and Informal organization.

b) Find IBFS of the following transportation problem using Least Cost Method.

					Supply
	19	30	50	10	7
	70	30	40	60	9
	40	08	70	20	18
Demand	5	8	7	14	

c) Certain equipment needs 5 repair jobs which have to be assigned to 5 machines. The estimated time in hours that each machine requires to complete the repair job is given in following table.

Job / Machine	J1	J2	J3	J4	J5
M1	7	5	9	8	11
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M3	8	5	4	6	9
M4	7	3	6	9	5
M5	4	6	7	5	11

Assuming that each machine can be assigned one job, determine minimum time of assignment.

d) Write notes on.
1) Monte Carlo Simulation
2) Queuing line theory

e) Find the value of the game

	B's strategy		
A's strategy		B1	B2
	A1	8	-7
	A2	-6	4

Q.3 Write notes. **04**

a) Decision under uncertainty

b) ANN

Section – II

Q.4 Answer any four **28**

a) Derive the formula for EOQ & explain each term.

b) Explain the importance of ABC analysis with graph.

c) What is BEP? How it is carried out? How it is used?

d) Write a note on Quality control chart.

e) Write note on Profit & loss account and Balance sheet.

f) Write a note various types inventory cost.

g) ABC corporation has got a demand for particular part at 10000 units per year. The cost per unit is Rs 2 and it cost Rs 36 to place an order and to process the delivery. The inventory carrying cost is estimated at 9 percent of average inventory investment. Determine

1) EOQ
2) Optimum number of orders to be placed per annum
3) Total cost of inventory per annum.

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The cost of keeping items in inventory is called _____.
   a) Set up cost b) Holding cost
   c) Shortage cost d) None of these

2) Moderate inventory control is sufficient for _____.
   a) A class items b) B class items
   c) C class items d) All of these

3) In Dynamic Programming Policy is defined as _____.
   a) Point where decision is made
   b) Information describing problem at each stage
   c) Decision making rule
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   a) 0 - 0.5%
   b) 0.5 - 3%
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   a) $L = \lambda w$
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14) In a dustbin opening from top queue discipline is normally _____.
   a) FIFO
   b) LIFO
   c) Random
   d) None of these

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

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2) Queuing line theory

e) Find the value of the game

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A's strategy		B1	B2
	A1	8	-7
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Q.3 Write notes. **04**

a) Decision under uncertainty

b) ANN

Section – II

Q.4 Answer any four **28**

a) Derive the formula for EOQ & explain each term.

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3) Total cost of inventory per annum.

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT – I

Day & Date: Friday, 13-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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14) The solution of decision tree is obtained by _____.
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Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT - I

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.
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Section – I

Q.2 Answer any three **24**

a) Explain with example Formal and Informal organization.

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A's strategy		B1	B2
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Q.3 Write notes. **04**

a) Decision under uncertainty

b) ANN

Section – II

Q.4 Answer any four **28**

a) Derive the formula for EOQ & explain each term.

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1) EOQ
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Seat No.	

Set P

T. E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) In a district where the rainfall is heavy, a state highway of high type bituminous concrete surface pavement 7.0 m wide is to be constructed. What should be the height of the crown with respect to the edges?
   a) 0.087 m b) 0.05 m
   c) 0.07 m d) 0.06 m

2) The stopping sight distance depends upon _____.
   a) total reaction time b) speed of vehicle
   c) efficiency of brakes d) all of the above

3) When the path travelled along the road surface is more than the circumferential movement of the wheels due to rotation, then it results in _____.
   a) Slipping b) Skidding
   c) Turning d) Revolving

4) Match List-I with List-II and select the correct answer using the codes given below the lists.

List -1		List -1	
A	Penetration Test	**1**	Overlay Design
B	Marshal Test	**2**	Determination of Softening Point
C	Ring and Ball Test	**3**	Gradation of asphalt cement
D	Benkelman Beam Test	**4**	Design of bituminous concrete mix

   a) A-4, B-3, C-2, D-1 b) A-2, B-3, C-1, D-4
   c) A-3, B-2, C-4, D-1 d) A A-3, B-4, C-2, D-1

5) On a single lane road with two-way traffic, the minimum stopping sight distance is equal to _____.
   a) stopping distance
   b) two times the stopping distance
   c) half the stopping distance
   d) three times the stopping distance

6) The maximum allowable Los Angeles abrasion value for high quality surface course is _____.
   a) 10% b) 20%
   c) 30% d) 45%

7) Maximum number of vehicles can be parked with _____.
   a) parallel parking b) 30^o angle parking
   c) 45^o angle parking d) 90^o angle parking

8) Essential requirement of soil properties which is used for subgrade construction are _____.
   a) LL to be less than 50% and PI to be less than 25
   b) LL to be less than 60% and PI to be less than 25
   c) LL to be less than 65% and PI to be less than 30
   d) LL to be less than 700% and PI to be less than 35

9) Which one of the following methods is generally considered the best for tunnel ventilation?
   a) Driving a drift through the tunnel
   b) 'Blow in' method
   c) 'Blowout' method
   d) Combination of 'Blow in' and 'Blowout' methods

10) Equivalent radius of resisting section for 20cm thick slab, given that the radius of contact area of wheel load is 15cm is _____.
   a) 15.07cm b) 14.07cm
   c) 16.07cm d) 17.07cm

11) Critical combination of stresses at edge in rigid pavement during summer mid-day are, _____.
   a) Load Stress-Warping stress-frictional stress
   b) Load stress+Warping stress+frictional stress
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12) The main objective of prime coat is, _____.
   a) Penetrate deep in to the pavement surface and plug the voids
   b) Coat and bond the loose particles on the surface
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   d) All the above

13) In construction of GSB layer, the rolling is done, _____.
   a) Starting from the center and towards edge
   b) Starting from the center and ends at center
   c) Starting from the lower edge and proceeded towards the center
   d) None of these

14) In order to justify the proposed improvement, the benefit-cost ratio should be _____.
   a) Less than 1.0 b) Greater than 1.0
   c) Between 0 to 1 d) Less than 0.5

Seat No.		Set	P

T. E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any TWO (7 marks each)

a) Calculate the safe overtaking sight distance from the following data for one way and two-way traffic. **07**
1) Speed of overtaking vehicle = 96 kmph.
2) Speed of overtaken vehicle = 22 kmph.
3) Reaction time of driver = 2 sec.
4) Rate of acceleration = 2.5 kmph/sec

b) A radius of 250 m has to be provided at a locality due to site restrictions on a National Highway with design speed 100 kmph. Design the super elevation. Should there be any restriction in speed? **07**

c) Write a detailed note on "Origin and Destination studies". **07**

Q.3 Solve any TWO (7 marks each)

a) Discuss different factors that affect highway alignment with neat sketch. **07**

b) Define camber. State its different types and values adopted under different road conditions. **07**

c) What is highway drainage? How it is carried out? **07**

Section – II

Q.4 Answer any two questions (7 marks each) **14**

a) Enumerate the construction steps of Bituminous Concrete pavement.

b) Determine the warping stresses at interior, edge and corner of a 25cm thick cement concrete pavement with transverse joints at 5.0m interval and longitudinal joints at 3.6m intervals. The modulus of subgrade reaction K is 6.9kg/cm^3 and radius of loaded area is 15cm. Assume temperature differential during day to be 0.6^{o}C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4^{o}C per cm slab thickness during the night (for warping stress at the corner). Assume e=10x10^{-6}per ^{o}C, E=3x10^5 kg/cm^2, μ=0.15.
Use Bradbury chart given in **Figure-I.**

c) Design the flexible pavement using IRC guidelines for the following data.
Input data:
1) Initial Traffic in each direction on counting year, N = 184 CV/day.
2) Construction period since last traffic count, x = 2 Years
3) Design Life of pavement to be considered, n = 15 Years.
4) Design CBR of Subgrade soil to be employed, = 5%.
5) Traffic Growth Rate, r = 7.5 %.
6) Vehicle Damage Factor as per axle load survey, F = 3.5.
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-3 to 5 of IRC-37-2012.

Q.5 Answer any two questions (7 marks each) **14**

a) Compare the annual costs of a 2-lane road for two types of pavement structures:

1) WBM with thin bituminous surface at total cost of Rs. 108 lakhs per km, life of 5 years, interest at 10%, salvage value of Rs. 10 lakhs after 5 years, annual average maintenance cost of Rs. 0.35 lakhs per km and

2) Bituminous Macadam Base and bituminous concrete surface, total cost of Rs. 197 Lakhs, life of 15 years, interest at 8%, salvage value of 25 lakhs at the end of 15 years, annual average maintenance cost of Rs. 0.75 lakhs per km.

b) State methods of tunneling in soft rock. Explain with sketch any one method.

c) Write short notes on:

1) DBFOT concept

2) Tunnel Lining

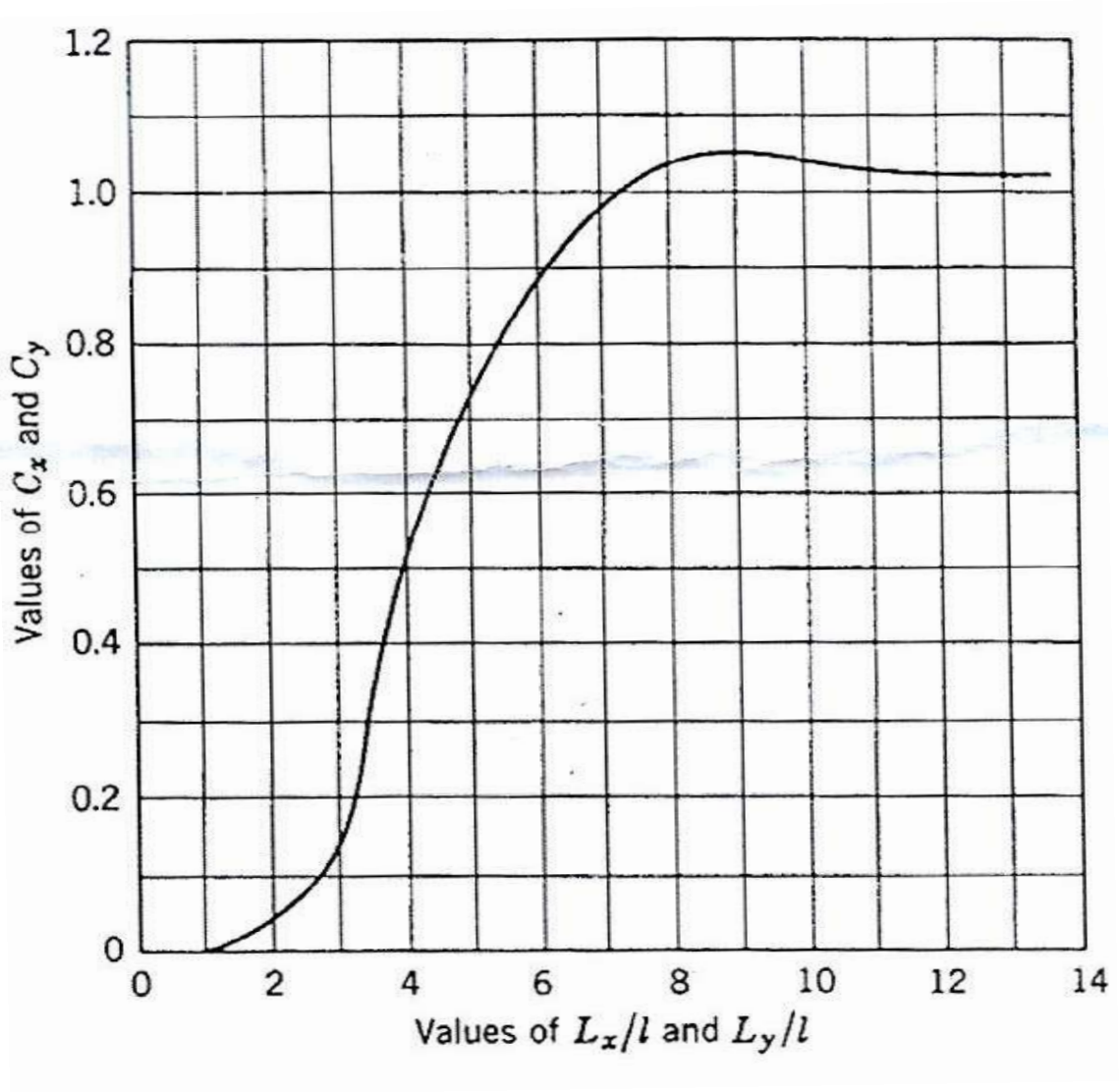

Figure-1

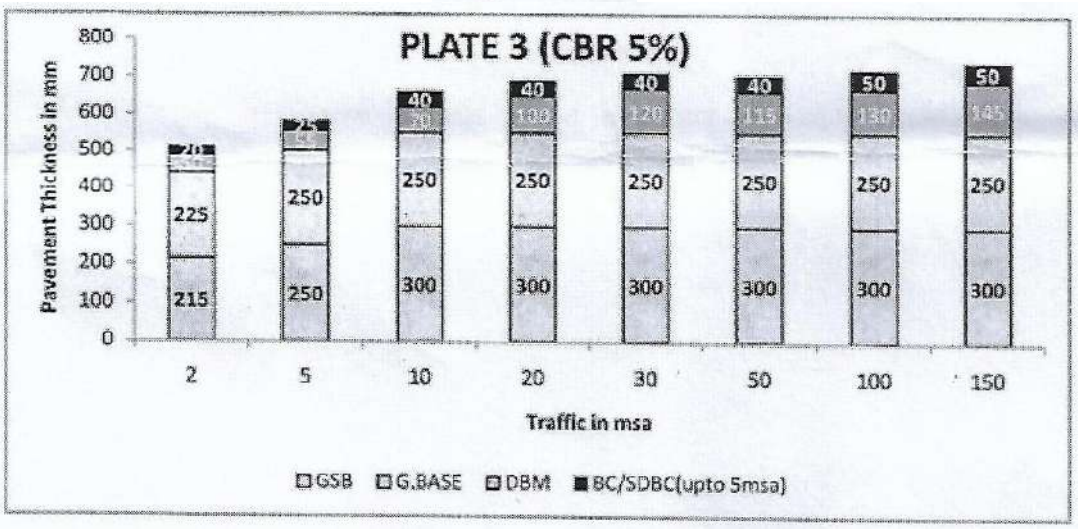
PLATE 3 (CBR 5%)
Pavement Thickness in mm
800
700
600
500
400
300
200
100
0
225
215
250
250
250
300
250
300
250
300
250
300
250
300
250
300
40
40
40
40
50
50
2
5
10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

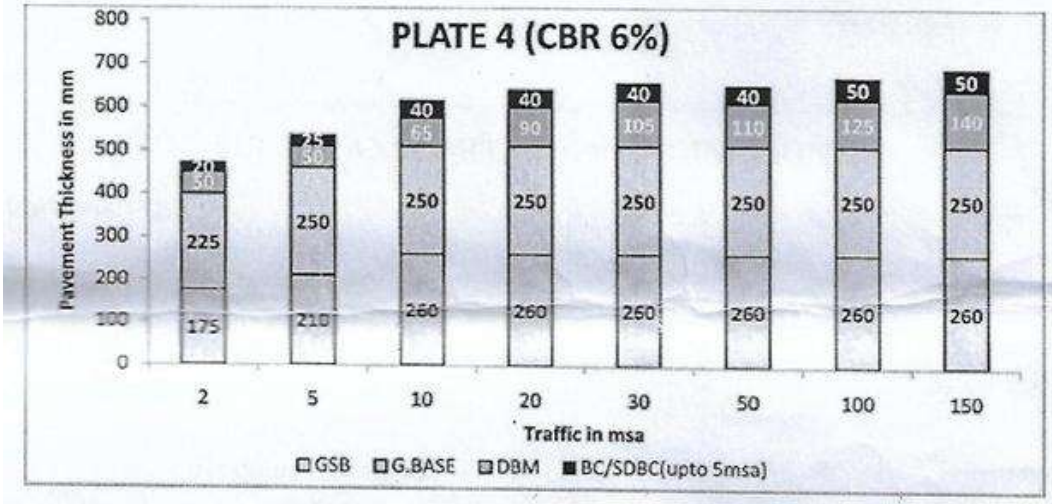
PLATE 4 (CBR 6%)
Pavement Thickness in mm
800
700
600
500
400
300
200
100
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225
175
250
210
250
260
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Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

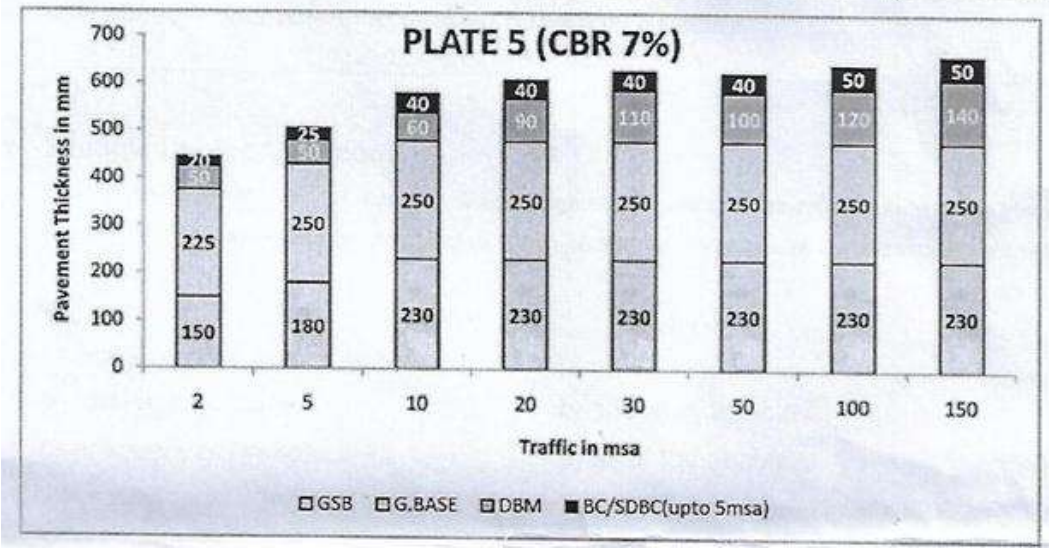
PLATE 5 (CBR 7%)
Pavement Thickness in mm
700
600
500
400
300
200
100
0
225
150
250
180
250
230
250
230
250
230
250
230
250
230
250
230
40
40
40
40
50
50
2
5
10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

Seat No.	

Set **Q**

T. E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Essential requirement of soil properties which is used for subgrade construction are _____.
   a) LL to be less than 50% and PI to be less than 25
   b) LL to be less than 60% and PI to be less than 25
   c) LL to be less than 65% and PI to be less than 30
   d) LL to be less than 700% and PI to be less than 35

2) Which one of the following methods is generally considered the best for tunnel ventilation?
   a) Driving a drift through the tunnel
   b) 'Blow in' method
   c) 'Blowout' method
   d) Combination of 'Blow in' and 'Blowout' methods

3) Equivalent radius of resisting section for 20cm thick slab, given that the radius of contact area of wheel load is 15cm is _____.
   a) 15.07cm b) 14.07cm
   c) 16.07cm d) 17.07cm

4) Critical combination of stresses at edge in rigid pavement during summer mid-day are, _____.
   a) Load Stress-Warping stress-frictional stress
   b) Load stress+Warping stress+frictional stress
   c) Load stress +Warping stress-frictional stress
   d) Load Stress-Warping stress +frictional stress

5) The main objective of prime coat is, _____.
   a) Penetrate deep in to the pavement surface and plug the voids
   b) Coat and bond the loose particles on the surface
   c) Render the surface of the base course water resistant
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6) In construction of GSB layer, the rolling is done, _____.
   a) Starting from the center and towards edge
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7) In order to justify the proposed improvement, the benefit-cost ratio should be _____.
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   c) Between 0 to 1 d) Less than 0.5

8) In a district where the rainfall is heavy, a state highway of high type bituminous concrete surface pavement 7.0 m wide is to be constructed. What should be the height of the crown with respect to the edges?
   a) 0.087 m b) 0.05 m
   c) 0.07 m d) 0.06 m

9) The stopping sight distance depends upon _____.
   a) total reaction time b) speed of vehicle
   c) efficiency of brakes d) all of the above

10) When the path travelled along the road surface is more than the circumferential movement of the wheels due to rotation, then it results in _____.
   a) Slipping b) Skidding
   c) Turning d) Revolving

11) Match List-I with List-II and select the correct answer using the codes given below the lists.

List -1		**List -1**	
A	Penetration Test	**1**	Overlay Design
B	Marshal Test	**2**	Determination of Softening Point
C	Ring and Ball Test	**3**	Gradation of asphalt cement
D	Benkelman Beam Test	**4**	Design of bituminous concrete mix

   a) A-4, B-3, C-2, D-1 b) A-2, B-3, C-1, D-4
   c) A-3, B-2, C-4, D-1 d) A A-3, B-4, C-2, D-1

12) On a single lane road with two-way traffic, the minimum stopping sight distance is equal to _____.
   a) stopping distance
   b) two times the stopping distance
   c) half the stopping distance
   d) three times the stopping distance

13) The maximum allowable Los Angeles abrasion value for high quality surface course is _____.
   a) 10% b) 20%
   c) 30% d) 45%

14) Maximum number of vehicles can be parked with _____.
   a) parallel parking b) 30^o angle parking
   c) 45^o angle parking d) 90^o angle parking

Seat No.	

Set **Q**

T. E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any TWO (7 marks each)

a) Calculate the safe overtaking sight distance from the following data for one way and two-way traffic. **07**
1) Speed of overtaking vehicle = 96 kmph.
2) Speed of overtaken vehicle = 22 kmph.
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c) Write a detailed note on "Origin and Destination studies". **07**

Q.3 Solve any TWO (7 marks each)

a) Discuss different factors that affect highway alignment with neat sketch. **07**

b) Define camber. State its different types and values adopted under different road conditions. **07**

c) What is highway drainage? How it is carried out? **07**

Section – II

Q.4 Answer any two questions (7 marks each) **14**

a) Enumerate the construction steps of Bituminous Concrete pavement.

b) Determine the warping stresses at interior, edge and corner of a 25cm thick cement concrete pavement with transverse joints at 5.0m interval and longitudinal joints at 3.6m intervals. The modulus of subgrade reaction K is 6.9kg/cm^3 and radius of loaded area is 15cm. Assume temperature differential during day to be 0.6^{o}C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4^{o}C per cm slab thickness during the night (for warping stress at the corner). Assume e=10x10^{-6}per ^{o}C, E=3x10^5 kg/cm^2, μ=0.15.
Use Bradbury chart given in **Figure-I.**

c) Design the flexible pavement using IRC guidelines for the following data.
Input data:
1) Initial Traffic in each direction on counting year, N = 184 CV/day.
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4) Design CBR of Subgrade soil to be employed, = 5%.
5) Traffic Growth Rate, r = 7.5 %.
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7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-3 to 5 of IRC-37-2012.

Q.5 Answer any two questions (7 marks each) **14**

a) Compare the annual costs of a 2-lane road for two types of pavement structures:

1) WBM with thin bituminous surface at total cost of Rs. 108 lakhs per km, life of 5 years, interest at 10%, salvage value of Rs. 10 lakhs after 5 years, annual average maintenance cost of Rs. 0.35 lakhs per km and

2) Bituminous Macadam Base and bituminous concrete surface, total cost of Rs. 197 Lakhs, life of 15 years, interest at 8%, salvage value of 25 lakhs at the end of 15 years, annual average maintenance cost of Rs. 0.75 lakhs per km.

b) State methods of tunneling in soft rock. Explain with sketch any one method.

c) Write short notes on:

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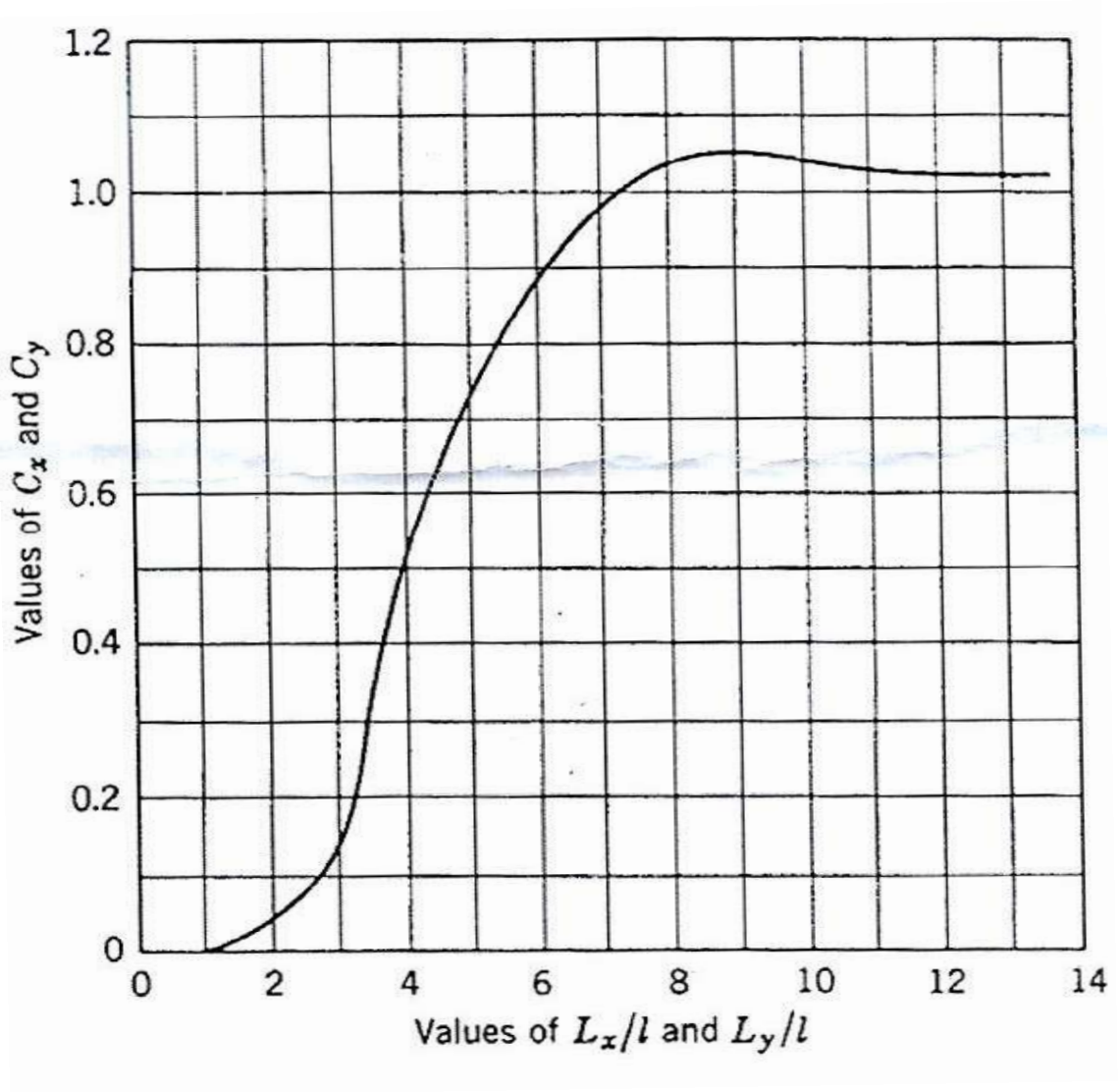

Figure-1

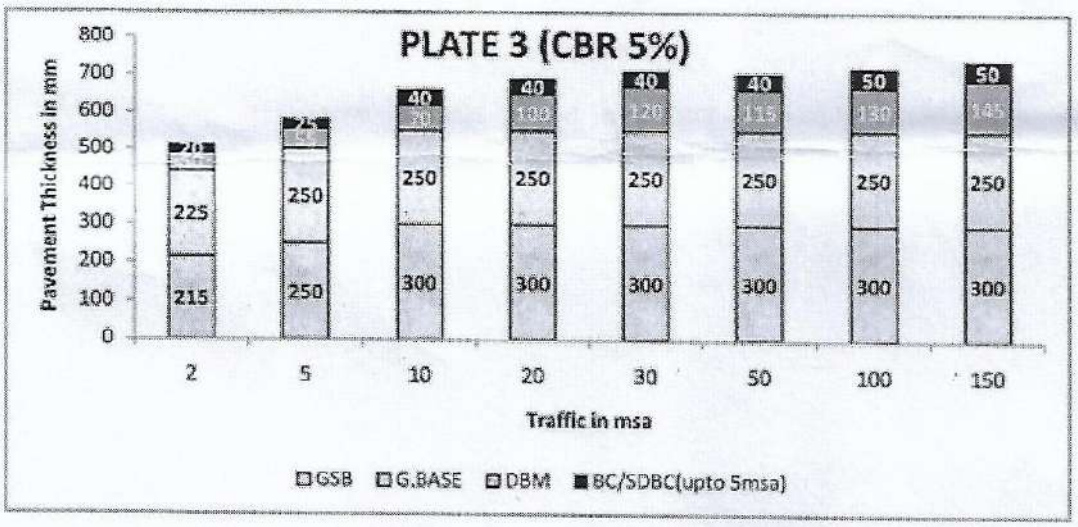
PLATE 3 (CBR 5%)
Pavement Thickness in mm
800
700
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150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

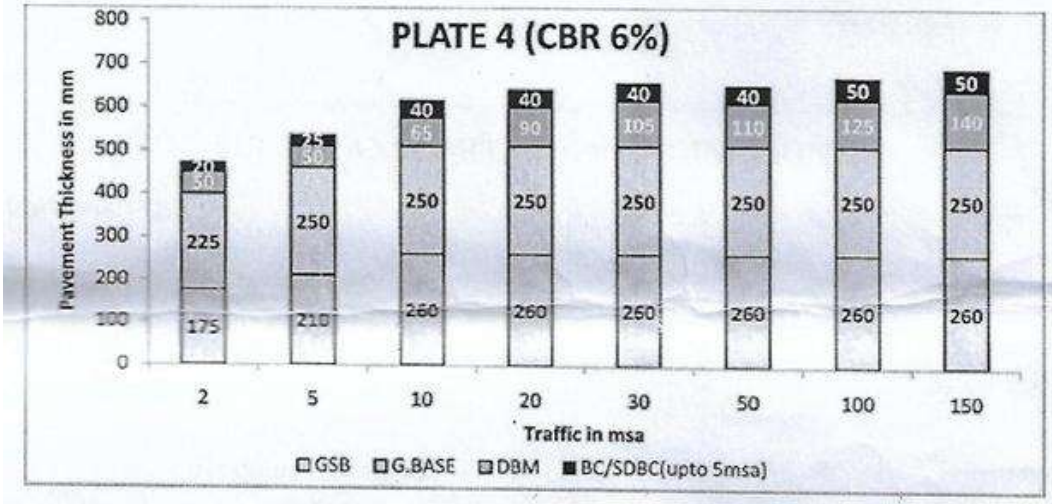
PLATE 4 (CBR 6%)
Pavement Thickness in mm
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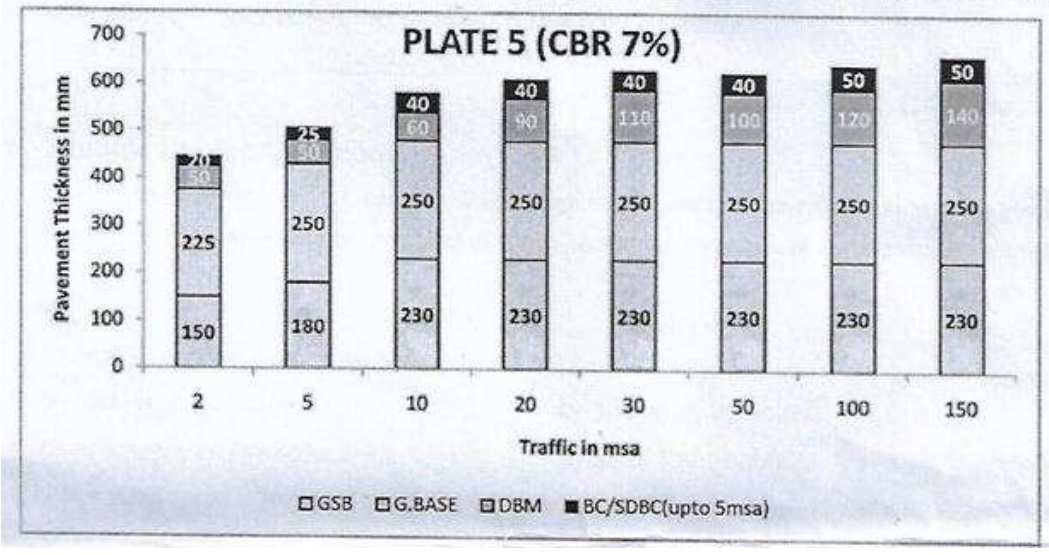
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)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40
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40
40
50
50
2
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10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

Seat No.	

Set **R**

T. E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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1) On a single lane road with two-way traffic, the minimum stopping sight distance is equal to _____.
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Seat No.	

Set **R**

T. E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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a) Discuss different factors that affect highway alignment with neat sketch. **07**

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Section – II

Q.4 Answer any two questions (7 marks each) **14**

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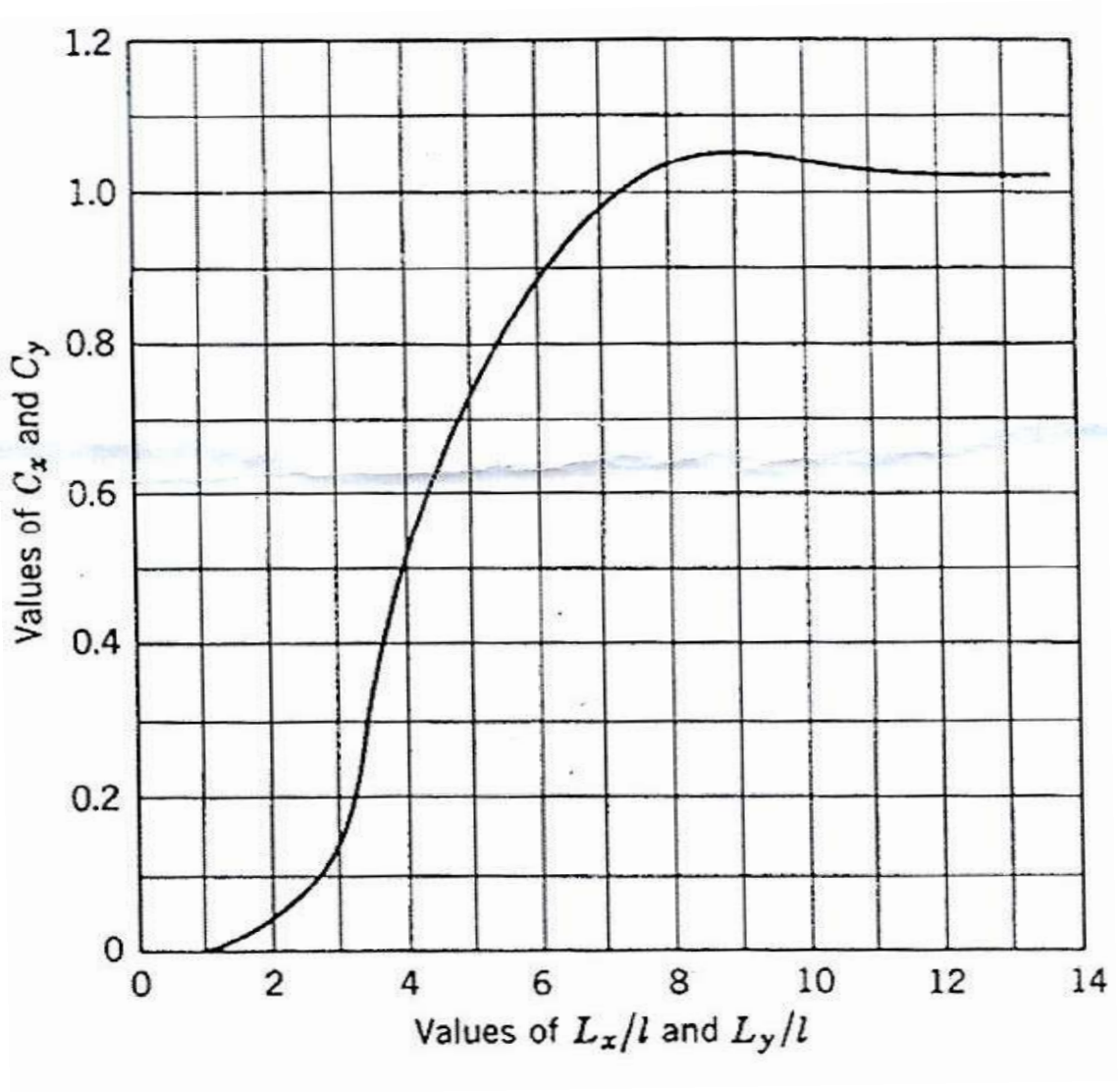

Figure-1

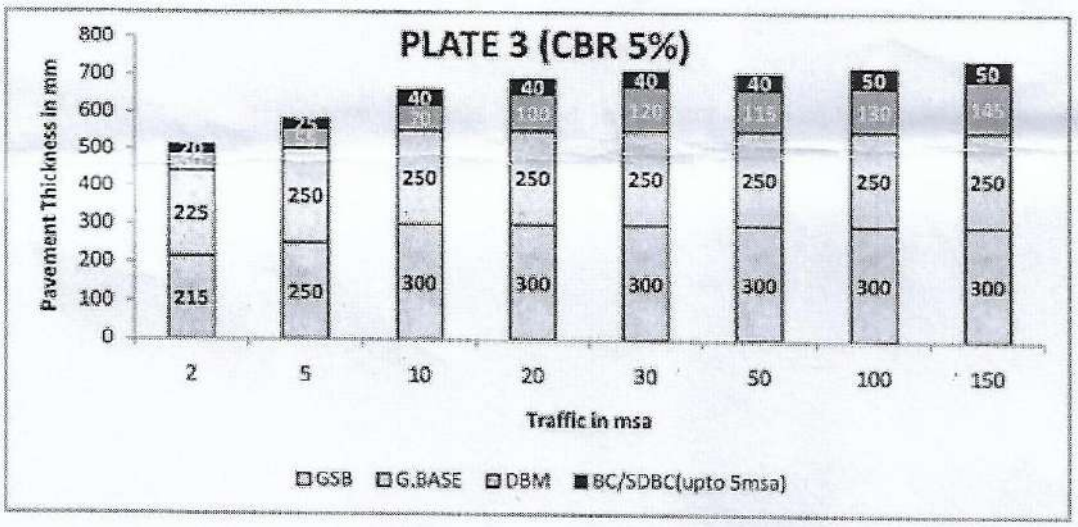
PLATE 3 (CBR 5%)
Pavement Thickness in mm
800
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Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

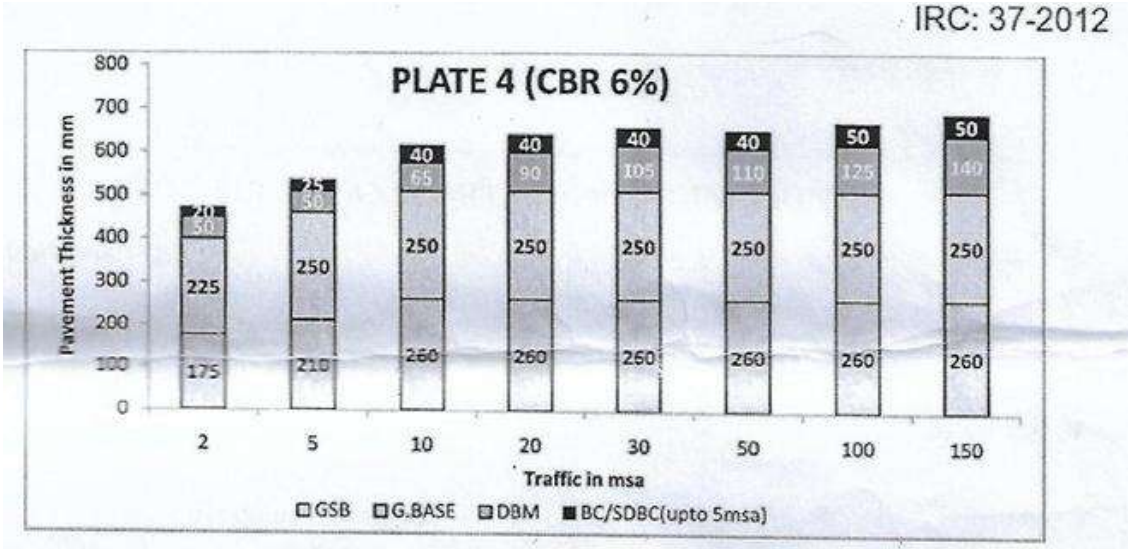
PLATE 4 (CBR 6%)
Pavement Thickness in mm
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Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

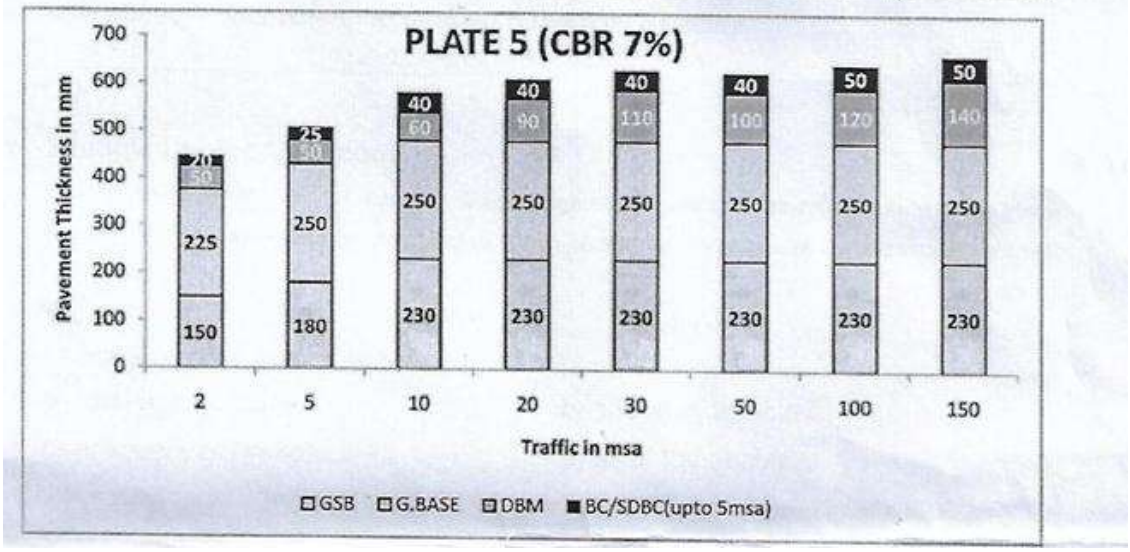
PLATE 5 (CBR 7%)
Pavement Thickness in mm
700
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40
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50
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2
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10
20
30
50
100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

Seat No.	

Set **S**

T. E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Equivalent radius of resisting section for 20cm thick slab, given that the radius of contact area of wheel load is 15cm is _____.
   a) 15.07cm b) 14.07cm
   c) 16.07cm d) 17.07cm

2) Critical combination of stresses at edge in rigid pavement during summer mid-day are, _____.
   a) Load Stress-Warping stress-frictional stress
   b) Load stress+Warping stress+frictional stress
   c) Load stress +Warping stress-frictional stress
   d) Load Stress-Warping stress +frictional stress

3) The main objective of prime coat is, _____.
   a) Penetrate deep in to the pavement surface and plug the voids
   b) Coat and bond the loose particles on the surface
   c) Render the surface of the base course water resistant
   d) All the above

4) In construction of GSB layer, the rolling is done, _____.
   a) Starting from the center and towards edge
   b) Starting from the center and ends at center
   c) Starting from the lower edge and proceeded towards the center
   d) None of these

5) In order to justify the proposed improvement, the benefit-cost ratio should be _____.
   a) Less than 1.0 b) Greater than 1.0
   c) Between 0 to 1 d) Less than 0.5

6) In a district where the rainfall is heavy, a state highway of high type bituminous concrete surface pavement 7.0 m wide is to be constructed. What should be the height of the crown with respect to the edges?
   a) 0.087 m b) 0.05 m
   c) 0.07 m d) 0.06 m

7) The stopping sight distance depends upon _____.
   a) total reaction time b) speed of vehicle
   c) efficiency of brakes d) all of the above

8) When the path travelled along the road surface is more than the circumferential movement of the wheels due to rotation, then it results in _____.
   a) Slipping
   b) Skidding
   c) Turning
   d) Revolving

9) Match List-I with List-II and select the correct answer using the codes given below the lists.

List -1		List -1	
A	Penetration Test	**1**	Overlay Design
B	Marshal Test	**2**	Determination of Softening Point
C	Ring and Ball Test	**3**	Gradation of asphalt cement
D	Benkelman Beam Test	**4**	Design of bituminous concrete mix

   a) A-4, B-3, C-2, D-1
   b) A-2, B-3, C-1, D-4
   c) A-3, B-2, C-4, D-1
   d) A A-3, B-4, C-2, D-1

10) On a single lane road with two-way traffic, the minimum stopping sight distance is equal to _____.
   a) stopping distance
   b) two times the stopping distance
   c) half the stopping distance
   d) three times the stopping distance

11) The maximum allowable Los Angeles abrasion value for high quality surface course is _____.
   a) 10%
   b) 20%
   c) 30%
   d) 45%

12) Maximum number of vehicles can be parked with _____.
   a) parallel parking
   b) 30^{o} angle parking
   c) 45^{o} angle parking
   d) 90^{o} angle parking

13) Essential requirement of soil properties which is used for subgrade construction are _____.
   a) LL to be less than 50% and PI to be less than 25
   b) LL to be less than 60% and PI to be less than 25
   c) LL to be less than 65% and PI to be less than 30
   d) LL to be less than 700% and PI to be less than 35

14) Which one of the following methods is generally considered the best for tunnel ventilation?
   a) Driving a drift through the tunnel
   b) ‘Blow in’ method
   c) ‘Blowout’ method
   d) Combination of ‘Blow in’ and ‘Blowout’ methods

Seat No.		Set	S

T. E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRANSPORTATION ENGINEERING – I

Day & Date: Monday,16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any TWO (7 marks each)

a) Calculate the safe overtaking sight distance from the following data for one way and two-way traffic. **07**
1) Speed of overtaking vehicle = 96 kmph.
2) Speed of overtaken vehicle = 22 kmph.
3) Reaction time of driver = 2 sec.
4) Rate of acceleration = 2.5 kmph/sec

b) A radius of 250 m has to be provided at a locality due to site restrictions on a National Highway with design speed 100 kmph. Design the super elevation. Should there be any restriction in speed? **07**

c) Write a detailed note on "Origin and Destination studies". **07**

Q.3 Solve any TWO (7 marks each)

a) Discuss different factors that affect highway alignment with neat sketch. **07**

b) Define camber. State its different types and values adopted under different road conditions. **07**

c) What is highway drainage? How it is carried out? **07**

Section – II

Q.4 Answer any two questions (7 marks each) **14**

a) Enumerate the construction steps of Bituminous Concrete pavement.

b) Determine the warping stresses at interior, edge and corner of a 25cm thick cement concrete pavement with transverse joints at 5.0m interval and longitudinal joints at 3.6m intervals. The modulus of subgrade reaction K is 6.9kg/cm^3 and radius of loaded area is 15cm. Assume temperature differential during day to be 0.6^{o}C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4^{o}C per cm slab thickness during the night (for warping stress at the corner). Assume e=10x10^{-6}per ^{o}C, E=3x10^5 kg/cm^2, μ=0.15.
Use Bradbury chart given in **Figure-I.**

c) Design the flexible pavement using IRC guidelines for the following data.
Input data:
1) Initial Traffic in each direction on counting year, N = 184 CV/day.
2) Construction period since last traffic count, x = 2 Years
3) Design Life of pavement to be considered, n = 15 Years.
4) Design CBR of Subgrade soil to be employed, = 5%.
5) Traffic Growth Rate, r = 7.5 %.
6) Vehicle Damage Factor as per axle load survey, F = 3.5.
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-3 to 5 of IRC-37-2012.

Q.5 Answer any two questions (7 marks each) **14**

a) Compare the annual costs of a 2-lane road for two types of pavement structures:

1) WBM with thin bituminous surface at total cost of Rs. 108 lakhs per km, life of 5 years, interest at 10%, salvage value of Rs. 10 lakhs after 5 years, annual average maintenance cost of Rs. 0.35 lakhs per km and

2) Bituminous Macadam Base and bituminous concrete surface, total cost of Rs. 197 Lakhs, life of 15 years, interest at 8%, salvage value of 25 lakhs at the end of 15 years, annual average maintenance cost of Rs. 0.75 lakhs per km.

b) State methods of tunneling in soft rock. Explain with sketch any one method.

c) Write short notes on:

1) DBFOT concept

2) Tunnel Lining

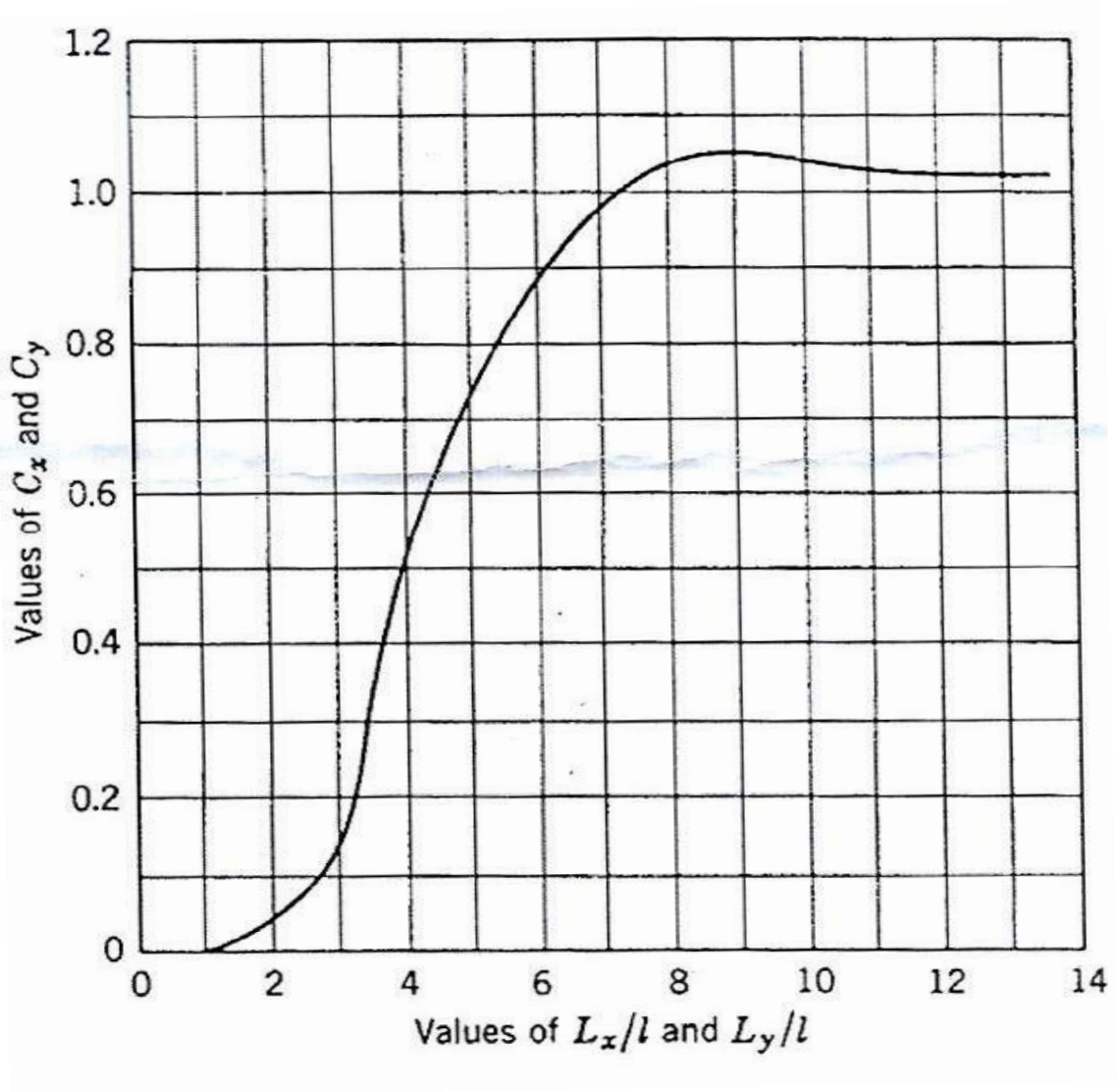

Figure-1

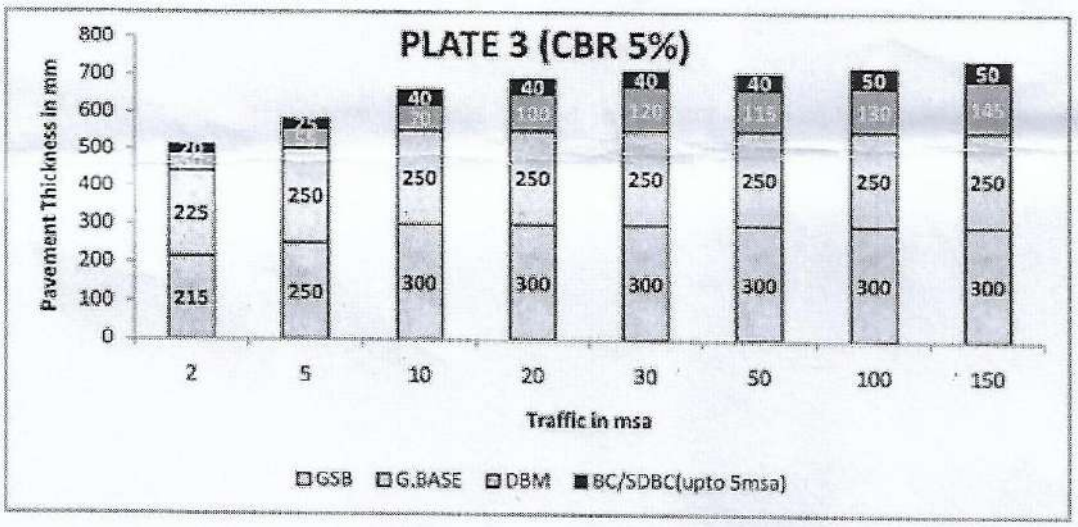
PLATE 3 (CBR 5%)
Pavement Thickness in mm
800
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150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

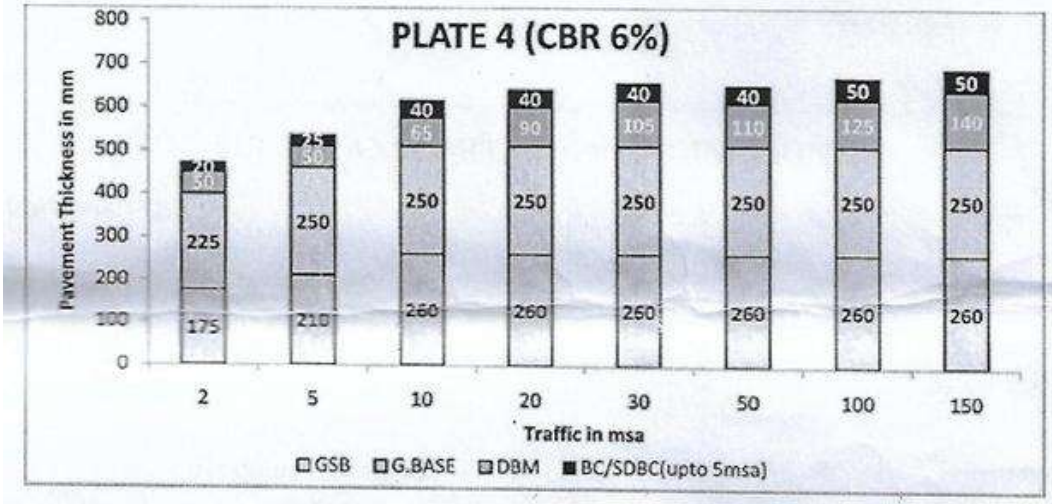
PLATE 4 (CBR 6%)
Pavement Thickness in mm
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Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

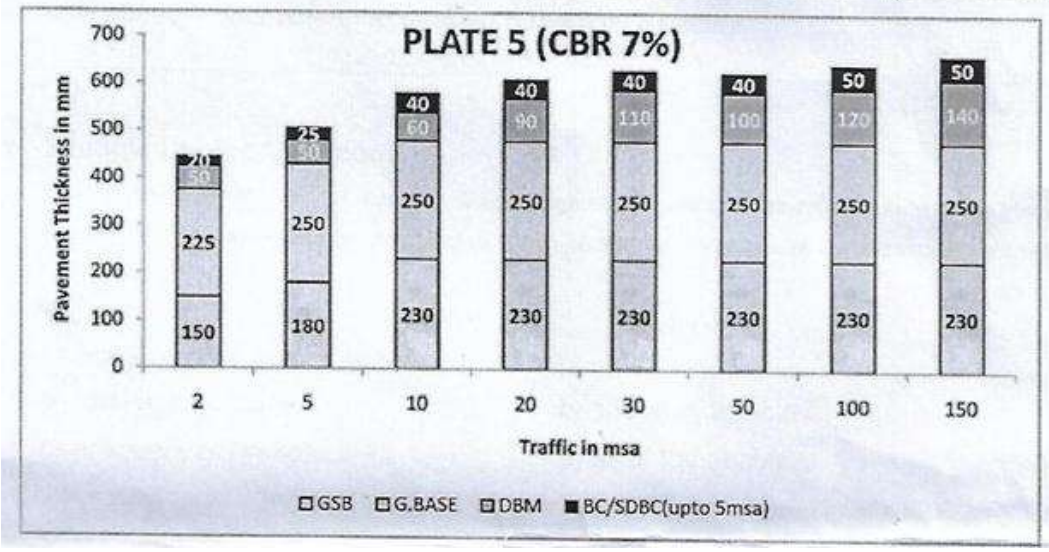
PLATE 5 (CBR 7%)
Pavement Thickness in mm
700
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100
150
Traffic in msa
GSB
G.BASE
DBM
BC/SDBC(upto 5msa)

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING & DESIGN

Day & Date: Wednesday, 18-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Suitable assumptions if necessary and state them clearly

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statement is correct or incorrect. 14

1) ICU in hospital means Intensive Care Unit.
2) Minimum width of a door opening in a school is 1.0m.
3) The horizontal angle of vision should not be greater than 20^0.
4) The slope for floor of Auditorium/Cinema theatre may be with an inclination of 8^0 to 15^0 from frontside.
5) The desirable sound intensity inside a hotel room is less than 45 dB.
6) The plan of a cinema theatre should be such that the walls converge towards the screen.
7) The desirable maximum distance between last row and the screen when no sound reflectors are provided is 23m.
8) In one point perspective only two sides of object is of true dimension in perspective view.
9) The vertical angle of vision should not be greater than 20^0.
10) Echo is dullsound.
11) The minimum clearance between the bed and the side wall is 300mm.
12) Reverberation is desirable to add to the musical quality.
13) Passage/corridor width in Primary Health Centre range from 0.5m to1.0m.
14) Height of counter in post office should range from 1.6m to 1.8m

Seat No.		Set	P

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING & DESIGN

Day & Date: Wednesday, 18-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Retain all projection/construction lines on drawing sheet.
3) Assume suitable data wherever necessary and mention it clearly.
4) Figure to right indicate full marks.
5) Use answer book for section II
6) Use both sides of full imperial drawing sheet for section - I

Section – I

Q.2 **a)** It is proposed to construct at wostoreyed shopping complex with the following data **16**
1) Entrance: 20 to 30sq.m.
2) Bigshops: 6nos.30 to 40sq.m.each
3) Smallshops: 8nos.20sq.m.each
4) Facility center: 4nos
5) Separate sanitary blocks for ladies and gents
6) Staircase for future expansion
7) Passages 2 to 2.5 wide.

b) The building is R.C.C framed structure. Assume additional data if required and mention it clearly. **12**
Draw
1) A detailed plan (scale 1:100)
2) A sectional elevation passing through sanitary block sand stair case (Scale1:100).

Section – II

Q.3 **Attempt any four of the following** **28**
a) Explain in brief “Green Building”.
b) Write a note on any two methods of sound insulation for RCC public building with neat sketch.
c) Explain the importance of AUTOCAD and describe any four commands of CAD.
d) Explain the Sabine's formula and reverberation.
e) What should be the consideration in planning of building for fire protection?
f) Explain in brief “types of fireload”.

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING & DESIGN

Day & Date: Wednesday, 18-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Suitable assumptions if necessary and state them clearly

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statement is correct or incorrect. 14

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2) The vertical angle of vision should not be greater than 20^0.
3) Echo is dullsound.
4) The minimum clearance between the bed and the side wall is 300mm.
5) Reverberation is desirable to add to the musical quality.
6) Passage/corridor width in Primary Health Centre range from 0.5m to1.0m.
7) Height of counter in post office should range from 1.6m to 1.8m
8) ICU in hospital means Intensive Care Unit.
9) Minimum width of a door opening in a school is 1.0m.
10) The horizontal angle of vision should not be greater than 20^0.
11) The slope for floor of Auditorium/Cinema theatre may be with an inclination of 8^0 to 15^0 from frontside.
12) The desirable sound intensity inside a hotel room is less than 45 dB.
13) The plan of a cinema theatre should be such that the walls converge towards the screen.
14) The desirable maximum distance between last row and the screen when no sound reflectors are provided is 23m.

Seat No.	

Set | Q

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING & DESIGN

Day & Date: Wednesday, 18-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Retain all projection/construction lines on drawing sheet.
3) Assume suitable data wherever necessary and mention it clearly.
4) Figure to right indicate full marks.
5) Use answer book for section II
6) Use both sides of full imperial drawing sheet for section - I

Section – I

Q.2 **a)** It is proposed to construct at wostoreyed shopping complex with the following data **16**
1) Entrance: 20 to 30sq.m.
2) Bigshops: 6nos.30 to 40sq.m.each
3) Smallshops: 8nos.20sq.m.each
4) Facility center: 4nos
5) Separate sanitary blocks for ladies and gents
6) Staircase for future expansion
7) Passages 2 to 2.5 wide.

b) The building is R.C.C framed structure. Assume additional data if required and mention it clearly. **12**
Draw
1) A detailed plan (scale 1:100)
2) A sectional elevation passing through sanitary block sand stair case (Scale1:100).

Section – II

Q.3 **Attempt any four of the following** **28**
a) Explain in brief “Green Building”.
b) Write a note on any two methods of sound insulation for RCC public building with neat sketch.
c) Explain the importance of AUTOCAD and describe any four commands of CAD.
d) Explain the Sabine's formula and reverberation.
e) What should be the consideration in planning of building for fire protection?
f) Explain in brief “types of fireload”.

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING & DESIGN

Day & Date: Wednesday, 18-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Suitable assumptions if necessary and state them clearly

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statement is correct or incorrect. **14**

1) The desirable sound intensity inside a hotel room is less than 45 dB.
2) The plan of a cinema theatre should be such that the walls converge towards the screen.
3) The desirable maximum distance between last row and the screen when no sound reflectors are provided is 23m.
4) In one point perspective only two sides of object is of true dimension in perspective view.
5) The vertical angle of vision should not be greater than 20^0.
6) Echo is dullsound.
7) The minimum clearance between the bed and the side wall is 300mm.
8) Reverberation is desirable to add to the musical quality.
9) Passage/corridor width in Primary Health Centre range from 0.5m to1.0m.
10) Height of counter in post office should range from 1.6m to 1.8m
11) ICU in hospital means Intensive Care Unit.
12) Minimum width of a door opening in a school is 1.0m.
13) The horizontal angle of vision should not be greater than 20^0.
14) The slope for floor of Auditorium/Cinema theatre may be with an inclination of 8^0 to 15^0 from frontside.

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING & DESIGN

Day & Date: Wednesday, 18-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Retain all projection/construction lines on drawing sheet.
3) Assume suitable data wherever necessary and mention it clearly.
4) Figure to right indicate full marks.
5) Use answer book for section II
6) Use both sides of full imperial drawing sheet for section - I

Section – I

Q.2 **a)** It is proposed to construct at wostoreyed shopping complex with the following data **16**
1) Entrance: 20 to 30sq.m.
2) Bigshops: 6nos.30 to 40sq.m.each
3) Smallshops: 8nos.20sq.m.each
4) Facility center: 4nos
5) Separate sanitary blocks for ladies and gents
6) Staircase for future expansion
7) Passages 2 to 2.5 wide.

b) The building is R.C.C framed structure. Assume additional data if required and mention it clearly. **12**
Draw
1) A detailed plan (scale 1:100)
2) A sectional elevation passing through sanitary block sand stair case (Scale1:100).

Section – II

Q.3 **Attempt any four of the following** **28**
a) Explain in brief “Green Building”.
b) Write a note on any two methods of sound insulation for RCC public building with neat sketch.
c) Explain the importance of AUTOCAD and describe any four commands of CAD.
d) Explain the Sabine's formula and reverberation.
e) What should be the consideration in planning of building for fire protection?
f) Explain in brief “types of fireload”.

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING & DESIGN

Day & Date: Wednesday, 18-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Suitable assumptions if necessary and state them clearly

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 State whether following statement is correct or incorrect. 14

1) Echo is dullsound.
2) The minimum clearance between the bed and the side wall is 300mm.
3) Reverberation is desirable to add to the musical quality.
4) Passage/corridor width in Primary Health Centre range from 0.5m to1.0m.
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10) The desirable sound intensity inside a hotel room is less than 45 dB.
11) The plan of a cinema theatre should be such that the walls converge towards the screen.
12) The desirable maximum distance between last row and the screen when no sound reflectors are provided is 23m.
13) In one point perspective only two sides of object is of true dimension in perspective view.
14) The vertical angle of vision should not be greater than 20^0.

Seat No.		Set	S

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
BUILDING PLANNING & DESIGN

Day & Date: Wednesday, 18-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) All questions are compulsory.
2) Retain all projection/construction lines on drawing sheet.
3) Assume suitable data wherever necessary and mention it clearly.
4) Figure to right indicate full marks.
5) Use answer book for section II
6) Use both sides of full imperial drawing sheet for section - I

Section – I

Q.2 **a)** It is proposed to construct at wostoreyed shopping complex with the following data **16**
1) Entrance: 20 to 30sq.m.
2) Bigshops: 6nos.30 to 40sq.m.each
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7) Passages 2 to 2.5 wide.

b) The building is R.C.C framed structure. Assume additional data if required and mention it clearly. **12**
Draw
1) A detailed plan (scale 1:100)
2) A sectional elevation passing through sanitary block sand stair case (Scale1:100).

Section – II

Q.3 **Attempt any four of the following** **28**
a) Explain in brief “Green Building”.
b) Write a note on any two methods of sound insulation for RCC public building with neat sketch.
c) Explain the importance of AUTOCAD and describe any four commands of CAD.
d) Explain the Sabine's formula and reverberation.
e) What should be the consideration in planning of building for fire protection?
f) Explain in brief “types of fireload”.

SLR-FM-638

Seat No.	

Set P

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures to the right indicate full marks.

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) The term sociology was given by _____.
   a) Herbert Spencer b) August Comte
   c) Karl Marx d) Max Weber

2) Status and _____ are interrelated and interdepended.
   a) Position b) Function
   c) Role d) Person

3) Urban society is _____.
   a) Heterogeneous b) Homogeneous
   c) Cultural d) Normative

4) A family is _____ unit.
   a) Social b) Bilateral
   c) Cultural d) Unilateral

5) Castes are _____ groups.
   a) Religious b) Formal
   c) Exogamous d) Endogamous

6) The term Sanskritization was given by _____.
   a) Ghurye b) Mukherjee
   c) Sriniwas d) Dr. Ambedkar

7) The directions of social change are _____.
   a) Uncertain b) Certain
   c) Positive d) Negative

8) A Social movement runs with _____.
   a) Media b) Ideology
   c) Government d) Philosophy

9) The process of socialization initiates at _____ stage.
   a) Anal b) Oral
   c) Oedipal d) Adult

10) Environmental science is the study of _____.
   a) Nature b) Society
   c) Diversity d) Srroundings

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Write answer on any Four of the following: **16**

a) Explain the meaning and elements of social structure.
b) Discuss on demographic features of India.
c) Elucidate nature and types of social institutions.
d) Explain the nature and process of social change.
e) Give and account of nature and types of social movements.
f) What is Human Ecology?

Q.3 **a)** Explain the environmental changes and related development in India. **12**

OR

b) What are the agencies of socialization?

Q.4 What the conventional characteristics of caste in India? **12**

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures to the right indicate full marks.

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) The term Sanskritization was given by _____.
   a) Ghurye b) Mukherjee
   c) Sriniwas d) Dr. Ambedkar

2) The directions of social change are _____.
   a) Uncertain b) Certain
   c) Positive d) Negative

3) A Social movement runs with _____.
   a) Media b) Ideology
   c) Government d) Philosophy

4) The process of socialization initiates at _____ stage.
   a) Anal b) Oral
   c) Oedipal d) Adult

5) Environmental science is the study of _____.
   a) Nature b) Society
   c) Diversity d) Srroundings

6) The term sociology was given by _____.
   a) Herbert Spencer b) August Comte
   c) Karl Marx d) Max Weber

7) Status and _____ are interrelated and interdepended.
   a) Position b) Function
   c) Role d) Person

8) Urban society is _____.
   a) Heterogeneous b) Homogeneous
   c) Cultural d) Normative

9) A family is _____ unit.
   a) Social b) Bilateral
   c) Cultural d) Unilateral

10) Castes are _____ groups.
   a) Religious b) Formal
   c) Exogamous d) Endogamous

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Write answer on any Four of the following: **16**

a) Explain the meaning and elements of social structure.
b) Discuss on demographic features of India.
c) Elucidate nature and types of social institutions.
d) Explain the nature and process of social change.
e) Give and account of nature and types of social movements.
f) What is Human Ecology?

Q.3 **a)** Explain the environmental changes and related development in India. **12**

OR

b) What are the agencies of socialization?

Q.4 What the conventional characteristics of caste in India? **12**

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures to the right indicate full marks.

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) The process of socialization initiates at _____ stage.
   a) Anal b) Oral
   c) Oedipal d) Adult

2) Environmental science is the study of _____.
   a) Nature b) Society
   c) Diversity d) Srroundings

3) The term sociology was given by _____.
   a) Herbert Spencer b) August Comte
   c) Karl Marx d) Max Weber

4) Status and _____ are interrelated and interdepended.
   a) Position b) Function
   c) Role d) Person

5) Urban society is _____.
   a) Heterogeneous b) Homogeneous
   c) Cultural d) Normative

6) A family is _____ unit.
   a) Social b) Bilateral
   c) Cultural d) Unilateral

7) Castes are _____ groups.
   a) Religious b) Formal
   c) Exogamous d) Endogamous

8) The term Sanskritization was given by _____.
   a) Ghurye b) Mukherjee
   c) Sriniwas d) Dr. Ambedkar

9) The directions of social change are _____.
   a) Uncertain b) Certain
   c) Positive d) Negative

10) A Social movement runs with _____.
   a) Media b) Ideology
   c) Government d) Philosophy

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Write answer on any Four of the following: **16**

a) Explain the meaning and elements of social structure.
b) Discuss on demographic features of India.
c) Elucidate nature and types of social institutions.
d) Explain the nature and process of social change.
e) Give and account of nature and types of social movements.
f) What is Human Ecology?

Q.3 **a)** Explain the environmental changes and related development in India. **12**

OR

b) What are the agencies of socialization?

Q.4 What the conventional characteristics of caste in India? **12**

Seat No.	

Set | S

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures to the right indicate full marks.

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Urban society is _____.
   a) Heterogeneous b) Homogeneous
   c) Cultural d) Normative

2) A family is _____ unit.
   a) Social b) Bilateral
   c) Cultural d) Unilateral

3) Castes are _____ groups.
   a) Religious b) Formal
   c) Exogamous d) Endogamous

4) The term Sanskritization was given by _____.
   a) Ghurye b) Mukherjee
   c) Sriniwas d) Dr. Ambedkar

5) The directions of social change are _____.
   a) Uncertain b) Certain
   c) Positive d) Negative

6) A Social movement runs with _____.
   a) Media b) Ideology
   c) Government d) Philosophy

7) The process of socialization initiates at _____ stage.
   a) Anal b) Oral
   c) Oedipal d) Adult

8) Environmental science is the study of _____.
   a) Nature b) Society
   c) Diversity d) Srroundings

9) The term sociology was given by _____.
   a) Herbert Spencer b) August Comte
   c) Karl Marx d) Max Weber

10) Status and _____ are interrelated and interdepended.
   a) Position b) Function
   c) Role d) Person

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
INTRODUCTION OF SOCIOLOGY

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Write answer on any Four of the following: **16**

a) Explain the meaning and elements of social structure.
b) Discuss on demographic features of India.
c) Elucidate nature and types of social institutions.
d) Explain the nature and process of social change.
e) Give and account of nature and types of social movements.
f) What is Human Ecology?

Q.3 **a)** Explain the environmental changes and related development in India. **12**

OR

b) What are the agencies of socialization?

Q.4 What the conventional characteristics of caste in India? **12**

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Morals are the welfare principles enunciated by the _____.
   a) Wise People b) Based on their experience
   c) Group of People d) None of Above

2) Ethics is the word that refers to _____.
   a) Human tendency b) Morals, values, and beliefs
   c) Only Values d) Psychology

3) The study on ethics helps to know the people's _____.
   a) Learn good or bad things b) Copyright
   c) Morality d) Beliefs, values, and morals

4) What is Integrity?
   a) Thought and words b) Honesty
   c) Moral d) 15 years

5) Work ethics is defined as a _____.
   a) Motivation
   b) Set of attitudes concerned with the value of work
   c) Attitude
   d) Values

6) Many complex social problems exist in the _____.
   a) Industry/ Business b) Society
   c) Home d) None of the above

7) Virtues are _____.
   a) Moral b) Ethics
   c) Values d) positive and preferred values

8) Honesty is a _____.
   a) Virtue b) Truthfulness
   c) T trustworthiness d) Communication

9) Courage is the tendency to accept and face _____.
   a) elf-confidence
   b) Risks and difficult tasks in rational ways
   c) Physical courage
   d) Social courage

10) Commitment means _____.
   a) Alignment to goals b) Adherence to ethical principles
   c) EMPATHY d) All the above

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 What are the Objectives of Engineering Ethics? **10**

Q.3 What is the Difference Between Moral and Ethics? **10**

OR

What is Value and Types of Values. **10**

Q.4 **Write short notes on any four** **20**

a) Moral
b) Ethics
c) Commitment
d) Integrity
e) Work Ethics
f) Virtues

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
SELF LEARNING (ALL BRANCH)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) Many complex social problems exist in the _____.
   a) Industry/ Business b) Society
   c) Home d) None of the above

2) Virtues are _____.
   a) Moral b) Ethics
   c) Values d) positive and preferred values

3) Honesty is a _____.
   a) Virtue b) Truthfulness
   c) T trustworthiness d) Communication

4) Courage is the tendency to accept and face _____.
   a) elf-confidence
   b) Risks and difficult tasks in rational ways
   c) Physical courage
   d) Social courage

5) Commitment means _____.
   a) Alignment to goals b) Adherence to ethical principles
   c) EMPATHY d) All the above

6) Morals are the welfare principles enunciated by the _____.
   a) Wise People b) Based on their experience
   c) Group of People d) None of Above

7) Ethics is the word that refers to _____.
   a) Human tendency b) Morals, values, and beliefs
   c) Only Values d) Psychology

8) The study on ethics helps to know the people's _____.
   a) Learn good or bad things b) Copyright
   c) Morality d) Beliefs, values, and morals

9) What is Integrity?
   a) Thought and words b) Honesty
   c) Moral d) 15 years

10) Work ethics is defined as a _____.
   a) Motivation
   b) Set of attitudes concerned with the value of work
   c) Attitude
   d) Values

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 What are the Objectives of Engineering Ethics? **10**

Q.3 What is the Difference Between Moral and Ethics? **10**

OR

What is Value and Types of Values. **10**

Q.4 **Write short notes on any four** **20**

a) Moral
b) Ethics
c) Commitment
d) Integrity
e) Work Ethics
f) Virtues

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
SELF LEARNING (ALL BRANCH)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) Courage is the tendency to accept and face _____.
   a) elf-confidence
   b) Risks and difficult tasks in rational ways
   c) Physical courage
   d) Social courage

2) Commitment means _____.
   a) Alignment to goals b) Adherence to ethical principles
   c) EMPATHY d) All the above

3) Morals are the welfare principles enunciated by the _____.
   a) Wise People b) Based on their experience
   c) Group of People d) None of Above

4) Ethics is the word that refers to _____.
   a) Human tendency b) Morals, values, and beliefs
   c) Only Values d) Psychology

5) The study on ethics helps to know the people's _____.
   a) Learn good or bad things b) Copyright
   c) Morality d) Beliefs, values, and morals

6) What is Integrity?
   a) Thought and words b) Honesty
   c) Moral d) 15 years

7) Work ethics is defined as a _____.
   a) Motivation
   b) Set of attitudes concerned with the value of work
   c) Attitude
   d) Values

8) Many complex social problems exist in the _____.
   a) Industry/ Business b) Society
   c) Home d) None of the above

9) Virtues are _____.
   a) Moral b) Ethics
   c) Values d) positive and preferred values

10) Honesty is a _____.
   a) Virtue b) Truthfulness
   c) T trustworthiness d) Communication

SLR-FM-639

Seat No.	

Set R

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 What are the Objectives of Engineering Ethics? **10**

Q.3 What is the Difference Between Moral and Ethics? **10**

OR

What is Value and Types of Values. **10**

Q.4 **Write short notes on any four** **20**

a) Moral
b) Ethics
c) Commitment
d) Integrity
e) Work Ethics
f) Virtues

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
SELF LEARNING (ALL BRANCH)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) The study on ethics helps to know the people's _____.
   a) Learn good or bad things b) Copyright
   c) Morality d) Beliefs, values, and morals

2) What is Integrity?
   a) Thought and words b) Honesty
   c) Moral d) 15 years

3) Work ethics is defined as a _____.
   a) Motivation
   b) Set of attitudes concerned with the value of work
   c) Attitude
   d) Values

4) Many complex social problems exist in the _____.
   a) Industry/ Business b) Society
   c) Home d) None of the above

5) Virtues are _____.
   a) Moral b) Ethics
   c) Values d) positive and preferred values

6) Honesty is a _____.
   a) Virtue b) Truthfulness
   c) T trustworthiness d) Communication

7) Courage is the tendency to accept and face _____.
   a) elf-confidence
   b) Risks and difficult tasks in rational ways
   c) Physical courage
   d) Social courage

8) Commitment means _____.
   a) Alignment to goals b) Adherence to ethical principles
   c) EMPATHY d) All the above

9) Morals are the welfare principles enunciated by the _____.
   a) Wise People b) Based on their experience
   c) Group of People d) None of Above

10) Ethics is the word that refers to _____.
   a) Human tendency b) Morals, values, and beliefs
   c) Only Values d) Psychology

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
PROFESSIONAL ETHICS & HUMAN VALUES

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 What are the Objectives of Engineering Ethics? **10**

Q.3 What is the Difference Between Moral and Ethics? **10**

OR

What is Value and Types of Values. **10**

Q.4 **Write short notes on any four** **20**

a) Moral
b) Ethics
c) Commitment
d) Integrity
e) Work Ethics
f) Virtues

SLR-FM-64

Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In the designation of concrete mix, 'M' refers to the mix and the number to the specified compressive strength of '150mm' size cube at '28 days' expressed in _____ unit.
   a) KN/mm^2 b) KN/m^2
   c) N/mm^2 d) N/m^2

2) If rise and tread of a step is 0.15m and 0.25m respectively, then the volume (in cubic meter) of 9 number of steps of 1 m length be recorded in measurement sheet shall be _____.
   a) 0.3375 b) 0.337
   c) 0.34 d) 0.33

3) If thickness of concreting is less than 100mm, the concreting in RCC slab is measured in _____.
   a) Running m b) Sq.m
   c) Cu.m d) None of the above

4) If the wall thickness is one and half brick thick, the brickwork is measured in _____.
   a) Running m b) Sq.m
   c) Cu.m d) None of the above

5) The minimum number of layers for compaction of 0.60m deep plinth filling, shall be _____.
   a) 1 b) 2
   c) 3 d) 5

6) The estimate of property may be needed for _____.
   a) Mortgage of property
   b) Taxation
   c) loan for construction of property
   d) Calculating the compensation during land acquisition

7) The valuation of property may be needed for _____.
   a) Preparation of Estimate
   b) Calculating the stamp duty of sale deed
   c) Project planning
   d) None of the above

8) Escalation clause is provided to cover unexpected cost due to fluctuation in the prices of _____.
   a) raw material
   b) Overheads
   c) contingencies
   d) work charged establishment

9) The lease is _____.
   a) Transferable, heritable, revocable
   b) Transferable, revocable, non-heritable
   c) Transferable, heritable, non-revocable
   d) heritable, revocable, non- transferable

10) Years purchase in perpetuity for highest rate of interest 2.5% will be, _____.
   a) 2.5
   b) 100
   c) 40
   d) 25

11) In long and short wall method of estimation, length of Short wall is centre to centre distance between extreme opposite walls in shorter directions of ground floor plan _____.
   a) Minus one breadth of item on each side
   b) Plus one breadth of item on each side
   c) Minus half breadth of item on each side
   d) Plus half breadth of item on each side

12) Earnest money is paid to enable the Government to ensure that a tenderer does not _____.
   a) back out of his tender before its acceptance
   b) refuse to execute the work after it has been awarded to him
   c) compromise with quality of work
   d) a or b

13) No deductions are required during the measurement of concreting work if area of opening is less than or equal to _____.
   a) 0.1 Sq.m.
   b) 0.5 Sq.m
   c) 1.0 Sq.m
   d) 3.0 Sq.m

14) For RCC framed structures types of buildings, economic life shall be taken as below _____.
   a) 100 years
   b) 75 years
   c) 50 years
   d) 40 years

SLR-FM-64

Seat No.		Set	P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.2 and Q.No.9 are compulsory.
2) Solve any two from remaining question from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 Prepare the measurement sheet and enter the measurements to calculate following quantities for Column footing for column number C - 21, 22

a) Earthwork in excavation for RCC footing (including additional space for centering and strutting) shown in attached Drawing. Assume depth of excavation as 1500mm. **04**

b) Concreting for RCC footing in M20. **04**

c) Concreting in M7.5 for PCC 100mm thick under footing. **04**

Q.3 **a)** Prepare a preliminary estimate for civil works required for establishing a polytechnic building requiring a total carpet area of 6000Sq.M.This includes actual total area required for classrooms, labs, office, store, etc. Suitable extra provision as 12% of the carpet area be made for walls, verandah corridors, toilets, staircase, etc. The plinth area rate is Rs. 15000/Sq.M. Suitable extra provision as 8% of the building cost be made for water supply,10% for electric fitting, 6% for other services, 1.5% for special architecture treatment of the building cost is also to be calculated. **04**

b) What are the thumb rules for calculating quantity of reinforcement required for Residential building? **04**

Q.4 **Write the detailed specifications for** **08**

a) Cement Concrete M20 for Column footing

b) Earthwork for excavation in Column footing

Q.5 **Carry out Rate analysis for the following items** **08**

a) Cement Concrete 1:1.5:3 for Column footing

d) Plane Cement Concrete 100mm thick in (1:4:8) below column footing

Section – II

Q.6 **a)** Compare Item Rate Contract and Percentage Rate Contract. **04**

b) What are contents for first and second envelope in two envelope system? **04**

Q.7 **a)** Write any eight factors affecting the valuation of properties. **04**

b) Differentiate between salvage value and scrap value. **04**

Q.8 **a)** Find the value of a four storied residential apartment with three flats per floor. Each flat is let out on a gross rent of Rs. 120000/year. The municipal tax is Rs.8000/flat/ year other outgoings are Lift maintenance, Salary of watchmen and sweepers, electricity charges all inclusive Rs.24000/flat/year. Calculate the value of one flat capitalizing the net annual rent at 8% in perpetuity with Years Purchase. **04**

b) Differentiate between free hold and lease hold property. **04**

Q.9 **a)** An old building has been purchases by a person at a cost of Rs. 30,00,000/- excluding the cost of the land. Calculate the amount of annual Sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase. **06**

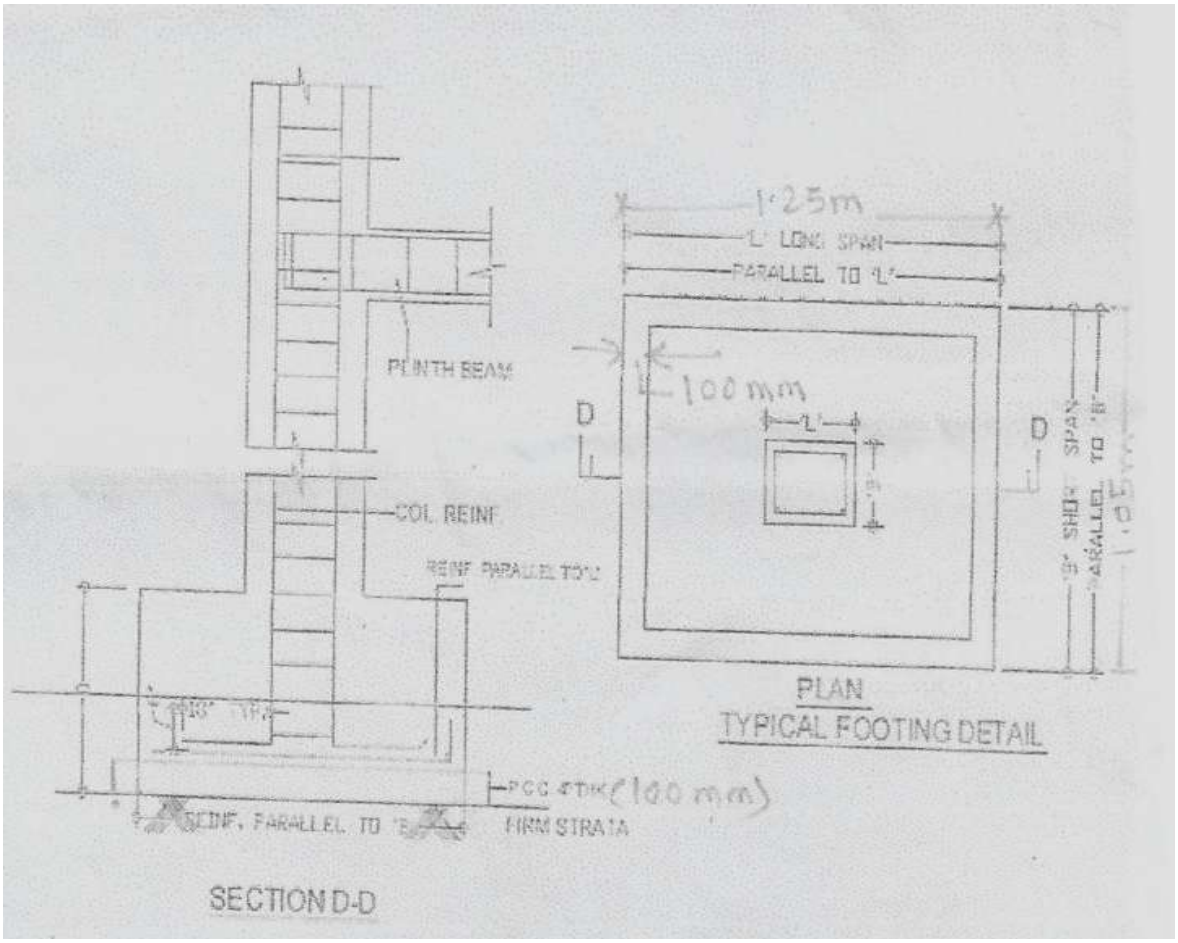
b) What is the valuation of a property in 2019, with following details of a building? Assume 10% scrap value at the end of useful life. **06**

Sr. No	Description	Area (Sq.M)	Rate Rs/SqM	Total life (year)	Built in
1.	Main Factory Building RCC skelection used as dyeing unit and old office G+1	700.92	11000	75	1984
2.	Mezzanine floor in main building	449.04	4500	75	2002

SCHEDULE OF COLUMN & FOOTINGS

COLUMN NO.	FOOTING SIZE L X B	FOOTING SIZE D	FOOTING STEEL	COLUMN SIZE	COLUMN STEEL	STIRRUPS
C-1,2,9,11,25,31, 42,44	1.20 X 1.45	0.400	MAIN 10 Φ 166 c/c (08 NO) DISTRI 10 Φ 157 c/c (07 NO)	200 X 450 200 X 380	10 Φ 12 8 Φ 12	8MM@150c/cD
C-3,4,5,6,48,49, 50,51	1.95 X 2.25	0.575	MAIN 10 Φ 113 c/c (19 NO) DISTRI 10 Φ 110 c/c (17 NO)	300 X 600 300 X 530	12 Φ 16 4 Φ 16 + 6 Φ 12	8MM@150c/cD
C-7,8,15,16,27, 30,37,38	1.35 X 1.60	0.46	MAIN 10 Φ 150 c/c (10 NO) DISTRI 10 Φ 156 c/c (08 NO)	200 X 450 200 X 380	6 Φ 16 + 4 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDC
C-10,20,23,28, 29,43,45,46, 47,52	1.30 X 1.55	0.43	MAIN 10 Φ 160 c/c (09 NO) DISTRI 10 Φ 150 c/c (06 NO)	200 X 450 200 X 380	6 Φ 16 + 2 Φ 12 4 Φ 16 + 2 Φ 12	8MM@150c/cDC
C-12,19,24,25,32, 33,34,41	1.45 X 1.75	0.500	MAIN 10 Φ 150 c/c (11 NO) DISTRI 10 Φ 160 c/c (09 NO)	200 X 530 200 X 450	6 Φ 16 + 4 Φ 12 4 Φ 16 + 4 Φ 12	8MM@150c/cDO
C-13,14,17,18	1.45 X 1.85	0.520	MAIN 10 Φ 145 c/c (12 NO) DISTRI 10 Φ 135 c/c (10 NO)	200 X 600 200 X 530	6 Φ 16 + 6 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDO
C-21,22	1.05 X 1.25	0.320	MAIN 10 Φ 190 c/c (06 NO) DISTRI 10 Φ 190 c/c (05 NO)	200 X 380 200 X 300	8 Φ 12 6 Φ 12	8MM@150c/cDO
C-35,36,39,40	1.75 X 2.00	0.560	MAIN 10 Φ 120 c/c (16 NO) DISTRI 10 Φ 120 c/c (14 NO)	300 X 530 300 X 450	8 Φ 16 6 Φ 16	8MM@150c/cDO

Q.2


1·25m
'L' LONG SPAN
PARALLEL TO 'L'
100 mm
D
D
PLINTH BEAM
COL. REINF.
REINF. PARALLEL TO 'L'
PCC 4 DK (100 mm)
REINF. PARALLEL TO 'B'
FIRM STRATA
PLAN
TYPICAL FOOTING DETAIL
SECTION D-D

SLR-FM-64

Seat No.	

Set Q

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Escalation clause is provided to cover unexpected cost due to fluctuation in the prices of _____.
   a) raw material b) Overheads
   c) contingencies d) work charged establishment

2) The lease is _____.
   a) Transferable, heritable, revocable
   b) Transferable, revocable, non-heritable
   c) Transferable, heritable, non-revocable
   d) heritable, revocable, non- transferable

3) Years purchase in perpetuity for highest rate of interest 2.5% will be, _____.
   a) 2.5 b) 100
   c) 40 d) 25

4) In long and short wall method of estimation, length of Short wall is centre to centre distance between extreme opposite walls in shorter directions of ground floor plan _____.
   a) Minus one breadth of item on each side
   b) Plus one breadth of item on each side
   c) Minus half breadth of item on each side
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5) Earnest money is paid to enable the Government to ensure that a tenderer does not _____.
   a) back out of his tender before its acceptance
   b) refuse to execute the work after it has been awarded to him
   c) compromise with quality of work
   d) a or b

6) No deductions are required during the measurement of concreting work if area of opening is less than or equal to _____.
   a) 0.1 Sq.m. b) 0.5 Sq.m
   c) 1.0 Sq.m d) 3.0 Sq.m

7) For RCC framed structures types of buildings, economic life shall be taken as below _____.
   a) 100 years b) 75 years
   c) 50 years d) 40 years

8) In the designation of concrete mix, 'M' refers to the mix and the number to the specified compressive strength of '150mm' size cube at '28 days' expressed in _____ unit.
   a) KN/mm^2 b) KN/m^2
   c) N/mm^2 d) N/m^2

9) If rise and tread of a step is 0.15m and 0.25m respectively, then the volume (in cubic meter) of 9 number of steps of 1 m length be recorded in measurement sheet shall be _____.
   a) 0.3375 b) 0.337
   c) 0.34 d) 0.33

10) If thickness of concreting is less than 100mm, the concreting in RCC slab is measured in _____.
   a) Running m b) Sq.m
   c) Cu.m d) None of the above

11) If the wall thickness is one and half brick thick, the brickwork is measured in _____.
   a) Running m b) Sq.m
   c) Cu.m d) None of the above

12) The minimum number of layers for compaction of 0.60m deep plinth filling, shall be _____.
   a) 1 b) 2
   c) 3 d) 5

13) The estimate of property may be needed for _____.
   a) Mortgage of property
   b) Taxation
   c) loan for construction of property
   d) Calculating the compensation during land acquisition

14) The valuation of property may be needed for _____.
   a) Preparation of Estimate
   b) Calculating the stamp duty of sale deed
   c) Project planning
   d) None of the above

SLR-FM-64

Seat No.	

Set Q

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.2 and Q.No.9 are compulsory.
2) Solve any two from remaining question from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 Prepare the measurement sheet and enter the measurements to calculate following quantities for Column footing for column number C - 21, 22

a) Earthwork in excavation for RCC footing (including additional space for centering and strutting) shown in attached Drawing. Assume depth of excavation as 1500mm. **04**

b) Concreting for RCC footing in M20. **04**

c) Concreting in M7.5 for PCC 100mm thick under footing. **04**

Q.3 **a)** Prepare a preliminary estimate for civil works required for establishing a polytechnic building requiring a total carpet area of 6000Sq.M.This includes actual total area required for classrooms, labs, office, store, etc. Suitable extra provision as 12% of the carpet area be made for walls, verandah corridors, toilets, staircase, etc. The plinth area rate is Rs. 15000/Sq.M. Suitable extra provision as 8% of the building cost be made for water supply,10% for electric fitting, 6% for other services, 1.5% for special architecture treatment of the building cost is also to be calculated. **04**

b) What are the thumb rules for calculating quantity of reinforcement required for Residential building? **04**

Q.4 **Write the detailed specifications for** **08**

a) Cement Concrete M20 for Column footing

b) Earthwork for excavation in Column footing

Q.5 **Carry out Rate analysis for the following items** **08**

a) Cement Concrete 1:1.5:3 for Column footing

d) Plane Cement Concrete 100mm thick in (1:4:8) below column footing

Section – II

Q.6 **a)** Compare Item Rate Contract and Percentage Rate Contract. **04**

b) What are contents for first and second envelope in two envelope system? **04**

Q.7 **a)** Write any eight factors affecting the valuation of properties. **04**

b) Differentiate between salvage value and scrap value. **04**

Q.8 **a)** Find the value of a four storied residential apartment with three flats per floor. Each flat is let out on a gross rent of Rs. 120000/year. The municipal tax is Rs.8000/flat/ year other outgoings are Lift maintenance, Salary of watchmen and sweepers, electricity charges all inclusive Rs.24000/flat/year. Calculate the value of one flat capitalizing the net annual rent at 8% in perpetuity with Years Purchase. **04**

b) Differentiate between free hold and lease hold property. **04**

Q.9 **a)** An old building has been purchases by a person at a cost of Rs. 30,00,000/- excluding the cost of the land. Calculate the amount of annual Sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase. **06**

b) What is the valuation of a property in 2019, with following details of a building? Assume 10% scrap value at the end of useful life. **06**

Sr. No	Description	Area (Sq.M)	Rate Rs/SqM	Total life (year)	Built in
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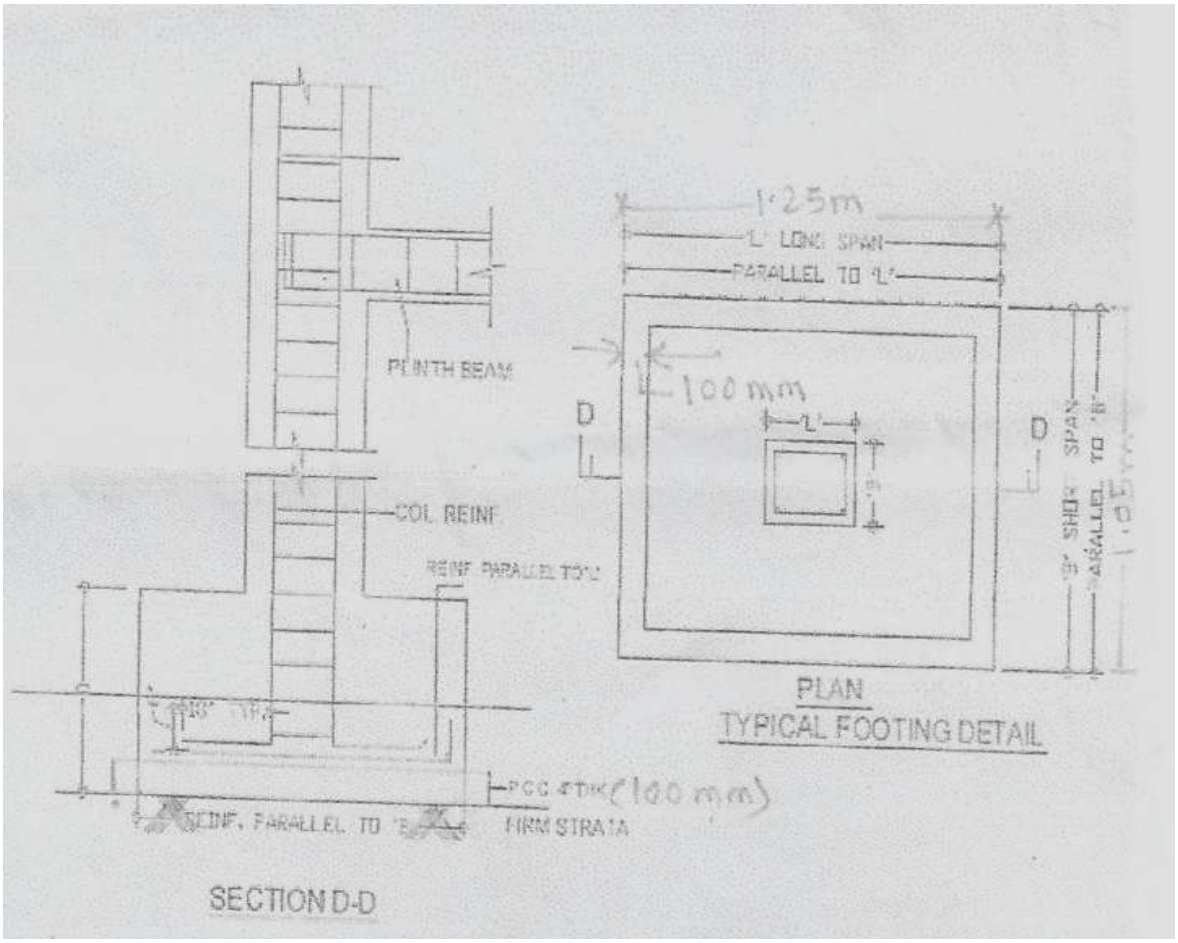
2.	Mezzanine floor in main building	449.04	4500	75	2002

SCHEDULE OF COLUMN & FOOTINGS

COLUMN NO.	FOOTING SIZE L X B	FOOTING SIZE D	FOOTING STEEL	COLUMN SIZE	COLUMN STEEL	STIRRUPS
C-1,2,9,11,25,31, 42,44	1.20 X 1.45	0.400	MAIN 10 Φ 166 c/c (08 NO) DISTRI 10 Φ 157 c/c (07 NO)	200 X 450 200 X 380	10 Φ 12 8 Φ 12	8MM@150c/cD
C-3,4,5,6,48,49, 50,51	1.95 X 2.25	0.575	MAIN 10 Φ 113 c/c (19 NO) DISTRI 10 Φ 110 c/c (17 NO)	300 X 600 300 X 530	12 Φ 16 4 Φ 16 + 6 Φ 12	8MM@150c/cD
C-7,8,15,16,27, 30,37,38	1.35 X 1.60	0.46	MAIN 10 Φ 150 c/c (10 NO) DISTRI 10 Φ 156 c/c (08 NO)	200 X 450 200 X 380	6 Φ 16 + 4 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDC
C-10,20,23,28, 29,43,45,46, 47,52	1.30 X 1.55	0.43	MAIN 10 Φ 160 c/c (09 NO) DISTRI 10 Φ 150 c/c (06 NO)	200 X 450 200 X 380	6 Φ 16 + 2 Φ 12 4 Φ 16 + 2 Φ 12	8MM@150c/cDC
C-12,19,24,25,32, 33,34,41	1.45 X 1.75	0.500	MAIN 10 Φ 150 c/c (11 NO) DISTRI 10 Φ 160 c/c (09 NO)	200 X 530 200 X 450	6 Φ 16 + 4 Φ 12 4 Φ 16 + 4 Φ 12	8MM@150c/cDO
C-13,14,17,18	1.45 X 1.85	0.520	MAIN 10 Φ 145 c/c (12 NO) DISTRI 10 Φ 135 c/c (10 NO)	200 X 600 200 X 530	6 Φ 16 + 6 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDO
C-21,22	1.05 X 1.25	0.320	MAIN 10 Φ 190 c/c (06 NO) DISTRI 10 Φ 190 c/c (05 NO)	200 X 380 200 X 300	8 Φ 12 6 Φ 12	8MM@150c/cDO
C-35,36,39,40	1.75 X 2.00	0.560	MAIN 10 Φ 120 c/c (16 NO) DISTRI 10 Φ 120 c/c (14 NO)	300 X 530 300 X 450	8 Φ 16 6 Φ 16	8MM@150c/cDO

Q.2


1·25m
'L' LONG SPAN
PARALLEL TO 'L'
100 mm
D
D
PLINTH BEAM
COL REINF
REINF PARALLEL TO 'L'
PCC 4 DK (100 mm)
REINF. PARALLEL TO 'B'
FIRM STRATA
PLAN
TYPICAL FOOTING DETAIL
SECTION D-D

SLR-FM-64

Seat No.	

Set R

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The minimum number of layers for compaction of 0.60m deep plinth filling, shall be _____.
   a) 1 b) 2
   c) 3 d) 5

2) The estimate of property may be needed for _____.
   a) Mortgage of property
   b) Taxation
   c) loan for construction of property
   d) Calculating the compensation during land acquisition

3) The valuation of property may be needed for _____.
   a) Preparation of Estimate
   b) Calculating the stamp duty of sale deed
   c) Project planning
   d) None of the above

4) Escalation clause is provided to cover unexpected cost due to fluctuation in the prices of _____.
   a) raw material b) Overheads
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5) The lease is _____.
   a) Transferable, heritable, revocable
   b) Transferable, revocable, non-heritable
   c) Transferable, heritable, non-revocable
   d) heritable, revocable, non- transferable

6) Years purchase in perpetuity for highest rate of interest 2.5% will be, _____.
   a) 2.5 b) 100
   c) 40 d) 25

7) In long and short wall method of estimation, length of Short wall is centre to centre distance between extreme opposite walls in shorter directions of ground floor plan _____.
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   b) Plus one breadth of item on each side
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9) No deductions are required during the measurement of concreting work if area of opening is less than or equal to _____.
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   c) 1.0 Sq.m d) 3.0 Sq.m

10) For RCC framed structures types of buildings, economic life shall be taken as below _____.
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11) In the designation of concrete mix, 'M' refers to the mix and the number to the specified compressive strength of '150mm' size cube at '28 days' expressed in _____ unit.
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12) If rise and tread of a step is 0.15m and 0.25m respectively, then the volume (in cubic meter) of 9 number of steps of 1 m length be recorded in measurement sheet shall be _____.
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13) If thickness of concreting is less than 100mm, the concreting in RCC slab is measured in _____.
   a) Running m b) Sq.m
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14) If the wall thickness is one and half brick thick, the brickwork is measured in _____.
   a) Running m b) Sq.m
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Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.2 and Q.No.9 are compulsory.
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Section – I

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a) Earthwork in excavation for RCC footing (including additional space for centering and strutting) shown in attached Drawing. Assume depth of excavation as 1500mm. **04**

b) Concreting for RCC footing in M20. **04**

c) Concreting in M7.5 for PCC 100mm thick under footing. **04**

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b) What are the thumb rules for calculating quantity of reinforcement required for Residential building? **04**

Q.4 **Write the detailed specifications for** **08**

a) Cement Concrete M20 for Column footing

b) Earthwork for excavation in Column footing

Q.5 **Carry out Rate analysis for the following items** **08**

a) Cement Concrete 1:1.5:3 for Column footing

d) Plane Cement Concrete 100mm thick in (1:4:8) below column footing

Section – II

Q.6 **a)** Compare Item Rate Contract and Percentage Rate Contract. **04**

b) What are contents for first and second envelope in two envelope system? **04**

Q.7 **a)** Write any eight factors affecting the valuation of properties. **04**

b) Differentiate between salvage value and scrap value. **04**

Q.8 **a)** Find the value of a four storied residential apartment with three flats per floor. Each flat is let out on a gross rent of Rs. 120000/year. The municipal tax is Rs.8000/flat/ year other outgoings are Lift maintenance, Salary of watchmen and sweepers, electricity charges all inclusive Rs.24000/flat/year. Calculate the value of one flat capitalizing the net annual rent at 8% in perpetuity with Years Purchase. **04**

b) Differentiate between free hold and lease hold property. **04**

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SCHEDULE OF COLUMN & FOOTINGS

COLUMN NO.	FOOTING SIZE L X B	FOOTING SIZE D	FOOTING STEEL	COLUMN SIZE	COLUMN STEEL	STIRRUPS
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C-3,4,5,6,48,49, 50,51	1.95 X 2.25	0.575	MAIN 10 Φ 113 c/c (19 NO) DISTRI 10 Φ 110 c/c (17 NO)	300 X 600 300 X 530	12 Φ 16 4 Φ 16 + 6 Φ 12	8MM@150c/cD
C-7,8,15,16,27, 30,37,38	1.35 X 1.60	0.46	MAIN 10 Φ 150 c/c (10 NO) DISTRI 10 Φ 156 c/c (08 NO)	200 X 450 200 X 380	6 Φ 16 + 4 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDC
C-10,20,23,28, 29,43,45,46, 47,52	1.30 X 1.55	0.43	MAIN 10 Φ 160 c/c (09 NO) DISTRI 10 Φ 150 c/c (06 NO)	200 X 450 200 X 380	6 Φ 16 + 2 Φ 12 4 Φ 16 + 2 Φ 12	8MM@150c/cDC
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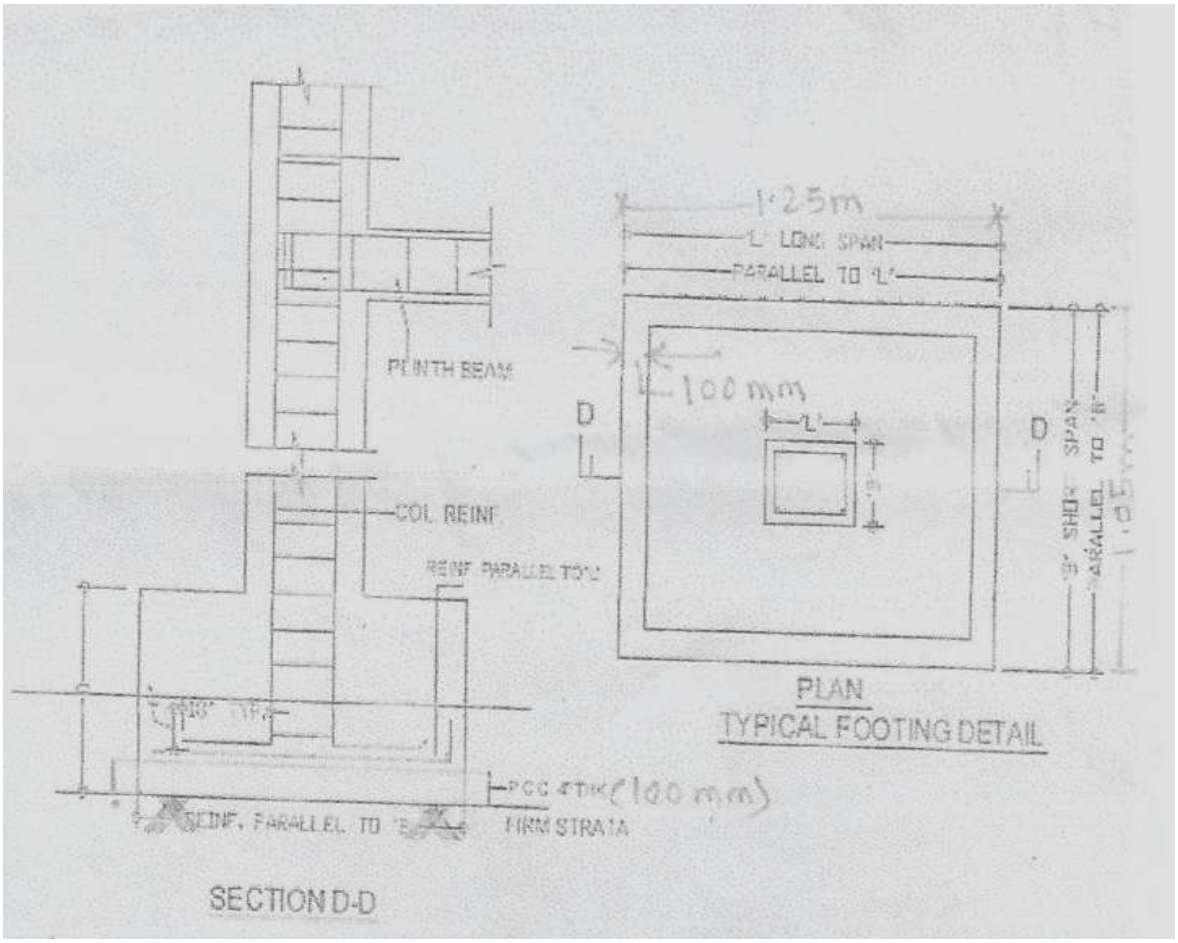
Q.2


1·25m
'L' LONG SPAN
PARALLEL TO 'L'
100 mm
D
D
PLINTH BEAM
COL. REINF.
REINF. PARALLEL TO 'L'
PCC 4 THK (100 mm)
REINF. PARALLEL TO 'B'
FIRM STRATA
PLAN
TYPICAL FOOTING DETAIL
SECTION D-D

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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Duration: 30 Minutes Marks: 14

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   d) heritable, revocable, non- transferable

Seat No.		Set	S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
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Instructions: 1) Q.No.2 and Q.No.9 are compulsory.
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Section – I

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a) Cement Concrete M20 for Column footing

b) Earthwork for excavation in Column footing

Q.5 **Carry out Rate analysis for the following items** **08**

a) Cement Concrete 1:1.5:3 for Column footing

d) Plane Cement Concrete 100mm thick in (1:4:8) below column footing

Section – II

Q.6 **a)** Compare Item Rate Contract and Percentage Rate Contract. **04**

b) What are contents for first and second envelope in two envelope system? **04**

Q.7 **a)** Write any eight factors affecting the valuation of properties. **04**

b) Differentiate between salvage value and scrap value. **04**

Q.8 **a)** Find the value of a four storied residential apartment with three flats per floor. Each flat is let out on a gross rent of Rs. 120000/year. The municipal tax is Rs.8000/flat/ year other outgoings are Lift maintenance, Salary of watchmen and sweepers, electricity charges all inclusive Rs.24000/flat/year. Calculate the value of one flat capitalizing the net annual rent at 8% in perpetuity with Years Purchase. **04**

b) Differentiate between free hold and lease hold property. **04**

Q.9 **a)** An old building has been purchases by a person at a cost of Rs. 30,00,000/- excluding the cost of the land. Calculate the amount of annual Sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase. **06**

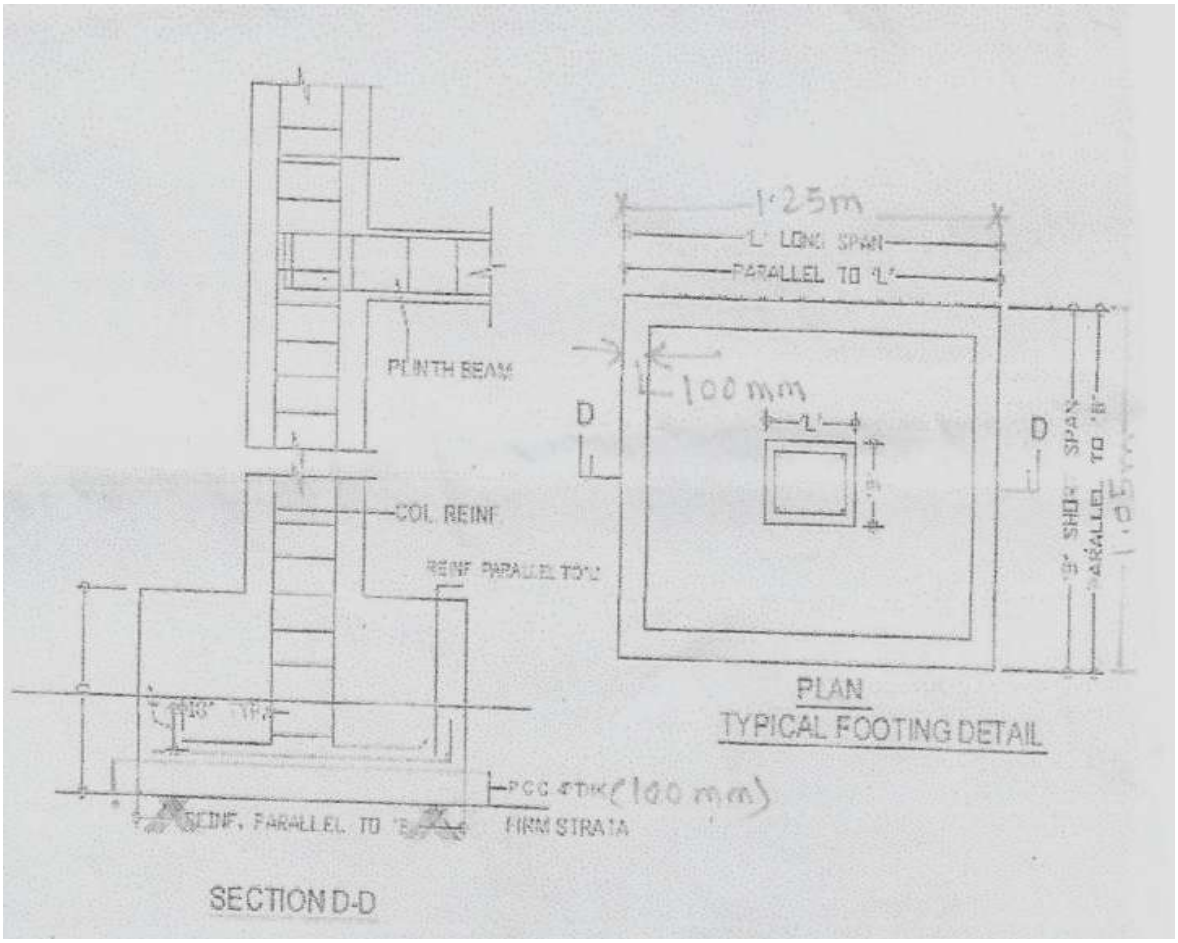
b) What is the valuation of a property in 2019, with following details of a building? Assume 10% scrap value at the end of useful life. **06**

Sr. No	Description	Area (Sq.M)	Rate Rs/SqM	Total life (year)	Built in
1.	Main Factory Building RCC skelection used as dyeing unit and old office G+1	700.92	11000	75	1984
2.	Mezzanine floor in main building	449.04	4500	75	2002

SCHEDULE OF COLUMN & FOOTINGS

COLUMN NO.	FOOTING SIZE L X B	FOOTING SIZE D	FOOTING STEEL	COLUMN SIZE	COLUMN STEEL	STIRRUPS
C-1,2,9,11,25,31, 42,44	1.20 X 1.45	0.400	MAIN 10 Φ 166 c/c (08 NO) DISTRI 10 Φ 157 c/c (07 NO)	200 X 450 200 X 380	10 Φ 12 8 Φ 12	8MM@150c/cD
C-3,4,5,6,48,49, 50,51	1.95 X 2.25	0.575	MAIN 10 Φ 113 c/c (19 NO) DISTRI 10 Φ 110 c/c (17 NO)	300 X 600 300 X 530	12 Φ 16 4 Φ 16 + 6 Φ 12	8MM@150c/cD
C-7,8,15,16,27, 30,37,38	1.35 X 1.60	0.46	MAIN 10 Φ 150 c/c (10 NO) DISTRI 10 Φ 156 c/c (08 NO)	200 X 450 200 X 380	6 Φ 16 + 4 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDC
C-10,20,23,28, 29,43,45,46, 47,52	1.30 X 1.55	0.43	MAIN 10 Φ 160 c/c (09 NO) DISTRI 10 Φ 150 c/c (06 NO)	200 X 450 200 X 380	6 Φ 16 + 2 Φ 12 4 Φ 16 + 2 Φ 12	8MM@150c/cDC
C-12,19,24,25,32, 33,34,41	1.45 X 1.75	0.500	MAIN 10 Φ 150 c/c (11 NO) DISTRI 10 Φ 160 c/c (09 NO)	200 X 530 200 X 450	6 Φ 16 + 4 Φ 12 4 Φ 16 + 4 Φ 12	8MM@150c/cDO
C-13,14,17,18	1.45 X 1.85	0.520	MAIN 10 Φ 145 c/c (12 NO) DISTRI 10 Φ 135 c/c (10 NO)	200 X 600 200 X 530	6 Φ 16 + 6 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDO
C-21,22	1.05 X 1.25	0.320	MAIN 10 Φ 190 c/c (06 NO) DISTRI 10 Φ 190 c/c (05 NO)	200 X 380 200 X 300	8 Φ 12 6 Φ 12	8MM@150c/cDO
C-35,36,39,40	1.75 X 2.00	0.560	MAIN 10 Φ 120 c/c (16 NO) DISTRI 10 Φ 120 c/c (14 NO)	300 X 530 300 X 450	8 Φ 16 6 Φ 16	8MM@150c/cDO

Q.2


1·25m
'L' LONG SPAN
PARALLEL TO 'L'
PLINTH BEAM
100 mm
D
D
COL REINF
REINF PARALLEL TO 'L'
PLAN
TYPICAL FOOTING DETAIL
PCC 4DK (100 mm)
REINF. PARALLEL TO 'B'
FIRM STRATA
SECTION D-D

Set No.	

Set | P

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book
2) Figures at right indicate marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Microeconomic theory deals with _____.
   a) Economic behavior of individual economic decision making units
   b) Economy as whole
   c) Trade relations
   d) Economic growth of the society

2) In a mixed economy which sector (s) is/are found _____.
   a) Private only b) Public only
   c) None d) Both (a) private (b) public

3) Who is known as father of economics?
   a) Adam Smith b) Prof. A. Samulson
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4) Which of these is an economic activity?
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5) Which of the following is true with respect to the law of diminishing marginal utility?
   a) The more the consumption, lesser the marginal utility from every additional unit consumed
   b) The more the consumption, the greater the marginal utility from every additional unit consumed
   c) The lesser the consumption, the lesser the marginal utility from every additional unit consumed
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6) Which of the following is NOT an account in the Balance of Payments?
   a) Current Account b) Capital Account
   c) Financial Account d) Future Account

7) The MPC can be defined as that fraction of a _____.
   a) Change in income that is not consumed
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8) Which of the following market structures has a predominant feature of price leadership?
   a) Perfectly competitive
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9) Average revenue is _____.
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10) Mr. Amol an Indian Citizen is working for an Indian MNC in USA. The income earned by Amol is part of _____.
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   b) Indian GNP and USA's GDP
   c) India's GDP and USA's GDP
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SLR-FM-640

Seat No.	

Set P

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) Attempt any four questions out of question no. two to seven.
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Q.2 **Write short notes.** **10**
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b) Saving and investment

Q.3 **Write short notes.** **10**
a) Importance of Money in the economy
b) International Trade

Q.4 Discuss the role of state government in economic activity. **10**

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Q.6 What is mean by consumption? Illustrate the determinants of consumption. **10**

Q.7 Define central bank, discuss the function of central banking in India. **10**

Set No.	

Set | Q

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

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Seat No.	

Set Q

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

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Set No.	

Set R

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

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MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

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Seat No.	

Set R

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

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Set No.	

Set | S

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

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Seat No.	

Set S

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
ECONOMICS

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

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b) Saving and investment

Q.3 **Write short notes.** **10**
a) Importance of Money in the economy
b) International Trade

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Q.5 Explain the properties of perfect and imperfectly competitive market. **10**

Q.6 What is mean by consumption? Illustrate the determinants of consumption. **10**

Q.7 Define central bank, discuss the function of central banking in India. **10**

Seat No.	

Set **P**

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) Aches, shallow breathing and sweating, frequent colds are _____ symptoms of stress.
   a) Physical b) Behavioral
   c) Emotional d) Cognitive

2) Which one is not a characteristics of Positive Stress?
   a) It improves performance b) It feels exciting
   c) It motivates d) It's frustrating

3) _____ deals with prioritizing & scheduling the activities to cope up with multiple job demands.
   a) Physical Exercise b) Time Management
   c) Wellness Programs d) Relaxation

4) Which one is not an environmental stressor?
   a) Weather b) Traffic
   c) Financial problems d) Substandard housing

5) Following are the examples of negative stressors.
   a) Unemployment b) Legal problems
   c) Divorce d) All of the above

6) Which of the following is a stressful event?
   a) Birthday b) Studying
   c) Spouse death d) Vacation

7) Stress which is healthy for organisation or for the individual is known as _____.
   a) Eustress b) Distress
   c) Resistance d) None of these

8) Stress is a normal physical response to events that make a person _____.
   a) Feels upset b) Excited
   c) Boring d) Happy

9) _____ is regarded as father of stress research.
   a) Hans Selye b) Sigmund Freud
   c) Atkinson Potter d) Mrunal Sengupta

10) _____ is an organizational way of managing stress.
   a) Job enlargement b) Jogging
   c) Job redesign d) Meditation

SLR-FM-641

Seat No.	

Set P

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Solve any 4 from Q. No. 2 to Q. No. 7.
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Q.2 Individual can also manage stress on their own. Explain. **10**

Q.3 Explain in detail various sources of stress. **10**

Q.4 Whether optimal stress can be effective. Explain this statement. **10**

Q.5 Highlight the role of social support in minimizing the effects of stress. **10**

Q.6 Define stress and state the current and historical status of stress.

Q.7 Explain the nature of stress response. **10**

Seat No.	

Set **Q**

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
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SLR-FM-641

Seat No.	

Set Q

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
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Seat No.	

Set | R

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SLR-FM-641

Seat No.	

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Set | S

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
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   c) Resistance d) None of these

6) Stress is a normal physical response to events that make a person _____.
   a) Feels upset b) Excited
   c) Boring d) Happy

7) _____ is regarded as father of stress research.
   a) Hans Selye b) Sigmund Freud
   c) Atkinson Potter d) Mrunal Sengupta

8) _____ is an organizational way of managing stress.
   a) Job enlargement b) Jogging
   c) Job redesign d) Meditation

9) Aches, shallow breathing and sweating, frequent colds are _____ symptoms of stress.
   a) Physical b) Behavioral
   c) Emotional d) Cognitive

10) Which one is not a characteristics of Positive Stress?
   a) It improves performance b) It feels exciting
   c) It motivates d) It's frustrating

Seat No.	

Set **S**

T.E (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Self Learning (All Branch)
STRESS & COPING

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04 :30 PM

Instructions: 1) Solve any 4 from Q. No. 2 to Q. No. 7.
2) Figure to the right indicates full marks.

Q.2 Individual can also manage stress on their own. Explain. **10**

Q.3 Explain in detail various sources of stress. **10**

Q.4 Whether optimal stress can be effective. Explain this statement. **10**

Q.5 Highlight the role of social support in minimizing the effects of stress. **10**

Q.6 Define stress and state the current and historical status of stress.

Q.7 Explain the nature of stress response. **10**

SLR-FM-642

Seat No.	

Set P

T.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures al right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) The first Patent Law was enacted in India in the year ____.
   a) 1856 b) 1880
   c) 1905 d) 1850

2) The legislation covering intellectual property right in India for Information Technology is _____.
   a) Information Technology Act 2003
   b) Information Technology Act 2000
   c) Information Technology Act 2008
   d) None of these

3) What is copyright meant for?
   a) Film work b) Books
   c) Essay d) All of these

4) What is the term of Patent?
   a) 35 years b) 25 years
   c) 20 years d) 15 years

5) Intellectual Property Rights (IPR) protect the use of information and ideas that are of _____.
   a) Ethical value b) Moral value
   c) Social value d) Commercial value

6) The following can be patented _____.
   a) Machine b) Process
   c) Composition of matter d) All of these

7) The following can not be exploited by assigning or by licensing the rights to others _____.
   a) Patents b) Designs
   c) Trademark d) All of these

8) What protects the intellectual property created by artists?
   a) Copyright b) Patents
   c) Trademarks d) Registered Designs

9) If a company develops a new technology that improves its main product, what type of intellectual property can they use to stop others from copying their invention?

a) Copyright
b) Patents
c) Trademarks
d) Registered Designs

10) All of the following are examples of intellectual property protections except ___.

a) Copyrights
b) Patents
c) Contracts
d) Trademarks

SLR-FM-642

Seat No.	

Set P

T.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Attempt following questions (Any Two) **20**

a) What is intellectual property? How it is useful for Engineers?
b) Explain concept of valuation of IP & value Realization.
c) Compare the Indian IPR system with international IPR frameworks.

Q.3 Write short notes (Any Four) **20**

a) Copy rights
b) Commercialization
c) Bio technology and intellectual property
d) Protection of Traditional knowledge
e) IPR & Electronic Commerce
f) TRIPS & Access to Medicines

Seat No.	

Set | Q

T.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures al right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. **10**

1) The following can be patented _____.
   a) Machine b) Process
   c) Composition of matter d) All of these

2) The following can not be exploited by assigning or by licensing the rights to others _____.
   a) Patents b) Designs
   c) Trademark d) All of these

3) What protects the intellectual property created by artists?
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4) If a company develops a new technology that improves its main product, what type of intellectual property can they use to stop others from copying their invention?
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5) All of the following are examples of intellectual property protections except ___.
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6) The first Patent Law was enacted in India in the year ____.
   a) 1856 b) 1880
   c) 1905 d) 1850

7) The legislation covering intellectual property right in India for Information Technology is _____.
   a) Information Technology Act 2003
   b) Information Technology Act 2000
   c) Information Technology Act 2008
   d) None of these

8) What is copyright meant for?
   a) Film work b) Books
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9) What is the term of Patent?

a) 35 years
b) 25 years
c) 20 years
d) 15 years

10) Intellectual Property Rights (IPR) protect the use of information and ideas that are of _____.

a) Ethical value
b) Moral value
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d) Commercial value

SLR-FM-642

Seat No.	

Set Q

T.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Attempt following questions (Any Two) **20**

a) What is intellectual property? How it is useful for Engineers?
b) Explain concept of valuation of IP & value Realization.
c) Compare the Indian IPR system with international IPR frameworks.

Q.3 Write short notes (Any Four) **20**

a) Copy rights
b) Commercialization
c) Bio technology and intellectual property
d) Protection of Traditional knowledge
e) IPR & Electronic Commerce
f) TRIPS & Access to Medicines

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures al right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) If a company develops a new technology that improves its main product, what type of intellectual property can they use to stop others from copying their invention?
   a) Copyright b) Patents
   c) Trademarks d) Registered Designs

2) All of the following are examples of intellectual property protections except ___.
   a) Copyrights b) Patents
   c) Contracts d) Trademarks

3) The first Patent Law was enacted in India in the year ____.
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5) What is copyright meant for?
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   c) Essay d) All of these

6) What is the term of Patent?
   a) 35 years b) 25 years
   c) 20 years d) 15 years

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   a) Machine b) Process
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9) The following can not be exploited by assigning or by licensing the rights to others _____.

a) Patents
b) Designs
c) Trademark
d) All of these

10) What protects the intellectual property created by artists?

a) Copyright
b) Patents
c) Trademarks
d) Registered Designs

SLR-FM-642

Seat No.	

Set R

T.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
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Q.2 Attempt following questions (Any Two) **20**

a) What is intellectual property? How it is useful for Engineers?
b) Explain concept of valuation of IP & value Realization.
c) Compare the Indian IPR system with international IPR frameworks.

Q.3 Write short notes (Any Four) **20**

a) Copy rights
b) Commercialization
c) Bio technology and intellectual property
d) Protection of Traditional knowledge
e) IPR & Electronic Commerce
f) TRIPS & Access to Medicines

Seat No.		Set	S

T.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 50
Time: 02:30 PM To 04:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
2) Figures al right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options. 10

1) What is copyright meant for?
   a) Film work b) Books
   c) Essay d) All of these

2) What is the term of Patent?
   a) 35 years b) 25 years
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3) Intellectual Property Rights (IPR) protect the use of information and ideas that are of _____.
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9) The first Patent Law was enacted in India in the year ____.
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    a) Information Technology Act 2003
    b) Information Technology Act 2000
    c) Information Technology Act 2008
    d) None of these

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Seat No.		Set	S

T.E. (Part – I) (Old) (CBCS) Examination Nov/Dec-2019
Self Learning (All Branch)
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMETN

Day & Date: Thursday, 19-12-2019 Max. Marks: 40
Time: 02:30 PM To 04:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Q.2 Attempt following questions (Any Two) **20**

a) What is intellectual property? How it is useful for Engineers?
b) Explain concept of valuation of IP & value Realization.
c) Compare the Indian IPR system with international IPR frameworks.

Q.3 Write short notes (Any Four) **20**

a) Copy rights
b) Commercialization
c) Bio technology and intellectual property
d) Protection of Traditional knowledge
e) IPR & Electronic Commerce
f) TRIPS & Access to Medicines

SLR-FM-65

Seat No.	

Set P

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 02.30 PM To 05.30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume the suitable data whenever necessary.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In which of the following cases, the dynamic system has no oscillation but returns to equilibrium at a slower rate? 02
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) None of above

2) The damping in a dynamic system is represented as equivalent to _____. 02
   a) Coulomb damping b) Viscous damping
   c) Friction damping d) Negative damping

3) The response steadily decreases when the frequency ratio is _____. 02
   a) <1 b) >1
   c) =1 d) =V2

4) Most rigid element in the structure will receive _____. 02
   a) Least of the lateral load due to seismic action
   b) Most of the lateral load due to seismic action
   c) The same lateral load as that of any element, due to seismic action
   d) None of above

5) Moment-resistant rigid joints in the structure will _____. 02
   a) Increase the ductility of the structure
   b) Decrease the ductility of the structure
   c) Not affect the ductility of the structure
   d) None of above

6) In the moment-resistant rigid framing system, for better seismic resistance, it is preferable to have _____. 02
   a) The moment capacity of column greater than that of the beam at the joint
   b) The moment capacity of beam greater than that of the column at the joint
   c) The moment capacity of beam equal to that of the column at the joint
   d) None of above

7) The following is not a brittle failure of an RCC structure _____. 01
   a) Shear failure
   b) Yielding of reinforcement in tension
   c) Bond failure
   d) Crushing of concrete in compression

8) Ductility in the structure _____. 01
   a) Increases the damping
   b) Increases the deformation
   c) Decreases the seismic force
   d) All the above

Seat No.	

Set **P**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

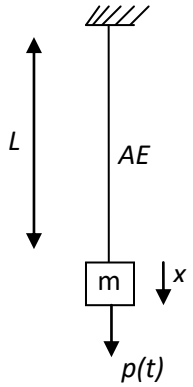
Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 02.30 PM To 05.30 PM

Instructions: 1) Q.No.4 and Q.No.6 are compulsory.
2) Solve any two questions from the remaining question from each section.
3) Assume the suitable data whenever necessary.
4) Figures to the right indicate full marks.
5) Use of only IS 1893:2016 is allowed.

Section – I

Q.2 What is meant by the focus and epicentre of an earthquake? Name the two kinds of body waves and explain how they differ. **09**

Q.3 A rod made of an elastic material with modulus of elasticity $E.$ having cross-sectional area and length L is fixed on top. carrying a mass *m* at its lower end. Derive the equation governing longitudinal motion of the system ignore mass of the rod and measure displacement, x from the static equilibrium position. **09**



Q.4 What do you mean by force transmissibility? Derive an expression for force transmissibility to the foundation of a SDOF system subjected to harmonic force. **10**

Q.5 What is combined spectrum? What are its characteristics? **09**

Section – II

Q.6 It is proposed to construct a R.C.C. three storied commercial building having plan dimensions as shown in fig.1 in zone III with following data. Determine the lateral forces and base shear. The all column sizes are 300 × 450 mm & beams sizes are 230 x 450 mm. The slab thickness is 120mm & thk. Of walls is 230mm. The ht. Of floor is 3.2m & Live load is 4.0 kN/m^2 IS 13920 provisions will not be used. The strata is Medium. **10**

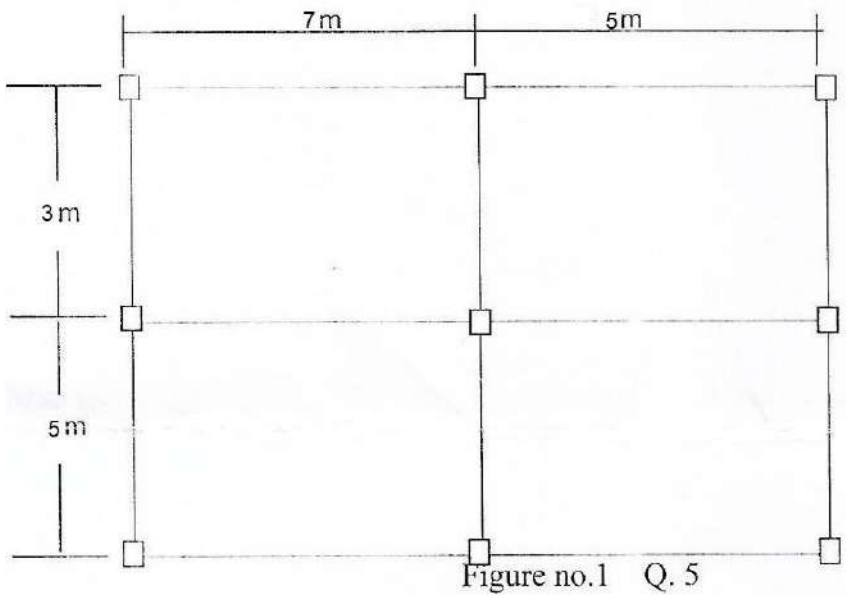


Figure no.1 Q. 5

Q.7 Discuss the factors required for accessing **09**

a) The lateral design forces
b) The design response spectrum

Q.8 State the reasons for the poor performances of masonry buildings in seismic areas. **09**

Q.9 Describe the various earthquake resistant features that can be introduced in masonry building to make it earthquake resistant. **09**

Seat No.	

Set **Q**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 02.30 PM To 05.30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume the suitable data whenever necessary.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Moment-resistant rigid joints in the structure will _____. 02
   a) Increase the ductility of the structure
   b) Decrease the ductility of the structure
   c) Not affect the ductility of the structure
   d) None of above

2) In the moment-resistant rigid framing system, for better seismic resistance, it is preferable to have _____. 02
   a) The moment capacity of column greater than that of the beam at the joint
   b) The moment capacity of beam greater than that of the column at the joint
   c) The moment capacity of beam equal to that of the column at the joint
   d) None of above

3) The following is not a brittle failure of an RCC structure _____. 01
   a) Shear failure
   b) Yielding of reinforcement in tension
   c) Bond failure
   d) Crushing of concrete in compression

4) Ductility in the structure _____. 01
   a) Increases the damping b) Increases the deformation
   c) Decreases the seismic force d) All the above

5) In which of the following cases, the dynamic system has no oscillation but returns to equilibrium at a slower rate? 02
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) None of above

6) The damping in a dynamic system is represented as equivalent to _____. 02
   a) Coulomb damping b) Viscous damping
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7) The response steadily decreases when the frequency ratio is _____. 02
   a) <1 b) >1
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8) Most rigid element in the structure will receive _____. 02
   a) Least of the lateral load due to seismic action
   b) Most of the lateral load due to seismic action
   c) The same lateral load as that of any element, due to seismic action
   d) None of above

SLR-FM-65

Seat No.	

Set Q

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

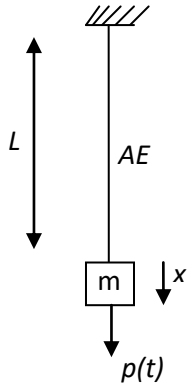
Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 02.30 PM To 05.30 PM

Instructions: 1) Q.No.4 and Q.No.6 are compulsory.
2) Solve any two questions from the remaining question from each section.
3) Assume the suitable data whenever necessary.
4) Figures to the right indicate full marks.
5) Use of only IS 1893:2016 is allowed.

Section – I

Q.2 What is meant by the focus and epicentre of an earthquake? Name the two kinds of body waves and explain how they differ. **09**

Q.3 A rod made of an elastic material with modulus of elasticity $E.$ having cross-sectional area and length L is fixed on top. carrying a mass *m* at its lower end. Derive the equation governing longitudinal motion of the system ignore mass of the rod and measure displacement, x from the static equilibrium position. **09**



Q.4 What do you mean by force transmissibility? Derive an expression for force transmissibility to the foundation of a SDOF system subjected to harmonic force. **10**

Q.5 What is combined spectrum? What are its characteristics? **09**

Section – II

Q.6 It is proposed to construct a R.C.C. three storied commercial building having plan dimensions as shown in fig.1 in zone III with following data. Determine the lateral forces and base shear. The all column sizes are 300 × 450 mm & beams sizes are 230 x 450 mm. The slab thickness is 120mm & thk. Of walls is 230mm. The ht. Of floor is 3.2m & Live load is 4.0 kN/m^2 IS 13920 provisions will not be used. The strata is Medium. **10**

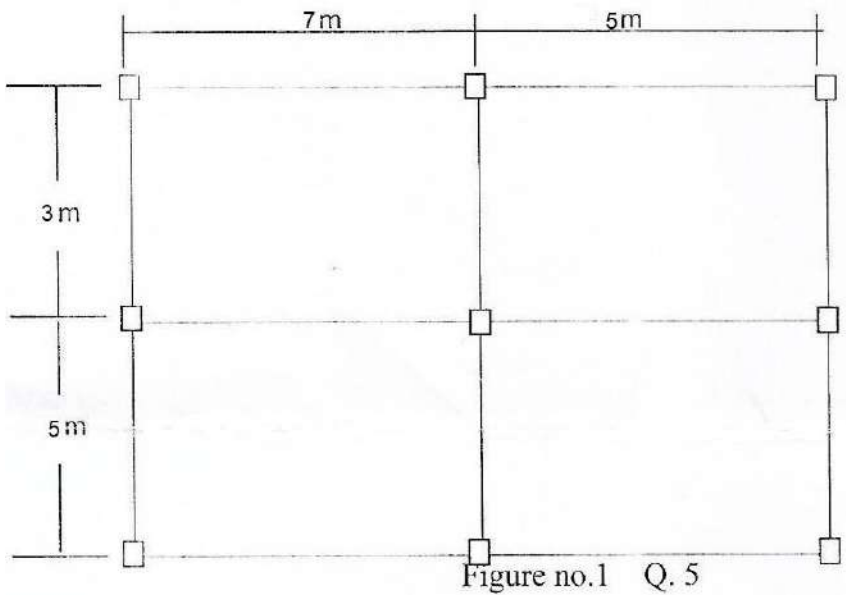


Figure no.1 Q. 5

Q.7 Discuss the factors required for accessing **09**

a) The lateral design forces
b) The design response spectrum

Q.8 State the reasons for the poor performances of masonry buildings in seismic areas. **09**

Q.9 Describe the various earthquake resistant features that can be introduced in masonry building to make it earthquake resistant. **09**

Seat No.	

Set **R**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 02.30 PM To 05.30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume the suitable data whenever necessary.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The response steadily decreases when the frequency ratio is _____. 02
   a) <1 b) >1
   c) =1 d) =V2

2) Most rigid element in the structure will receive _____. 02
   a) Least of the lateral load due to seismic action
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   d) None of above

3) Moment-resistant rigid joints in the structure will _____. 02
   a) Increase the ductility of the structure
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4) In the moment-resistant rigid framing system, for better seismic resistance, it is preferable to have _____. 02
   a) The moment capacity of column greater than that of the beam at the joint
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5) The following is not a brittle failure of an RCC structure _____. 01
   a) Shear failure
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   c) Bond failure
   d) Crushing of concrete in compression

6) Ductility in the structure _____. 01
   a) Increases the damping b) Increases the deformation
   c) Decreases the seismic force d) All the above

7) In which of the following cases, the dynamic system has no oscillation but returns to equilibrium at a slower rate? 02
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) None of above

8) The damping in a dynamic system is represented as equivalent to _____. 02

a) Coulomb damping
b) Viscous damping
c) Friction damping
d) Negative damping

Seat No.	

Set **R**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 02.30 PM To 05.30 PM

Instructions: 1) Q.No.4 and Q.No.6 are compulsory.
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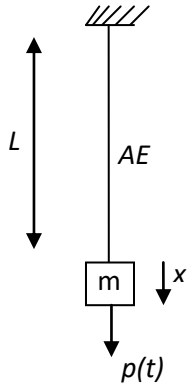
5) Use of only IS 1893:2016 is allowed.

Section – I

Q.2 What is meant by the focus and epicentre of an earthquake? Name the two kinds of body waves and explain how they differ. **09**

Q.3 A rod made of an elastic material with modulus of elasticity $E.$ having cross-sectional area and length L is fixed on top. carrying a mass *m* at its lower end. Derive the equation governing longitudinal motion of the system ignore mass of the rod and measure displacement, x from the static equilibrium position. **09**



Q.4 What do you mean by force transmissibility? Derive an expression for force transmissibility to the foundation of a SDOF system subjected to harmonic force. **10**

Q.5 What is combined spectrum? What are its characteristics? **09**

Section – II

Q.6 It is proposed to construct a R.C.C. three storied commercial building having plan dimensions as shown in fig.1 in zone III with following data. Determine the lateral forces and base shear. The all column sizes are 300 × 450 mm & beams sizes are 230 x 450 mm. The slab thickness is 120mm & thk. Of walls is 230mm. The ht. Of floor is 3.2m & Live load is 4.0 kN/m^2 IS 13920 provisions will not be used. The strata is Medium. **10**

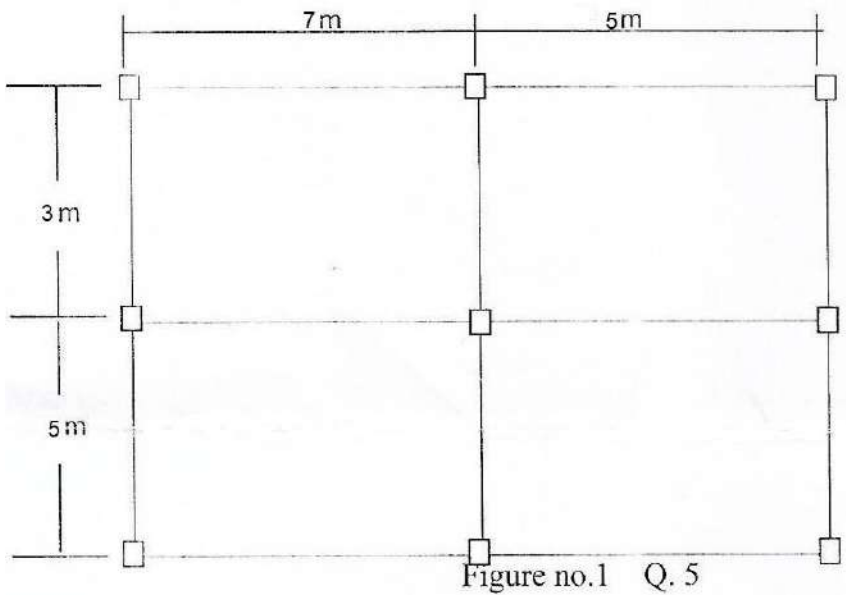


Figure no.1 Q. 5

Q.7 Discuss the factors required for accessing **09**

a) The lateral design forces
b) The design response spectrum

Q.8 State the reasons for the poor performances of masonry buildings in seismic areas. **09**

Q.9 Describe the various earthquake resistant features that can be introduced in masonry building to make it earthquake resistant. **09**

Seat No.	

Set **S**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 02.30 PM To 05.30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume the suitable data whenever necessary.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The following is not a brittle failure of an RCC structure _____. 01
   a) Shear failure
   b) Yielding of reinforcement in tension
   c) Bond failure
   d) Crushing of concrete in compression

2) Ductility in the structure _____. 01
   a) Increases the damping b) Increases the deformation
   c) Decreases the seismic force d) All the above

3) In which of the following cases, the dynamic system has no oscillation but returns to equilibrium at a slower rate? 02
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) None of above

4) The damping in a dynamic system is represented as equivalent to _____. 02
   a) Coulomb damping b) Viscous damping
   c) Friction damping d) Negative damping

5) The response steadily decreases when the frequency ratio is _____. 02
   a) <1 b) >1
   c) =1 d) =V2

6) Most rigid element in the structure will receive _____. 02
   a) Least of the lateral load due to seismic action
   b) Most of the lateral load due to seismic action
   c) The same lateral load as that of any element, due to seismic action
   d) None of above

7) Moment-resistant rigid joints in the structure will _____. 02
   a) Increase the ductility of the structure
   b) Decrease the ductility of the structure
   c) Not affect the ductility of the structure
   d) None of above

8) In the moment-resistant rigid framing system, for better seismic resistance, it is preferable to have _____. 02

a) The moment capacity of column greater than that of the beam at the joint
b) The moment capacity of beam greater than that of the column at the joint
c) The moment capacity of beam equal to that of the column at the joint
d) None of above

SLR-FM-65

Seat No.	

Set S

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

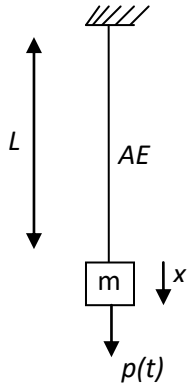
Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 02.30 PM To 05.30 PM

Instructions: 1) Q.No.4 and Q.No.6 are compulsory.
2) Solve any two questions from the remaining question from each section.
3) Assume the suitable data whenever necessary.
4) Figures to the right indicate full marks.
5) Use of only IS 1893:2016 is allowed.

Section – I

Q.2 What is meant by the focus and epicentre of an earthquake? Name the two kinds of body waves and explain how they differ. **09**

Q.3 A rod made of an elastic material with modulus of elasticity $E.$ having cross-sectional area and length L is fixed on top. carrying a mass *m* at its lower end. Derive the equation governing longitudinal motion of the system ignore mass of the rod and measure displacement, x from the static equilibrium position. **09**



Q.4 What do you mean by force transmissibility? Derive an expression for force transmissibility to the foundation of a SDOF system subjected to harmonic force. **10**

Q.5 What is combined spectrum? What are its characteristics? **09**

Section – II

Q.6 It is proposed to construct a R.C.C. three storied commercial building having plan dimensions as shown in fig.1 in zone III with following data. Determine the lateral forces and base shear. The all column sizes are 300 × 450 mm & beams sizes are 230 x 450 mm. The slab thickness is 120mm & thk. Of walls is 230mm. The ht. Of floor is 3.2m & Live load is 4.0 kN/m^2 IS 13920 provisions will not be used. The strata is Medium. **10**

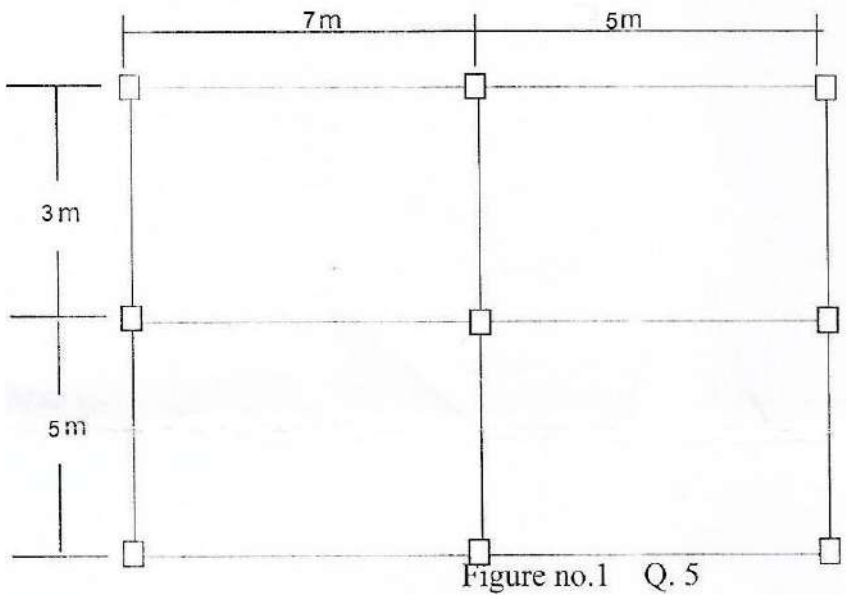


Figure no.1 Q. 5

Q.7 Discuss the factors required for accessing **09**

a) The lateral design forces
b) The design response spectrum

Q.8 State the reasons for the poor performances of masonry buildings in seismic areas. **09**

Q.9 Describe the various earthquake resistant features that can be introduced in masonry building to make it earthquake resistant. **09**

SLR-FM-66

Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT- II

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Which of the following tools is/are used when there is uncertainty in activity durations?
   a) Bar Chart b) CPM network
   c) PERT network d) All of these

2) Arrange the following steps of project scheduling in correct order
   i) Develop the schedule
   ii) Define the activities
   iii) Determine the logical dependency between the activities
   iv) Calculate the time required for each activity
   v) Estimate the resources required for each activity
   a) i),ii),iii),iv),v) b) ii),iii),v),iv),i)
   c) iii),iv),v),i),ii) d) v),iv),iii),ii),i)

3) Read the following statements.
   i) A WBS need not be hierarchical in nature.
   ii) A WBS is a framework for converting project objectives to specific deliverables.
   iii) A WBS need not be comprehensive, there can be gaps in job logic.
   iv) A WBS should have a level of detail required to plan, communicate, monitor and control the project.
   Choose the correct option from the following:
   a) i,ii b) ii,iii
   c) ii,iv d) all of these

4) Please read the following statements:
   i) Critical path has no float and it determines the project completion period
   ii) Critical path is the largest path which actually is the shortest duration within which the project can be completed
   Which of the above statements are wrong?
   a) i) b) ii)
   c) Both i) and ii) d) Neither i) nor ii)

5) PERT in Project Management is a tool for managing _____.
   a) Time b) Cost
   c) Quality d) Resources

6) Based on the following statements select the correct option: _____.
   i) There can be only one critical path in a project network
   ii) It is necessary to introduce a dummy activity in AON network to ensure logic
   iii) The critical path is the longest path in the network
   a) i b) ii
   c) iii d) i and ii

7) The critical path activities have _____ float.
   a) negative b) non zero
   c) zero d) positive

8) Float is used for_____.
   a) Activities b) Events
   c) Nodes d) None of the above

9) _____ is the maximum delay possible for an activity without considering any delay in its precedence or succeeding activity.
   a) Total float b) Free float
   c) Continuous float d) Independent float

10) What is the correct sequence for floats?
   a) Independent float < Total float < Free float
   b) Total Float <= Free Float <= Independent Float
   c) Independent Float <= Free Float <= Total Float
   d) Free Float < Total Float < Independent Float

11) The early finish of an activity is always: _____.
   a) greater than earliest start time of the following node
   b) less than earliest start time of the following node
   c) greater than or equal to earliest start time of the following node
   d) less than or equal to earliest start time of the following node

12) Choose the correct condition for crashing _____.
   a) Crash Direct cost > Normal Direct cost, Crash time > Normal duration
   b) Crash Direct cost < Normal Direct cost, Crash time > Normal duration
   c) Crash Direct cost < Normal Direct cost, Crash time < Normal duration
   d) Crash Direct cost > Normal Direct cost, Crash time < Normal duration

13) Below are statements with respect to resource leveling
   i) It involves shifting activities within their float to minimize fluctuations in daily resource use.
   ii) One of the strategies of resource leveling include interrupting an activity and resuming it later.
   iii) Resource can be levelled by extending the deadline of the project and keeping the daily resource requirement within available limits

   Which of the above statement/s are false?
   a) ii b) ii, iii
   c) i, iii d) None of the above

14) Which of the following is not a characteristic of a project?
   a) Unique b) Infinite
   c) Heterogeneous d) Non-repetitive

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT- II

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. 2 and Q.6 are compulsory. Answer any two questions out of remaining three questions from each section.
2) Figures to the right indicate full marks.

Section – I

Q.2 a) Draw the Bar Chart for the project with following data and find the project duration. **04**

Activity	Preceding Activities	Duration (days)
A	--	2
B	--	4
C	--	10
D	B	3
E	A,B	5
F	B	6
G	B	4
H	C,D	1
I	G,H	7

b) Differentiate between Bar chart and Milestone chart. **04**

c) Explain the Fulkerson's rule. **04**

Q.3 a) In Table 1, activities and their uncertainty in duration captured in terms of optimistic, most likely and pessimistic duration (to, tm and tp respectively). Calculate the project duration. **04**

Table 1

Activity ID	IPA	t_o	t_m	t_p
A	-	10	12	16
B	A	6	9	12
C	B,D	2	3	5
D	-	8	10	14
E	D	5	6	8
F	E	2	3	4
G	-	1	2	3
H	G	7	9	11
J	E,H	1	2	3

b) Calculate the project duration. What is the critical path of the project network? **04**

Activity	Predecessor	Duration
A	Nil	2
B	A	4
C	A	3
D	B,C	6
E	B,C	9
F	D,E	3

Q.4 a) For the following project indirect cost- Rs. 800 Day. **04**

Activity	Predecessor	Normal Duration (Days)	Crash Duration (Days)	Normal Cost (Rs)	Crash Cost (Rs)
A	-	5	4	5000	7000
B	-	3	3	4000	-
C	A,B	3	1	3000	4500
D	B	4	2	8000	10000
E	C,D	5	3	4000	6000
F	E	2	1	7000	7500

Calculate

a) The sequence of the activities in critical path.
b) The slope of activity D.
c) The direct cost of project if the duration is reduced to 13 days.
d) The indirect cost of project if the duration is reduced to 14 days.
e) The total cost of project if the duration is reduced to 14 days.
f) Minimum total cost and optimal duration.

b) Prepare a network from following data. Answer the questions. **04**

Activity	Predecessor	Duration	Resource rate/day
A	-	8	4
B	-	2	7
C	B	4	3
D	C	3	3
E	D	5	6
F	B	6	5

1) What is Critical path and duration
2) What is free flat of activities A and F
3) If all the activities started on early start (ES), when shall be the minimum daily resource requirement?
4) If all activities are started on early start (ES), what shall be the cumulative daily resource requirement on days 3, 6, 9, 12?
5) If only 11 units are available on a daily basis. On which days resources are over allocated if all activities start on early start (ES)?

Q.5 Explain

a) The reports possible to be generated by a project management software. **04**
b) Information system planning design and implementation. **04**

Section – II

Q.6	**a)**	Project-A cost INR 100 crore to construct and an annual return of INR 40 crore is expected for next 5 years. On the other hand, project B costs INR 150 crore to construct and the expected annual return is INR 20 crore for next 15 years. Assume that the applicable rate of interest is 10%. Which project should be preferred by the owner based on their NPV?	**04**
	b)	Consider an equipment with an initial value of INR 50 lakhs (INR 5 million). It has been estimated that at the end of the service life of 5 years, the salvage value of the equipment is INR 5 lakhs. Assuming that the 'sum of years' method is used for calculating depreciation, what is the book value of the equipment after 3 years of operation?	**04**
	c)	Explain the different types of interest	**04**
Q.7	**a)**	Write a note on "Precedence Network" and its relation-ships presentation with sketch.	**08**
	b)	When to apply Value Engineering? What are the application areas of value engineering?	
Q.8	**a)**	There are two alternatives for purchasing a concrete mixer. Both the alternatives have same useful life. The cash flow details of alternatives are as follows: Alternative- 1: Initial purchase cost = Rs.3,00,000, Annual operating and maintenance cost = Rs.20,000, Expected salvage value = Rs.1,25,000, Useful life = 5 years. Alternative- 2: Initial purchase cost = Rs.2,00,000, Annual operating and maintenance cost = Rs.35,000, Expected salvage value = Rs.70,000, Useful life = 5 years. Using present worth method, find out which alternative should be selected, if the rate of interest is 10% per year.	**08**
	b)	Define Life Cycle Costing. What are its purpose and implications?	
Q.9	**Compare**		**08**
	a)	Discounting methods and Nondiscounting methods.	
	b)	EUAC method and IRR method.	

SLR-FM-66

Seat No.		Set	Q

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT- II

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Float is used for_____.
   a) Activities b) Events
   c) Nodes d) None of the above

2) _____ is the maximum delay possible for an activity without considering any delay in its precedence or succeeding activity.
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   i) It involves shifting activities within their float to minimize fluctuations in daily resource use.
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   Which of the above statement/s are false?
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   a) i b) ii
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Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT- II

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

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Section – I

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b) Differentiate between Bar chart and Milestone chart. **04**

c) Explain the Fulkerson's rule. **04**

Q.3 a) In Table 1, activities and their uncertainty in duration captured in terms of optimistic, most likely and pessimistic duration (to, tm and tp respectively). Calculate the project duration. **04**

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H	G	7	9	11
J	E,H	1	2	3

b) Calculate the project duration. What is the critical path of the project network? **04**

Activity	Predecessor	Duration
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D	B	4	2	8000	10000
E	C,D	5	3	4000	6000
F	E	2	1	7000	7500

Calculate

a) The sequence of the activities in critical path.
b) The slope of activity D.
c) The direct cost of project if the duration is reduced to 13 days.
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Q.5 Explain

a) The reports possible to be generated by a project management software. **04**

b) Information system planning design and implementation. **04**

Section – II

Q.6	**a)**	Project-A cost INR 100 crore to construct and an annual return of INR 40 crore is expected for next 5 years. On the other hand, project B costs INR 150 crore to construct and the expected annual return is INR 20 crore for next 15 years. Assume that the applicable rate of interest is 10%. Which project should be preferred by the owner based on their NPV?	**04**
	b)	Consider an equipment with an initial value of INR 50 lakhs (INR 5 million). It has been estimated that at the end of the service life of 5 years, the salvage value of the equipment is INR 5 lakhs. Assuming that the 'sum of years' method is used for calculating depreciation, what is the book value of the equipment after 3 years of operation?	**04**
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	b)	Define Life Cycle Costing. What are its purpose and implications?	
Q.9	**Compare**		**08**
	a)	Discounting methods and Nondiscounting methods.	
	b)	EUAC method and IRR method.	

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT- II

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) PERT in Project Management is a tool for managing _____.
   a) Time b) Cost
   c) Quality d) Resources

2) Based on the following statements select the correct option: _____.
   i) There can be only one critical path in a project network
   ii) It is necessary to introduce a dummy activity in AON network to ensure logic
   iii) The critical path is the longest path in the network
   a) i b) ii
   c) iii d) i and ii

3) The critical path activities have _____ float.
   a) negative b) non zero
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4) Float is used for_____.
   a) Activities b) Events
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   a) Crash Direct cost > Normal Direct cost, Crash time > Normal duration
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   Which of the above statement/s are false?
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   i) Critical path has no float and it determines the project completion period
   ii) Critical path is the largest path which actually is the shortest duration within which the project can be completed

   Which of the above statements are wrong?
   a) i) b) ii)
   c) Both i) and ii) d) Neither i) nor ii)

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT- II

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. 2 and Q.6 are compulsory. Answer any two questions out of remaining three questions from each section.
2) Figures to the right indicate full marks.

Section – I

Q.2 a) Draw the Bar Chart for the project with following data and find the project duration. **04**

Activity	Preceding Activities	Duration (days)
A	--	2
B	--	4
C	--	10
D	B	3
E	A,B	5
F	B	6
G	B	4
H	C,D	1
I	G,H	7

b) Differentiate between Bar chart and Milestone chart. **04**

c) Explain the Fulkerson's rule. **04**

Q.3 a) In Table 1, activities and their uncertainty in duration captured in terms of optimistic, most likely and pessimistic duration (to, tm and tp respectively). Calculate the project duration. **04**

Table 1

Activity ID	IPA	t_o	t_m	t_p
A	-	10	12	16
B	A	6	9	12
C	B,D	2	3	5
D	-	8	10	14
E	D	5	6	8
F	E	2	3	4
G	-	1	2	3
H	G	7	9	11
J	E,H	1	2	3

b) Calculate the project duration. What is the critical path of the project network? **04**

Activity	Predecessor	Duration
A	Nil	2
B	A	4
C	A	3
D	B,C	6
E	B,C	9
F	D,E	3

Q.4 a) For the following project indirect cost- Rs. 800 Day. **04**

Activity	Predecessor	Normal Duration (Days)	Crash Duration (Days)	Normal Cost (Rs)	Crash Cost (Rs)
A	-	5	4	5000	7000
B	-	3	3	4000	-
C	A,B	3	1	3000	4500
D	B	4	2	8000	10000
E	C,D	5	3	4000	6000
F	E	2	1	7000	7500

Calculate

a) The sequence of the activities in critical path.
b) The slope of activity D.
c) The direct cost of project if the duration is reduced to 13 days.
d) The indirect cost of project if the duration is reduced to 14 days.
e) The total cost of project if the duration is reduced to 14 days.
f) Minimum total cost and optimal duration.

b) Prepare a network from following data. Answer the questions. **04**

Activity	Predecessor	Duration	Resource rate/day
A	-	8	4
B	-	2	7
C	B	4	3
D	C	3	3
E	D	5	6
F	B	6	5

1) What is Critical path and duration
2) What is free flat of activities A and F
3) If all the activities started on early start (ES), when shall be the minimum daily resource requirement?
4) If all activities are started on early start (ES), what shall be the cumulative daily resource requirement on days 3, 6, 9, 12?
5) If only 11 units are available on a daily basis. On which days resources are over allocated if all activities start on early start (ES)?

Q.5 Explain

a) The reports possible to be generated by a project management software. **04**

b) Information system planning design and implementation. **04**

Section – II

Q.6	**a)**	Project-A cost INR 100 crore to construct and an annual return of INR 40 crore is expected for next 5 years. On the other hand, project B costs INR 150 crore to construct and the expected annual return is INR 20 crore for next 15 years. Assume that the applicable rate of interest is 10%. Which project should be preferred by the owner based on their NPV?	**04**
	b)	Consider an equipment with an initial value of INR 50 lakhs (INR 5 million). It has been estimated that at the end of the service life of 5 years, the salvage value of the equipment is INR 5 lakhs. Assuming that the 'sum of years' method is used for calculating depreciation, what is the book value of the equipment after 3 years of operation?	**04**
	c)	Explain the different types of interest	**04**
Q.7	**a)**	Write a note on "Precedence Network" and its relation-ships presentation with sketch.	**08**
	b)	When to apply Value Engineering? What are the application areas of value engineering?	
Q.8	**a)**	There are two alternatives for purchasing a concrete mixer. Both the alternatives have same useful life. The cash flow details of alternatives are as follows: Alternative- 1: Initial purchase cost = Rs.3,00,000, Annual operating and maintenance cost = Rs.20,000, Expected salvage value = Rs.1,25,000, Useful life = 5 years. Alternative- 2: Initial purchase cost = Rs.2,00,000, Annual operating and maintenance cost = Rs.35,000, Expected salvage value = Rs.70,000, Useful life = 5 years. Using present worth method, find out which alternative should be selected, if the rate of interest is 10% per year.	**08**
	b)	Define Life Cycle Costing. What are its purpose and implications?	
Q.9	**Compare**		**08**
	a)	Discounting methods and Nondiscounting methods.	
	b)	EUAC method and IRR method.	

SLR-FM-66

Seat No.	

Set S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT- II

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) What is the correct sequence for floats?
   a) Independent float < Total float < Free float
   b) Total Float <= Free Float <= Independent Float
   c) Independent Float <= Free Float <= Total Float
   d) Free Float < Total Float < Independent Float

2) The early finish of an activity is always: _____.
   a) greater than earliest start time of the following node
   b) less than earliest start time of the following node
   c) greater than or equal to earliest start time of the following node
   d) less than or equal to earliest start time of the following node

3) Choose the correct condition for crashing _____.
   a) Crash Direct cost > Normal Direct cost, Crash time > Normal duration
   b) Crash Direct cost < Normal Direct cost, Crash time > Normal duration
   c) Crash Direct cost < Normal Direct cost, Crash time < Normal duration
   d) Crash Direct cost > Normal Direct cost, Crash time < Normal duration

4) Below are statements with respect to resource leveling
   i) It involves shifting activities within their float to minimize fluctuations in daily resource use.
   ii) One of the strategies of resource leveling include interrupting an activity and resuming it later.
   iii) Resource can be levelled by extending the deadline of the project and keeping the daily resource requirement within available limits

   Which of the above statement/s are false?
   a) ii b) ii, iii
   c) i, iii d) None of the above

5) Which of the following is not a characteristic of a project?
   a) Unique b) Infinite
   c) Heterogeneous d) Non-repetitive

6) Which of the following tools is/are used when there is uncertainty in activity durations?
   a) Bar Chart
   b) CPM network
   c) PERT network
   d) All of these

7) Arrange the following steps of project scheduling in correct order
   i) Develop the schedule
   ii) Define the activities
   iii) Determine the logical dependency between the activities
   iv) Calculate the time required for each activity
   v) Estimate the resources required for each activity
   a) i),ii),iii),iv),v)
   b) ii),iii),v),iv),i)
   c) iii),iv),v),i),ii)
   d) v),iv),iii),ii),i)

8) Read the following statements.
   i) A WBS need not be hierarchical in nature.
   ii) A WBS is a framework for converting project objectives to specific deliverables.
   iii) A WBS need not be comprehensive, there can be gaps in job logic.
   iv) A WBS should have a level of detail required to plan, communicate, monitor and control the project.

   Choose the correct option from the following:
   a) i,ii
   b) ii,iii
   c) ii,iv
   d) all of these

9) Please read the following statements:
   i) Critical path has no float and it determines the project completion period
   ii) Critical path is the largest path which actually is the shortest duration within which the project can be completed

   Which of the above statements are wrong?
   a) i)
   b) ii)
   c) Both i) and ii)
   d) Neither i) nor ii)

10) PERT in Project Management is a tool for managing _____.
   a) Time
   b) Cost
   c) Quality
   d) Resources

11) Based on the following statements select the correct option: _____.
   i) There can be only one critical path in a project network
   ii) It is necessary to introduce a dummy activity in AON network to ensure logic
   iii) The critical path is the longest path in the network
   a) i
   b) ii
   c) iii
   d) i and ii

12) The critical path activities have _____ float.
   a) negative
   b) non zero
   c) zero
   d) positive

13) Float is used for_____.
   a) Activities
   b) Events
   c) Nodes
   d) None of the above

14) _____ is the maximum delay possible for an activity without considering any delay in its precedence or succeeding activity.
   a) Total float
   b) Free float
   c) Continuous float
   d) Independent float

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING MANAGEMENT- II

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. 2 and Q.6 are compulsory. Answer any two questions out of remaining three questions from each section.
2) Figures to the right indicate full marks.

Section – I

Q.2 a) Draw the Bar Chart for the project with following data and find the project duration. **04**

Activity	Preceding Activities	Duration (days)
A	--	2
B	--	4
C	--	10
D	B	3
E	A,B	5
F	B	6
G	B	4
H	C,D	1
I	G,H	7

b) Differentiate between Bar chart and Milestone chart. **04**

c) Explain the Fulkerson's rule. **04**

Q.3 a) In Table 1, activities and their uncertainty in duration captured in terms of optimistic, most likely and pessimistic duration (to, tm and tp respectively). Calculate the project duration. **04**

Table 1

Activity ID	IPA	t_o	t_m	t_p
A	-	10	12	16
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D	-	8	10	14
E	D	5	6	8
F	E	2	3	4
G	-	1	2	3
H	G	7	9	11
J	E,H	1	2	3

b) Calculate the project duration. What is the critical path of the project network? **04**

Activity	Predecessor	Duration
A	Nil	2
B	A	4
C	A	3
D	B,C	6
E	B,C	9
F	D,E	3

Q.4 a) For the following project indirect cost- Rs. 800 Day. **04**

Activity	Predecessor	Normal Duration (Days)	Crash Duration (Days)	Normal Cost (Rs)	Crash Cost (Rs)
A	-	5	4	5000	7000
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D	B	4	2	8000	10000
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F	E	2	1	7000	7500

Calculate

a) The sequence of the activities in critical path.
b) The slope of activity D.
c) The direct cost of project if the duration is reduced to 13 days.
d) The indirect cost of project if the duration is reduced to 14 days.
e) The total cost of project if the duration is reduced to 14 days.
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b) Prepare a network from following data. Answer the questions. **04**

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E	D	5	6
F	B	6	5

1) What is Critical path and duration
2) What is free flat of activities A and F
3) If all the activities started on early start (ES), when shall be the minimum daily resource requirement?
4) If all activities are started on early start (ES), what shall be the cumulative daily resource requirement on days 3, 6, 9, 12?
5) If only 11 units are available on a daily basis. On which days resources are over allocated if all activities start on early start (ES)?

Q.5 Explain

a) The reports possible to be generated by a project management software. **04**

b) Information system planning design and implementation. **04**

Section – II

Q.6	**a)**	Project-A cost INR 100 crore to construct and an annual return of INR 40 crore is expected for next 5 years. On the other hand, project B costs INR 150 crore to construct and the expected annual return is INR 20 crore for next 15 years. Assume that the applicable rate of interest is 10%. Which project should be preferred by the owner based on their NPV?	**04**
	b)	Consider an equipment with an initial value of INR 50 lakhs (INR 5 million). It has been estimated that at the end of the service life of 5 years, the salvage value of the equipment is INR 5 lakhs. Assuming that the 'sum of years' method is used for calculating depreciation, what is the book value of the equipment after 3 years of operation?	**04**
	c)	Explain the different types of interest	**04**
Q.7	**a)**	Write a note on "Precedence Network" and its relation-ships presentation with sketch.	**08**
	b)	When to apply Value Engineering? What are the application areas of value engineering?	
Q.8	**a)**	There are two alternatives for purchasing a concrete mixer. Both the alternatives have same useful life. The cash flow details of alternatives are as follows: Alternative- 1: Initial purchase cost = Rs.3,00,000, Annual operating and maintenance cost = Rs.20,000, Expected salvage value = Rs.1,25,000, Useful life = 5 years. Alternative- 2: Initial purchase cost = Rs.2,00,000, Annual operating and maintenance cost = Rs.35,000, Expected salvage value = Rs.70,000, Useful life = 5 years. Using present worth method, find out which alternative should be selected, if the rate of interest is 10% per year.	**08**
	b)	Define Life Cycle Costing. What are its purpose and implications?	
Q.9	**Compare**		**08**
	a)	Discounting methods and Nondiscounting methods.	
	b)	EUAC method and IRR method.	

SLR-FM-67

Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL & RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) At critical depth discharge is _____.
   a) maximum for given specific energy
   b) minimum for given specific energy
   c) maximum for given specific force
   d) minimum for given specific force

2) Froude's number is defined as ratio of Inertia force to _____.
   a) Gravity force b) Viscous force
   c) Pressure force d) Surface tension force

3) The difference between T.E.L and H.G.L. is _____.
   a) pressure head b) depth of flow
   c) velocity head d) none

4) Specific force represents the sum of pressure force and _____.
   a) Datum head
   b) Momentum flux per unit weight
   c) Momentum flux and datum head
   d) None

5) For the trapezoidal section _____.
   a) Side slope equal to 45^{o}
   b) Depth of flow equal to half bed width
   c) Shape is of half hexagon
   d) None

6) River plains are made up of _____.
   a) Black soil b) Alluvium
   c) Red soil d) None

7) The momentum correction factor, β is given as _____.
   a) $1/\mathrm{V}^2\mathrm{A}\int \cdot \mathrm{V}^3.\mathrm{dA}$ b) $1/\mathrm{VA}\int \cdot \mathrm{V}.\mathrm{dA}$
   c) $1/\mathrm{V}^3\mathrm{A}\int \cdot \mathrm{V}^2.\mathrm{dA}$ d) $1/\mathrm{V}^2\mathrm{A}\int \cdot \mathrm{V}^2.\mathrm{dA}$

8) The mean velocity in Lacey's regime channel is proportional to _____.
   a) $\mathrm{R}^{1/3}$ b) S^2
   c) $\mathrm{R}^{2/3}$ d) $\mathrm{So}^{1/3}$

9) Shield's diagram is a plot of non dimensional shear stress (τc) against _____.
   a) Relative depth
   b) Shear Reynold's number
   c) Hydraulic radius
   d) Reynold's number

10) Silting of reservoir _____.
   a) reduces efficiency of dam
   b) raises water level
   c) reduces storage capacity
   d) none

11) The Lacey's equation for a regime channel consist of a set of 'x' independent equation relating to flow, where 'x' is equal to _____.
   a) 8
   b) 6
   c) 4
   d) 2

12) Bed load is the term used to describe combination of _____.
   a) contact load and wash load
   b) contact load and saltation load
   c) contact load and suspended load
   d) only bed material load

13) The dimension of shear stress is _____.
   a) $\mathrm{ML^{-1}T^{-1}}$
   b) $\mathrm{ML^{-1}T^{-2}}$
   c) $\mathrm{ML^{-3}T^{-3}}$
   d) $\mathrm{ML^{-2}T^{-3}}$

14) If froude's law of similitude exists between a model and prototype then the force ratio is $\mathrm{f_r}$ = _____.
   a) $\mathrm{Lr^3}$
   b) $\mathrm{Lr\ \rho r}$
   c) $\mathrm{Lr^3\ \rho r}$
   d) $\mathrm{Lr^3\ \rho r^{-1}}$

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL & RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

Section – I

Q.2 Attempt any four. **16**

a) The velocity distribution in rectangular channel of width 'B' and depth 'Yo' was approximated as $V= k_1\sqrt{y}$ Where k_1= constant; calculate the average velocity for the cross-section and correction coefficient 'α' & 'β'.

b) A 3.5 in wide rectangular channel covey's 10 m^3/s of water with velocity 5 m/s. state is there formation of hydraulic jump if yes calculate height, length and strength of Jump and what is loss of energy per kg of water.

c) Derive the modified GVF equation and draw a neat sketch and show all details.

d) A flow of 5.0 m^3/s is passing at a depth of 1.2 m. through a rectangular channel of width 2.5 m. If 'α' is 1.1 Determine specific energy of flow also determine the value of the depth alternative to the existing depth. If 'α' = 1.0 (assumed for alternate depth flow).

e) What do you understand by most economical channel section? and show that for trapezoidal section Half of top width= Length of one of sloping side and hydraulic mean depth= half the depth of flow

Q.3 Attempt any two. **12**

a) Define kinetic energy correction factor (α) and momentum correction factor (β) and derive their expressions.

b) A discharge of 800 m^3/s flows down a spillway and then passes on a 55 m. wide concrete apron (n= 0.012) the velocity of water at the toe of spillway is 10 m/s. A tail water depth of 4.40 m the channel below causes a hydraulic jump on the horizontal apron. Determine
1) Depth before the jump
2) Length of jump
3) Energy loss in jump
4) Specific force at the toe

c) Derive the modified equation for GVF and also state the assumptions made for it.

Section – II

Q.4 Attempt any four. **16**

a) Explain
1) River training works
2) Meandering of river

b) Differentiate between 'Kennedy's theory and Lacey's theory for channel design.

c) Explain 'Similitude' and what are its types? and derive the equation for Froude's number.

d) Draw a neat sketch of current meter and Explain its working in details.

e) A model of water meter is tested in 100 mm diameter pipe. The discharge was 45 lit/sec and pressure difference is 0.11 n/mm^2. What will be the discharge in pipe of 500 mm diameter pipe and what will be the pressure?

Q.5 Attempt any two. **12**

a) Design a regime channel by using Lacey's theory using the following data
1) Discharge 55 m^3/sec
2) silt factor 1.1

b) Write short notes. (Any two)
1) River gauging and its types
2) Threshold motion of the sediment
3) Cut-off and spurs. (Draw neat sketch).

c) Oil of kinematic viscosity is 5.5 x10^{-5} m^2/sec is used in prototype in which both gravity and viscous forces are important. What should be the viscosity of liquid used in dynamically similar model of scale 1:8? Also find discharge ratio and time ratio for this model.

SLR-FM-67

Seat No.	

Set Q

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL & RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) The mean velocity in Lacey's regime channel is proportional to _____.
   a) $R^{1/3}$ b) S^2
   c) $R^{2/3}$ d) $So^{1/3}$

2) Shield's diagram is a plot of non dimensional shear stress (τc) against _____.
   a) Relative depth b) Shear Reynold's number
   c) Hydraulic radius d) Reynold's number

3) Silting of reservoir _____.
   a) reduces efficiency of dam b) raises water level
   c) reduces storage capacity d) none

4) The Lacey's equation for a regime channel consist of a set of 'x' independent equation relating to flow, where 'x' is equal to _____.
   a) 8 b) 6
   c) 4 d) 2

5) Bed load is the term used to describe combination of _____.
   a) contact load and wash load
   b) contact load and saltation load
   c) contact load and suspended load
   d) only bed material load

6) The dimension of shear stress is _____.
   a) $ML^{-1}T^{-1}$ b) $ML^{-1}T^{-2}$
   c) $ML^{-3}T^{-3}$ d) $ML^{-2}T^{-3}$

7) If froude's law of similitude exists between a model and prototype then the force ratio is f_r = _____.
   a) Lr^3 b) $Lr\ \rho r$
   c) $Lr^3\ \rho r$ d) $Lr^3\ \rho r^{-1}$

8) At critical depth discharge is _____.
   a) maximum for given specific energy
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10) The difference between T.E.L and H.G.L. is _____.
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   c) velocity head
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11) Specific force represents the sum of pressure force and _____.
   a) Datum head
   b) Momentum flux per unit weight
   c) Momentum flux and datum head
   d) None

12) For the trapezoidal section _____.
   a) Side slope equal to 45^o
   b) Depth of flow equal to half bed width
   c) Shape is of half hexagon
   d) None

13) River plains are made up of _____.
   a) Black soil
   b) Alluvium
   c) Red soil
   d) None

14) The momentum correction factor, β is given as _____.
   a) $1/V^2A\int \cdot V^3.dA$
   b) $1/VA\int \cdot V.dA$
   c) $1/V^3A\int \cdot V^2.dA$
   d) $1/V^2A\int \cdot V^2.dA$

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL & RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

Section – I

Q.2 Attempt any four. **16**

a) The velocity distribution in rectangular channel of width 'B' and depth 'Yo' was approximated as $V= k_1\sqrt{y}$ Where k_1= constant; calculate the average velocity for the cross-section and correction coefficient 'α' & 'β'.

b) A 3.5 in wide rectangular channel covey's 10 m^3/s of water with velocity 5 m/s. state is there formation of hydraulic jump if yes calculate height, length and strength of Jump and what is loss of energy per kg of water.

c) Derive the modified GVF equation and draw a neat sketch and show all details.

d) A flow of 5.0 m^3/s is passing at a depth of 1.2 m. through a rectangular channel of width 2.5 m. If 'α' is 1.1 Determine specific energy of flow also determine the value of the depth alternative to the existing depth. If 'α' = 1.0 (assumed for alternate depth flow).

e) What do you understand by most economical channel section? and show that for trapezoidal section Half of top width= Length of one of sloping side and hydraulic mean depth= half the depth of flow

Q.3 Attempt any two. **12**

a) Define kinetic energy correction factor (α) and momentum correction factor (β) and derive their expressions.

b) A discharge of 800 m^3/s flows down a spillway and then passes on a 55 m. wide concrete apron (n= 0.012) the velocity of water at the toe of spillway is 10 m/s. A tail water depth of 4.40 m the channel below causes a hydraulic jump on the horizontal apron. Determine
1) Depth before the jump
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c) Derive the modified equation for GVF and also state the assumptions made for it.

Section – II

Q.4 Attempt any four. **16**

a) Explain
1) River training works
2) Meandering of river

b) Differentiate between 'Kennedy's theory and Lacey's theory for channel design.

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e) A model of water meter is tested in 100 mm diameter pipe. The discharge was 45 lit/sec and pressure difference is 0.11 n/mm^2. What will be the discharge in pipe of 500 mm diameter pipe and what will be the pressure?

Q.5 Attempt any two. **12**

a) Design a regime channel by using Lacey's theory using the following data
1) Discharge 55 m^3/sec
2) silt factor 1.1

b) Write short notes. (Any two)
1) River gauging and its types
2) Threshold motion of the sediment
3) Cut-off and spurs. (Draw neat sketch).

c) Oil of kinematic viscosity is 5.5 x10^{-5} m^2/sec is used in prototype in which both gravity and viscous forces are important. What should be the viscosity of liquid used in dynamically similar model of scale 1:8? Also find discharge ratio and time ratio for this model.

SLR-FM-67

Seat No.	

Set R

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL & RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
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3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) For the trapezoidal section _____.
   a) Side slope equal to 45^o
   b) Depth of flow equal to half bed width
   c) Shape is of half hexagon
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2) River plains are made up of _____.
   a) Black soil b) Alluvium
   c) Red soil d) None

3) The momentum correction factor, β is given as _____.
   a) $1/V^2A\int \cdot V^3.dA$ b) $1/VA\int \cdot V.dA$
   c) $1/V^3A\int \cdot V^2.dA$ d) $1/V^2A\int \cdot V^2.dA$

4) The mean velocity in Lacey's regime channel is proportional to _____.
   a) $R^{1/3}$ b) S^2
   c) $R^{2/3}$ d) $So^{1/3}$

5) Shield's diagram is a plot of non dimensional shear stress (τc) against _____.
   a) Relative depth b) Shear Reynold's number
   c) Hydraulic radius d) Reynold's number

6) Silting of reservoir _____.
   a) reduces efficiency of dam b) raises water level
   c) reduces storage capacity d) none

7) The Lacey's equation for a regime channel consist of a set of 'x' independent equation relating to flow, where 'x' is equal to _____.
   a) 8 b) 6
   c) 4 d) 2

8) Bed load is the term used to describe combination of _____.
   a) contact load and wash load
   b) contact load and saltation load
   c) contact load and suspended load
   d) only bed material load

9) The dimension of shear stress is _____.
   a) $ML^{-1}T^{-1}$ b) $ML^{-1}T^{-2}$
   c) $ML^{-3}T^{-3}$ d) $ML^{-2}T^{-3}$

10) If froude's law of similitude exists between a model and prototype then the force ratio is f_r = _____.
   a) Lr^3 b) $Lr\ \rho r$
   c) $Lr^3\ \rho r$ d) $Lr^3\ \rho r^{-1}$

11) At critical depth discharge is _____.
   a) maximum for given specific energy
   b) minimum for given specific energy
   c) maximum for given specific force
   d) minimum for given specific force

12) Froude's number is defined as ratio of Inertia force to _____.
   a) Gravity force b) Viscous force
   c) Pressure force d) Surface tension force

13) The difference between T.E.L and H.G.L. is _____.
   a) pressure head b) depth of flow
   c) velocity head d) none

14) Specific force represents the sum of pressure force and _____.
   a) Datum head
   b) Momentum flux per unit weight
   c) Momentum flux and datum head
   d) None

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL & RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

Section – I

Q.2 Attempt any four. **16**

a) The velocity distribution in rectangular channel of width 'B' and depth 'Yo' was approximated as $V= k_1\sqrt{y}$ Where k_1= constant; calculate the average velocity for the cross-section and correction coefficient 'α' & 'β'.

b) A 3.5 in wide rectangular channel covey's 10 m^3/s of water with velocity 5 m/s. state is there formation of hydraulic jump if yes calculate height, length and strength of Jump and what is loss of energy per kg of water.

c) Derive the modified GVF equation and draw a neat sketch and show all details.

d) A flow of 5.0 m^3/s is passing at a depth of 1.2 m. through a rectangular channel of width 2.5 m. If 'α' is 1.1 Determine specific energy of flow also determine the value of the depth alternative to the existing depth. If 'α' = 1.0 (assumed for alternate depth flow).

e) What do you understand by most economical channel section? and show that for trapezoidal section Half of top width= Length of one of sloping side and hydraulic mean depth= half the depth of flow

Q.3 Attempt any two. **12**

a) Define kinetic energy correction factor (α) and momentum correction factor (β) and derive their expressions.

b) A discharge of 800 m^3/s flows down a spillway and then passes on a 55 m. wide concrete apron (n= 0.012) the velocity of water at the toe of spillway is 10 m/s. A tail water depth of 4.40 m the channel below causes a hydraulic jump on the horizontal apron. Determine
1) Depth before the jump
2) Length of jump
3) Energy loss in jump
4) Specific force at the toe

c) Derive the modified equation for GVF and also state the assumptions made for it.

Section – II

Q.4 Attempt any four. **16**

a) Explain
1) River training works
2) Meandering of river

b) Differentiate between 'Kennedy's theory and Lacey's theory for channel design.

c) Explain 'Similitude' and what are its types? and derive the equation for Froude's number.

d) Draw a neat sketch of current meter and Explain its working in details.

e) A model of water meter is tested in 100 mm diameter pipe. The discharge was 45 lit/sec and pressure difference is 0.11 n/mm^2. What will be the discharge in pipe of 500 mm diameter pipe and what will be the pressure?

Q.5 Attempt any two. **12**

a) Design a regime channel by using Lacey's theory using the following data
1) Discharge 55 m^3/sec
2) silt factor 1.1

b) Write short notes. (Any two)
1) River gauging and its types
2) Threshold motion of the sediment
3) Cut-off and spurs. (Draw neat sketch).

c) Oil of kinematic viscosity is 5.5 x10^{-5} m^2/sec is used in prototype in which both gravity and viscous forces are important. What should be the viscosity of liquid used in dynamically similar model of scale 1:8? Also find discharge ratio and time ratio for this model.

SLR-FM-67

Seat No.	

Set S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL & RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Silting of reservoir _____.
   a) reduces efficiency of dam b) raises water level
   c) reduces storage capacity d) none

2) The Lacey's equation for a regime channel consist of a set of 'x' independent equation relating to flow, where 'x' is equal to _____.
   a) 8 b) 6
   c) 4 d) 2

3) Bed load is the term used to describe combination of _____.
   a) contact load and wash load
   b) contact load and saltation load
   c) contact load and suspended load
   d) only bed material load

4) The dimension of shear stress is _____.
   a) $ML^{-1}T^{-1}$ b) $ML^{-1}T^{-2}$
   c) $ML^{-3}T^{-3}$ d) $ML^{-2}T^{-3}$

5) If froude's law of similitude exists between a model and prototype then the force ratio is $f_r =$ _____.
   a) Lr^3 b) $Lr\ \rho r$
   c) $Lr^3\ \rho r$ d) $Lr^3\ \rho r^{-1}$

6) At critical depth discharge is _____.
   a) maximum for given specific energy
   b) minimum for given specific energy
   c) maximum for given specific force
   d) minimum for given specific force

7) Froude's number is defined as ratio of Inertia force to _____.
   a) Gravity force b) Viscous force
   c) Pressure force d) Surface tension force

8) The difference between T.E.L and H.G.L. is _____.
   a) pressure head b) depth of flow
   c) velocity head d) none

9) Specific force represents the sum of pressure force and _____.
   a) Datum head
   b) Momentum flux per unit weight
   c) Momentum flux and datum head
   d) None

10) For the trapezoidal section _____.
   a) Side slope equal to 45^{o}
   b) Depth of flow equal to half bed width
   c) Shape is of half hexagon
   d) None

11) River plains are made up of _____.
   a) Black soil
   b) Alluvium
   c) Red soil
   d) None

12) The momentum correction factor, β is given as _____.
   a) $1/\mathrm{V}^2\mathrm{A}\int \cdot \mathrm{V}^3.\mathrm{dA}$
   b) $1/\mathrm{VA}\int \cdot \mathrm{V}.\mathrm{dA}$
   c) $1/\mathrm{V}^3\mathrm{A}\int \cdot \mathrm{V}^2.\mathrm{dA}$
   d) $1/\mathrm{V}^2\mathrm{A}\int \cdot \mathrm{V}^2.\mathrm{dA}$

13) The mean velocity in Lacey's regime channel is proportional to _____.
   a) $\mathrm{R}^{1/3}$
   b) S^2
   c) $\mathrm{R}^{2/3}$
   d) $\mathrm{So}^{1/3}$

14) Shield's diagram is a plot of non dimensional shear stress (τc) against _____.
   a) Relative depth
   b) Shear Reynold's number
   c) Hydraulic radius
   d) Reynold's number

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL & RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

Section – I

Q.2 Attempt any four. **16**

a) The velocity distribution in rectangular channel of width 'B' and depth 'Yo' was approximated as $V= k_1\sqrt{y}$ Where k_1= constant; calculate the average velocity for the cross-section and correction coefficient 'α' & 'β'.

b) A 3.5 in wide rectangular channel covey's 10 m^3/s of water with velocity 5 m/s. state is there formation of hydraulic jump if yes calculate height, length and strength of Jump and what is loss of energy per kg of water.

c) Derive the modified GVF equation and draw a neat sketch and show all details.

d) A flow of 5.0 m^3/s is passing at a depth of 1.2 m. through a rectangular channel of width 2.5 m. If 'α' is 1.1 Determine specific energy of flow also determine the value of the depth alternative to the existing depth. If 'α' = 1.0 (assumed for alternate depth flow).

e) What do you understand by most economical channel section? and show that for trapezoidal section Half of top width= Length of one of sloping side and hydraulic mean depth= half the depth of flow

Q.3 Attempt any two. **12**

a) Define kinetic energy correction factor (α) and momentum correction factor (β) and derive their expressions.

b) A discharge of 800 m^3/s flows down a spillway and then passes on a 55 m. wide concrete apron (n= 0.012) the velocity of water at the toe of spillway is 10 m/s. A tail water depth of 4.40 m the channel below causes a hydraulic jump on the horizontal apron. Determine
1) Depth before the jump
2) Length of jump
3) Energy loss in jump
4) Specific force at the toe

c) Derive the modified equation for GVF and also state the assumptions made for it.

Section – II

Q.4 Attempt any four. **16**

a) Explain
1) River training works
2) Meandering of river

b) Differentiate between 'Kennedy's theory and Lacey's theory for channel design.

c) Explain 'Similitude' and what are its types? and derive the equation for Froude's number.

d) Draw a neat sketch of current meter and Explain its working in details.

e) A model of water meter is tested in 100 mm diameter pipe. The discharge was 45 lit/sec and pressure difference is 0.11 n/mm^2. What will be the discharge in pipe of 500 mm diameter pipe and what will be the pressure?

Q.5 Attempt any two. **12**

a) Design a regime channel by using Lacey's theory using the following data
1) Discharge 55 m^3/sec
2) silt factor 1.1

b) Write short notes. (Any two)
1) River gauging and its types
2) Threshold motion of the sediment
3) Cut-off and spurs. (Draw neat sketch).

c) Oil of kinematic viscosity is 5.5 x10^{-5} m^2/sec is used in prototype in which both gravity and viscous forces are important. What should be the viscosity of liquid used in dynamically similar model of scale 1:8? Also find discharge ratio and time ratio for this model.

SLR-FM-68

Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
AIR POLUTION AND CONTROL

Day & Date: Tuesday,17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Photochemical smog reduces _____ considerably.
   a) Visibility b) Lapse rate
   c) Odour d) Land pollution

2) In ESP particulates are separated by virtue of _____ action.
   a) Gravitational acceleration b) centrifugal
   c) Electrostatic d) diffusion

3) _____ can remove _____.
   a) Scrubers, Water soluble Gases
   b) Gravity settler. Particulates
   c) Adsorption tower, organic gases
   d) All of above

4) Velocity of gas flow in gravity settler should be less than _____ m/s for excellent results.
   a) 0.3 b) 0.5
   c) 3.1 d) 10

5) _____ is the First step in removal of particles in ESP.
   a) Charge neutralization b) Charging of particles
   c) Collection of particles d) Ionization of gas

6) _____ is needed in stack monitoring in order to obtain true and representative samples from stack.
   a) Over isokinetic sampling b) Under isokinetic sampling
   c) Isokinetic sampling d) None of these

7) _____ is commonly found carcinogenic indoor pollutant.
   a) Ozone b) Radon
   c) Both a and b d) Uranium

8) Choose the control equipment with highest particulate removal efficiency Cyclone, Scrubber, ESP, Gravity settler, Bag house _____.
   a) Bag house b) Cyclone
   c) Gravity settler d) ESP

9) Cyclonic Scubber is a type of _____.
   a) Stack monitoring kit
   b) Dry collector
   c) Wet collector
   d) Bag house filter

10) Concentration of SPM in ambient air can be determined by using _____.
   a) Stack monitoring kit
   b) Auto exhaust analyzer
   c) High volume sampler or respirable dust sampler
   d) All of above

11) Consider four pollutants O_3, NO_2, PBN and PAN. Out of these pollutants _____ is a primary pollutant.
   a) O_3
   b) NO_2
   c) PBN
   d) None of above

12) Molecular mass of H_2S is _____ grams/ mole.
   a) 44
   b) 48
   c) 34
   d) 28

13) _____ are categorized under dry collectors.
   a) Venturi scrubber
   b) Spray tower
   c) Cyclonic scrubber
   d) Cyclone separator

14) Thickness of troposphere is approximately _____ km.
   a) 35
   b) 11
   c) 39
   d) 500

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
AIR POLUTION AND CONTROL

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Solve any two questions from section – I and any two questions from section- II.
2) Q. No.3 compulsory from section-I and Q.No.7 compulsory from section II.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.2 **a)** Define air pollution based on composition of clean air. **03**

b) Discuss detailed classification of sources of air *pollutants.* **06**

Q.3 **a)** Explain adiabatic cooling process with the help of neat sketches. **04**

b) 1) The average daily concentration of sulfur dioxide is 415 micrograms/m^3 at 25^0C and 1 atmospheric pressure. What is concentration of SO_2 in ppm? **06**

2) The ozone concentration is observed to be 118 microgram/m3 at 25^0C and 1 atmospheric pressure. Estimate its concentration in ppm.

Q.4 **a)** Sulphur dioxide is emitted from a stack at a rate of 160 gm/sec. Effective height of stack is 60 m. The wind speed at stack top is 6 m/sec. The atmospheric stability class is D. Determine the ground level concentration along the centre line at a distance of 500 m (i.e. C (500m.0.0.H)) from the stack. Assume σy= 36 m and σz 18.5 m. **03**

b) Write GDM and explain each and every term in it. **06**

Q.5 **Write short notes (Any three)** **09**

a) Types of inversion
b) Acid rain
c) Wind velocity profile
d) London Smog and Bhopal Gas tragedy

Section – II

Q.6 **a)** Explain various mechanisms involved in different particulate separation in air pollution control equipments. **05**

b) Two air pollution control equipments (Gravity settling chamber and Cyclone) are connected in series. Efficiencies of settling chamber and cyclone are 80%and 75% respectively. Determine overall efficiency of the system. **04**

Q.7 **a)** Explain working of ESP with neat sketch. Also write advantages and disadvantages. **04**

b) In a Air pollution survey following observations were recorded with high volume sampler. **06**

1) Avg temp of air = 27^0C
2) Avg pressure of air = 760 mm of hg
3) Initial sampling rate = 1.6 m^3/min
4) Final sampling rate = 1.4 m^3/min
5) Duration of sampling = 8 hrs
6) Wt. of filter before sampling = 3.06 gm
7) Wt. of filter after sampling = 3.60 gm

Estimate concentration of SPM im micrograms/m^3. (No need to apply correction)

Q.8 **a)** List out various methods used in gaseous pollution control. Explain Catalytic incineration with neat sketch. **04**

b) What is photochemical smog? Explain photochemical reactions with the help of chemical equations. What are effects of photochemical smog? **05**

Q.9 **Write short note (any three)** **09**

a) Bag house filter
b) Automobile pollution and its control
c) Spray tower
d) Isokinetic sampling

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
AIR POLUTION AND CONTROL

Day & Date: Tuesday,17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Choose the control equipment with highest particulate removal efficiency Cyclone, Scrubber, ESP, Gravity settler, Bag house _____.
   a) Bag house b) Cyclone
   c) Gravity settler d) ESP

2) Cyclonic Scubber is a type of _____.
   a) Stack monitoring kit b) Dry collector
   c) Wet collector d) Bag house filter

3) Concentration of SPM in ambient air can be determined by using _____.
   a) Stack monitoring kit
   b) Auto exhaust analyzer
   c) High volume sampler or respirable dust sampler
   d) All of above

4) Consider four pollutants O_3, NO_2, PBN and PAN. Out of these pollutants _____ is a primary pollutant.
   a) O_3 b) NO_2
   c) PBN d) None of above

5) Molecular mass of H_2S is _____ grams/ mole.
   a) 44 b) 48
   c) 34 d) 28

6) _____ are categorized under dry collectors.
   a) Venturi scrubber b) Spray tower
   c) Cyclonic scrubber d) Cyclone separator

7) Thickness of troposphere is approximately _____ km.
   a) 35 b) 11
   c) 39 d) 500

8) Photochemical smog reduces _____ considerably.
   a) Visibility b) Lapse rate
   c) Odour d) Land pollution

9) In ESP particulates are separated by virtue of _____ action.
   a) Gravitational acceleration b) centrifugal
   c) Electrostatic d) diffusion

10) _____ can remove _____.
   a) Scrubers, Water soluble Gases
   b) Gravity settler. Particulates
   c) Adsorption tower, organic gases
   d) All of above

11) Velocity of gas flow in gravity settler should be less than _____ m/s for excellent results.
   a) 0.3 b) 0.5
   c) 3.1 d) 10

12) _____ is the First step in removal of particles in ESP.
   a) Charge neutralization b) Charging of particles
   c) Collection of particles d) Ionization of gas

13) _____ is needed in stack monitoring in order to obtain true and representative samples from stack.
   a) Over isokinetic sampling b) Under isokinetic sampling
   c) Isokinetic sampling d) None of these

14) _____ is commonly found carcinogenic indoor pollutant.
   a) Ozone b) Radon
   c) Both a and b d) Uranium

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
AIR POLUTION AND CONTROL

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Solve any two questions from section – I and any two questions from section- II.
2) Q. No.3 compulsory from section-I and Q.No.7 compulsory from section II.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.2 **a)** Define air pollution based on composition of clean air. **03**

b) Discuss detailed classification of sources of air *pollutants.* **06**

Q.3 **a)** Explain adiabatic cooling process with the help of neat sketches. **04**

b) 1) The average daily concentration of sulfur dioxide is 415 micrograms/m^3 at 25^0C and 1 atmospheric pressure. What is concentration of SO_2 in ppm? **06**

2) The ozone concentration is observed to be 118 microgram/m3 at 25^0C and 1 atmospheric pressure. Estimate its concentration in ppm.

Q.4 **a)** Sulphur dioxide is emitted from a stack at a rate of 160 gm/sec. Effective height of stack is 60 m. The wind speed at stack top is 6 m/sec. The atmospheric stability class is D. Determine the ground level concentration along the centre line at a distance of 500 m (i.e. C (500m.0.0.H)) from the stack. Assume σy= 36 m and σz 18.5 m. **03**

b) Write GDM and explain each and every term in it. **06**

Q.5 **Write short notes (Any three)** **09**

a) Types of inversion
b) Acid rain
c) Wind velocity profile
d) London Smog and Bhopal Gas tragedy

Section – II

Q.6 **a)** Explain various mechanisms involved in different particulate separation in air pollution control equipments. **05**

b) Two air pollution control equipments (Gravity settling chamber and Cyclone) are connected in series. Efficiencies of settling chamber and cyclone are 80%and 75% respectively. Determine overall efficiency of the system. **04**

Q.7 **a)** Explain working of ESP with neat sketch. Also write advantages and disadvantages. **04**

b) In a Air pollution survey following observations were recorded with high volume sampler. **06**

1) Avg temp of air = 27^0C
2) Avg pressure of air = 760 mm of hg
3) Initial sampling rate = 1.6 m^3/min
4) Final sampling rate = 1.4 m^3/min
5) Duration of sampling = 8 hrs
6) Wt. of filter before sampling = 3.06 gm
7) Wt. of filter after sampling = 3.60 gm

Estimate concentration of SPM im micrograms/m^3. (No need to apply correction)

Q.8 **a)** List out various methods used in gaseous pollution control. Explain Catalytic incineration with neat sketch. **04**

b) What is photochemical smog? Explain photochemical reactions with the help of chemical equations. What are effects of photochemical smog? **05**

Q.9 **Write short note (any three)** **09**

a) Bag house filter
b) Automobile pollution and its control
c) Spray tower
d) Isokinetic sampling

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
AIR POLUTION AND CONTROL

Day & Date: Tuesday,17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) _____ is the First step in removal of particles in ESP.
   a) Charge neutralization b) Charging of particles
   c) Collection of particles d) Ionization of gas

2) _____ is needed in stack monitoring in order to obtain true and representative samples from stack.
   a) Over isokinetic sampling b) Under isokinetic sampling
   c) Isokinetic sampling d) None of these

3) _____ is commonly found carcinogenic indoor pollutant.
   a) Ozone b) Radon
   c) Both a and b d) Uranium

4) Choose the control equipment with highest particulate removal efficiency Cyclone, Scrubber, ESP, Gravity settler, Bag house _____.
   a) Bag house b) Cyclone
   c) Gravity settler d) ESP

5) Cyclonic Scubber is a type of _____.
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6) Concentration of SPM in ambient air can be determined by using _____.
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   c) High volume sampler or respirable dust sampler
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7) Consider four pollutants O_3, NO_2, PBN and PAN. Out of these pollutants _____ is a primary pollutant.
   a) O_3 b) NO_2
   c) PBN d) None of above

8) Molecular mass of H_2S is _____ grams/ mole.
   a) 44 b) 48
   c) 34 d) 28

9) _____ are categorized under dry collectors.
   a) Venturi scrubber b) Spray tower
   c) Cyclonic scrubber d) Cyclone separator

10) Thickness of troposphere is approximately _____ km.
   a) 35 b) 11
   c) 39 d) 500

11) Photochemical smog reduces _____ considerably.
   a) Visibility b) Lapse rate
   c) Odour d) Land pollution

12) In ESP particulates are separated by virtue of _____ action.
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   c) Electrostatic d) diffusion

13) _____ can remove _____.
   a) Scrubers, Water soluble Gases
   b) Gravity settler. Particulates
   c) Adsorption tower, organic gases
   d) All of above

14) Velocity of gas flow in gravity settler should be less than _____ m/s for excellent results.
   a) 0.3 b) 0.5
   c) 3.1 d) 10

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
AIR POLUTION AND CONTROL

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Solve any two questions from section – I and any two questions from section- II.
2) Q. No.3 compulsory from section-I and Q.No.7 compulsory from section II.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.2 **a)** Define air pollution based on composition of clean air. **03**

b) Discuss detailed classification of sources of air *pollutants.* **06**

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b) 1) The average daily concentration of sulfur dioxide is 415 micrograms/m^3 at 25^0C and 1 atmospheric pressure. What is concentration of SO_2 in ppm? **06**

2) The ozone concentration is observed to be 118 microgram/m3 at 25^0C and 1 atmospheric pressure. Estimate its concentration in ppm.

Q.4 **a)** Sulphur dioxide is emitted from a stack at a rate of 160 gm/sec. Effective height of stack is 60 m. The wind speed at stack top is 6 m/sec. The atmospheric stability class is D. Determine the ground level concentration along the centre line at a distance of 500 m (i.e. C (500m.0.0.H)) from the stack. Assume σy= 36 m and σz 18.5 m. **03**

b) Write GDM and explain each and every term in it. **06**

Q.5 **Write short notes (Any three)** **09**

a) Types of inversion
b) Acid rain
c) Wind velocity profile
d) London Smog and Bhopal Gas tragedy

Section – II

Q.6 **a)** Explain various mechanisms involved in different particulate separation in air pollution control equipments. **05**

b) Two air pollution control equipments (Gravity settling chamber and Cyclone) are connected in series. Efficiencies of settling chamber and cyclone are 80%and 75% respectively. Determine overall efficiency of the system. **04**

Q.7 **a)** Explain working of ESP with neat sketch. Also write advantages and disadvantages. **04**

b) In a Air pollution survey following observations were recorded with high volume sampler. **06**

1) Avg temp of air = 27^0C
2) Avg pressure of air = 760 mm of hg
3) Initial sampling rate = 1.6 m^3/min
4) Final sampling rate = 1.4 m^3/min
5) Duration of sampling = 8 hrs
6) Wt. of filter before sampling = 3.06 gm
7) Wt. of filter after sampling = 3.60 gm

Estimate concentration of SPM im micrograms/m^3. (No need to apply correction)

Q.8 **a)** List out various methods used in gaseous pollution control. Explain Catalytic incineration with neat sketch. **04**

b) What is photochemical smog? Explain photochemical reactions with the help of chemical equations. What are effects of photochemical smog? **05**

Q.9 **Write short note (any three)** **09**

a) Bag house filter
b) Automobile pollution and its control
c) Spray tower
d) Isokinetic sampling

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
AIR POLUTION AND CONTROL

Day & Date: Tuesday,17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Concentration of SPM in ambient air can be determined by using _____.
   a) Stack monitoring kit
   b) Auto exhaust analyzer
   c) High volume sampler or respirable dust sampler
   d) All of above

2) Consider four pollutants O_3, NO_2, PBN and PAN. Out of these pollutants _____ is a primary pollutant.
   a) O_3 b) NO_2
   c) PBN d) None of above

3) Molecular mass of H_2S is _____ grams/ mole.
   a) 44 b) 48
   c) 34 d) 28

4) _____ are categorized under dry collectors.
   a) Venturi scrubber b) Spray tower
   c) Cyclonic scrubber d) Cyclone separator

5) Thickness of troposphere is approximately _____ km.
   a) 35 b) 11
   c) 39 d) 500

6) Photochemical smog reduces _____ considerably.
   a) Visibility b) Lapse rate
   c) Odour d) Land pollution

7) In ESP particulates are separated by virtue of _____ action.
   a) Gravitational acceleration b) centrifugal
   c) Electrostatic d) diffusion

8) _____ can remove _____.
   a) Scrubers, Water soluble Gases
   b) Gravity settler. Particulates
   c) Adsorption tower, organic gases
   d) All of above

9) Velocity of gas flow in gravity settler should be less than _____ m/s for excellent results.
   a) 0.3 b) 0.5
   c) 3.1 d) 10

10) _____ is the First step in removal of particles in ESP.
   a) Charge neutralization b) Charging of particles
   c) Collection of particles d) Ionization of gas

11) _____ is needed in stack monitoring in order to obtain true and representative samples from stack.
   a) Over isokinetic sampling b) Under isokinetic sampling
   c) Isokinetic sampling d) None of these

12) _____ is commonly found carcinogenic indoor pollutant.
   a) Ozone b) Radon
   c) Both a and b d) Uranium

13) Choose the control equipment with highest particulate removal efficiency Cyclone, Scrubber, ESP, Gravity settler, Bag house _____.
   a) Bag house b) Cyclone
   c) Gravity settler d) ESP

14) Cyclonic Scubber is a type of _____.
   a) Stack monitoring kit b) Dry collector
   c) Wet collector d) Bag house filter

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
AIR POLUTION AND CONTROL

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Solve any two questions from section – I and any two questions from section- II.
2) Q. No.3 compulsory from section-I and Q.No.7 compulsory from section II.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.2 **a)** Define air pollution based on composition of clean air. **03**

b) Discuss detailed classification of sources of air *pollutants.* **06**

Q.3 **a)** Explain adiabatic cooling process with the help of neat sketches. **04**

b) 1) The average daily concentration of sulfur dioxide is 415 micrograms/m^3 at 25^0C and 1 atmospheric pressure. What is concentration of SO_2 in ppm? **06**

2) The ozone concentration is observed to be 118 microgram/m3 at 25^0C and 1 atmospheric pressure. Estimate its concentration in ppm.

Q.4 **a)** Sulphur dioxide is emitted from a stack at a rate of 160 gm/sec. Effective height of stack is 60 m. The wind speed at stack top is 6 m/sec. The atmospheric stability class is D. Determine the ground level concentration along the centre line at a distance of 500 m (i.e. C (500m.0.0.H)) from the stack. Assume σy= 36 m and σz 18.5 m. **03**

b) Write GDM and explain each and every term in it. **06**

Q.5 **Write short notes (Any three)** **09**

a) Types of inversion
b) Acid rain
c) Wind velocity profile
d) London Smog and Bhopal Gas tragedy

Section – II

Q.6 **a)** Explain various mechanisms involved in different particulate separation in air pollution control equipments. **05**

b) Two air pollution control equipments (Gravity settling chamber and Cyclone) are connected in series. Efficiencies of settling chamber and cyclone are 80%and 75% respectively. Determine overall efficiency of the system. **04**

Q.7 **a)** Explain working of ESP with neat sketch. Also write advantages and disadvantages. **04**

b) In a Air pollution survey following observations were recorded with high volume sampler. **06**

1) Avg temp of air = 27^0C
2) Avg pressure of air = 760 mm of hg
3) Initial sampling rate = 1.6 m^3/min
4) Final sampling rate = 1.4 m^3/min
5) Duration of sampling = 8 hrs
6) Wt. of filter before sampling = 3.06 gm
7) Wt. of filter after sampling = 3.60 gm

Estimate concentration of SPM im micrograms/m^3. (No need to apply correction)

Q.8 **a)** List out various methods used in gaseous pollution control. Explain Catalytic incineration with neat sketch. **04**

b) What is photochemical smog? Explain photochemical reactions with the help of chemical equations. What are effects of photochemical smog? **05**

Q.9 **Write short note (any three)** **09**

a) Bag house filter
b) Automobile pollution and its control
c) Spray tower
d) Isokinetic sampling

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Make suitable assumption, if necessary and mention it clearly.
3) Figures to the right indicate full marks.
4) Use of electronic calculator and relevant I.S codes are allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Three piles are arranged in triangular form, efficiency of this pile group by Feld's rule is _____.
   a) 33.33% b) 97%
   c) 75% d) 87.5%

2) What were the values for soil parameters used by Terzaghi for his local shear failure analysis?
   a) $\Phi_m = \frac{2}{3}\tan\Phi, C_m = \frac{2}{3}c$ b) $\Phi_m = \frac{3}{4}\tan\Phi, C = \frac{3}{4}c$
   c) $\Phi_m = \frac{1}{2}\tan\Phi, C = \frac{1}{2}c$ d) none of these

3) A cyclic load test is performed to determine a pile's _____.
   a) Ultimate load capacity under repetition
   b) Skin resistance and base resistance separately
   c) Skin resistance
   d) Tip resistance

4) The efficiency of pile group depends on _____.
   a) soil type b) method of pile installation
   c) pile spacing d) all of these

5) Geophysical surveys are not useful for _____.
   a) large areas b) Complex boundary layers
   c) Underground cavities d) locating water tables

6) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is____.
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

7) With increase in the size of footing the bearing capacity of footing on clay _____.
   a) Increases b) Decreases
   c) Remains same d) None of these

8) Bored piles are _____ pilles.
   a) Large displacement b) Non displacement
   c) Small displacement d) None of the above

9) Resonance in machine foundation occurs when frequency ratio is _____.
   a) Zero b) less than 1
   c) Greater than 1 d) Equal to one

10) The floating caisson is _____.
   a) Open at top closed at bottom b) closed at top open at bottom
   c) Open at top and bottom both d) None of the above

11) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is _____.
   a) 1/1.5 b) ½
   c) 1/2.5 d) 1/4

12) SPT test will be stopped when.
   a) 10 successive blows produce no advance
   b) 50 blows required for 150mm penetration
   c) Both a and b
   d) Either a or b

13) Pressure meter test is developed by _____.
   a) Terzaghi's b) Taylor
   c) Cassagrande d) Menard

14) The bottom plug in well foundation is usually made up of _____.
   a) Brick Masonry b) RCC
   c) Cement Concrete d) Steel

SLR-FM-69

Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No 5 & Q. No. 9 are compulsory.
2) Solve any two questions from each section.
2) Figure to the right indicates full marks.

Section – I

Q.2 **a)** Discuss the major criteria to be satisfied in the design of foundation? **04**

b) A footing 2.25 m square is located at a depth of 1.5 m in a sand of unit weight 18 kN/m^3. The shear strength parameters are c= 0, ∅= 36^o. Calculate the safe load carried by the footing against complete shear failure. FOS against shear failure is 3. Use Terzaghi's analysis. N_c= 65.4, N_q= 49.4, Nγ= 54 **05**

Q.3 **a)** Discuss the limitation of plate load test. **05**

b) Explain in which situation raft foundation is needed? What are the IS Code provision for it? **04**

Q.4 **a)** A footing 3 m x 2 m in plan transmits a pressure of 130 kN /m^2 on a cohesive soil having E = 6 x 10^4 kN /m and μ = 0.50. Determine the immediate settlement of the footing at the centre. **05**

b) Write note on standard penetration test? **04**

Q.5 **Write note (Any Two)** **10**

a) Foundation techniques in B.C.soil
b) Types of samplers
c) IS code method of bearing capacity
d) Settlement in raft foundation

Section – II

Q.6 **a)** Explain types of piles with neat sketch. **04**

b) A group of 9 piles with 3 piles in row were driven into soft clay extending from ground level up to a great depth. The dia and the length of piles were 25 cm and 10 m respectively. The unconfined compressive strength of the clay is 120 kPa. If the piles are placed at 100 cm c/c, compute the allowable load on the pile group. Take factor of safety = 2.5 For Ø = 0, Nc = 9. Take adhesion factor as 0.75. **05**

Q.7 **a)** Draw a neat sketch of a typical arrangement of a hammer foundation with a frame. **05**

b) Discuss the construction process of Box caisson. **04**

Q.8 **a)** Discuss vibration isolation of machine foundation. **04**

b) Draw the sketch of block foundation with all 6 degrees of freedom. (3 translations and 3 rotations). **05**

Q.9 Write note on any Two. **10**

a) Methods of Shoring
b) Pneumatic caisson
c) Vibration absorbers
d) Criteria for satisfaction performance of machine foundation

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Make suitable assumption, if necessary and mention it clearly.
3) Figures to the right indicate full marks.
4) Use of electronic calculator and relevant I.S codes are allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Bored piles are _____ pilles.
   a) Large displacement b) Non displacement
   c) Small displacement d) None of the above

2) Resonance in machine foundation occurs when frequency ratio is _____.
   a) Zero b) less than 1
   c) Greater than 1 d) Equal to one

3) The floating caisson is _____.
   a) Open at top closed at bottom b) closed at top open at bottom
   c) Open at top and bottom both d) None of the above

4) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is _____.
   a) 1/1.5 b) ½
   c) 1/2.5 d) 1/4

5) SPT test will be stopped when.
   a) 10 successive blows produce no advance
   b) 50 blows required for 150mm penetration
   c) Both a and b
   d) Either a or b

6) Pressure meter test is developed by _____.
   a) Terzaghi's b) Taylor
   c) Cassagrande d) Menard

7) The bottom plug in well foundation is usually made up of _____.
   a) Brick Masonry b) RCC
   c) Cement Concrete d) Steel

8) Three piles are arranged in triangular form, efficiency of this pile group by Feld's rule is _____.
   a) 33.33% b) 97%
   c) 75% d) 87.5%

9) What were the values for soil parameters used by Terzaghi for his local shear failure analysis?
   a) $\Phi_m = \frac{2}{3}\tan\Phi, C_m = \frac{2}{3}c$
   b) $\Phi_m = \frac{3}{4}\tan\Phi, C = \frac{3}{4}c$
   c) $\Phi_m = \frac{1}{2}\tan\Phi, C = \frac{1}{2}c$
   d) none of these

10) A cyclic load test is performed to determine a pile's _____.
   a) Ultimate load capacity under repetition
   b) Skin resistance and base resistance separately
   c) Skin resistance
   d) Tip resistance

11) The efficiency of pile group depends on _____.
   a) soil type
   b) method of pile installation
   c) pile spacing
   d) all of these

12) Geophysical surveys are not useful for _____.
   a) large areas
   b) Complex boundary layers
   c) Underground cavities
   d) locating water tables

13) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is____.
   a) Kentiledge
   b) Bed rock
   c) Cutting edge
   d) Steining

14) With increase in the size of footing the bearing capacity of footing on clay _____.
   a) Increases
   b) Decreases
   c) Remains same
   d) None of these

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No 5 & Q. No. 9 are compulsory.
2) Solve any two questions from each section.
2) Figure to the right indicates full marks.

Section – I

Q.2 **a)** Discuss the major criteria to be satisfied in the design of foundation? **04**

b) A footing 2.25 m square is located at a depth of 1.5 m in a sand of unit weight 18 kN/m^3. The shear strength parameters are c= 0, ∅= 36^o. Calculate the safe load carried by the footing against complete shear failure. FOS against shear failure is 3. Use Terzaghi's analysis. N_c= 65.4, N_q= 49.4, Nγ= 54 **05**

Q.3 **a)** Discuss the limitation of plate load test. **05**

b) Explain in which situation raft foundation is needed? What are the IS Code provision for it? **04**

Q.4 **a)** A footing 3 m x 2 m in plan transmits a pressure of 130 kN /m^2 on a cohesive soil having E = 6 x 10^4 kN /m and μ = 0.50. Determine the immediate settlement of the footing at the centre. **05**

b) Write note on standard penetration test? **04**

Q.5 **Write note (Any Two)** **10**

a) Foundation techniques in B.C.soil
b) Types of samplers
c) IS code method of bearing capacity
d) Settlement in raft foundation

Section – II

Q.6 **a)** Explain types of piles with neat sketch. **04**

b) A group of 9 piles with 3 piles in row were driven into soft clay extending from ground level up to a great depth. The dia and the length of piles were 25 cm and 10 m respectively. The unconfined compressive strength of the clay is 120 kPa. If the piles are placed at 100 cm c/c, compute the allowable load on the pile group. Take factor of safety = 2.5 For Ø = 0, Nc = 9. Take adhesion factor as 0.75. **05**

Q.7 **a)** Draw a neat sketch of a typical arrangement of a hammer foundation with a frame. **05**

b) Discuss the construction process of Box caisson. **04**

Q.8 **a)** Discuss vibration isolation of machine foundation. **04**

b) Draw the sketch of block foundation with all 6 degrees of freedom. (3 translations and 3 rotations). **05**

Q.9 Write note on any Two. **10**

a) Methods of Shoring
b) Pneumatic caisson
c) Vibration absorbers
d) Criteria for satisfaction performance of machine foundation

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Make suitable assumption, if necessary and mention it clearly.
3) Figures to the right indicate full marks.
4) Use of electronic calculator and relevant I.S codes are allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Geophysical surveys are not useful for _____.
   a) large areas b) Complex boundary layers
   c) Underground cavities d) locating water tables

2) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is____.
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

3) With increase in the size of footing the bearing capacity of footing on clay _____.
   a) Increases b) Decreases
   c) Remains same d) None of these

4) Bored piles are _____ pilles.
   a) Large displacement b) Non displacement
   c) Small displacement d) None of the above

5) Resonance in machine foundation occurs when frequency ratio is _____.
   a) Zero b) less than 1
   c) Greater than 1 d) Equal to one

6) The floating caisson is _____.
   a) Open at top closed at bottom b) closed at top open at bottom
   c) Open at top and bottom both d) None of the above

7) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is _____.
   a) 1/1.5 b) ½
   c) 1/2.5 d) 1/4

8) SPT test will be stopped when.
   a) 10 successive blows produce no advance
   b) 50 blows required for 150mm penetration
   c) Both a and b
   d) Either a or b

9) Pressure meter test is developed by _____.
   a) Terzaghi's
   b) Taylor
   c) Cassagrande
   d) Menard

10) The bottom plug in well foundation is usually made up of _____.
   a) Brick Masonry
   b) RCC
   c) Cement Concrete
   d) Steel

11) Three piles are arranged in triangular form, efficiency of this pile group by Feld's rule is _____.
   a) 33.33%
   b) 97%
   c) 75%
   d) 87.5%

12) What were the values for soil parameters used by Terzaghi for his local shear failure analysis?
   a) $\Phi_m = \frac{2}{3}\tan\Phi\,, C_m = \frac{2}{3}c$
   b) $\Phi_m = \frac{3}{4}\tan\Phi\,, C = \frac{3}{4}c$
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   d) none of these

13) A cyclic load test is performed to determine a pile's _____.
   a) Ultimate load capacity under repetition
   b) Skin resistance and base resistance separately
   c) Skin resistance
   d) Tip resistance

14) The efficiency of pile group depends on _____.
   a) soil type
   b) method of pile installation
   c) pile spacing
   d) all of these

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No 5 & Q. No. 9 are compulsory.
2) Solve any two questions from each section.
2) Figure to the right indicates full marks.

Section – I

Q.2 **a)** Discuss the major criteria to be satisfied in the design of foundation? **04**

b) A footing 2.25 m square is located at a depth of 1.5 m in a sand of unit weight 18 kN/m^3. The shear strength parameters are c= 0, ∅= 36^o. Calculate the safe load carried by the footing against complete shear failure. FOS against shear failure is 3. Use Terzaghi's analysis. N_c= 65.4, N_q= 49.4, Nγ= 54 **05**

Q.3 **a)** Discuss the limitation of plate load test. **05**

b) Explain in which situation raft foundation is needed? What are the IS Code provision for it? **04**

Q.4 **a)** A footing 3 m x 2 m in plan transmits a pressure of 130 kN /m^2 on a cohesive soil having E = 6 x 10^4 kN /m and μ = 0.50. Determine the immediate settlement of the footing at the centre. **05**

b) Write note on standard penetration test? **04**

Q.5 **Write note (Any Two)** **10**

a) Foundation techniques in B.C.soil
b) Types of samplers
c) IS code method of bearing capacity
d) Settlement in raft foundation

Section – II

Q.6 **a)** Explain types of piles with neat sketch. **04**

b) A group of 9 piles with 3 piles in row were driven into soft clay extending from ground level up to a great depth. The dia and the length of piles were 25 cm and 10 m respectively. The unconfined compressive strength of the clay is 120 kPa. If the piles are placed at 100 cm c/c, compute the allowable load on the pile group. Take factor of safety = 2.5 For Ø = 0, Nc = 9. Take adhesion factor as 0.75. **05**

Q.7 **a)** Draw a neat sketch of a typical arrangement of a hammer foundation with a frame. **05**

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Q.8 **a)** Discuss vibration isolation of machine foundation. **04**

b) Draw the sketch of block foundation with all 6 degrees of freedom. (3 translations and 3 rotations). **05**

Q.9 Write note on any Two. **10**

a) Methods of Shoring
b) Pneumatic caisson
c) Vibration absorbers
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Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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3) Figures to the right indicate full marks.
4) Use of electronic calculator and relevant I.S codes are allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) The floating caisson is _____.
   a) Open at top closed at bottom b) closed at top open at bottom
   c) Open at top and bottom both d) None of the above

2) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is _____.
   a) 1/1.5 b) ½
   c) 1/2.5 d) 1/4

3) SPT test will be stopped when.
   a) 10 successive blows produce no advance
   b) 50 blows required for 150mm penetration
   c) Both a and b
   d) Either a or b

4) Pressure meter test is developed by _____.
   a) Terzaghi's b) Taylor
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5) The bottom plug in well foundation is usually made up of _____.
   a) Brick Masonry b) RCC
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7) What were the values for soil parameters used by Terzaghi for his local shear failure analysis?
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8) A cyclic load test is performed to determine a pile's _____.
   a) Ultimate load capacity under repetition
   b) Skin resistance and base resistance separately
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9) The efficiency of pile group depends on _____.
   a) soil type
   b) method of pile installation
   c) pile spacing
   d) all of these

10) Geophysical surveys are not useful for _____.
   a) large areas
   b) Complex boundary layers
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11) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is____.
   a) Kentiledge
   b) Bed rock
   c) Cutting edge
   d) Steining

12) With increase in the size of footing the bearing capacity of footing on clay _____.
   a) Increases
   b) Decreases
   c) Remains same
   d) None of these

13) Bored piles are _____ pilles.
   a) Large displacement
   b) Non displacement
   c) Small displacement
   d) None of the above

14) Resonance in machine foundation occurs when frequency ratio is _____.
   a) Zero
   b) less than 1
   c) Greater than 1
   d) Equal to one

SLR-FM-69

Seat No.		Set	S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No 5 & Q. No. 9 are compulsory.
2) Solve any two questions from each section.
2) Figure to the right indicates full marks.

Section – I

Q.2 **a)** Discuss the major criteria to be satisfied in the design of foundation? **04**

b) A footing 2.25 m square is located at a depth of 1.5 m in a sand of unit weight 18 kN/m^3. The shear strength parameters are c= 0, ∅= 36^o. Calculate the safe load carried by the footing against complete shear failure. FOS against shear failure is 3. Use Terzaghi's analysis. N_c= 65.4, N_q= 49.4, Nγ= 54 **05**

Q.3 **a)** Discuss the limitation of plate load test. **05**

b) Explain in which situation raft foundation is needed? What are the IS Code provision for it? **04**

Q.4 **a)** A footing 3 m x 2 m in plan transmits a pressure of 130 kN /m^2 on a cohesive soil having E = 6 x 10^4 kN /m and μ = 0.50. Determine the immediate settlement of the footing at the centre. **05**

b) Write note on standard penetration test? **04**

Q.5 **Write note (Any Two)** **10**

a) Foundation techniques in B.C.soil
b) Types of samplers
c) IS code method of bearing capacity
d) Settlement in raft foundation

Section – II

Q.6 **a)** Explain types of piles with neat sketch. **04**

b) A group of 9 piles with 3 piles in row were driven into soft clay extending from ground level up to a great depth. The dia and the length of piles were 25 cm and 10 m respectively. The unconfined compressive strength of the clay is 120 kPa. If the piles are placed at 100 cm c/c, compute the allowable load on the pile group. Take factor of safety = 2.5 For Ø = 0, Nc = 9. Take adhesion factor as 0.75. **05**

Q.7 **a)** Draw a neat sketch of a typical arrangement of a hammer foundation with a frame. **05**

b) Discuss the construction process of Box caisson. **04**

Q.8 **a)** Discuss vibration isolation of machine foundation. **04**

b) Draw the sketch of block foundation with all 6 degrees of freedom. (3 translations and 3 rotations). **05**

Q.9 Write note on any Two. **10**

a) Methods of Shoring
b) Pneumatic caisson
c) Vibration absorbers
d) Criteria for satisfaction performance of machine foundation

SLR-FM-70

Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Use of IS 456 and IS 3370 is not allowed.
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) In an interior span of a flat slab, the negative design moment is _____ % of the total design moment.
   a) 65 b) 35
   c) 75 d) None of these

2) The floor of the underground water tank designed for _____ pressure for the empty tank condition.
   a) Uplift b) Water
   c) Earth d) All of these

3) Thickened part of a flat slab over its supporting column, is technically known as _____.
   a) drop panel b) capital
   c) column head d) none of these

4) According to I.S.: 456, 2000 the thickness of reinforced concrete footing on piles at its edges, is kept not less than _____.
   a) 20 cm b) 30 cm
   c) 40 cm d) 50 cm

5) A raft foundation is provided if its area exceeds the plan area of the building _____.
   a) 10% b) 20%
   c) 30% d) 50%

6) The tanks situated underground, the walls of the tanks are to be generally designed for _____.
   a) Earth pressure only b) Water pressure only
   c) both a and b d) None of above

7) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement near the water face is _____.
   a) 125 N/mm^2 b) 150N/mm^2
   c) 115 N/mm^2 d) 145 N/mm^2

8) Effective span of a deep beam is taken as _____.
   a) centre to centre distance between the support or 1.15 time clear span whichever is smaller
   b) centre to centre distance between the support or 1.15 time clear span whichever is greater
   c) centre to centre distance between the support or 1.2 time clear span whichever is smaller
   d) centre to centre distance between the support or 1.25 time clear span whichever is smaller

9) Piles are usually driven by _____.
   a) Diesel operated hammer b) Drop hammer
   c) Single acting steam hammer d) All the above

10) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement near the water face is _____.
   a) 125N/mm^2 b) 130N/mm^2
   c) 205 N/mm^2 d) 190N/mm^2

11) The diameter of the column head support a flat slab, is generally kept _____.
   a) 0.25 times the diameter of the column
   b) 4.0 cm larger than the diameter of the column
   c) 0.25 times the span length
   d) none of these

12) A foundation is called shallow if its depth, is _____.
   a) one-fourth of its width b) three-fourth of its width
   c) half of its width d) equal to its width

13) The minimum thickness of a flat slab is taken _____.
   a) L/32 for end panels without drops
   b) L /36 for interior panels without drop
   c) L /36 for end panels without drops
   d) All the above

14) A simply supported beam shall be deemed as deep beam when the ratio effective span to overall depth is less than, _____
   a) 2 b) 4
   c) 6 d) 8

SLR-FM-70

Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Answer any two questions from each section.
2) Use of IS 456 and IS 3370 part IV are allowed.
3) Assume suitable data if necessary.
4) Draw neat sketches wherever necessary.
5) Figures to the right indicate full marks.

Section – I

Q.2 Design a combined R.C footing for two columns A and B located 3.5 m apart. The size of column are 400 mm x 400 mm and 500 mm x 500 mm. The loads acting on the columns are 1000 kN and 1200 kN respectively. The maximum length of the footing is restricted to 6m only. The safe bearing capacity of soil may be taken as 250kN/m^2. Use M_{25} grade of concrete and Fe_{415} steel. **14**

Q.3 An R.C column 450 mm x 450 mm carrying a load of 800 kN is supported on three piles 450 mm x 450 mm in section. The centre to centre distance between the pile is 1.8 m. Design a suitable pile cap. Use M_{20} grade of concrete and Fe_{500} steel. **14**

Q.4 A circular slab of diameter 6 m subjected to a super imposed load of 4 N/m^2. It may considered as simply supported. Design the slab. Assume Poisson's ratio is zero. Use M_{20} grade of concrete and Fe_{415} steel. **14**

Section – II

Q.5 Design a circular ESR by assuming top slab simply supported at edges, vertical walls top free and bottom fixed. Bottom slab is supported by beams resting on four peripheral columns. The capacity of ESR is 50,000 litres. Use IS code method for design. The depth of water may be kept as 3.2 m with free board 0.3 m. Use M_{25} grade of concrete and Fe_{500} Steel. **14**

Q.6 Design an underground water tank 3 m x 8 m x 3 m deep. The subsoil consists of sand having angle of repose of 30^0 and saturated unit weight of 16 kN/m^3. The water table can rise up to ground level. Use M_{25} grade of concrete and Fe_{415} Steel. Take unit weight of water as 9.8 kN/m^3. Live load on roof slab is 2 kN/m^2. **14**

Q.7 A simply supported deep beam is 250 mm wide, 3500 mm deep and has clear span 4.2 m. The beam carries superimposed load of 225 kN/m. The beam has bearing of 450 mm at each end. Design the beam with M_{20}grade of concrete and Fe_{415} Steel. **14**

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Effective span of a deep beam is taken as _____.
   a) centre to centre distance between the support or 1.15 time clear span whichever is smaller
   b) centre to centre distance between the support or 1.15 time clear span whichever is greater
   c) centre to centre distance between the support or 1.2 time clear span whichever is smaller
   d) centre to centre distance between the support or 1.25 time clear span whichever is smaller

2) Piles are usually driven by _____.
   a) Diesel operated hammer b) Drop hammer
   c) Single acting steam hammer d) All the above

3) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement near the water face is _____.
   a) 125N/mm^2 b) 130N/mm^2
   c) 205 N/mm^2 d) 190N/mm^2

4) The diameter of the column head support a flat slab, is generally kept _____.
   a) 0.25 times the diameter of the column
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5) A foundation is called shallow if its depth, is _____.
   a) one-fourth of its width b) three-fourth of its width
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6) The minimum thickness of a flat slab is taken _____.
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   c) L /36 for end panels without drops
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7) A simply supported beam shall be deemed as deep beam when the ratio effective span to overall depth is less than, _____
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9) The floor of the underground water tank designed for _____ pressure for the empty tank condition.
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10) Thickened part of a flat slab over its supporting column, is technically known as _____.
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11) According to I.S.: 456, 2000 the thickness of reinforced concrete footing on piles at its edges, is kept not less than _____.
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14) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement near the water face is _____.
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Seat No.	

Set **Q**

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Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Answer any two questions from each section.
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Section – I

Q.2 Design a combined R.C footing for two columns A and B located 3.5 m apart. The size of column are 400 mm x 400 mm and 500 mm x 500 mm. The loads acting on the columns are 1000 kN and 1200 kN respectively. The maximum length of the footing is restricted to 6m only. The safe bearing capacity of soil may be taken as 250kN/m^2. Use M_{25} grade of concrete and Fe_{415} steel. **14**

Q.3 An R.C column 450 mm x 450 mm carrying a load of 800 kN is supported on three piles 450 mm x 450 mm in section. The centre to centre distance between the pile is 1.8 m. Design a suitable pile cap. Use M_{20} grade of concrete and Fe_{500} steel. **14**

Q.4 A circular slab of diameter 6 m subjected to a super imposed load of 4 N/m^2. It may considered as simply supported. Design the slab. Assume Poisson's ratio is zero. Use M_{20} grade of concrete and Fe_{415} steel. **14**

Section – II

Q.5 Design a circular ESR by assuming top slab simply supported at edges, vertical walls top free and bottom fixed. Bottom slab is supported by beams resting on four peripheral columns. The capacity of ESR is 50,000 litres. Use IS code method for design. The depth of water may be kept as 3.2 m with free board 0.3 m. Use M_{25} grade of concrete and Fe_{500} Steel. **14**

Q.6 Design an underground water tank 3 m x 8 m x 3 m deep. The subsoil consists of sand having angle of repose of 30^0 and saturated unit weight of 16 kN/m^3. The water table can rise up to ground level. Use M_{25} grade of concrete and Fe_{415} Steel. Take unit weight of water as 9.8 kN/m^3. Live load on roof slab is 2 kN/m^2. **14**

Q.7 A simply supported deep beam is 250 mm wide, 3500 mm deep and has clear span 4.2 m. The beam carries superimposed load of 225 kN/m. The beam has bearing of 450 mm at each end. Design the beam with M_{20}grade of concrete and Fe_{415} Steel. **14**

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Seat No.	

Set R

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) A raft foundation is provided if its area exceeds the plan area of the building _____.
   a) 10% b) 20%
   c) 30% d) 50%

2) The tanks situated underground, the walls of the tanks are to be generally designed for _____.
   a) Earth pressure only b) Water pressure only
   c) both a and b d) None of above

3) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement near the water face is _____.
   a) 125 N/mm^2 b) 150N/mm^2
   c) 115 N/mm^2 d) 145 N/mm^2

4) Effective span of a deep beam is taken as _____.
   a) centre to centre distance between the support or 1.15 time clear span whichever is smaller
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   c) centre to centre distance between the support or 1.2 time clear span whichever is smaller
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5) Piles are usually driven by _____.
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Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

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Section – I

Q.2 Design a combined R.C footing for two columns A and B located 3.5 m apart. The size of column are 400 mm x 400 mm and 500 mm x 500 mm. The loads acting on the columns are 1000 kN and 1200 kN respectively. The maximum length of the footing is restricted to 6m only. The safe bearing capacity of soil may be taken as 250kN/m^2. Use M_{25} grade of concrete and Fe_{415} steel. **14**

Q.3 An R.C column 450 mm x 450 mm carrying a load of 800 kN is supported on three piles 450 mm x 450 mm in section. The centre to centre distance between the pile is 1.8 m. Design a suitable pile cap. Use M_{20} grade of concrete and Fe_{500} steel. **14**

Q.4 A circular slab of diameter 6 m subjected to a super imposed load of 4 N/m^2. It may considered as simply supported. Design the slab. Assume Poisson's ratio is zero. Use M_{20} grade of concrete and Fe_{415} steel. **14**

Section – II

Q.5 Design a circular ESR by assuming top slab simply supported at edges, vertical walls top free and bottom fixed. Bottom slab is supported by beams resting on four peripheral columns. The capacity of ESR is 50,000 litres. Use IS code method for design. The depth of water may be kept as 3.2 m with free board 0.3 m. Use M_{25} grade of concrete and Fe_{500} Steel. **14**

Q.6 Design an underground water tank 3 m x 8 m x 3 m deep. The subsoil consists of sand having angle of repose of 30^0 and saturated unit weight of 16 kN/m^3. The water table can rise up to ground level. Use M_{25} grade of concrete and Fe_{415} Steel. Take unit weight of water as 9.8 kN/m^3. Live load on roof slab is 2 kN/m^2. **14**

Q.7 A simply supported deep beam is 250 mm wide, 3500 mm deep and has clear span 4.2 m. The beam carries superimposed load of 225 kN/m. The beam has bearing of 450 mm at each end. Design the beam with M_{20}grade of concrete and Fe_{415} Steel. **14**

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Seat No.	

Set S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement near the water face is _____.
   a) 125N/mm^2 b) 130N/mm^2
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2) The diameter of the column head support a flat slab, is generally kept _____.
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3) A foundation is called shallow if its depth, is _____.
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14) Piles are usually driven by _____.
   a) Diesel operated hammer b) Drop hammer
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Seat No.	

Set S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Answer any two questions from each section.
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Section – I

Q.2 Design a combined R.C footing for two columns A and B located 3.5 m apart. The size of column are 400 mm x 400 mm and 500 mm x 500 mm. The loads acting on the columns are 1000 kN and 1200 kN respectively. The maximum length of the footing is restricted to 6m only. The safe bearing capacity of soil may be taken as 250kN/m^2. Use M_{25} grade of concrete and Fe_{415} steel. **14**

Q.3 An R.C column 450 mm x 450 mm carrying a load of 800 kN is supported on three piles 450 mm x 450 mm in section. The centre to centre distance between the pile is 1.8 m. Design a suitable pile cap. Use M_{20} grade of concrete and Fe_{500} steel. **14**

Q.4 A circular slab of diameter 6 m subjected to a super imposed load of 4 N/m^2. It may considered as simply supported. Design the slab. Assume Poisson's ratio is zero. Use M_{20} grade of concrete and Fe_{415} steel. **14**

Section – II

Q.5 Design a circular ESR by assuming top slab simply supported at edges, vertical walls top free and bottom fixed. Bottom slab is supported by beams resting on four peripheral columns. The capacity of ESR is 50,000 litres. Use IS code method for design. The depth of water may be kept as 3.2 m with free board 0.3 m. Use M_{25} grade of concrete and Fe_{500} Steel. **14**

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Q.7 A simply supported deep beam is 250 mm wide, 3500 mm deep and has clear span 4.2 m. The beam carries superimposed load of 225 kN/m. The beam has bearing of 450 mm at each end. Design the beam with M_{20}grade of concrete and Fe_{415} Steel. **14**

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Seat No.	

Set P

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Identify the INCORRECT option.
   a) “Measure” involves collection of data relating to quality, cost, throughput time etc.
   b) “Analyze” uses data collected from previous step to understand cause-and-effect relationship and to identify sources of variability
   c) "Define" imposes creative thinking to about the specific change that can be made in the process.
   d) “Control” completes all remaining project and to hand off the improved process to the owner along with a process control plan.

2) Six sigma implementations can be divided into three generations. Which of the following option is INCORRECT?
   a) The first generation focused on defect elimination and variability reduction
   b) Second generation mainly focused on integrating the above with improved business performance through cost reduction.
   c) Third generation is marked by focus on creating value throughout the organization and for its stakeholders.
   d) All options are FALSE

3) Improving quality through small, incremental improvements is a characteristic of what type of quality management system?
   a) Just-in-time b) Six Sigma
   c) Kaizen d) Total Quality Management

4) The following is (are) the type(s) of flow process chart: Man type, Material type, Equipment type. The correct answer is: _____.
   a) All of these b) Material and Equipment type
   c) Man and Material type d) Only man type

5) Work study is most useful in _____.
   a) improving industrial relations
   b) Where production activities are involved
   c) In judging the rating of machines
   d) In judging the output of a man and improving it

6) Work study is also recognized as _____.
   a) Both Time and motion study b) None of these
   c) Motion study d) Time study

7) In process charts, the symbol used for storage is _____.
   a) Square b) Triangle
   c) Arrow d) Circle

8) In process charts, the symbol used for inspection is _____.
   a) Circle b) Arrow
   c) Square d) Triangle

9) The correct order of procedure in method study is _____.
   a) Select - Record - Examine - Develop - Define - Install - Maintain
   b) Select - Record - Examine - Define - Develop - Install - Maintain
   c) Select - Define - Examine - Develop - Record - Install - Maintain
   d) Select - Record - Develop - Examine - Define - Install - Maintain

10) Analysis of Therbligs is most closely related to _____.
   a) all of these b) motion study
   c) methods analysis d) work sampling

11) A _____ is based on film analysis.
   a) Operation flow chart b) Outline process chart
   c) String diagram d) SIMO chart

12) In SIMO chart, the movements are recorded against time measured in _____.
   a) Winks b) Micro seconds
   c) Seconds d) Minutes

13) Functional analysis is _____ step of value engineering job plan.
   a) I b) II
   c) III d) IV

14) Aesthetic aspects of the product are majorly related to _____.
   a) Use value b) Esteem value
   c) Cost value d) Exchange value

Seat No.	

Set **P**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Explain advantages of Work study? **06**
b) State and explain the eight steps or procedures in Method study. **06**

Q.3 **a)** In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle time (in minutes)	Number of times observed
20	2
24	1
29	1
32	1

From the above statement**,**
1) Determine the standard time using the experienced industrial engineer's worker rating. **02**
2) Find the standard time using the worker rating of inexperienced industrial engineer. **02**

b) Explain recording techniques for the motion study. **04**

Q.4 **a)** Explain Total Quality Management. **04**
b) Explain 'KAIZEN'. **04**

Q.5 **a)** Explain 5S Techniques. **04**
b) Explain Contributions by Dr J. M. Juran **04**

Section – II

Q.6 **a)** State and explain Steps of work sampling procedure. **06**
b) An office worker wants to perform work sampling for task T. It was estimated that employees are idle 20% of the time. An office worker would like to take a work sample with accuracy of 4% desired confidence level of 95.45%. Assuming Z value as 2 for confidence level of 95.45%, calculate the number of samples required. **06**

Q.7 **a)** What are the objectives of value engineering and Value Analysis? **04**
b) Write a short note on Fault Tree Analysis (FTA). **04**

Q.8 **a)** Write a short note on Failure mode and effects analysis (FMEA). **04**
b) Discuss types of failures in reliability analysis. **04**

Q.9 **a)** Write a note on Techniques in Value Analysis. **04**

b) Three contractors A, B, and C are bidding for a project. A has half the chance that B has. B has two thirds as likely as C for the award of contract. What is the probability of each contractor, if only he gets the contract? **04**

SLR-FM-71

Seat No.	

Set Q

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) In process charts, the symbol used for inspection is _____.
   a) Circle b) Arrow
   c) Square d) Triangle

2) The correct order of procedure in method study is _____.
   a) Select - Record - Examine - Develop - Define - Install - Maintain
   b) Select - Record - Examine - Define - Develop - Install - Maintain
   c) Select - Define - Examine - Develop - Record - Install - Maintain
   d) Select - Record - Develop - Examine - Define - Install - Maintain

3) Analysis of Therbligs is most closely related to _____.
   a) all of these b) motion study
   c) methods analysis d) work sampling

4) A _____ is based on film analysis.
   a) Operation flow chart b) Outline process chart
   c) String diagram d) SIMO chart

5) In SIMO chart, the movements are recorded against time measured in _____.
   a) Winks b) Micro seconds
   c) Seconds d) Minutes

6) Functional analysis is _____ step of value engineering job plan.
   a) I b) II
   c) III d) IV

7) Aesthetic aspects of the product are majorly related to _____.
   a) Use value b) Esteem value
   c) Cost value d) Exchange value

8) Identify the INCORRECT option.
   a) “Measure” involves collection of data relating to quality, cost, throughput time etc.
   b) “Analyze” uses data collected from previous step to understand cause-and-effect relationship and to identify sources of variability
   c) "Define" imposes creative thinking to about the specific change that can be made in the process.
   d) “Control” completes all remaining project and to hand off the improved process to the owner along with a process control plan.

9) Six sigma implementations can be divided into three generations. Which of the following option is INCORRECT?
   a) The first generation focused on defect elimination and variability reduction
   b) Second generation mainly focused on integrating the above with improved business performance through cost reduction.
   c) Third generation is marked by focus on creating value throughout the organization and for its stakeholders.
   d) All options are FALSE

10) Improving quality through small, incremental improvements is a characteristic of what type of quality management system?
   a) Just-in-time
   b) Six Sigma
   c) Kaizen
   d) Total Quality Management

11) The following is (are) the type(s) of flow process chart: Man type, Material type, Equipment type. The correct answer is: _____.
   a) All of these
   b) Material and Equipment type
   c) Man and Material type
   d) Only man type

12) Work study is most useful in _____.
   a) improving industrial relations
   b) Where production activities are involved
   c) In judging the rating of machines
   d) In judging the output of a man and improving it

13) Work study is also recognized as _____.
   a) Both Time and motion study
   b) None of these
   c) Motion study
   d) Time study

14) In process charts, the symbol used for storage is _____.
   a) Square
   b) Triangle
   c) Arrow
   d) Circle

Seat No.	

Set **Q**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Explain advantages of Work study? **06**
b) State and explain the eight steps or procedures in Method study. **06**

Q.3 **a)** In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle time (in minutes)	Number of times observed
20	2
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From the above statement**,**
1) Determine the standard time using the experienced industrial engineer's worker rating. **02**
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b) Explain recording techniques for the motion study. **04**

Q.4 **a)** Explain Total Quality Management. **04**
b) Explain 'KAIZEN'. **04**

Q.5 **a)** Explain 5S Techniques. **04**
b) Explain Contributions by Dr J. M. Juran **04**

Section – II

Q.6 **a)** State and explain Steps of work sampling procedure. **06**
b) An office worker wants to perform work sampling for task T. It was estimated that employees are idle 20% of the time. An office worker would like to take a work sample with accuracy of 4% desired confidence level of 95.45%. Assuming Z value as 2 for confidence level of 95.45%, calculate the number of samples required. **06**

Q.7 **a)** What are the objectives of value engineering and Value Analysis? **04**
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Q.8 **a)** Write a short note on Failure mode and effects analysis (FMEA). **04**
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Q.9 **a)** Write a note on Techniques in Value Analysis. **04**

b) Three contractors A, B, and C are bidding for a project. A has half the chance that B has. B has two thirds as likely as C for the award of contract. What is the probability of each contractor, if only he gets the contract? **04**

Seat No.	

Set **R**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Work study is most useful in _____.
   a) improving industrial relations
   b) Where production activities are involved
   c) In judging the rating of machines
   d) In judging the output of a man and improving it

2) Work study is also recognized as _____.
   a) Both Time and motion study b) None of these
   c) Motion study d) Time study

3) In process charts, the symbol used for storage is _____.
   a) Square b) Triangle
   c) Arrow d) Circle

4) In process charts, the symbol used for inspection is _____.
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   c) Square d) Triangle

5) The correct order of procedure in method study is _____.
   a) Select - Record - Examine - Develop - Define - Install - Maintain
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8) In SIMO chart, the movements are recorded against time measured in _____.
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   c) Seconds d) Minutes

9) Functional analysis is _____ step of value engineering job plan.
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10) Aesthetic aspects of the product are majorly related to _____.
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11) Identify the INCORRECT option.
   a) “Measure” involves collection of data relating to quality, cost, throughput time etc.
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12) Six sigma implementations can be divided into three generations. Which of the following option is INCORRECT?
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13) Improving quality through small, incremental improvements is a characteristic of what type of quality management system?
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14) The following is (are) the type(s) of flow process chart: Man type, Material type, Equipment type. The correct answer is: _____.
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   c) Man and Material type
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Seat No.	

Set R

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Explain advantages of Work study? **06**
b) State and explain the eight steps or procedures in Method study. **06**

Q.3 **a)** In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle time (in minutes)	Number of times observed
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From the above statement**,**
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Q.4 **a)** Explain Total Quality Management. **04**
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Section – II

Q.6 **a)** State and explain Steps of work sampling procedure. **06**
b) An office worker wants to perform work sampling for task T. It was estimated that employees are idle 20% of the time. An office worker would like to take a work sample with accuracy of 4% desired confidence level of 95.45%. Assuming Z value as 2 for confidence level of 95.45%, calculate the number of samples required. **06**

Q.7 **a)** What are the objectives of value engineering and Value Analysis? **04**
b) Write a short note on Fault Tree Analysis (FTA). **04**

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Q.9 **a)** Write a note on Techniques in Value Analysis. **04**

b) Three contractors A, B, and C are bidding for a project. A has half the chance that B has. B has two thirds as likely as C for the award of contract. What is the probability of each contractor, if only he gets the contract? **04**

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Seat No.	

Set S

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

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4) Functional analysis is _____ step of value engineering job plan.
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   a) Square
   b) Triangle
   c) Arrow
   d) Circle

13) In process charts, the symbol used for inspection is _____.
   a) Circle
   b) Arrow
   c) Square
   d) Triangle

14) The correct order of procedure in method study is _____.
   a) Select - Record - Examine - Develop - Define - Install - Maintain
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   c) Select - Define - Examine - Develop - Record - Install - Maintain
   d) Select - Record - Develop - Examine - Define - Install - Maintain

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Seat No.	

Set S

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Explain advantages of Work study? **06**
b) State and explain the eight steps or procedures in Method study. **06**

Q.3 **a)** In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle time (in minutes)	Number of times observed
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24	1
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From the above statement**,**
1) Determine the standard time using the experienced industrial engineer's worker rating. **02**
2) Find the standard time using the worker rating of inexperienced industrial engineer. **02**

b) Explain recording techniques for the motion study. **04**

Q.4 **a)** Explain Total Quality Management. **04**
b) Explain 'KAIZEN'. **04**

Q.5 **a)** Explain 5S Techniques. **04**
b) Explain Contributions by Dr J. M. Juran **04**

Section – II

Q.6 **a)** State and explain Steps of work sampling procedure. **06**
b) An office worker wants to perform work sampling for task T. It was estimated that employees are idle 20% of the time. An office worker would like to take a work sample with accuracy of 4% desired confidence level of 95.45%. Assuming Z value as 2 for confidence level of 95.45%, calculate the number of samples required. **06**

Q.7 **a)** What are the objectives of value engineering and Value Analysis? **04**
b) Write a short note on Fault Tree Analysis (FTA). **04**

Q.8 **a)** Write a short note on Failure mode and effects analysis (FMEA). **04**
b) Discuss types of failures in reliability analysis. **04**

Q.9 **a)** Write a note on Techniques in Value Analysis. **04**

b) Three contractors A, B, and C are bidding for a project. A has half the chance that B has. B has two thirds as likely as C for the award of contract. What is the probability of each contractor, if only he gets the contract? **04**

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENTREPRENEURSHIP

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) An enterprise is a company or business _____.
   a) Company b) Business
   c) Either a or b d) None of these

2) The activity of setting up a business or businesses, taking on _____ in the hope of profit.
   a) Financial risk b) Loss
   c) Profit d) Technical risk

3) Venture capital is concerned with:
   a) New project having potential for higher profit
   b) New project of high technology
   c) New project having high risk
   d) All the above

4) A women entrepreneur is supposed to have a minimum financial interest in share capital of entrepreneur's enterprise _____.
   a) 35 per cent b) 51 per cent
   c) 25 per cent d) None of the above

5) EDP (Entrepreneurship Development Programmes) is required to help _____.
   a) Existing entrepreneurs
   b) First generation entrepreneurs
   c) Future generations entrepreneurs
   d) None of the above

6) A Micro Enterprise is an enterprise where investment in plant and machinery does not exceed (According to MSMED Act, 2006) _____.
   a) Rs. 15 Lakh b) Rs. 20 Lakh
   c) Rs. 25 Lakh d) Rs. 30 Lakh

7) Why should an entrepreneur do a feasibility study for starting a new venture _____.
   a) To identify possible sources of funds
   b) To see if there are possible barriers to success
   c) To estimate the expected sales
   d) To explore potential customers

8) Individuals influencing an entrepreneur's career choice and style are known as which of the following?
   a) Moral-support network b) Role model
   c) Professional support network d) Support system

9) Which one of the following is the process of entrepreneurs developing new products that over time make current products obsolete?
   a) New business model b) Anatomization
   c) None of the given options d) Creative destruction

10) Having less than 50 percent of equity share in an international venture is called _____.
   a) Joint Venture b) Majority interest
   c) Minority interest d) Exporting

11) What is the process by which individuals pursue opportunities without regard to resources they currently control?
   a) Startup management b) Entrepreneurship
   c) Financial analysis d) Feasibility planning

12) A person who managed large project was termed as the entrepreneur in the _____.
   a) Earliest period b) Middle ages
   c) 17th century d) 19th and 20th century

13) The entrepreneur was distinguished from capital provider in _____.
   a) Middle ages b) 17th century
   c) 18th century d) 19th and 20th century

14) Which of the following is used by entrepreneurs to acquire experience in an international market before making a major commitment?
   a) Merger b) Minority Interest
   c) Joint venture d) Majority interest

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Seat No.	

Set P

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENTREPRENEURSHIP

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 & Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.
4) Draw neat sketches wherever necessary.
5) Use of non programmable calculator is permitted.

Section – I

Q.2 Explain the following: **12**
a) risks involved with entrepreneurship
b) barriers to Entrepreneurship
c) Factors affecting entrepreneurial growth.

Q.3 Write Notes. **08**
a) qualities of a successful entrepreneur
b) types of entrepreneurs

Q.4 Explain the following concepts. **08**
a) Role of Government in promoting Entrepreneurship
b) entrepreneurial competencies

Q.5 Write detailed notes. **08**
a) Women Entrepreneurship Problems of Women Entrepreneurship in India
b) remedies to solve the problems of women entrepreneurs

Section – II

Q.6 **a)** Estimation of cost of project and means of financing **12**
b) 1) break even analysis
2) cash flow charts
3) financial statements

Q.7 Write Notes. **08**
a) Long term and Short term financial support
b) Preparation of Business Plans

Q.8 Explain in brief. **08**
a) working capital and fixed capital assessment
b) Preliminary and final project report preparation

Q.9 Write Notes. **08**
a) Industrial and commercial tax laws
b) Communication skills development and barriers

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Seat No.	

Set Q

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENTREPRENEURSHIP

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

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Duration: 30 Minutes Marks: 14

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SLR-FM-74

Seat No.	

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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENTREPRENEURSHIP

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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Section – I

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a) Women Entrepreneurship Problems of Women Entrepreneurship in India
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Q.6 **a)** Estimation of cost of project and means of financing **12**
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Q.8 Explain in brief. **08**
a) working capital and fixed capital assessment
b) Preliminary and final project report preparation

Q.9 Write Notes. **08**
a) Industrial and commercial tax laws
b) Communication skills development and barriers

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENTREPRENEURSHIP

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) EDP (Entrepreneurship Development Programmes) is required to help _____.
   a) Existing entrepreneurs
   b) First generation entrepreneurs
   c) Future generations entrepreneurs
   d) None of the above

2) A Micro Enterprise is an enterprise where investment in plant and machinery does not exceed (According to MSMED Act, 2006) _____.
   a) Rs. 15 Lakh b) Rs. 20 Lakh
   c) Rs. 25 Lakh d) Rs. 30 Lakh

3) Why should an entrepreneur do a feasibility study for starting a new venture _____.
   a) To identify possible sources of funds
   b) To see if there are possible barriers to success
   c) To estimate the expected sales
   d) To explore potential customers

4) Individuals influencing an entrepreneur's career choice and style are known as which of the following?
   a) Moral-support network b) Role model
   c) Professional support network d) Support system

5) Which one of the following is the process of entrepreneurs developing new products that over time make current products obsolete?
   a) New business model b) Anatomization
   c) None of the given options d) Creative destruction

6) Having less than 50 percent of equity share in an international venture is called _____.
   a) Joint Venture b) Majority interest
   c) Minority interest d) Exporting

7) What is the process by which individuals pursue opportunities without regard to resources they currently control?
   a) Startup management
   b) Entrepreneurship
   c) Financial analysis
   d) Feasibility planning

8) A person who managed large project was termed as the entrepreneur in the _____.
   a) Earliest period
   b) Middle ages
   c) 17th century
   d) 19th and 20th century

9) The entrepreneur was distinguished from capital provider in _____.
   a) Middle ages
   b) 17th century
   c) 18th century
   d) 19th and 20th century

10) Which of the following is used by entrepreneurs to acquire experience in an international market before making a major commitment?
   a) Merger
   b) Minority Interest
   c) Joint venture
   d) Majority interest

11) An enterprise is a company or business _____.
   a) Company
   b) Business
   c) Either a or b
   d) None of these

12) The activity of setting up a business or businesses, taking on _____ in the hope of profit.
   a) Financial risk
   b) Loss
   c) Profit
   d) Technical risk

13) Venture capital is concerned with:
   a) New project having potential for higher profit
   b) New project of high technology
   c) New project having high risk
   d) All the above

14) A women entrepreneur is supposed to have a minimum financial interest in share capital of entrepreneur's enterprise _____.
   a) 35 per cent
   b) 51 per cent
   c) 25 per cent
   d) None of the above

SLR-FM-74

Seat No.	

Set R

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENTREPRENEURSHIP

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 & Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.
4) Draw neat sketches wherever necessary.
5) Use of non programmable calculator is permitted.

Section – I

Q.2 Explain the following: **12**
a) risks involved with entrepreneurship
b) barriers to Entrepreneurship
c) Factors affecting entrepreneurial growth.

Q.3 Write Notes. **08**
a) qualities of a successful entrepreneur
b) types of entrepreneurs

Q.4 Explain the following concepts. **08**
a) Role of Government in promoting Entrepreneurship
b) entrepreneurial competencies

Q.5 Write detailed notes. **08**
a) Women Entrepreneurship Problems of Women Entrepreneurship in India
b) remedies to solve the problems of women entrepreneurs

Section – II

Q.6 **a)** Estimation of cost of project and means of financing **12**
b) 1) break even analysis
2) cash flow charts
3) financial statements

Q.7 Write Notes. **08**
a) Long term and Short term financial support
b) Preparation of Business Plans

Q.8 Explain in brief. **08**
a) working capital and fixed capital assessment
b) Preliminary and final project report preparation

Q.9 Write Notes. **08**
a) Industrial and commercial tax laws
b) Communication skills development and barriers

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENTREPRENEURSHIP

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat sketches wherever necessary.
4) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Having less than 50 percent of equity share in an international venture is called _____.
   a) Joint Venture b) Majority interest
   c) Minority interest d) Exporting

2) What is the process by which individuals pursue opportunities without regard to resources they currently control?
   a) Startup management b) Entrepreneurship
   c) Financial analysis d) Feasibility planning

3) A person who managed large project was termed as the entrepreneur in the _____.
   a) Earliest period b) Middle ages
   c) 17th century d) 19th and 20th century

4) The entrepreneur was distinguished from capital provider in _____.
   a) Middle ages b) 17th century
   c) 18th century d) 19th and 20th century

5) Which of the following is used by entrepreneurs to acquire experience in an international market before making a major commitment?
   a) Merger b) Minority Interest
   c) Joint venture d) Majority interest

6) An enterprise is a company or business _____.
   a) Company b) Business
   c) Either a or b d) None of these

7) The activity of setting up a business or businesses, taking on _____ in the hope of profit.
   a) Financial risk b) Loss
   c) Profit d) Technical risk

8) Venture capital is concerned with:
   a) New project having potential for higher profit
   b) New project of high technology
   c) New project having high risk
   d) All the above

9) A women entrepreneur is supposed to have a minimum financial interest in share capital of entrepreneur's enterprise _____.
   a) 35 per cent
   b) 51 per cent
   c) 25 per cent
   d) None of the above

10) EDP (Entrepreneurship Development Programmes) is required to help _____.
   a) Existing entrepreneurs
   b) First generation entrepreneurs
   c) Future generations entrepreneurs
   d) None of the above

11) A Micro Enterprise is an enterprise where investment in plant and machinery does not exceed (According to MSMED Act, 2006) _____.
   a) Rs. 15 Lakh
   b) Rs. 20 Lakh
   c) Rs. 25 Lakh
   d) Rs. 30 Lakh

12) Why should an entrepreneur do a feasibility study for starting a new venture _____.
   a) To identify possible sources of funds
   b) To see if there are possible barriers to success
   c) To estimate the expected sales
   d) To explore potential customers

13) Individuals influencing an entrepreneur's career choice and style are known as which of the following?
   a) Moral-support network
   b) Role model
   c) Professional support network
   d) Support system

14) Which one of the following is the process of entrepreneurs developing new products that over time make current products obsolete?
   a) New business model
   b) Anatomization
   c) None of the given options
   d) Creative destruction

SLR-FM-74

Seat No.	

Set S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENTREPRENEURSHIP

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 & Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.
4) Draw neat sketches wherever necessary.
5) Use of non programmable calculator is permitted.

Section – I

Q.2 Explain the following: **12**
a) risks involved with entrepreneurship
b) barriers to Entrepreneurship
c) Factors affecting entrepreneurial growth.

Q.3 Write Notes. **08**
a) qualities of a successful entrepreneur
b) types of entrepreneurs

Q.4 Explain the following concepts. **08**
a) Role of Government in promoting Entrepreneurship
b) entrepreneurial competencies

Q.5 Write detailed notes. **08**
a) Women Entrepreneurship Problems of Women Entrepreneurship in India
b) remedies to solve the problems of women entrepreneurs

Section – II

Q.6 **a)** Estimation of cost of project and means of financing **12**
b) 1) break even analysis
2) cash flow charts
3) financial statements

Q.7 Write Notes. **08**
a) Long term and Short term financial support
b) Preparation of Business Plans

Q.8 Explain in brief. **08**
a) working capital and fixed capital assessment
b) Preliminary and final project report preparation

Q.9 Write Notes. **08**
a) Industrial and commercial tax laws
b) Communication skills development and barriers

Seat No.	

Set **P**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicates full marks.
3) Non programmable calculator is allowed.
4) Assume suitable data if required and state it clearly.
5) IS 456-2000 is not allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The overall thickness of a slab is 125mm The concrete grade is M20 and the steel grade is Fe415. The clear cover is 20 mm and the diameter of bars is 8mm according to limit state method followed in IS456:2000, the moment capacity due to concrete is _____. **02**
   a) 21.134 kNm b) 28.178 kNm
   c) 35.223 kNm d) 42.267 kNm

2) In an under-reinforced concrete beam _____. **01**
   a) actual depth of neutral axis is less than the critical depth of neutral axis
   b) moment of resistance of a section of the beam is less than that of balanced section
   c) both Option a and Option b
   d) none of these

3) A square column of 5.0m unsupported length restrained in position and direction at both ends carries an axial load of 1200 kN. Assuming M20 and Fe 415 and 1% of steel, what would be the dimension of the column (to the nearest multiple of 10) when designed according to limit state method of design outlined in IS 456:2000? **02**
   a) 420 mm x 420 mm b) 350 mm x 350 mm
   c) 500 mm x 500 mm d) 300 mm x 300 mm

4) The dimension of a rectangular section is 250 mm x 300 mm. The effective cover is 50 mm. The tensile reinforcement is provided with 3 nos. 16 mm HYSD bars. The percentage of steel provided is _____. **02**
   a) 0.6% b) 0.7%
   c) 0.8% d) 0.9%

5) A flanged beam is having the following dimension: width of flange, bf = 1000mm depth of flange, Df = 125mm, width of web, bw = 250 mm and overall depth of beam, D = 450 mm The concrete grade is M20 and the grade of reinforcing steel is Fe415. The clear cover is 25 mm. The moment capacity of the section due to concrete as per limit state method is _____. **02**

a) 95.891 kNm
b) 498.52 kNm
c) 159.818 kNm
d) 191.781 kNm

6) For a rectangular column of size 400mm×400mm, the value of p/fck is taken as 0.10 for using interaction curve of columns as given in SP-16. The grade of concrete is M20 and the grade of steel is Fe415. The area of steel will be equal to _____. **02**

a) 4000 mm^2
b) 3200 mm^2
c) 2400 mm^2
d) 1600 mm^2

7) In a cantilever beam carrying gravity load, main reinforcement is provided _____. **01**

a) above the neutral axis
b) as vertical stirrups
c) below the neutral axis
d) as a helical reinforcement

8) According to IS456:2000, the HYSD reinforcement in either direction of slab shall not be less than _____. **01**

a) 0.10% of the total cross-sectional area
b) 0.12% of the total cross-sectional area
c) 0.15% of the total cross-sectional area
d) 0.20% of the total cross-sectional area

9) Types of shear failures can be of _____. **01**

a) Shear- tension
b) Shear- bond
c) Shear- compression
d) All of these

Seat No.	

Set **P**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and 6 are compulsory.
2) Solve any two from Q. no. 3 to Q. no 5 in section I and Q. no. 7 to Q. no. 9 in section II.
3) Use of IS 456:2000 Original and non programmable calculator is allowed.
4) Draw neat sketches of reinforcement details.

Section – I

Q.2 A reinforced concrete beam section reinforced on the tension side is 250 mm wide with an effective depth of 400mm. It is reinforced with 4 bars of 25mm diameter. Find the ultimate moment of resistance. Take F_{ck}= 20 N/mm^2 and F_y= 415 N/mm^2 **08**

Q.3 Design an R.C.C slab of size 4.5 m X 6 m. The edges of slab are simply supported and the corners are not held down. The slab is carrying a live load of 3 kN/m^2. The slab has bearing of 230 mm on the supporting walls. Use M_{25} concrete and Fe $_{500}$ steel. **10**

Q.4 A floor of a hall 12 m x 6 m to the centres of the supporting walls consists of 3 beams spaced at 3 m apart, the thickness of the slab being 130 mm. Design an intermediate beam. Allow a live load of 3500 N/m^2. The dead load of the floor finish may be taken as 500 N/ m^2. Use M_{20} concrete and Fe $_{415}$ steel. **10**

Q.5 A doubly reinforced beam is 200 mm x 350 mm in section. The areas of the compression and tensile steel are 1200 mm^2 and 1600 mm^2 respectively. The effective cover to the compression reinforcement is 50mm. Find the ultimate moment of resistance of the beam section. Use M_{25} and Fe $_{500}$ steel. For determining Fsc consider stress of 403.5 N/mm^2 for d'\d(0.125) and 395 N/mm^2 for d'\d (0.150). **10**

Section – II

Q.6 Determine the safe axial load for a short circular column 425 mm in diameter, reinforced with 6 bars of 22 mm diameter. It is provided with 8 mm diameter helical reinforcement at a pitch of 40 mm. Use M_{20} concrete and Fe $_{415}$ steel. **08**

Q.7 Design a rectangular beam 450 mm wide subjected to a bending moment of 50 kNm, a shear force of 32 kN and a torsion of 28 kNm. Use M_{20} concrete and Fe $_{415}$ steel. **10**

Q.8 Design a circular column to carry an axial load of 1650 kN. The column is having spiral ties. The column is 3.2 m long and in effectively held in at both ends, but not restrained against rotation. Use M_{20} concrete and Fe_{500} steel. **10**

Q.9 Design a three span continuous beam rectangular beam of span of 5 m each to carry a dead load of 15 kN/m (excluding self weight of beam) and live load of 10 kN/m. The beam is supported by columns. Use M_{25} concrete and Fe_{415} steel. Sketch the reinforcement details. **10**

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicates full marks.
3) Non programmable calculator is allowed.
4) Assume suitable data if required and state it clearly.
5) IS 456-2000 is not allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) For a rectangular column of size 400mm×400mm, the value of p/fck is taken as 0.10 for using interaction curve of columns as given in SP-16. The grade of concrete is M20 and the grade of steel is Fe415. The area of steel will be equal to _____. **02**
   a) 4000 mm^2 b) 3200 mm^2
   c) 2400 mm^2 d) 1600 mm^2

2) In a cantilever beam carrying gravity load, main reinforcement is provided _____. **01**
   a) above the neutral axis b) as vertical stirrups
   c) below the neutral axis d) as a helical reinforcement

3) According to IS456:2000, the HYSD reinforcement in either direction of slab shall not be less than _____. **01**
   a) 0.10% of the total cross-sectional area
   b) 0.12% of the total cross-sectional area
   c) 0.15% of the total cross-sectional area
   d) 0.20% of the total cross-sectional area

4) Types of shear failures can be of _____. **01**
   a) Shear- tension b) Shear- bond
   c) Shear- compression d) All of these

5) The overall thickness of a slab is 125mm The concrete grade is M20 and the steel grade is Fe415. The clear cover is 20 mm and the diameter of bars is 8mm according to limit state method followed in IS456:2000, the moment capacity due to concrete is _____. **02**
   a) 21.134 kNm b) 28.178 kNm
   c) 35.223 kNm d) 42.267 kNm

6) In an under-reinforced concrete beam _____. **01**
   a) actual depth of neutral axis is less than the critical depth of neutral axis
   b) moment of resistance of a section of the beam is less than that of balanced section
   c) both Option a and Option b
   d) none of these

7) A square column of 5.0m unsupported length restrained in position and direction at both ends carries an axial load of 1200 kN. Assuming M20 and Fe 415 and 1% of steel, what would be the dimension of the column (to the nearest multiple of 10) when designed according to limit state method of design outlined in IS 456:2000? **02**

a) 420 mm x 420 mm
b) 350 mm x 350 mm
c) 500 mm x 500 mm
d) 300 mm x 300 mm

8) The dimension of a rectangular section is 250 mm x 300 mm. The effective cover is 50 mm. The tensile reinforcement is provided with 3 nos. 16 mm HYSD bars. The percentage of steel provided is _____. **02**

a) 0.6%
b) 0.7%
c) 0.8%
d) 0.9%

9) A flanged beam is having the following dimension: width of flange, bf = 1000mm depth of flange, Df = 125mm, width of web, bw = 250 mm and overall depth of beam, D = 450 mm The concrete grade is M20 and the grade of reinforcing steel is Fe415. The clear cover is 25 mm. The moment capacity of the section due to concrete as per limit state method is _____. **02**

a) 95.891 kNm
b) 498.52 kNm
c) 159.818 kNm
d) 191.781 kNm

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and 6 are compulsory.
2) Solve any two from Q. no. 3 to Q. no 5 in section I and Q. no. 7 to Q. no. 9 in section II.
3) Use of IS 456:2000 Original and non programmable calculator is allowed.
4) Draw neat sketches of reinforcement details.

Section – I

Q.2 A reinforced concrete beam section reinforced on the tension side is 250 mm wide with an effective depth of 400mm. It is reinforced with 4 bars of 25mm diameter. Find the ultimate moment of resistance. Take F_{ck}= 20 N/mm^2 and F_y= 415 N/mm^2 **08**

Q.3 Design an R.C.C slab of size 4.5 m X 6 m. The edges of slab are simply supported and the corners are not held down. The slab is carrying a live load of 3 kN/m^2. The slab has bearing of 230 mm on the supporting walls. Use M_{25} concrete and Fe $_{500}$ steel. **10**

Q.4 A floor of a hall 12 m x 6 m to the centres of the supporting walls consists of 3 beams spaced at 3 m apart, the thickness of the slab being 130 mm. Design an intermediate beam. Allow a live load of 3500 N/m^2. The dead load of the floor finish may be taken as 500 N/ m^2. Use M_{20} concrete and Fe $_{415}$ steel. **10**

Q.5 A doubly reinforced beam is 200 mm x 350 mm in section. The areas of the compression and tensile steel are 1200 mm^2 and 1600 mm^2 respectively. The effective cover to the compression reinforcement is 50mm. Find the ultimate moment of resistance of the beam section. Use M_{25} and Fe $_{500}$ steel. For determining Fsc consider stress of 403.5 N/mm^2 for d'\d(0.125) and 395 N/mm^2 for d'\d (0.150). **10**

Section – II

Q.6 Determine the safe axial load for a short circular column 425 mm in diameter, reinforced with 6 bars of 22 mm diameter. It is provided with 8 mm diameter helical reinforcement at a pitch of 40 mm. Use M_{20} concrete and Fe $_{415}$ steel. **08**

Q.7 Design a rectangular beam 450 mm wide subjected to a bending moment of 50 kNm, a shear force of 32 kN and a torsion of 28 kNm. Use M_{20} concrete and Fe $_{415}$ steel. **10**

Q.8 Design a circular column to carry an axial load of 1650 kN. The column is having spiral ties. The column is 3.2 m long and in effectively held in at both ends, but not restrained against rotation. Use M_{20} concrete and Fe_{500} steel. **10**

Q.9 Design a three span continuous beam rectangular beam of span of 5 m each to carry a dead load of 15 kN/m (excluding self weight of beam) and live load of 10 kN/m. The beam is supported by columns. Use M_{25} concrete and Fe_{415} steel. Sketch the reinforcement details. **10**

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicates full marks.
3) Non programmable calculator is allowed.
4) Assume suitable data if required and state it clearly.
5) IS 456-2000 is not allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) A flanged beam is having the following dimension: width of flange, bf = 1000mm depth of flange, Df = 125mm, width of web, bw = 250 mm and overall depth of beam, D = 450 mm The concrete grade is M20 and the grade of reinforcing steel is Fe415. The clear cover is 25 mm. The moment capacity of the section due to concrete as per limit state method is _____. **02**

a) 95.891 kNm b) 498.52 kNm
c) 159.818 kNm d) 191.781 kNm

2) For a rectangular column of size 400mm×400mm, the value of p/fck is taken as 0.10 for using interaction curve of columns as given in SP-16. The grade of concrete is M20 and the grade of steel is Fe415. The area of steel will be equal to _____. **02**

a) 4000 mm^2 b) 3200 mm^2
c) 2400 mm^2 d) 1600 mm^2

3) In a cantilever beam carrying gravity load, main reinforcement is provided _____. **01**

a) above the neutral axis b) as vertical stirrups
c) below the neutral axis d) as a helical reinforcement

4) According to IS456:2000, the HYSD reinforcement in either direction of slab shall not be less than _____. **01**

a) 0.10% of the total cross-sectional area
b) 0.12% of the total cross-sectional area
c) 0.15% of the total cross-sectional area
d) 0.20% of the total cross-sectional area

5) Types of shear failures can be of _____. **01**

a) Shear- tension b) Shear- bond
c) Shear- compression d) All of these

6) The overall thickness of a slab is 125mm The concrete grade is M20 and the steel grade is Fe415. The clear cover is 20 mm and the diameter of bars is 8mm according to limit state method followed in IS456:2000, the moment capacity due to concrete is _____. **02**

a) 21.134 kNm b) 28.178 kNm
c) 35.223 kNm d) 42.267 kNm

7) In an under-reinforced concrete beam _____. **01**

a) actual depth of neutral axis is less than the critical depth of neutral axis
b) moment of resistance of a section of the beam is less than that of balanced section
c) both Option a and Option b
d) none of these

8) A square column of 5.0m unsupported length restrained in position and direction at both ends carries an axial load of 1200 kN. Assuming M20 and Fe 415 and 1% of steel, what would be the dimension of the column (to the nearest multiple of 10) when designed according to limit state method of design outlined in IS 456:2000? **02**

a) 420 mm x 420 mm b) 350 mm x 350 mm
c) 500 mm x 500 mm d) 300 mm x 300 mm

9) The dimension of a rectangular section is 250 mm x 300 mm. The effective cover is 50 mm. The tensile reinforcement is provided with 3 nos. 16 mm HYSD bars. The percentage of steel provided is _____. **02**

a) 0.6% b) 0.7%
c) 0.8% d) 0.9%

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and 6 are compulsory.
2) Solve any two from Q. no. 3 to Q. no 5 in section I and Q. no. 7 to Q. no. 9 in section II.
3) Use of IS 456:2000 Original and non programmable calculator is allowed.
4) Draw neat sketches of reinforcement details.

Section – I

Q.2 A reinforced concrete beam section reinforced on the tension side is 250 mm wide with an effective depth of 400mm. It is reinforced with 4 bars of 25mm diameter. Find the ultimate moment of resistance. Take F_{ck}= 20 N/mm^2 and F_y= 415 N/mm^2 **08**

Q.3 Design an R.C.C slab of size 4.5 m X 6 m. The edges of slab are simply supported and the corners are not held down. The slab is carrying a live load of 3 kN/m^2. The slab has bearing of 230 mm on the supporting walls. Use M_{25} concrete and Fe $_{500}$ steel. **10**

Q.4 A floor of a hall 12 m x 6 m to the centres of the supporting walls consists of 3 beams spaced at 3 m apart, the thickness of the slab being 130 mm. Design an intermediate beam. Allow a live load of 3500 N/m^2. The dead load of the floor finish may be taken as 500 N/ m^2. Use M_{20} concrete and Fe $_{415}$ steel. **10**

Q.5 A doubly reinforced beam is 200 mm x 350 mm in section. The areas of the compression and tensile steel are 1200 mm^2 and 1600 mm^2 respectively. The effective cover to the compression reinforcement is 50mm. Find the ultimate moment of resistance of the beam section. Use M_{25} and Fe $_{500}$ steel. For determining Fsc consider stress of 403.5 N/mm^2 for d'\d(0.125) and 395 N/mm^2 for d'\d (0.150). **10**

Section – II

Q.6 Determine the safe axial load for a short circular column 425 mm in diameter, reinforced with 6 bars of 22 mm diameter. It is provided with 8 mm diameter helical reinforcement at a pitch of 40 mm. Use M_{20} concrete and Fe $_{415}$ steel. **08**

Q.7 Design a rectangular beam 450 mm wide subjected to a bending moment of 50 kNm, a shear force of 32 kN and a torsion of 28 kNm. Use M_{20} concrete and Fe $_{415}$ steel. **10**

Q.8 Design a circular column to carry an axial load of 1650 kN. The column is having spiral ties. The column is 3.2 m long and in effectively held in at both ends, but not restrained against rotation. Use M_{20} concrete and Fe_{500} steel. **10**

Q.9 Design a three span continuous beam rectangular beam of span of 5 m each to carry a dead load of 15 kN/m (excluding self weight of beam) and live load of 10 kN/m. The beam is supported by columns. Use M_{25} concrete and Fe_{415} steel. Sketch the reinforcement details. **10**

Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicates full marks.
3) Non programmable calculator is allowed.
4) Assume suitable data if required and state it clearly.
5) IS 456-2000 is not allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) A square column of 5.0m unsupported length restrained in position and direction at both ends carries an axial load of 1200 kN. Assuming M20 and Fe 415 and 1% of steel, what would be the dimension of the column (to the nearest multiple of 10) when designed according to limit state method of design outlined in IS 456:2000? **02**
   a) 420 mm x 420 mm b) 350 mm x 350 mm
   c) 500 mm x 500 mm d) 300 mm x 300 mm

2) The dimension of a rectangular section is 250 mm x 300 mm. The effective cover is 50 mm. The tensile reinforcement is provided with 3 nos. 16 mm HYSD bars. The percentage of steel provided is _____. **02**
   a) 0.6% b) 0.7%
   c) 0.8% d) 0.9%

3) A flanged beam is having the following dimension: width of flange, bf = 1000mm depth of flange, Df = 125mm, width of web, bw = 250 mm and overall depth of beam, D = 450 mm The concrete grade is M20 and the grade of reinforcing steel is Fe415. The clear cover is 25 mm. The moment capacity of the section due to concrete as per limit state method is _____. **02**
   a) 95.891 kNm b) 498.52 kNm
   c) 159.818 kNm d) 191.781 kNm

4) For a rectangular column of size 400mm×400mm, the value of p/fck is taken as 0.10 for using interaction curve of columns as given in SP-16. The grade of concrete is M20 and the grade of steel is Fe415. The area of steel will be equal to _____. **02**
   a) 4000 mm^2 b) 3200 mm^2
   c) 2400 mm^2 d) 1600 mm^2

5) In a cantilever beam carrying gravity load, main reinforcement is provided _____. **01**
   a) above the neutral axis b) as vertical stirrups
   c) below the neutral axis d) as a helical reinforcement

6) According to IS456:2000, the HYSD reinforcement in either direction of slab shall not be less than _____. **01**
   a) 0.10% of the total cross-sectional area
   b) 0.12% of the total cross-sectional area
   c) 0.15% of the total cross-sectional area
   d) 0.20% of the total cross-sectional area

7) Types of shear failures can be of _____. **01**
   a) Shear- tension b) Shear- bond
   c) Shear- compression d) All of these

8) The overall thickness of a slab is 125mm The concrete grade is M20 and the steel grade is Fe415. The clear cover is 20 mm and the diameter of bars is 8mm according to limit state method followed in IS456:2000, the moment capacity due to concrete is _____. **02**
   a) 21.134 kNm b) 28.178 kNm
   c) 35.223 kNm d) 42.267 kNm

9) In an under-reinforced concrete beam _____. **01**
   a) actual depth of neutral axis is less than the critical depth of neutral axis
   b) moment of resistance of a section of the beam is less than that of balanced section
   c) both Option a and Option b
   d) none of these

SLR-FM-76

Seat No.	

Set S

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – I

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and 6 are compulsory.
2) Solve any two from Q. no. 3 to Q. no 5 in section I and Q. no. 7 to Q. no. 9 in section II.
3) Use of IS 456:2000 Original and non programmable calculator is allowed.
4) Draw neat sketches of reinforcement details.

Section – I

Q.2 A reinforced concrete beam section reinforced on the tension side is 250 mm wide with an effective depth of 400mm. It is reinforced with 4 bars of 25mm diameter. Find the ultimate moment of resistance. Take F_{ck}= 20 N/mm^2 and F_y= 415 N/mm^2 **08**

Q.3 Design an R.C.C slab of size 4.5 m X 6 m. The edges of slab are simply supported and the corners are not held down. The slab is carrying a live load of 3 kN/m^2. The slab has bearing of 230 mm on the supporting walls. Use M_{25} concrete and Fe $_{500}$ steel. **10**

Q.4 A floor of a hall 12 m x 6 m to the centres of the supporting walls consists of 3 beams spaced at 3 m apart, the thickness of the slab being 130 mm. Design an intermediate beam. Allow a live load of 3500 N/m^2. The dead load of the floor finish may be taken as 500 N/ m^2. Use M_{20} concrete and Fe $_{415}$ steel. **10**

Q.5 A doubly reinforced beam is 200 mm x 350 mm in section. The areas of the compression and tensile steel are 1200 mm^2 and 1600 mm^2 respectively. The effective cover to the compression reinforcement is 50mm. Find the ultimate moment of resistance of the beam section. Use M_{25} and Fe $_{500}$ steel. For determining Fsc consider stress of 403.5 N/mm^2 for d'\d(0.125) and 395 N/mm^2 for d'\d (0.150). **10**

Section – II

Q.6 Determine the safe axial load for a short circular column 425 mm in diameter, reinforced with 6 bars of 22 mm diameter. It is provided with 8 mm diameter helical reinforcement at a pitch of 40 mm. Use M_{20} concrete and Fe $_{415}$ steel. **08**

Q.7 Design a rectangular beam 450 mm wide subjected to a bending moment of 50 kNm, a shear force of 32 kN and a torsion of 28 kNm. Use M_{20} concrete and Fe $_{415}$ steel. **10**

Q.8 Design a circular column to carry an axial load of 1650 kN. The column is having spiral ties. The column is 3.2 m long and in effectively held in at both ends, but not restrained against rotation. Use M_{20} concrete and Fe_{500} steel. **10**

Q.9 Design a three span continuous beam rectangular beam of span of 5 m each to carry a dead load of 15 kN/m (excluding self weight of beam) and live load of 10 kN/m. The beam is supported by columns. Use M_{25} concrete and Fe_{415} steel. Sketch the reinforcement details. **10**

SLR-FM-77

Seat No.	

Set P

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In the designation of concrete mix, 'M' refers to the mix and the number to the specified compressive strength of '150mm' size cube at '28 days' expressed in _____ unit.
   a) KN/mm^2 b) KN/m^2
   c) N/mm^2 d) N/m^2

2) If rise and tread of a step is 0.15m and 0.25m respectively, then the volume (in cubic meter) of 9 number of steps of 1 m length be recorded in measurement sheet shall be _____.
   a) 0.3375 b) 0.337
   c) 0.34 d) 0.33

3) If thickness of concreting is less than 100mm, the concreting in RCC slab is measured in _____.
   a) Running m b) Sq.m
   c) Cu.m d) None of the above

4) If the wall thickness is one and half brick thick, the brickwork is measured in _____.
   a) Running m b) Sq.m
   c) Cu.m d) None of the above

5) The minimum number of layers for compaction of 0.60m deep plinth filling, shall be _____.
   a) 1 b) 2
   c) 3 d) 5

6) The estimate of property may be needed for _____.
   a) Mortgage of property
   b) Taxation
   c) loan for construction of property
   d) Calculating the compensation during land acquisition

7) The valuation of property may be needed for _____.
   a) Preparation of Estimate
   b) Calculating the stamp duty of sale deed
   c) Project planning
   d) None of the above

8) Escalation clause is provided to cover unexpected cost due to fluctuation in the prices of _____.
   a) raw material
   b) Overheads
   c) contingencies
   d) work charged establishment

9) The lease is _____.
   a) Transferable, heritable, revocable
   b) Transferable, revocable, non-heritable
   c) Transferable, heritable, non-revocable
   d) heritable, revocable, non- transferable

10) Years purchase in perpetuity for highest rate of interest 2.5% will be, _____.
   a) 2.5
   b) 100
   c) 40
   d) 25

11) In long and short wall method of estimation, length of Short wall is centre to centre distance between extreme opposite walls in shorter directions of ground floor plan _____.
   a) Minus one breadth of item on each side
   b) Plus one breadth of item on each side
   c) Minus half breadth of item on each side
   d) Plus half breadth of item on each side

12) Earnest money is paid to enable the Government to ensure that a tenderer does not _____.
   a) back out of his tender before its acceptance
   b) refuse to execute the work after it has been awarded to him
   c) compromise with quality of work
   d) a or b

13) No deductions are required during the measurement of concreting work if area of opening is less than or equal to _____.
   a) 0.1 Sq.m.
   b) 0.5 Sq.m
   c) 1.0 Sq.m
   d) 3.0 Sq.m

14) For RCC framed structures types of buildings, economic life shall be taken as below _____.
   a) 100 years
   b) 75 years
   c) 50 years
   d) 40 years

SLR-FM-77

Seat No.	

Set P

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.2 and Q.No.9 are compulsory.
2) Solve any two from remaining question from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 Prepare the measurement sheet and enter the measurements to calculate following quantities for Column footing for column number C - 21, 22

a) Earthwork in excavation for RCC footing (including additional space for centering and strutting) shown in attached Drawing. Assume depth of excavation as 1500mm. **04**

b) Concreting for RCC footing in M20. **04**

c) Concreting in M7.5 for PCC 100mm thick under footing. **04**

Q.3 **a)** Prepare a preliminary estimate for civil works required for establishing a polytechnic building requiring a total carpet area of 6000Sq.M.This includes actual total area required for classrooms, labs, office, store, etc. Suitable extra provision as 12% of the carpet area be made for walls, verandah corridors, toilets, staircase, etc. The plinth area rate is Rs. 15000/Sq.M. Suitable extra provision as 8% of the building cost be made for water supply,10% for electric fitting, 6% for other services, 1.5% for special architecture treatment of the building cost is also to be calculated. **04**

b) What are the thumb rules for calculating quantity of reinforcement required for Residential building? **04**

Q.4 **Write the detailed specifications for** **08**

a) Cement Concrete M20 for Column footing

b) Earthwork for excavation in Column footing

Q.5 **Carry out Rate analysis for the following items** **08**

a) Cement Concrete 1:1.5:3 for Column footing

d) Plane Cement Concrete 100mm thick in (1:4:8) below column footing

Section – II

Q.6 **a)** Compare Item Rate Contract and Percentage Rate Contract. **04**

b) What are contents for first and second envelope in two envelope system? **04**

Q.7 **a)** Write any eight factors affecting the valuation of properties. **04**

b) Differentiate between salvage value and scrap value. **04**

Q.8 **a)** Find the value of a four storied residential apartment with three flats per floor. Each flat is let out on a gross rent of Rs. 120000/year. The municipal tax is Rs.8000/flat/ year other outgoings are Lift maintenance, Salary of watchmen and sweepers, electricity charges all inclusive Rs.24000/flat/year. Calculate the value of one flat capitalizing the net annual rent at 8% in perpetuity with Years Purchase. **04**

b) Differentiate between free hold and lease hold property. **04**

Q.9 **a)** An old building has been purchases by a person at a cost of Rs. 30,00,000/- excluding the cost of the land. Calculate the amount of annual Sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase. **06**

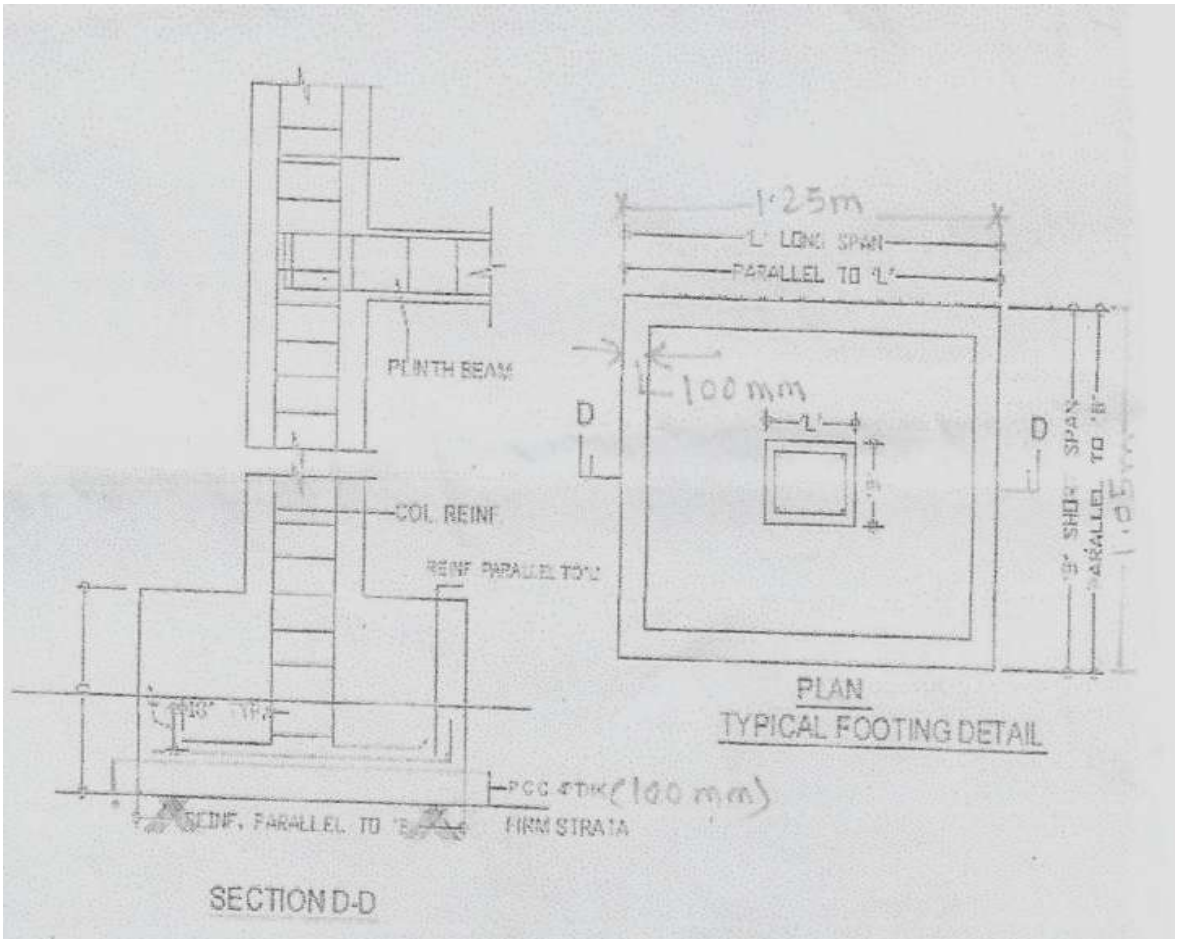
b) What is the valuation of a property in 2019, with following details of a building? Assume 10% scrap value at the end of useful life. **06**

Sr. No	Description	Area (Sq.M)	Rate Rs/SqM	Total life (year)	Built in
1.	Main Factory Building RCC skelection used as dyeing unit and old office G+1	700.92	11000	75	1984
2.	Mezzanine floor in main building	449.04	4500	75	2002

SCHEDULE OF COLUMN & FOOTINGS

COLUMN NO.	FOOTING SIZE L X B	FOOTING SIZE D	FOOTING STEEL	COLUMN SIZE	COLUMN STEEL	STIRRUPS
C-1,2,9,11,25,31, 42,44	1.20 X 1.45	0.400	MAIN 10 Φ 166 c/c (08 NO) DISTRI 10 Φ 157 c/c (07 NO)	200 X 450 200 X 380	10 Φ 12 8 Φ 12	8MM@150c/cD
C-3,4,5,6,48,49, 50,51	1.95 X 2.25	0.575	MAIN 10 Φ 113 c/c (19 NO) DISTRI 10 Φ 110 c/c (17 NO)	300 X 600 300 X 530	12 Φ 16 4 Φ 16 + 6 Φ 12	8MM@150c/cD
C-7,8,15,16,27, 30,37,38	1.35 X 1.60	0.46	MAIN 10 Φ 150 c/c (10 NO) DISTRI 10 Φ 156 c/c (08 NO)	200 X 450 200 X 380	6 Φ 16 + 4 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDC
C-10,20,23,28, 29,43,45,46, 47,52	1.30 X 1.55	0.43	MAIN 10 Φ 160 c/c (09 NO) DISTRI 10 Φ 150 c/c (06 NO)	200 X 450 200 X 380	6 Φ 16 + 2 Φ 12 4 Φ 16 + 2 Φ 12	8MM@150c/cDC
C-12,19,24,25,32, 33,34,41	1.45 X 1.75	0.500	MAIN 10 Φ 150 c/c (11 NO) DISTRI 10 Φ 160 c/c (09 NO)	200 X 530 200 X 450	6 Φ 16 + 4 Φ 12 4 Φ 16 + 4 Φ 12	8MM@150c/cDO
C-13,14,17,18	1.45 X 1.85	0.520	MAIN 10 Φ 145 c/c (12 NO) DISTRI 10 Φ 135 c/c (10 NO)	200 X 600 200 X 530	6 Φ 16 + 6 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDO
C-21,22	1.05 X 1.25	0.320	MAIN 10 Φ 190 c/c (06 NO) DISTRI 10 Φ 190 c/c (05 NO)	200 X 380 200 X 300	8 Φ 12 6 Φ 12	8MM@150c/cDO
C-35,36,39,40	1.75 X 2.00	0.560	MAIN 10 Φ 120 c/c (16 NO) DISTRI 10 Φ 120 c/c (14 NO)	300 X 530 300 X 450	8 Φ 16 6 Φ 16	8MM@150c/cDO

Q.2


1·25m
'L' LONG SPAN
PARALLEL TO 'L'
100 mm
D
D
PLINTH BEAM
COL REINF
REINF PARALLEL TO 'L'
PCC 4 DK (100 mm)
REINF. PARALLEL TO 'B'
FIRM STRATA
PLAN
TYPICAL FOOTING DETAIL
SECTION D-D

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Escalation clause is provided to cover unexpected cost due to fluctuation in the prices of _____.
   a) raw material b) Overheads
   c) contingencies d) work charged establishment

2) The lease is _____.
   a) Transferable, heritable, revocable
   b) Transferable, revocable, non-heritable
   c) Transferable, heritable, non-revocable
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3) Years purchase in perpetuity for highest rate of interest 2.5% will be, _____.
   a) 2.5 b) 100
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4) In long and short wall method of estimation, length of Short wall is centre to centre distance between extreme opposite walls in shorter directions of ground floor plan _____.
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12) The minimum number of layers for compaction of 0.60m deep plinth filling, shall be _____.
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Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

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Section – I

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a) Cement Concrete 1:1.5:3 for Column footing

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Section – II

Q.6 **a)** Compare Item Rate Contract and Percentage Rate Contract. **04**

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C-12,19,24,25,32, 33,34,41	1.45 X 1.75	0.500	MAIN 10 Φ 150 c/c (11 NO) DISTRI 10 Φ 160 c/c (09 NO)	200 X 530 200 X 450	6 Φ 16 + 4 Φ 12 4 Φ 16 + 4 Φ 12	8MM@150c/cDO
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C-21,22	1.05 X 1.25	0.320	MAIN 10 Φ 190 c/c (06 NO) DISTRI 10 Φ 190 c/c (05 NO)	200 X 380 200 X 300	8 Φ 12 6 Φ 12	8MM@150c/cDO
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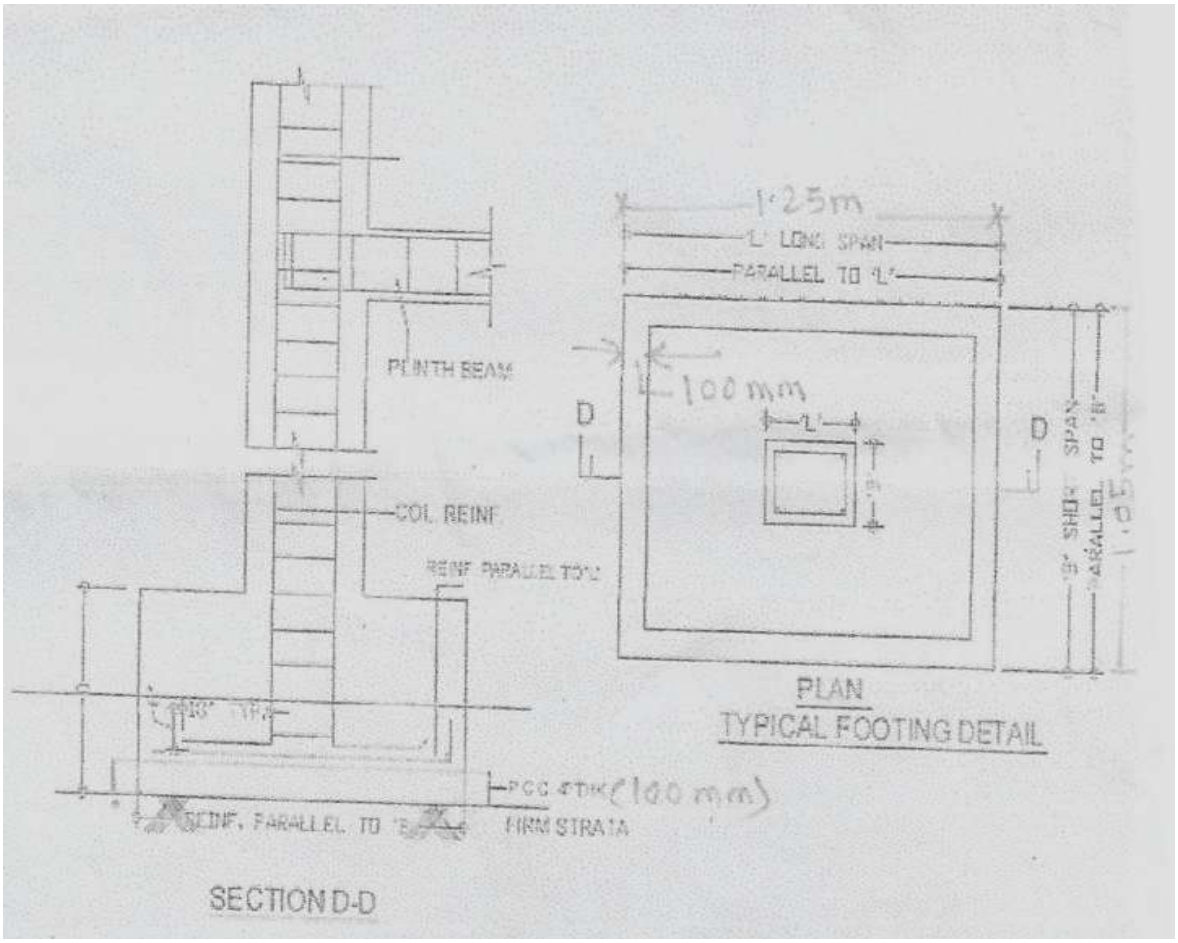
Q.2


1·25m
'L' LONG SPAN
PARALLEL TO 'L'
100 mm
D
D
PLINTH BEAM
COL REINF
REINF PARALLEL TO 'L'
PCC 4DK (100 mm)
REINF. PARALLEL TO 'B'
FIRM STRATA
PLAN
TYPICAL FOOTING DETAIL
SECTION D-D

SLR-FM-77

Seat No.	

Set R

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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Duration: 30 Minutes Marks: 14

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   c) compromise with quality of work
   d) a or b

9) No deductions are required during the measurement of concreting work if area of opening is less than or equal to _____.
   a) 0.1 Sq.m. b) 0.5 Sq.m
   c) 1.0 Sq.m d) 3.0 Sq.m

10) For RCC framed structures types of buildings, economic life shall be taken as below _____.
   a) 100 years b) 75 years
   c) 50 years d) 40 years

11) In the designation of concrete mix, 'M' refers to the mix and the number to the specified compressive strength of '150mm' size cube at '28 days' expressed in _____ unit.
   a) KN/mm^2 b) KN/m^2
   c) N/mm^2 d) N/m^2

12) If rise and tread of a step is 0.15m and 0.25m respectively, then the volume (in cubic meter) of 9 number of steps of 1 m length be recorded in measurement sheet shall be _____.
   a) 0.3375 b) 0.337
   c) 0.34 d) 0.33

13) If thickness of concreting is less than 100mm, the concreting in RCC slab is measured in _____.
   a) Running m b) Sq.m
   c) Cu.m d) None of the above

14) If the wall thickness is one and half brick thick, the brickwork is measured in _____.
   a) Running m b) Sq.m
   c) Cu.m d) None of the above

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.2 and Q.No.9 are compulsory.
2) Solve any two from remaining question from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 Prepare the measurement sheet and enter the measurements to calculate following quantities for Column footing for column number C - 21, 22

a) Earthwork in excavation for RCC footing (including additional space for centering and strutting) shown in attached Drawing. Assume depth of excavation as 1500mm. **04**

b) Concreting for RCC footing in M20. **04**

c) Concreting in M7.5 for PCC 100mm thick under footing. **04**

Q.3 **a)** Prepare a preliminary estimate for civil works required for establishing a polytechnic building requiring a total carpet area of 6000Sq.M.This includes actual total area required for classrooms, labs, office, store, etc. Suitable extra provision as 12% of the carpet area be made for walls, verandah corridors, toilets, staircase, etc. The plinth area rate is Rs. 15000/Sq.M. Suitable extra provision as 8% of the building cost be made for water supply,10% for electric fitting, 6% for other services, 1.5% for special architecture treatment of the building cost is also to be calculated. **04**

b) What are the thumb rules for calculating quantity of reinforcement required for Residential building? **04**

Q.4 **Write the detailed specifications for** **08**

a) Cement Concrete M20 for Column footing

b) Earthwork for excavation in Column footing

Q.5 **Carry out Rate analysis for the following items** **08**

a) Cement Concrete 1:1.5:3 for Column footing

d) Plane Cement Concrete 100mm thick in (1:4:8) below column footing

Section – II

Q.6 **a)** Compare Item Rate Contract and Percentage Rate Contract. **04**

b) What are contents for first and second envelope in two envelope system? **04**

Q.7 **a)** Write any eight factors affecting the valuation of properties. **04**

b) Differentiate between salvage value and scrap value. **04**

Q.8 **a)** Find the value of a four storied residential apartment with three flats per floor. Each flat is let out on a gross rent of Rs. 120000/year. The municipal tax is Rs.8000/flat/ year other outgoings are Lift maintenance, Salary of watchmen and sweepers, electricity charges all inclusive Rs.24000/flat/year. Calculate the value of one flat capitalizing the net annual rent at 8% in perpetuity with Years Purchase. **04**

b) Differentiate between free hold and lease hold property. **04**

Q.9 **a)** An old building has been purchases by a person at a cost of Rs. 30,00,000/- excluding the cost of the land. Calculate the amount of annual Sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase. **06**

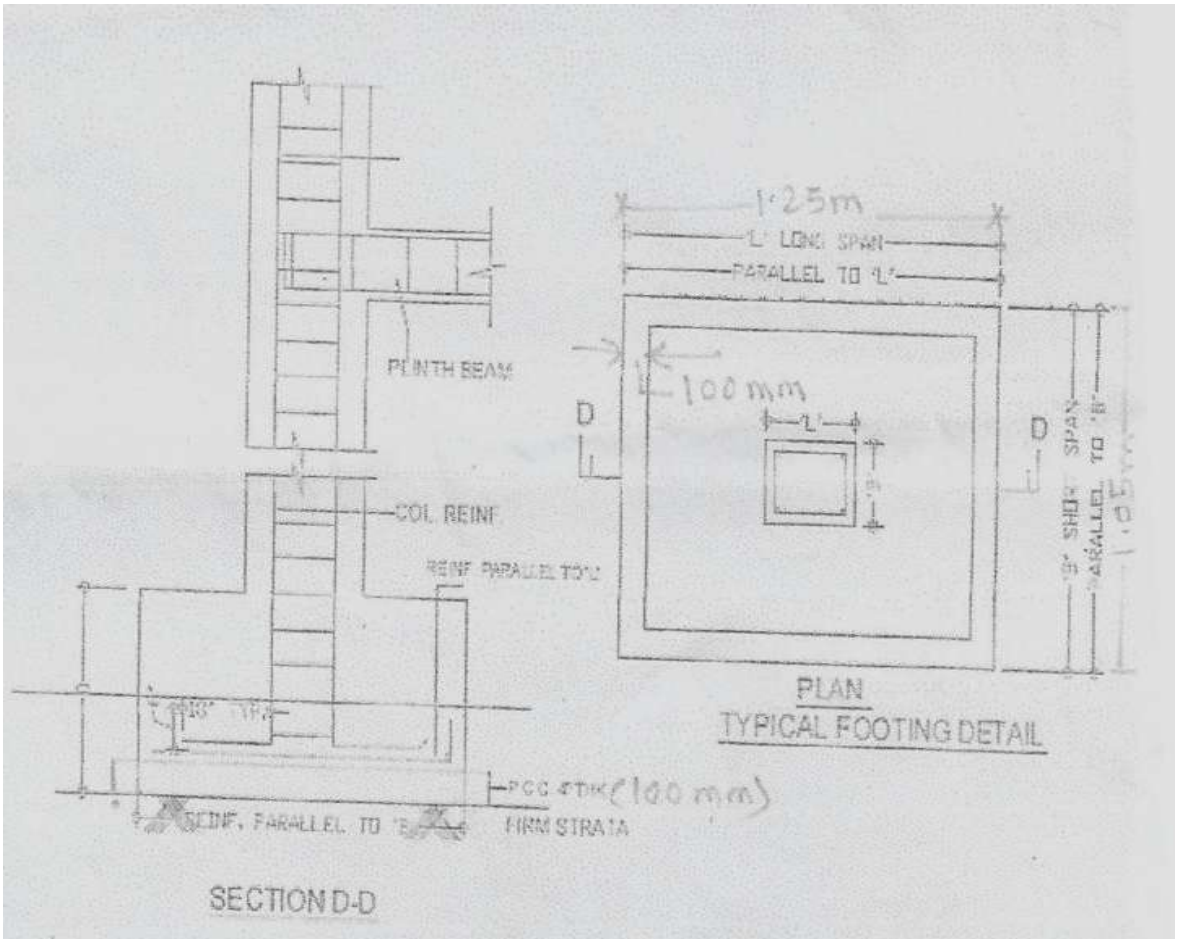
b) What is the valuation of a property in 2019, with following details of a building? Assume 10% scrap value at the end of useful life. **06**

Sr. No	Description	Area (Sq.M)	Rate Rs/SqM	Total life (year)	Built in
1.	Main Factory Building RCC skelection used as dyeing unit and old office G+1	700.92	11000	75	1984
2.	Mezzanine floor in main building	449.04	4500	75	2002

SCHEDULE OF COLUMN & FOOTINGS

COLUMN NO.	FOOTING SIZE L X B	FOOTING SIZE D	FOOTING STEEL	COLUMN SIZE	COLUMN STEEL	STIRRUPS
C-1,2,9,11,25,31, 42,44	1.20 X 1.45	0.400	MAIN 10 Φ 166 c/c (08 NO) DISTRI 10 Φ 157 c/c (07 NO)	200 X 450 200 X 380	10 Φ 12 8 Φ 12	8MM@150c/cD
C-3,4,5,6,48,49, 50,51	1.95 X 2.25	0.575	MAIN 10 Φ 113 c/c (19 NO) DISTRI 10 Φ 110 c/c (17 NO)	300 X 600 300 X 530	12 Φ 16 4 Φ 16 + 6 Φ 12	8MM@150c/cD
C-7,8,15,16,27, 30,37,38	1.35 X 1.60	0.46	MAIN 10 Φ 150 c/c (10 NO) DISTRI 10 Φ 156 c/c (08 NO)	200 X 450 200 X 380	6 Φ 16 + 4 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDC
C-10,20,23,28, 29,43,45,46, 47,52	1.30 X 1.55	0.43	MAIN 10 Φ 160 c/c (09 NO) DISTRI 10 Φ 150 c/c (06 NO)	200 X 450 200 X 380	6 Φ 16 + 2 Φ 12 4 Φ 16 + 2 Φ 12	8MM@150c/cDC
C-12,19,24,25,32, 33,34,41	1.45 X 1.75	0.500	MAIN 10 Φ 150 c/c (11 NO) DISTRI 10 Φ 160 c/c (09 NO)	200 X 530 200 X 450	6 Φ 16 + 4 Φ 12 4 Φ 16 + 4 Φ 12	8MM@150c/cDO
C-13,14,17,18	1.45 X 1.85	0.520	MAIN 10 Φ 145 c/c (12 NO) DISTRI 10 Φ 135 c/c (10 NO)	200 X 600 200 X 530	6 Φ 16 + 6 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDO
C-21,22	1.05 X 1.25	0.320	MAIN 10 Φ 190 c/c (06 NO) DISTRI 10 Φ 190 c/c (05 NO)	200 X 380 200 X 300	8 Φ 12 6 Φ 12	8MM@150c/cDO
C-35,36,39,40	1.75 X 2.00	0.560	MAIN 10 Φ 120 c/c (16 NO) DISTRI 10 Φ 120 c/c (14 NO)	300 X 530 300 X 450	8 Φ 16 6 Φ 16	8MM@150c/cDO

Q.2


1·25m
'L' LONG SPAN
PARALLEL TO 'L'
PLINTH BEAM
100 mm
D
D
COL REINF
REINF PARALLEL TO 'L'
PLAN
TYPICAL FOOTING DETAIL
PCC 4DK (100 mm)
REINF. PARALLEL TO 'B'
FIRM STRATA
SECTION D-D

Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 70
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Years purchase in perpetuity for highest rate of interest 2.5% will be, _____.
   a) 2.5 b) 100
   c) 40 d) 25

2) In long and short wall method of estimation, length of Short wall is centre to centre distance between extreme opposite walls in shorter directions of ground floor plan _____.
   a) Minus one breadth of item on each side
   b) Plus one breadth of item on each side
   c) Minus half breadth of item on each side
   d) Plus half breadth of item on each side

3) Earnest money is paid to enable the Government to ensure that a tenderer does not _____.
   a) back out of his tender before its acceptance
   b) refuse to execute the work after it has been awarded to him
   c) compromise with quality of work
   d) a or b

4) No deductions are required during the measurement of concreting work if area of opening is less than or equal to _____.
   a) 0.1 Sq.m. b) 0.5 Sq.m
   c) 1.0 Sq.m d) 3.0 Sq.m

5) For RCC framed structures types of buildings, economic life shall be taken as below _____.
   a) 100 years b) 75 years
   c) 50 years d) 40 years

6) In the designation of concrete mix, 'M' refers to the mix and the number to the specified compressive strength of '150mm' size cube at '28 days' expressed in _____ unit.
   a) KN/mm^2 b) KN/m^2
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7) If rise and tread of a step is 0.15m and 0.25m respectively, then the volume (in cubic meter) of 9 number of steps of 1 m length be recorded in measurement sheet shall be _____.
   a) 0.3375 b) 0.337
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8) If thickness of concreting is less than 100mm, the concreting in RCC slab is measured in _____.
   a) Running m
   b) Sq.m
   c) Cu.m
   d) None of the above

9) If the wall thickness is one and half brick thick, the brickwork is measured in _____.
   a) Running m
   b) Sq.m
   c) Cu.m
   d) None of the above

10) The minimum number of layers for compaction of 0.60m deep plinth filling, shall be _____.
   a) 1
   b) 2
   c) 3
   d) 5

11) The estimate of property may be needed for _____.
   a) Mortgage of property
   b) Taxation
   c) loan for construction of property
   d) Calculating the compensation during land acquisition

12) The valuation of property may be needed for _____.
   a) Preparation of Estimate
   b) Calculating the stamp duty of sale deed
   c) Project planning
   d) None of the above

13) Escalation clause is provided to cover unexpected cost due to fluctuation in the prices of _____.
   a) raw material
   b) Overheads
   c) contingencies
   d) work charged establishment

14) The lease is _____.
   a) Transferable, heritable, revocable
   b) Transferable, revocable, non-heritable
   c) Transferable, heritable, non-revocable
   d) heritable, revocable, non- transferable

Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
QUANTITY SURVEYING AND VALUATION

Day & Date: Tuesday,10-12-2019 Max. Marks: 56
Time: 02:30 PM To 06:30 PM

Instructions: 1) Q.No.2 and Q.No.9 are compulsory.
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Section – I

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a) Earthwork in excavation for RCC footing (including additional space for centering and strutting) shown in attached Drawing. Assume depth of excavation as 1500mm. **04**

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Q.3 **a)** Prepare a preliminary estimate for civil works required for establishing a polytechnic building requiring a total carpet area of 6000Sq.M.This includes actual total area required for classrooms, labs, office, store, etc. Suitable extra provision as 12% of the carpet area be made for walls, verandah corridors, toilets, staircase, etc. The plinth area rate is Rs. 15000/Sq.M. Suitable extra provision as 8% of the building cost be made for water supply,10% for electric fitting, 6% for other services, 1.5% for special architecture treatment of the building cost is also to be calculated. **04**

b) What are the thumb rules for calculating quantity of reinforcement required for Residential building? **04**

Q.4 **Write the detailed specifications for** **08**

a) Cement Concrete M20 for Column footing

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Section – II

Q.6 **a)** Compare Item Rate Contract and Percentage Rate Contract. **04**

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Q.8 **a)** Find the value of a four storied residential apartment with three flats per floor. Each flat is let out on a gross rent of Rs. 120000/year. The municipal tax is Rs.8000/flat/ year other outgoings are Lift maintenance, Salary of watchmen and sweepers, electricity charges all inclusive Rs.24000/flat/year. Calculate the value of one flat capitalizing the net annual rent at 8% in perpetuity with Years Purchase. **04**

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2.	Mezzanine floor in main building	449.04	4500	75	2002

SCHEDULE OF COLUMN & FOOTINGS

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C-3,4,5,6,48,49, 50,51	1.95 X 2.25	0.575	MAIN 10 Φ 113 c/c (19 NO) DISTRI 10 Φ 110 c/c (17 NO)	300 X 600 300 X 530	12 Φ 16 4 Φ 16 + 6 Φ 12	8MM@150c/cD
C-7,8,15,16,27, 30,37,38	1.35 X 1.60	0.46	MAIN 10 Φ 150 c/c (10 NO) DISTRI 10 Φ 156 c/c (08 NO)	200 X 450 200 X 380	6 Φ 16 + 4 Φ 12 2 Φ 16 + 8 Φ 12	8MM@150c/cDC
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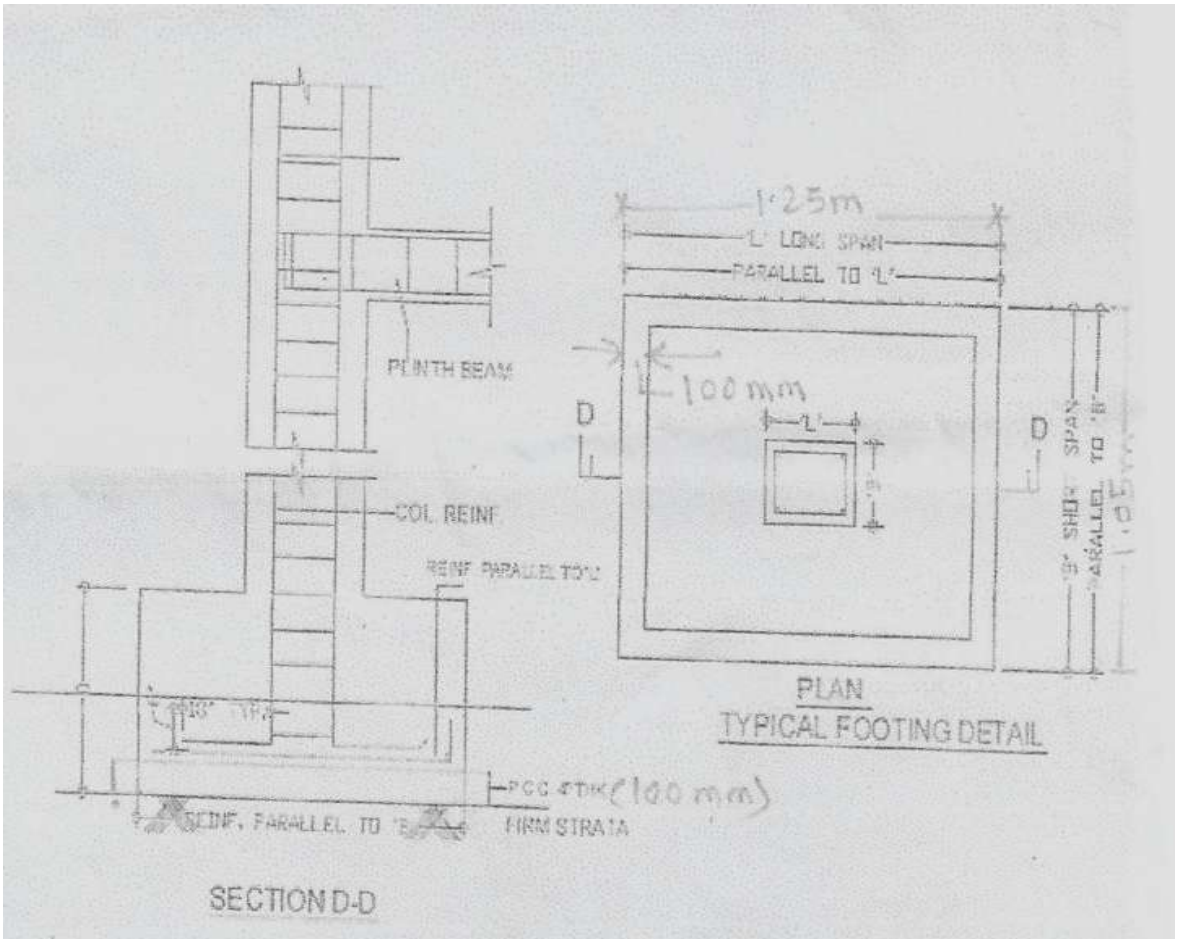
Q.2


1·25m
'L' LONG SPAN
PARALLEL TO 'L'
PLINTH BEAM
100 mm
D
D
COL REINF
REINF PARALLEL TO 'L'
PLAN
TYPICAL FOOTING DETAIL
PCC 4DK (100 mm)
REINF. PARALLEL TO 'B'
FIRM STRATA
SECTION D-D

Seat No.	

Set **P**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Use of only IS 1893 is allowed.
4) Assume suitable data if required and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The S-waves (secondary or shear waves) travel through _____.
   a) Solids only b) Both solids and fluids
   c) Fluids only d) Gases

2) Out of the many effects of earthquakes, IS-1893-2002 addresses only _____.
   a) Liquefaction of the soil strata b) Landslides due to earthquake
   c) Inertia forces on Structure d) Flood caused by earthquake

3) Acceleration response spectrum is a plot of _____.
   a) Ground acceleration versus time
   b) Response acceleration, versus time
   c) Response acceleration versus natural period
   d) Ground acceleration versus natural period

4) In which of the following cases, the dynamic system has no oscillation but returns to equillibrium at a slower rate?
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) Undamped case

5) The damping in a dynamic system is represented as equivalent to _____.
   a) Coulomb damping b) Viscous damping
   c) Friction damping d) Negative damping

6) The importance factor for a Railway station building is _____.
   a) 1 b) 1.25
   c) 1.5 d) 2

7) The zone factor for zone III is _____.
   a) 0.16 b) 0.36
   c) 0.24 d) 0.10

Seat No.	

Set | P

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 3 & Q. No. 6 are compulsory and Solve any two questions from Each section.
2) Use of only IS 1893 is allowed.
3) Assume suitable data if required and state it clearly.

Section – I

Q.2 Discuss briefly the two measures of an earthquake. **09**

Q.3 Derive the governing differential equation of undamped forced vibration of a SDOF system subjected to harmonic loading. Also obtain complete solution of differential equation and plot graph of magnification factor vs frequency ratio 'r'. **10**

Q.4 What do you mean by force transmissibility? Derive an expression for force transmissibility to the foundation of a SDOF system subjected to harmonic force. **09**

Q.5 What is combined spectrum? What are its characteristics? **09**

Section – II

Q.6 It is proposed to construct a R.C.C. four storied commercial building having plan dimensions as shown in fig.1 in zone III with following data. Determine the lateral forces and base shear in both direction of building. The all column sizes are 300 × 450 mm & beams sizes are 230 x 450 mm. The slab thickness is 120mm & thk. of walls is 230mm. The ht. of floor is 3.2m & Live load is 2.5 kN/m^2 IS 13920 will be used. The strata is Medium. **10**

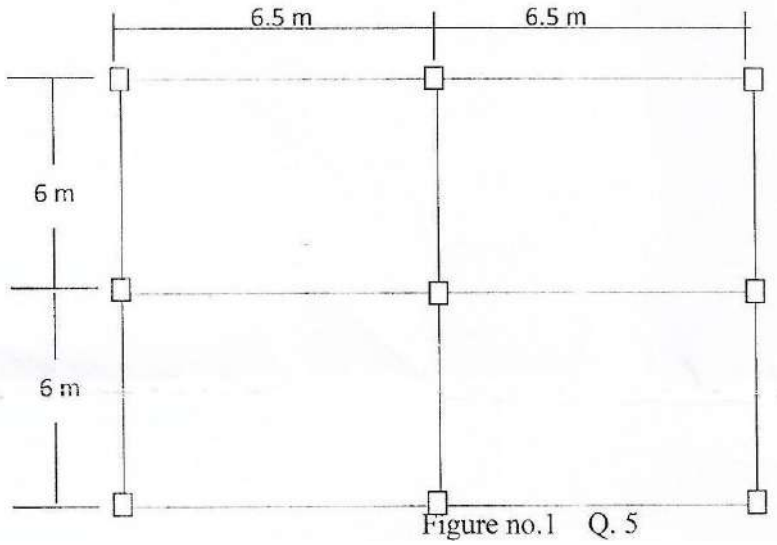


Figure no.1 Q. 5

Q.7 What do understand by a weak storey? How weak storey differs from soft storey? **09**

Q.8 What do you understand by ductility and what is its importance? **09**

Q.9 Explain the strengthening arrangements for masonry construction. **09**

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In which of the following cases, the dynamic system has no oscillation but returns to equillibrium at a slower rate?
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) Undamped case

2) The damping in a dynamic system is represented as equivalent to _____.
   a) Coulomb damping b) Viscous damping
   c) Friction damping d) Negative damping

3) The importance factor for a Railway station building is _____.
   a) 1 b) 1.25
   c) 1.5 d) 2

4) The zone factor for zone III is _____.
   a) 0.16 b) 0.36
   c) 0.24 d) 0.10

5) The S-waves (secondary or shear waves) travel through _____.
   a) Solids only b) Both solids and fluids
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6) Out of the many effects of earthquakes, IS-1893-2002 addresses only _____.
   a) Liquefaction of the soil strata b) Landslides due to earthquake
   c) Inertia forces on Structure d) Flood caused by earthquake

7) Acceleration response spectrum is a plot of _____.
   a) Ground acceleration versus time
   b) Response acceleration, versus time
   c) Response acceleration versus natural period
   d) Ground acceleration versus natural period

Seat No.	

Set | Q

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 3 & Q. No. 6 are compulsory and Solve any two questions from Each section.
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Section – I

Q.2 Discuss briefly the two measures of an earthquake. **09**

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Q.5 What is combined spectrum? What are its characteristics? **09**

Section – II

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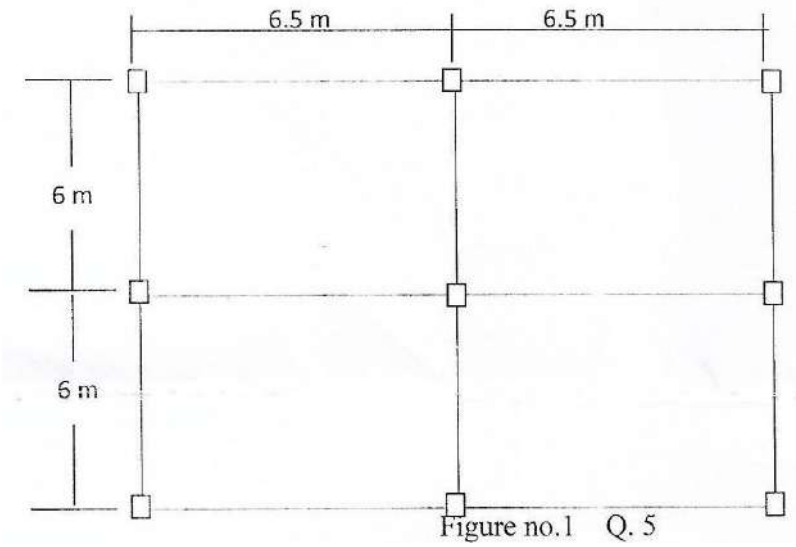

Figure no.1 Q. 5

Q.7 What do understand by a weak storey? How weak storey differs from soft storey? **09**

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Q.9 Explain the strengthening arrangements for masonry construction. **09**

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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1) The importance factor for a Railway station building is _____.
   a) 1 b) 1.25
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   a) 0.16 b) 0.36
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Seat No.	

Set | R

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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Section – I

Q.2 Discuss briefly the two measures of an earthquake. **09**

Q.3 Derive the governing differential equation of undamped forced vibration of a SDOF system subjected to harmonic loading. Also obtain complete solution of differential equation and plot graph of magnification factor vs frequency ratio 'r'. **10**

Q.4 What do you mean by force transmissibility? Derive an expression for force transmissibility to the foundation of a SDOF system subjected to harmonic force. **09**

Q.5 What is combined spectrum? What are its characteristics? **09**

Section – II

Q.6 It is proposed to construct a R.C.C. four storied commercial building having plan dimensions as shown in fig.1 in zone III with following data. Determine the lateral forces and base shear in both direction of building. The all column sizes are 300 × 450 mm & beams sizes are 230 x 450 mm. The slab thickness is 120mm & thk. of walls is 230mm. The ht. of floor is 3.2m & Live load is 2.5 kN/m^2 IS 13920 will be used. The strata is Medium. **10**

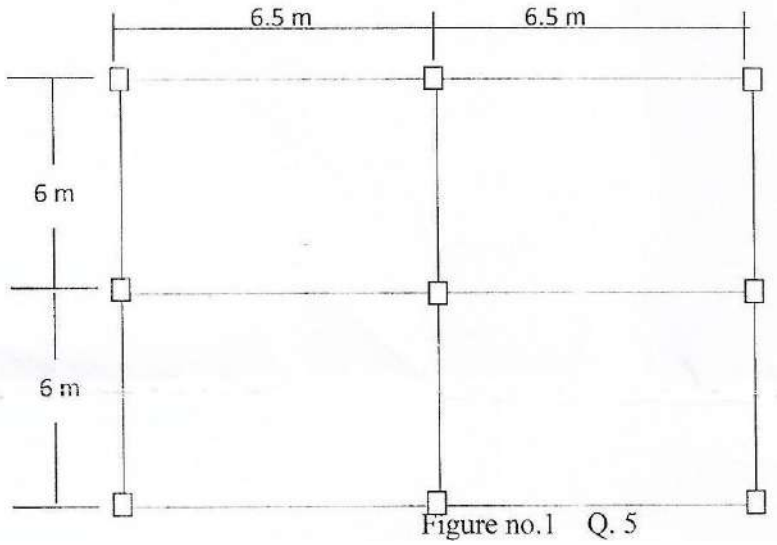

Figure no.1 Q. 5

Q.7 What do understand by a weak storey? How weak storey differs from soft storey? **09**

Q.8 What do you understand by ductility and what is its importance? **09**

Q.9 Explain the strengthening arrangements for masonry construction. **09**

SLR-FM-78

Seat No.	

Set S

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.
3) Use of only IS 1893 is allowed.
4) Assume suitable data if required and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Out of the many effects of earthquakes, IS-1893-2002 addresses only _____.
   a) Liquefaction of the soil strata b) Landslides due to earthquake
   c) Inertia forces on Structure d) Flood caused by earthquake

2) Acceleration response spectrum is a plot of _____.
   a) Ground acceleration versus time
   b) Response acceleration, versus time
   c) Response acceleration versus natural period
   d) Ground acceleration versus natural period

3) In which of the following cases, the dynamic system has no oscillation but returns to equillibrium at a slower rate?
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) Undamped case

4) The damping in a dynamic system is represented as equivalent to _____.
   a) Coulomb damping b) Viscous damping
   c) Friction damping d) Negative damping

5) The importance factor for a Railway station building is _____.
   a) 1 b) 1.25
   c) 1.5 d) 2

6) The zone factor for zone III is _____.
   a) 0.16 b) 0.36
   c) 0.24 d) 0.10

7) The S-waves (secondary or shear waves) travel through _____.
   a) Solids only b) Both solids and fluids
   c) Fluids only d) Gases

Seat No.	

Set | S

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
EARTHQUAKE ENGINEERING

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 3 & Q. No. 6 are compulsory and Solve any two questions from Each section.
2) Use of only IS 1893 is allowed.
3) Assume suitable data if required and state it clearly.

Section – I

Q.2 Discuss briefly the two measures of an earthquake. **09**

Q.3 Derive the governing differential equation of undamped forced vibration of a SDOF system subjected to harmonic loading. Also obtain complete solution of differential equation and plot graph of magnification factor vs frequency ratio 'r'. **10**

Q.4 What do you mean by force transmissibility? Derive an expression for force transmissibility to the foundation of a SDOF system subjected to harmonic force. **09**

Q.5 What is combined spectrum? What are its characteristics? **09**

Section – II

Q.6 It is proposed to construct a R.C.C. four storied commercial building having plan dimensions as shown in fig.1 in zone III with following data. Determine the lateral forces and base shear in both direction of building. The all column sizes are 300 × 450 mm & beams sizes are 230 x 450 mm. The slab thickness is 120mm & thk. of walls is 230mm. The ht. of floor is 3.2m & Live load is 2.5 kN/m^2 IS 13920 will be used. The strata is Medium. **10**

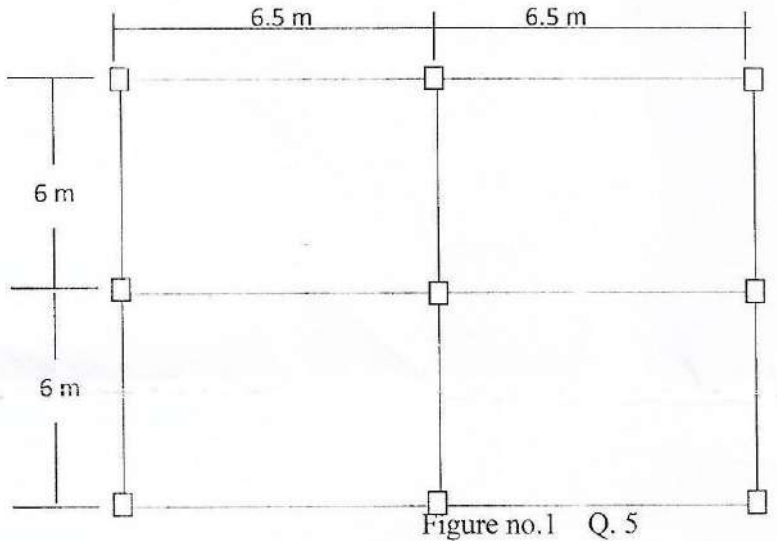

Figure no.1 Q. 5

Q.7 What do understand by a weak storey? How weak storey differs from soft storey? **09**

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SLR-FM-79

Seat No.	

Set P

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data if necessary but mention it clearly**.**
3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) As the height of a proposed dam is increased, the cost per unit of storage: _____.
   a) Increases
   b) Decreases
   c) Initially increases and then decreases
   d) None of these

2) Transverse joints in concrete gravity dams are the _____.
   a) horizontal construction joints at each lift height
   b) vertical construction joints full of height and width
   c) diagonal construction joints for torsion
   d) none of the above

3) The most preferred soil for the central impervious core of a zoned embankment type of an earthen dam, is _____.
   a) highly impervious clay b) highly pervious gravel
   c) coarse sand d) clay mixed with fine sand

4) When the water level standing against an earthen embankment, suddenly falls down, then there is an imminent risk of sliding failure, to the _____.
   a) upstream slope b) downstream slope
   c) both (a) and (b) d) none of these

5) The uplift pressure at the face of a drainage gallery in a gravity dam, is taken as equal to _____.
   a) hydrostatic pressure at the toe
   b) average of hydrostatic pressure at the toe and heel
   c) two third of the hydrostatic pressure at the toe plus one third of the hydrostatic pressure at the heel
   d) none of the above

6) The most economical type of arch dam in general is of _____.
   a) constant radius type b) variable radius type
   c) constant angle type d) none of these

7) When the crest of an ogee spillway is designed to be in accordance with the lower nappe of a free falling water jet over a duly ventilated sharp crested weir, then theoretically _____.
   a) the pressure on the spillway crest will always be zero. (i.e. atmospheric pressure)
   b) the pressure on the spillway crest will be zero at design head only.
   c) the pressure on the spillway crest will always be negative.
   d) the pressure on the spillway crest will always be positive.

8) If the operating head on an ogee spillway is more than the design head, then _____.
   a) the pressure on the spillway crest will be zero.
   b) the pressure on the spillway crest will be negative, causing cavitation.
   c) the pressure on the spillway crest will be positive.
   d) the discharge coefficient of the spillway will be reduced.

9) Bar screens, used to cover dam outlets to prevent entry of debris or ice into the sluiceway conduits, are called _____.
   a) gate controlled ports
   b) projecting collars
   c) trash racks
   d) none of these

10) Which one of the followings does not contribute to water logging?
   a) inadequate drainage
   b) seepage from unlined canals
   c) frequent flooding
   d) excessive tapping of ground water

11) The free-board in lined canals is measured between _____.
   a) FSL and top of lining
   b) FSL and top of canal bank
   c) top of lining and top of canal bank
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12) The alkali salt, which is most injurious to plant growth, is _____.
   a) sodium carbonate
   b) sodium chloride
   c) sodium sulphate
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13) The most commonly used vertical lift gates in modern days is _____.
   a) sliding gates
   b) free roller gates
   c) stoney gates
   d) fixed wheel gates

14) The only statement, which is incorrect in regard to hydropower, is _____.
   a) the system efficiency of a hydro-plant is quite high
   b) the installation cost of a hydro-plant is very high
   c) the running cost of a hydro power plant is very low
   d) the hydraulic turbines takes a lot of time in being put off and on

Seat No.	

Set **P**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 9 are compulsory.
2) Solve any two questions from each section.
3) Assume suitable data if necessary but mention it clearly**.**
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Section – I

Q.2 a) Discuss the process of reservoir sedimentation. Show with a neat sketch, deposition of various grain sizes of sediments along the reservoir bed. **05**

b) Annual runoff in terms of depth over the catchment are of 1965 sq km of a reservoir is given below. **05**

Year	1962	1963	1964	1965	1966	1967	1968	1969
Runoff cm depth	98	143.5	168.3	94	95.3	152.4	110	131.3

Draw the flow mass diagram. What is average yield of the catchment? What should be the live storage capacity of the reservoir to use the source fully? If the dead storage is 20% of live storage, what should be the gross storage?

Q.3 a) What do you understand by a 'Gravity dam'? Explain the major forces acting on a gravity dam. **05**

b) Draw and discuss typical the energy dissipation arrangements on the downstream side of ogee spillway in form of a hydraulic jump. **04**

Q.4 a) What do you mean by a 'Phreatic line' in Earthen dam? Draw a typical flow net showing seepage of water through 'Homogeneous embankment' type earth dam. State the formula for calculating seepage in this case. **05**

b) Enumerate two different methods which are adopted for construction of earthen dam. Which of these methods you will prefer and why? **04**

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b) A saddle siphon has the following data: Full reservoir level=435.00 m, Level of centre of siphon outlet=429.60, Highest flood level=435.85 m, Highest flood discharge=600 cumec. If the dimensions of throat are: width = 4 m, Height = 2 m, determine the number of siphon units required to pass the flood safely. The siphon discharges freely in air. **04**

Section – II

Q.6 **a)** Draw a neat sectional view of a weir showing the various parts. What is exit gradient? How does it affect the design of a weir? **05**

b) What do you mean by river training? Explain, High water, low water and mean water training. **04**

Q.7 **a)** Write a detailed note on Financial justification for lining new canals'. **05**

b) What is meant by 'saline' and 'alkaline' soils? What precautions will you adopt to prevent salinity of irrigated land? **04**

Q.8 **a)** State under what circumstances you will recommend the use of the following cross drainage structures: **05**

1) Syphon.
2) Aqueduct.

b) Explain: How do the following assist in River Training: **04**

1) Guide bunds.
2) Repelling groyenes.

Q.9 **a)** Compare 'Thermal power plants' and 'Hydropower Plants' with respected to establishment costs, operation, efficiency and environmental aspects. **05**

b) The water turbines at a 'Hydro-electric Storage Plant' produce 7360 kW of power when working under net head of 30 m. And with overall efficiency 80%. The inflow in reservoir in Million Cubic Meter (MCM) during a year is given below: **05**

Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
90	80	73	80	70	98	120	80	96	105	100	75

Find:

1) The minimum reservoir capacity required to satisfy the uniform demand of water.
2) The quantity of water wasted during the year.

Assume reservoir to be full at the beginning of November. Use analytical method.

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) If the operating head on an ogee spillway is more than the design head, then _____.
   a) the pressure on the spillway crest will be zero.
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2) Bar screens, used to cover dam outlets to prevent entry of debris or ice into the sluiceway conduits, are called _____.
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5) The alkali salt, which is most injurious to plant growth, is _____.
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6) The most commonly used vertical lift gates in modern days is _____.
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Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 9 are compulsory.
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Section – I

Q.2 a) Discuss the process of reservoir sedimentation. Show with a neat sketch, deposition of various grain sizes of sediments along the reservoir bed. **05**

b) Annual runoff in terms of depth over the catchment are of 1965 sq km of a reservoir is given below. **05**

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Section – II

Q.6 **a)** Draw a neat sectional view of a weir showing the various parts. What is exit gradient? How does it affect the design of a weir? **05**

b) What do you mean by river training? Explain, High water, low water and mean water training. **04**

Q.7 **a)** Write a detailed note on Financial justification for lining new canals'. **05**

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Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
90	80	73	80	70	98	120	80	96	105	100	75

Find:

1) The minimum reservoir capacity required to satisfy the uniform demand of water.
2) The quantity of water wasted during the year.

Assume reservoir to be full at the beginning of November. Use analytical method.

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 9 are compulsory.
2) Solve any two questions from each section.
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Section – I

Q.2 a) Discuss the process of reservoir sedimentation. Show with a neat sketch, deposition of various grain sizes of sediments along the reservoir bed. **05**

b) Annual runoff in terms of depth over the catchment are of 1965 sq km of a reservoir is given below. **05**

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Section – II

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Assume reservoir to be full at the beginning of November. Use analytical method.

Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Saturday, 14-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Which one of the followings does not contribute to water logging?
   a) inadequate drainage
   b) seepage from unlined canals
   c) frequent flooding
   d) excessive tapping of ground water

2) The free-board in lined canals is measured between _____.
   a) FSL and top of lining
   b) FSL and top of canal bank
   c) top of lining and top of canal bank
   d) none of them

3) The alkali salt, which is most injurious to plant growth, is _____.
   a) sodium carbonate b) sodium chloride
   c) sodium sulphate d) sodium nitrate

4) The most commonly used vertical lift gates in modern days is _____.
   a) sliding gates b) free roller gates
   c) stoney gates d) fixed wheel gates

5) The only statement, which is incorrect in regard to hydropower, is _____.
   a) the system efficiency of a hydro-plant is quite high
   b) the installation cost of a hydro-plant is very high
   c) the running cost of a hydro power plant is very low
   d) the hydraulic turbines takes a lot of time in being put off and on

6) As the height of a proposed dam is increased, the cost per unit of storage: _____.
   a) Increases
   b) Decreases
   c) Initially increases and then decreases
   d) None of these

7) Transverse joints in concrete gravity dams are the _____.
   a) horizontal construction joints at each lift height
   b) vertical construction joints full of height and width
   c) diagonal construction joints for torsion
   d) none of the above

8) The most preferred soil for the central impervious core of a zoned embankment type of an earthen dam, is _____.
   a) highly impervious clay
   b) highly pervious gravel
   c) coarse sand
   d) clay mixed with fine sand

9) When the water level standing against an earthen embankment, suddenly falls down, then there is an imminent risk of sliding failure, to the _____.
   a) upstream slope
   b) downstream slope
   c) both (a) and (b)
   d) none of these

10) The uplift pressure at the face of a drainage gallery in a gravity dam, is taken as equal to _____.
   a) hydrostatic pressure at the toe
   b) average of hydrostatic pressure at the toe and heel
   c) two third of the hydrostatic pressure at the toe plus one third of the hydrostatic pressure at the heel
   d) none of the above

11) The most economical type of arch dam in general is of _____.
   a) constant radius type
   b) variable radius type
   c) constant angle type
   d) none of these

12) When the crest of an ogee spillway is designed to be in accordance with the lower nappe of a free falling water jet over a duly ventilated sharp crested weir, then theoretically _____.
   a) the pressure on the spillway crest will always be zero. (i.e. atmospheric pressure)
   b) the pressure on the spillway crest will be zero at design head only.
   c) the pressure on the spillway crest will always be negative.
   d) the pressure on the spillway crest will always be positive.

13) If the operating head on an ogee spillway is more than the design head, then _____.
   a) the pressure on the spillway crest will be zero.
   b) the pressure on the spillway crest will be negative, causing cavitation.
   c) the pressure on the spillway crest will be positive.
   d) the discharge coefficient of the spillway will be reduced.

14) Bar screens, used to cover dam outlets to prevent entry of debris or ice into the sluiceway conduits, are called _____.
   a) gate controlled ports
   b) projecting collars
   c) trash racks
   d) none of these

SLR-FM-79

Seat No.		Set	S

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
WATER RESOURCES ENGINEERING – II

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 and Q. No. 9 are compulsory.
2) Solve any two questions from each section.
3) Assume suitable data if necessary but mention it clearly**.**
4) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Discuss the process of reservoir sedimentation. Show with a neat sketch, deposition of various grain sizes of sediments along the reservoir bed. **05**

b) Annual runoff in terms of depth over the catchment are of 1965 sq km of a reservoir is given below. **05**

Year	1962	1963	1964	1965	1966	1967	1968	1969
Runoff cm depth	98	143.5	168.3	94	95.3	152.4	110	131.3

Draw the flow mass diagram. What is average yield of the catchment? What should be the live storage capacity of the reservoir to use the source fully? If the dead storage is 20% of live storage, what should be the gross storage?

Q.3 **a)** What do you understand by a 'Gravity dam'? Explain the major forces acting on a gravity dam. **05**

b) Draw and discuss typical the energy dissipation arrangements on the downstream side of ogee spillway in form of a hydraulic jump. **04**

Q.4 **a)** What do you mean by a 'Phreatic line' in Earthen dam? Draw a typical flow net showing seepage of water through 'Homogeneous embankment' type earth dam. State the formula for calculating seepage in this case. **05**

b) Enumerate two different methods which are adopted for construction of earthen dam. Which of these methods you will prefer and why? **04**

Q.5 **a)** Draw a cross section of a 'Radial spillway gate'. Why these gates are preferred over Vertical lift gates? **05**

b) A saddle siphon has the following data: Full reservoir level=435.00 m, Level of centre of siphon outlet=429.60, Highest flood level=435.85 m, Highest flood discharge=600 cumec. If the dimensions of throat are: width = 4 m, Height = 2 m, determine the number of siphon units required to pass the flood safely. The siphon discharges freely in air. **04**

Section – II

Q.6 **a)** Draw a neat sectional view of a weir showing the various parts. What is exit gradient? How does it affect the design of a weir? **05**

b) What do you mean by river training? Explain, High water, low water and mean water training. **04**

Q.7 **a)** Write a detailed note on Financial justification for lining new canals'. **05**

b) What is meant by 'saline' and 'alkaline' soils? What precautions will you adopt to prevent salinity of irrigated land? **04**

Q.8 **a)** State under what circumstances you will recommend the use of the following cross drainage structures: **05**

1) Syphon.
2) Aqueduct.

b) Explain: How do the following assist in River Training: **04**

1) Guide bunds.
2) Repelling groyenes.

Q.9 **a)** Compare 'Thermal power plants' and 'Hydropower Plants' with respected to establishment costs, operation, efficiency and environmental aspects. **05**

b) The water turbines at a 'Hydro-electric Storage Plant' produce 7360 kW of power when working under net head of 30 m. And with overall efficiency 80%. The inflow in reservoir in Million Cubic Meter (MCM) during a year is given below: **05**

Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
90	80	73	80	70	98	120	80	96	105	100	75

Find:

1) The minimum reservoir capacity required to satisfy the uniform demand of water.
2) The quantity of water wasted during the year.

Assume reservoir to be full at the beginning of November. Use analytical method.

SLR-FM-80

Seat No.		Set	P

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL AND RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer Book.
2) Draw neat sketches wherever necessary.
3) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) The flow in open channel may be characterized as laminar when _____.
   a) Re <500 b) Re >2000
   c) Re >4000 d) 500 <Re >2000

2) The strength of 'Hydraulic Jump' is governed by the _____.
   a) Up stream velocity b) Up stream Froude's number
   c) Down stream velocity d) Bed slope

3) For the trapezoidal section _____.
   a) Shape is of half hexagon
   b) Depth of flow equal to half bed width
   c) Side slope equal to 45^o
   d) None

4) The maximum velocity in open channel occurs at _____.
   a) Little below the free surface b) At the free surface
   c) Near the channel bottom d) None

5) The momentum correction factor, β is given as _____.
   a) $1/V^2\ AV^3.dA$ b) $1/V\ AV.dA$
   c) $1/V^3\ AV^2.dA$ d) $1/V^2\ AV^2.dA$

6) The mean velocity in Lacey's regime channel is proportional to _____.
   a) $R^{2/3}$ b) $R^{½}$
   c) $S_0^{1/2}$ d) $S_0^{1/3}$

7) Shield's diagram is a plot of non dimensional shear stress τc against ___.
   a) Relative depth b) Shear Reynold's number
   c) Hydraulic radius d) Reynold's number

8) Extreme condition of meanders is called as _____.
   a) Leavee b) Spurs
   c) Cut-off d) Island

9) The size of sediment particles that will just remain at rest in bed of wide rectangular channel equal to _____.
   a) $11DS_0$ b) $10.8\ D^{2/3}S_0^{1/3}$
   c) $11\ R^{1/2}S_0^{1/2}$ d) None

10) Kinematic similarity between model and prototype is the similarity of ____.
   a) Discharge
   b) Streamline pattern
   c) Shape
   d) None

11) The Lacey's equation for a regime channel consist of a set of x' independent equation relating to flow, where 'x' is equal to _____.
   a) 1
   b) 3
   c) 5
   d) 8

12) River training work serves the following purposes _____.
   a) Protect the river bed and banks
   b) Direct the river flow in desired condition
   c) Increase or decrease of the river discharge
   d) Protect the surrounding land from flooding

13) Distorted models are required to be prepared for _____.
   a) Rivers
   b) Harbors
   c) Dams across wide rivers
   d) All

14) The dimension of Kinematic viscosity is _____.
   a) LT^{-2}
   b) $L^2 T^{-1}$
   c) $L^3 T^{-1}$
   d) LT^{-1}

Seat No.	

Set **P**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL AND RIVER HYDRAULICS

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat sketches wherever necessary.
3) Use of non programmable calculator is permitted.

Section – I

Q.2 Attempt any two. **12**

a) What do you understand by most economical channel section? And show that for trapezoidal section. Half of top width = length of one of sloping side and hydraulic mean depth = half the depth of flow.

b) A flow of 5.0 m^3/s is passing at a depth of 1.5 m through a rectangular channel of width 3.0 m, if α is 1.2 what is specific energy of flow? What is the value of the depth alternate to the existing depth if α= 1.0 (assumed for alternate flow).

c) A rectangular channel has a bed width is 4.5 m; bottom slope is 0.0004 and mannings n = 0.020. The normal depth of flow in this channel is 2.0 m. If the channel empties into a pool at the down stream end and the pool elevation is 0.60 m higher than the canal bed elevation at the downstream end. Calculate the coordinates of the resulting GVF profile.
(Take 2 steps only).

Q.3 Attempt any four. **16**

a) Derive the modified equation for GVF and also state the assumptions made for it.

b) Define kinetic energy correction factor (α) and momentum correction factor(β)·

c) A 3.6 m wide rectangular channel conveys 10 m^3/s of water with velocity of 6 m/s. Is there formation of Hydraulic Jump if yes calculate height, length and strength of Jump and what is loss of energy per kg of water?

d) Find the rate of flow and conveyance 'K' for rectangular channel 6 m wide for uniform flow at a depth of 1.5 m. The bed slope of channel is 1:1000 and C = 50. Also slate that the flow is tranquil or rapid

e) Derive the equation for energy loss through Hydraulic Jump starting from first principle.

Section – II

Q.4 Attempt any two. **12**

a) A 1:50 spillway model has discharge of 1.50 m^3/sec. What is the corresponding prototype discharge if the flood phenomenon takes 12 hrs to occur in the prototype, how long should it take in model?

b) Define similitude and state its types and derive Reynold's model law and state where it is used?

c) Draw a neat sketch of current meter and explain its working. And following velocities were recorded with current meter find discharge where the depth of flow is 5 m.

Depth above bed m	0	1	2	3	4
Velocity m/s	0	0.6	0.7	0.7	0.8

Q.5 Attempt any four. **16**

a) What is 'River Training Work' and explain its types?

b) Write short note on:

1) Levees.
2) Cut-offs.

c) Design an irrigation channel to carry 60 cumecs discharge. The channel is laid at a slope of 1/4500. The critical velocity ratio is 1.10. Use Kutters roughosity coefficient as 0.022.

d) Oil of kinematic viscosity 4.5×10^{-5} m^2/s is to be used in the prototype in which both gravity and viscous forces are important. What should be the viscosity of liquid used in dynamically similar model of scale 1:9 and find discharge ratio and time ratio for this model.

e) Differentiate:

1) Lacey's theory and Kennedy's theory

SLR-FM-80

Seat No.	

Set Q

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL AND RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer Book.
2) Draw neat sketches wherever necessary.
3) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Extreme condition of meanders is called as _____.
   a) Leavee b) Spurs
   c) Cut-off d) Island

2) The size of sediment particles that will just remain at rest in bed of wide rectangular channel equal to _____.
   a) $11DS_0$ b) $10.8\ D^{2/3}S_0^{1/3}$
   c) $11\ R^{1/2}S_0^{1/2}$ d) None

3) Kinematic similarity between model and prototype is the similarity of ____.
   a) Discharge b) Streamline pattern
   c) Shape d) None

4) The Lacey's equation for a regime channel consist of a set of x' independent equation relating to flow, where 'x' is equal to _____.
   a) 1 b) 3
   c) 5 d) 8

5) River training work serves the following purposes _____.
   a) Protect the river bed and banks
   b) Direct the river flow in desired condition
   c) Increase or decrease of the river discharge
   d) Protect the surrounding land from flooding

6) Distorted models are required to be prepared for _____.
   a) Rivers b) Harbors
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7) The dimension of Kinematic viscosity is _____.
   a) LT^{-2} b) $L^2\ T^{-1}$
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10) For the trapezoidal section _____.
   a) Shape is of half hexagon
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Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL AND RIVER HYDRAULICS

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

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Section – I

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b) A flow of 5.0 m^3/s is passing at a depth of 1.5 m through a rectangular channel of width 3.0 m, if α is 1.2 what is specific energy of flow? What is the value of the depth alternate to the existing depth if α= 1.0 (assumed for alternate flow).

c) A rectangular channel has a bed width is 4.5 m; bottom slope is 0.0004 and mannings n = 0.020. The normal depth of flow in this channel is 2.0 m. If the channel empties into a pool at the down stream end and the pool elevation is 0.60 m higher than the canal bed elevation at the downstream end. Calculate the coordinates of the resulting GVF profile.
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Q.3 Attempt any four. **16**

a) Derive the modified equation for GVF and also state the assumptions made for it.

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c) A 3.6 m wide rectangular channel conveys 10 m^3/s of water with velocity of 6 m/s. Is there formation of Hydraulic Jump if yes calculate height, length and strength of Jump and what is loss of energy per kg of water?

d) Find the rate of flow and conveyance 'K' for rectangular channel 6 m wide for uniform flow at a depth of 1.5 m. The bed slope of channel is 1:1000 and C = 50. Also slate that the flow is tranquil or rapid

e) Derive the equation for energy loss through Hydraulic Jump starting from first principle.

Section – II

Q.4 Attempt any two. **12**

a) A 1:50 spillway model has discharge of 1.50 m^3/sec. What is the corresponding prototype discharge if the flood phenomenon takes 12 hrs to occur in the prototype, how long should it take in model?

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c) Draw a neat sketch of current meter and explain its working. And following velocities were recorded with current meter find discharge where the depth of flow is 5 m.

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Velocity m/s	0	0.6	0.7	0.7	0.8

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1) Levees.
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c) Design an irrigation channel to carry 60 cumecs discharge. The channel is laid at a slope of 1/4500. The critical velocity ratio is 1.10. Use Kutters roughosity coefficient as 0.022.

d) Oil of kinematic viscosity 4.5×10^{-5} m^2/s is to be used in the prototype in which both gravity and viscous forces are important. What should be the viscosity of liquid used in dynamically similar model of scale 1:9 and find discharge ratio and time ratio for this model.

e) Differentiate:
1) Lacey's theory and Kennedy's theory

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL AND RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) The momentum correction factor, β is given as _____.
   a) $1/V^2\ AV^3.dA$ b) $1/V\ AV.dA$
   c) $1/V^3\ AV^2.dA$ d) $1/V^2\ AV^2.dA$

2) The mean velocity in Lacey's regime channel is proportional to _____.
   a) $R^{2/3}$ b) $R^{½}$
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3) Shield's diagram is a plot of non dimensional shear stress τc against ___.
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12) The strength of 'Hydraulic Jump' is governed by the _____.

a) Up stream velocity b) Up stream Froude's number
c) Down stream velocity d) Bed slope

13) For the trapezoidal section _____.

a) Shape is of half hexagon
b) Depth of flow equal to half bed width
c) Side slope equal to 45^o
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14) The maximum velocity in open channel occurs at _____.

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Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL AND RIVER HYDRAULICS

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

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Section – II

Q.4 Attempt any two. **12**

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d) Oil of kinematic viscosity 4.5×10^{-5} m^2/s is to be used in the prototype in which both gravity and viscous forces are important. What should be the viscosity of liquid used in dynamically similar model of scale 1:9 and find discharge ratio and time ratio for this model.

e) Differentiate:
1) Lacey's theory and Kennedy's theory

Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL AND RIVER HYDRAULICS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer Book.
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3) Use of non programmable calculator is permitted.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Kinematic similarity between model and prototype is the similarity of ____.
   a) Discharge b) Streamline pattern
   c) Shape d) None

2) The Lacey's equation for a regime channel consist of a set of x' independent equation relating to flow, where 'x' is equal to _____.
   a) 1 b) 3
   c) 5 d) 8

3) River training work serves the following purposes _____.
   a) Protect the river bed and banks
   b) Direct the river flow in desired condition
   c) Increase or decrease of the river discharge
   d) Protect the surrounding land from flooding

4) Distorted models are required to be prepared for _____.
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5) The dimension of Kinematic viscosity is _____.
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10) The momentum correction factor, β is given as _____.
   a) $1/V^2\ AV^3.dA$ b) $1/V\ AV.dA$
   c) $1/V^3\ AV^2.dA$ d) $1/V^2\ AV^2.dA$

11) The mean velocity in Lacey's regime channel is proportional to _____.
   a) $R^{2/3}$ b) $R^{½}$
   c) $S_0^{1/2}$ d) $S_0^{1/3}$

12) Shield's diagram is a plot of non dimensional shear stress τc against ___.
   a) Relative depth b) Shear Reynold's number
   c) Hydraulic radius d) Reynold's number

13) Extreme condition of meanders is called as _____.
   a) Leavee b) Spurs
   c) Cut-off d) Island

14) The size of sediment particles that will just remain at rest in bed of wide rectangular channel equal to _____.
   a) $11DS_0$ b) $10.8\ D^{2/3}S_0^{1/3}$
   c) $11\ R^{1/2}S_0^{1/2}$ d) None

Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
OPEN CHANNEL AND RIVER HYDRAULICS

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat sketches wherever necessary.
3) Use of non programmable calculator is permitted.

Section – I

Q.2 Attempt any two. **12**

a) What do you understand by most economical channel section? And show that for trapezoidal section. Half of top width = length of one of sloping side and hydraulic mean depth = half the depth of flow.

b) A flow of 5.0 m^3/s is passing at a depth of 1.5 m through a rectangular channel of width 3.0 m, if α is 1.2 what is specific energy of flow? What is the value of the depth alternate to the existing depth if α= 1.0 (assumed for alternate flow).

c) A rectangular channel has a bed width is 4.5 m; bottom slope is 0.0004 and mannings n = 0.020. The normal depth of flow in this channel is 2.0 m. If the channel empties into a pool at the down stream end and the pool elevation is 0.60 m higher than the canal bed elevation at the downstream end. Calculate the coordinates of the resulting GVF profile.
(Take 2 steps only).

Q.3 Attempt any four. **16**

a) Derive the modified equation for GVF and also state the assumptions made for it.

b) Define kinetic energy correction factor (α) and momentum correction factor(β)·

c) A 3.6 m wide rectangular channel conveys 10 m^3/s of water with velocity of 6 m/s. Is there formation of Hydraulic Jump if yes calculate height, length and strength of Jump and what is loss of energy per kg of water?

d) Find the rate of flow and conveyance 'K' for rectangular channel 6 m wide for uniform flow at a depth of 1.5 m. The bed slope of channel is 1:1000 and C = 50. Also slate that the flow is tranquil or rapid

e) Derive the equation for energy loss through Hydraulic Jump starting from first principle.

Section – II

Q.4 Attempt any two. **12**

a) A 1:50 spillway model has discharge of 1.50 m^3/sec. What is the corresponding prototype discharge if the flood phenomenon takes 12 hrs to occur in the prototype, how long should it take in model?

b) Define similitude and state its types and derive Reynold's model law and state where it is used?

c) Draw a neat sketch of current meter and explain its working. And following velocities were recorded with current meter find discharge where the depth of flow is 5 m.

Depth above bed m	0	1	2	3	4
Velocity m/s	0	0.6	0.7	0.7	0.8

Q.5 Attempt any four. **16**

a) What is 'River Training Work' and explain its types?

b) Write short note on:
1) Levees.
2) Cut-offs.

c) Design an irrigation channel to carry 60 cumecs discharge. The channel is laid at a slope of 1/4500. The critical velocity ratio is 1.10. Use Kutters roughosity coefficient as 0.022.

d) Oil of kinematic viscosity 4.5×10^{-5} m^2/s is to be used in the prototype in which both gravity and viscous forces are important. What should be the viscosity of liquid used in dynamically similar model of scale 1:9 and find discharge ratio and time ratio for this model.

e) Differentiate:
1) Lacey's theory and Kennedy's theory

Seat No.	

Set **P**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
AIR POLLUTION & CONTROL

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) As per NAAQS (2009), air quality standards are given for _____ areas.
   a) Eco-sensitive b) Rural and urban
   c) Industrial d) All of above

2) Unit of measuring thickness of ozone is _____.
   a) Hofmann unit b) Chapman unit
   c) Dobson unit d) Hudson unit

3) Which of the following is/are primary pollutant?
   a) Ozone b) PAN
   c) Photo chemical Smog d) CH_4

4) Automobile pollution can be controlled by _____.
   a) Use of catalytic convertors
   b) Reducing use of vehicle for shorter distance
   c) Creating awareness in public
   d) Proper air to fuel ratio
   e) All of above

5) Bags in bag house filter are _____ m in length/height.
   a) 2-10 b) 1-2
   c) 2-12 d) 10-10

6) Pick out the o one: Superadiabatic, Subadiabatic, inversion, Subsidence.
   a) Superadiabatic b) Inversion
   c) Subadiabatic d) subsidence

7) Injury/injuries to plant amongst following is/are _____.
   a) Epinasty b) Chlorosis
   c) Abscission d) All of above

8) Hb in blood reacts with CO to form _____.
   a) Carbon diaoxide b) Carboxy hemoglobein
   c) PAN d) PBN

9) In Gaussian Dispersion Model down wind direction is considered along _____ axis.
   a) x b) y
   c) z d) none of these

10) Negative lapse rate is called as _____.
   a) MMD b) DALR
   c) Inversion d) Unstable condition

11) The standard value of DALR is _____.
   a) $-0.8°C/10km$ b) $-1.9°C/100km$
   c) $-9.8°C/km$ d) $-10°C/1.5km$

12) High volume sampler or respirable dust sampler is used for _____.
   a) Stack monitorsing b) Auto exhaust analysis
   c) ambient air quality monitoring d) All of above

13) Sick building syndrome is associated with _____.
   a) Out door pollution b) Indoor pollution
   c) Space pollution d) Geothermal effect

14) Molecular weight of ozone is _____.
   a) 16 b) 32
   c) 48 d) 64

Seat No.	

Set **P**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
AIR POLLUTION & CONTROL

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.3 and Q.No.8 are compulsory.
2) Solve any two questions from each section.
3) Use of non-programmable is allowed.
4) Figure to the right indicates full marks.
5) Assume suitable data whenever required.

Section – I

Q.2 **a)** Explain structure of atmosphere with the help of neat sketch. **06**

b) Explain with example. **03**
1) Micro scale
2) Meso scale
3) Macro scale

Q.3 **a)** Complete the remaining columns of the following table. **04**

Meteorologcal parameter	Unit of measurement	Instrument used to measure the parameter	Contributing to air pollution YES/NO
Wind speed			
Relatie humidity			
Atmospheric pressure			
temperature			

b) A thermal powerplant burns coalat a rate of 500 kg/hr. Coal contains 30% ash and 1% sulphur. Determine SPM and SO_2 emission ratesin gm/sec. **06**

Q.4 **a)** Give Gaussian dispersion model equation used for prediction of concentration of air pollutants. **05**

b) Convert. **04**
1) 800 $\mu g/m^3$ of SO_2 in ppm at 30^oC
2) 1200 ppm of H_2S in $\mu g/m^3$ at 27^oC

Q.5 **Write short notes (Any Three)** **09**
a) Air pollution episodes
b) Heat island effect
c) Acid rain
d) Effects of air pollutants on materials

Section – II

Q.6 **a)** Define with neat sketch. **06**
1) Over iso-kinetic sampling
2) Under iso-kinetic sampling
3) Iso-kinetic sampling

b) Explain any two methods for determination of air pollution index. **03**

Q.7 **a)** Explain working of ESP with neat sketch and along with advantages and disadvantages. **04**

b) Determine number of bags necessary to treat 16 m^3/sec of pollutes air laden with particulates, Air to cloth ratio is 10 m/min. the bags have 0.25 m diameter and 7 m length. **05**

Q.8 **a)** Explain with neat sketch working of spray tower. Also give advantages and disadvantages. **04**

b) Concentration of SPM was determined by using high volume sampler. Determine the concentration of SPM in µg/m^3 for following data. **06**
1) Actual sampling time (T) = 24 hrs.
2) Average flow rate (Q_{avg}) = 1.45 cu. M/min
3) Initial weight of filter(w_2) = 10.280 gm
4) Final weight of filter(w_1) = 9.789 gm

(Note — No need to apply correction for volume)

Q.9 **Write short notes. (Any Three)** **09**
a) Gravity settling chamber with tray
b) Automobile pollution
c) Indoor pollution
d) Photochemical smog

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
AIR POLLUTION & CONTROL

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Hb in blood reacts with CO to form _____.
   a) Carbon diaoxide b) Carboxy hemoglobein
   c) PAN d) PBN

2) In Gaussian Dispersion Model down wind direction is considered along _____ axis.
   a) x b) y
   c) z d) none of these

3) Negative lapse rate is called as _____.
   a) MMD b) DALR
   c) Inversion d) Unstable condition

4) The standard value of DALR is _____.
   a) $-0.8°C/10km$ b) $-1.9°C/100km$
   c) $-9.8°C/km$ d) $-10°C/1.5km$

5) High volume sampler or respirable dust sampler is used for _____.
   a) Stack monitorsing b) Auto exhaust analysis
   c) ambient air quality monitoring d) All of above

6) Sick building syndrome is associated with _____.
   a) Out door pollution b) Indoor pollution
   c) Space pollution d) Geothermal effect

7) Molecular weight of ozone is _____.
   a) 16 b) 32
   c) 48 d) 64

8) As per NAAQS (2009), air quality standards are given for _____ areas.
   a) Eco-sensitive b) Rural and urban
   c) Industrial d) All of above

9) Unit of measuring thickness of ozone is _____.
   a) Hofmann unit b) Chapman unit
   c) Dobson unit d) Hudson unit

10) Which of the following is/are primary pollutant?
   a) Ozone
   b) PAN
   c) Photo chemical Smog
   d) CH_4

11) Automobile pollution can be controlled by _____.
   a) Use of catalytic convertors
   b) Reducing use of vehicle for shorter distance
   c) Creating awareness in public
   d) Proper air to fuel ratio
   e) All of above

12) Bags in bag house filter are _____ m in length/height.
   a) 2-10
   b) 1-2
   c) 2-12
   d) 10-10

13) Pick out the o one: Superadiabatic, Subadiabatic, inversion, Subsidence.
   a) Superadiabatic
   b) Inversion
   c) Subadiabatic
   d) subsidence

14) Injury/injuries to plant amongst following is/are _____.
   a) Epinasty
   b) Chlorosis
   c) Abscission
   d) All of above

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
AIR POLLUTION & CONTROL

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.3 and Q.No.8 are compulsory.
2) Solve any two questions from each section.
3) Use of non-programmable is allowed.
4) Figure to the right indicates full marks.
5) Assume suitable data whenever required.

Section – I

Q.2 **a)** Explain structure of atmosphere with the help of neat sketch. **06**

b) Explain with example. **03**
1) Micro scale
2) Meso scale
3) Macro scale

Q.3 **a)** Complete the remaining columns of the following table. **04**

Meteorologcal parameter	Unit of measurement	Instrument used to measure the parameter	Contributing to air pollution YES/NO
Wind speed			
Relatie humidity			
Atmospheric pressure			
temperature			

b) A thermal powerplant burns coalat a rate of 500 kg/hr. Coal contains 30% ash and 1% sulphur. Determine SPM and SO_2 emission ratesin gm/sec. **06**

Q.4 **a)** Give Gaussian dispersion model equation used for prediction of concentration of air pollutants. **05**

b) Convert. **04**
1) 800 µg/m^3 of SO_2 in ppm at 30^{o}C
2) 1200 ppm of H_2S in µg/m^3 at 27^{o}C

Q.5 **Write short notes. (Any Three)** **09**
a) Air pollution episodes
b) Heat island effect
c) Acid rain
d) Effects of air pollutants on materials

Section – II

Q.6 **a)** Define with neat sketch. **06**
1) Over iso-kinetic sampling
2) Under iso-kinetic sampling
3) Iso-kinetic sampling

b) Explain any two methods for determination of air pollution index. **03**

Q.7 **a)** Explain working of ESP with neat sketch and along with advantages and disadvantages. **04**

b) Determine number of bags necessary to treat 16 m^3/sec of pollutes air laden with particulates, Air to cloth ratio is 10 m/min. the bags have 0.25 m diameter and 7 m length. **05**

Q.8 **a)** Explain with neat sketch working of spray tower. Also give advantages and disadvantages. **04**

b) Concentration of SPM was determined by using high volume sampler. Determine the concentration of SPM in µg/m^3 for following data. **06**
1) Actual sampling time (T) = 24 hrs.
2) Average flow rate (Q_{avg}) = 1.45 cu. M/min
3) Initial weight of filter(w_2) = 10.280 gm
4) Final weight of filter(w_1) = 9.789 gm

(Note — No need to apply correction for volume)

Q.9 **Write short notes. (Any Three)** **09**
a) Gravity settling chamber with tray
b) Automobile pollution
c) Indoor pollution
d) Photochemical smog

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
AIR POLLUTION & CONTROL

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Bags in bag house filter are _____ m in length/height.
   a) 2-10 b) 1-2
   c) 2-12 d) 10-10

2) Pick out the o one: Superadiabatic, Subadiabatic, inversion, Subsidence.
   a) Superadiabatic b) Inversion
   c) Subadiabatic d) subsidence

3) Injury/injuries to plant amongst following is/are _____.
   a) Epinasty b) Chlorosis
   c) Abscission d) All of above

4) Hb in blood reacts with CO to form _____.
   a) Carbon diaoxide b) Carboxy hemoglobein
   c) PAN d) PBN

5) In Gaussian Dispersion Model down wind direction is considered along _____ axis.
   a) x b) y
   c) z d) none of these

6) Negative lapse rate is called as _____.
   a) MMD b) DALR
   c) Inversion d) Unstable condition

7) The standard value of DALR is _____.
   a) $-0.8°C/10km$ b) $-1.9°C/100km$
   c) $-9.8°C/km$ d) $-10°C/1.5km$

8) High volume sampler or respirable dust sampler is used for _____.
   a) Stack monitorsing b) Auto exhaust analysis
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9) Sick building syndrome is associated with _____.
   a) Out door pollution b) Indoor pollution
   c) Space pollution d) Geothermal effect

10) Molecular weight of ozone is _____.
   a) 16 b) 32
   c) 48 d) 64

11) As per NAAQS (2009), air quality standards are given for _____ areas.
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12) Unit of measuring thickness of ozone is _____.
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   a) Ozone b) PAN
   c) Photo chemical Smog d) CH_4

14) Automobile pollution can be controlled by _____.
   a) Use of catalytic convertors
   b) Reducing use of vehicle for shorter distance
   c) Creating awareness in public
   d) Proper air to fuel ratio
   e) All of above

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
AIR POLLUTION & CONTROL

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.3 and Q.No.8 are compulsory.
2) Solve any two questions from each section.
3) Use of non-programmable is allowed.
4) Figure to the right indicates full marks.
5) Assume suitable data whenever required.

Section – I

Q.2 **a)** Explain structure of atmosphere with the help of neat sketch. **06**

b) Explain with example. **03**
1) Micro scale
2) Meso scale
3) Macro scale

Q.3 **a)** Complete the remaining columns of the following table. **04**

Meteorologcal parameter	Unit of measurement	Instrument used to measure the parameter	Contributing to air pollution YES/NO
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Relatie humidity			
Atmospheric pressure			
temperature			

b) A thermal powerplant burns coalat a rate of 500 kg/hr. Coal contains 30% ash and 1% sulphur. Determine SPM and SO_2 emission ratesin gm/sec. **06**

Q.4 **a)** Give Gaussian dispersion model equation used for prediction of concentration of air pollutants. **05**

b) Convert. **04**
1) 800 $\mu g/m^3$ of SO_2 in ppm at 30^oC
2) 1200 ppm of H_2S in $\mu g/m^3$ at 27^oC

Q.5 **Write short notes. (Any Three)** **09**
a) Air pollution episodes
b) Heat island effect
c) Acid rain
d) Effects of air pollutants on materials

Section – II

Q.6 **a)** Define with neat sketch. **06**
1) Over iso-kinetic sampling
2) Under iso-kinetic sampling
3) Iso-kinetic sampling

b) Explain any two methods for determination of air pollution index. **03**

Q.7 **a)** Explain working of ESP with neat sketch and along with advantages and disadvantages. **04**

b) Determine number of bags necessary to treat 16 m^3/sec of pollutes air laden with particulates, Air to cloth ratio is 10 m/min. the bags have 0.25 m diameter and 7 m length. **05**

Q.8 **a)** Explain with neat sketch working of spray tower. Also give advantages and disadvantages. **04**

b) Concentration of SPM was determined by using high volume sampler. Determine the concentration of SPM in µg/m^3 for following data. **06**
1) Actual sampling time (T) = 24 hrs.
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3) Initial weight of filter(w_2) = 10.280 gm
4) Final weight of filter(w_1) = 9.789 gm

(Note — No need to apply correction for volume)

Q.9 **Write short notes. (Any Three)** **09**
a) Gravity settling chamber with tray
b) Automobile pollution
c) Indoor pollution
d) Photochemical smog

Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
AIR POLLUTION & CONTROL

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Assume suitable data whenever required.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Negative lapse rate is called as _____.
   a) MMD b) DALR
   c) Inversion d) Unstable condition

2) The standard value of DALR is _____.
   a) $-0.8°C/10km$ b) $-1.9°C/100km$
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3) High volume sampler or respirable dust sampler is used for _____.
   a) Stack monitorsing b) Auto exhaust analysis
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4) Sick building syndrome is associated with _____.
   a) Out door pollution b) Indoor pollution
   c) Space pollution d) Geothermal effect

5) Molecular weight of ozone is _____.
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10) Bags in bag house filter are _____ m in length/height.
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14) In Gaussian Dispersion Model down wind direction is considered along _____ axis.
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Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
AIR POLLUTION & CONTROL

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.3 and Q.No.8 are compulsory.
2) Solve any two questions from each section.
3) Use of non-programmable is allowed.
4) Figure to the right indicates full marks.
5) Assume suitable data whenever required.

Section – I

Q.2 **a)** Explain structure of atmosphere with the help of neat sketch. **06**

b) Explain with example. **03**
1) Micro scale
2) Meso scale
3) Macro scale

Q.3 **a)** Complete the remaining columns of the following table. **04**

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temperature			

b) A thermal powerplant burns coalat a rate of 500 kg/hr. Coal contains 30% ash and 1% sulphur. Determine SPM and SO_2 emission ratesin gm/sec. **06**

Q.4 **a)** Give Gaussian dispersion model equation used for prediction of concentration of air pollutants. **05**

b) Convert. **04**
1) 800 $\mu g/m^3$ of SO_2 in ppm at 30^oC
2) 1200 ppm of H_2S in $\mu g/m^3$ at 27^oC

Q.5 **Write short notes. (Any Three)** **09**
a) Air pollution episodes
b) Heat island effect
c) Acid rain
d) Effects of air pollutants on materials

Section – II

Q.6 **a)** Define with neat sketch. **06**
1) Over iso-kinetic sampling
2) Under iso-kinetic sampling
3) Iso-kinetic sampling

b) Explain any two methods for determination of air pollution index. **03**

Q.7 **a)** Explain working of ESP with neat sketch and along with advantages and disadvantages. **04**

b) Determine number of bags necessary to treat 16 m^3/sec of pollutes air laden with particulates, Air to cloth ratio is 10 m/min. the bags have 0.25 m diameter and 7 m length. **05**

Q.8 **a)** Explain with neat sketch working of spray tower. Also give advantages and disadvantages. **04**

b) Concentration of SPM was determined by using high volume sampler. Determine the concentration of SPM in µg/m^3 for following data. **06**
1) Actual sampling time (T) = 24 hrs.
2) Average flow rate (Q_{avg}) = 1.45 cu. M/min
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4) Final weight of filter(w_1) = 9.789 gm

(Note — No need to apply correction for volume)

Q.9 **Write short notes. (Any Three)** **09**
a) Gravity settling chamber with tray
b) Automobile pollution
c) Indoor pollution
d) Photochemical smog

Seat No.	

Set **P**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) The negative skin friction on pile develops when _____.
   a) The soil in which it is driven in sandy soil
   b) The surrounding soil settles more than pile
   c) The ground water table rises
   d) The soil near the tip is clay

2) The seismic refraction method cannot be need if the wave velocity in the lower layer is _____ that in the upper layer.
   a) Greater than b) Less than
   c) More than 4 times d) Less than 4 times

3) The bearing capacity of soil supporting a footing of size 1.5m x 1.5m will not be affected by the presence of water table located at a depth _____ below base of footing.
   a) 0.5m b) 1.0m
   c) 1.5m d) 2.0m

4) Gross and net bearing capacities will be the same when the structure is founded at _____.
   a) Ground Level b) At a depth 2m below GL
   c) At a depth 4m below GL d) It is not possible

5) In case of sandy soil _____ settlement is predominant.
   a) Immediate settlement
   b) Consolidation settlement
   c) Secondary consolidation settlement
   d) Both b & c

6) When the area of all the footings covers more than 50% of the area of the structure, which foundation is considered more suitable?
   a) Raft b) Pile
   c) Caisson d) Well Foundation

7) The floating caisson is _____.
   a) Open at top closed at bottom b) closed at top open at bottom
   c) open at top and bottom both d) none of the above

8) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is _____.
   a) 1/1.5 b) ½
   c) 1/2.5 d) ¼

9) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is ___.
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

10) With increase in the size of footing the bearing capacity of footing on clay _____.
   a) Increases b) Decreases
   c) Remains same d) None of these

11) In case of Well Foundation, grip length is defined as the _____.
   a) Length below the top of well cap to the cutting edge
   b) Length between bottom of the well cap to the cutting edge
   c) Length between minimum scour level and bottom of the well
   d) Length between maximum scour level and bottom of the well

12) The scour depth as per Lacey's formulae is given by _____.
   a) $0.473(Q/f)^{1/3}$ b) $0.573(Q/f)^{1/3}$
   c) $0.673(Q/f)^{1/3}$ d) $0.773(Q/f)^{1/3}$

13) When the frequency of the exciting force in a forced vibration of a body or a system equals one of the natural frequencies of the body or system, the amplitude of motion tends to become excessively large. This condition or phenomenon is called _____.
   a) Resonance b) Damping
   c) Negative damping d) Free Vibration

14) When the allowable soil pressure is low and expected differential settlement for spread footing is high, the best choice is _____ foundation.
   a) Raft b) Trapezoidal
   c) Rectangular d) None of the above

SLR-FM-82

Seat No.	

Set P

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 4 & Q. No. 8 is compulsory. Attempt any two questions from remaining questions from each sections.
2) Figures to the right indicate full marks.
3) Assume suitable data and mention it clearly.

Section – I

Q.2 a) Discuss the depth of explorations necessary for various types of foundations. **03**

b) Explain Geophysical Exploration with neat sketches. **06**

Q.3 a) Explain various types of shear failure of soil? **03**

b) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kn/m^3. The shear strength parameters are c = 0 and Φ = 35^0. Determine F.O.S w.r.t shear failure for the water table 4 m below G.L. Use Terzaghi's equation. **06**

Q.4 a) Explain in which situation raft foundation is needed? What are the IS Code provision for it? **04**

b) As per IS code rigid method analysis, analyze and find the maximum stresses at the corners of the Raft foundation shown below in fig 1. All columns are in square shape of size 400 x 400 mm. **06**

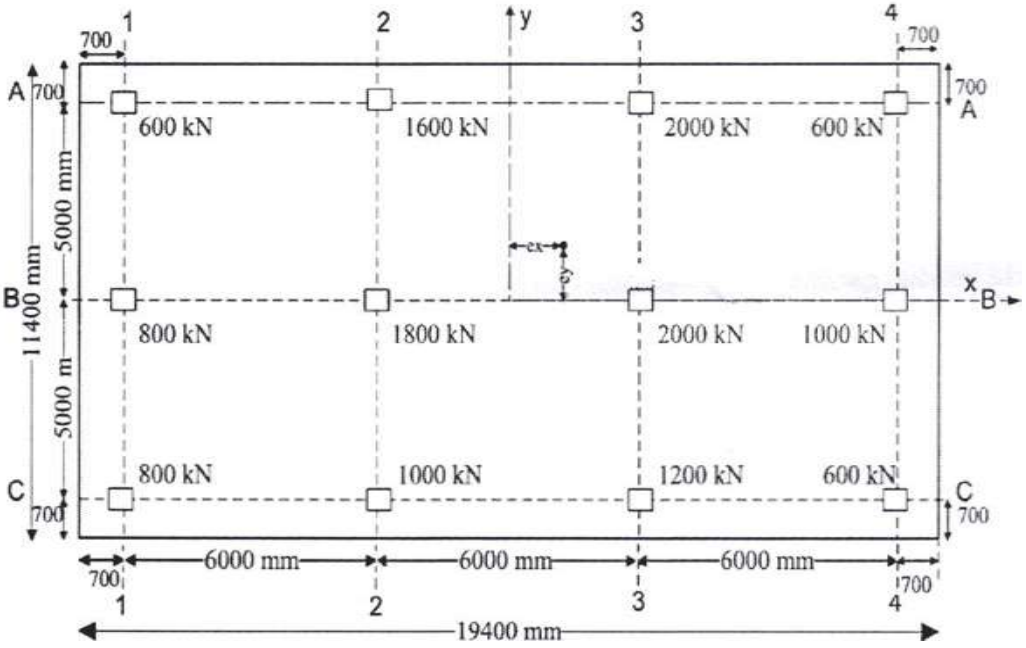

Fig. 1

Q.5	**a)**	Discuss the characteristics of Black Cotton soil.	**03**
	b)	Boussinesq equation for vertical stress distribution.	**06**

Section – II

Q.6	**a)**	Explain types of piles with neat sketch.	**03**
	b)	A group of 9 piles with 3 piles in row were driven into a soft clay extending from ground level up to a great depth. The dia and the length of piles were 30 cm and 10 m respectively. The unconfined compressive strength of the clay is 70 kpa. If the piles are placed at 90 cm c/c, compute the allowable load on the pile group on the of shear failure criteria. Take factor of safety = 2.5 For $\varphi u = 0$, Nc = 9.	**06**
Q.7	**a)**	Explain Pneumatic caisson with neat sketch.	**03**
	b)	What are the various components of well foundation? Explain the design of individual component of the Well Foundation.	**06**
Q.8	**a)**	Resonance occurs at a frequency of 20 cps in vertical vibration of a test block 1m x 1m x 1m. Calculate the coefficient of elastic uniform compression.	**06**
	b)	Draw the sketch of block foundation with all 6 degrees of freedom? (3 translation and 3 rotation)	**04**
Q.9	**Write short notes on any three**		**09**
	a)	Methods of Underpinning	
	b)	Box caisson	
	c)	Pile cap	
	d)	Vibration absorbers	
	e)	Criteria for satisfaction performance of machine foundation	

Seat No.	

Set | Q

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is _____.
   a) 1/1.5 b) ½
   c) 1/2.5 d) ¼

2) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is ___.
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

3) With increase in the size of footing the bearing capacity of footing on clay _____.
   a) Increases b) Decreases
   c) Remains same d) None of these

4) In case of Well Foundation, grip length is defined as the _____.
   a) Length below the top of well cap to the cutting edge
   b) Length between bottom of the well cap to the cutting edge
   c) Length between minimum scour level and bottom of the well
   d) Length between maximum scour level and bottom of the well

5) The scour depth as per Lacey's formulae is given by _____.
   a) $0.473(Q/f)^{1/3}$ b) $0.573(Q/f)^{1/3}$
   c) $0.673(Q/f)^{1/3}$ d) $0.773(Q/f)^{1/3}$

6) When the frequency of the exciting force in a forced vibration of a body or a system equals one of the natural frequencies of the body or system, the amplitude of motion tends to become excessively large. This condition or phenomenon is called _____.
   a) Resonance b) Damping
   c) Negative damping d) Free Vibration

7) When the allowable soil pressure is low and expected differential settlement for spread footing is high, the best choice is _____ foundation.
   a) Raft b) Trapezoidal
   c) Rectangular d) None of the above

8) The negative skin friction on pile develops when _____.
   a) The soil in which it is driven in sandy soil
   b) The surrounding soil settles more than pile
   c) The ground water table rises
   d) The soil near the tip is clay

9) The seismic refraction method cannot be need if the wave velocity in the lower layer is _____ that in the upper layer.
   a) Greater than b) Less than
   c) More than 4 times d) Less than 4 times

10) The bearing capacity of soil supporting a footing of size 1.5m x 1.5m will not be affected by the presence of water table located at a depth _____ below base of footing.
   a) 0.5m b) 1.0m
   c) 1.5m d) 2.0m

11) Gross and net bearing capacities will be the same when the structure is founded at _____.
   a) Ground Level b) At a depth 2m below GL
   c) At a depth 4m below GL d) It is not possible

12) In case of sandy soil _____ settlement is predominant.
   a) Immediate settlement
   b) Consolidation settlement
   c) Secondary consolidation settlement
   d) Both b & c

13) When the area of all the footings covers more than 50% of the area of the structure, which foundation is considered more suitable?
   a) Raft b) Pile
   c) Caisson d) Well Foundation

14) The floating caisson is _____.
   a) Open at top closed at bottom b) closed at top open at bottom
   c) open at top and bottom both d) none of the above

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 4 & Q. No. 8 is compulsory. Attempt any two questions from remaining questions from each sections.
2) Figures to the right indicate full marks.
3) Assume suitable data and mention it clearly.

Section – I

Q.2 **a)** Discuss the depth of explorations necessary for various types of foundations. **03**

b) Explain Geophysical Exploration with neat sketches. **06**

Q.3 **a)** Explain various types of shear failure of soil? **03**

b) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kn/m^3. The shear strength parameters are c = 0 and $\Phi = 35^0$. Determine F.O.S w.r.t shear failure for the water table 4 m below G.L. Use Terzaghi's equation. **06**

Q.4 **a)** Explain in which situation raft foundation is needed? What are the IS Code provision for it? **04**

b) As per IS code rigid method analysis, analyze and find the maximum stresses at the corners of the Raft foundation shown below in fig 1. All columns are in square shape of size 400 x 400 mm. **06**

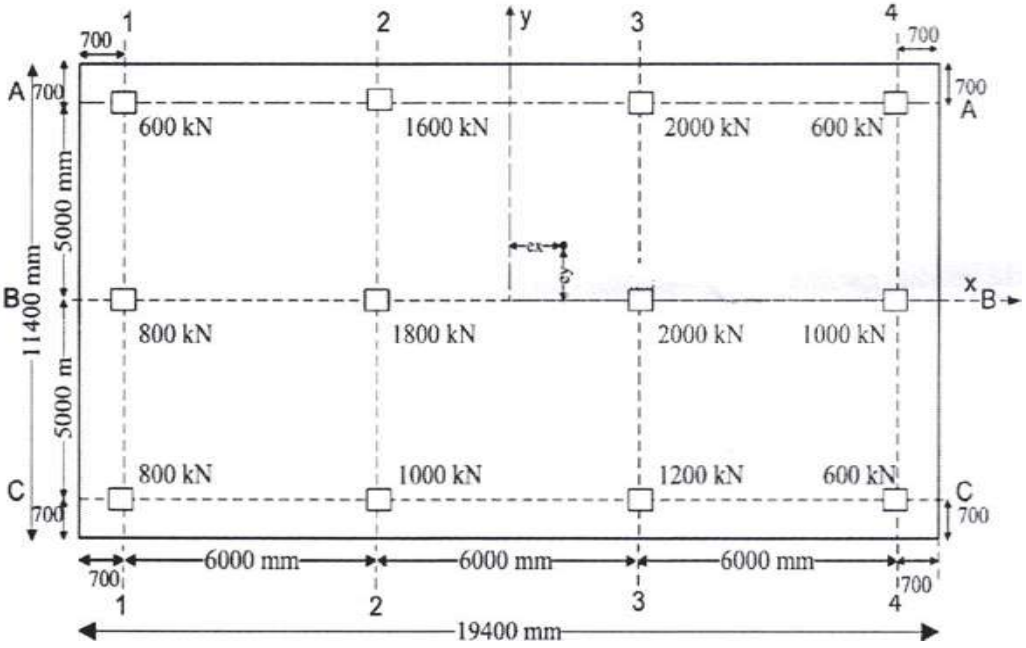

Fig. 1

Q.5	**a)**	Discuss the characteristics of Black Cotton soil.	**03**
	b)	Boussinesq equation for vertical stress distribution.	**06**

Section – II

Q.6	**a)**	Explain types of piles with neat sketch.	**03**
	b)	A group of 9 piles with 3 piles in row were driven into a soft clay extending from ground level up to a great depth. The dia and the length of piles were 30 cm and 10 m respectively. The unconfined compressive strength of the clay is 70 kpa. If the piles are placed at 90 cm c/c, compute the allowable load on the pile group on the of shear failure criteria. Take factor of safety = 2.5 For $\varphi u = 0$, Nc = 9.	**06**
Q.7	**a)**	Explain Pneumatic caisson with neat sketch.	**03**
	b)	What are the various components of well foundation? Explain the design of individual component of the Well Foundation.	**06**
Q.8	**a)**	Resonance occurs at a frequency of 20 cps in vertical vibration of a test block 1m x 1m x 1m. Calculate the coefficient of elastic uniform compression.	**06**
	b)	Draw the sketch of block foundation with all 6 degrees of freedom? (3 translation and 3 rotation)	**04**
Q.9	**Write short notes on any three**		**09**
	a)	Methods of Underpinning	
	b)	Box caisson	
	c)	Pile cap	
	d)	Vibration absorbers	
	e)	Criteria for satisfaction performance of machine foundation	

Seat No.	

Set **R**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Assume additional data if required and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) In case of sandy soil _____ settlement is predominant.
   a) Immediate settlement
   b) Consolidation settlement
   c) Secondary consolidation settlement
   d) Both b & c

2) When the area of all the footings covers more than 50% of the area of the structure, which foundation is considered more suitable?
   a) Raft b) Pile
   c) Caisson d) Well Foundation

3) The floating caisson is _____.
   a) Open at top closed at bottom b) closed at top open at bottom
   c) open at top and bottom both d) none of the above

4) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is _____.
   a) 1/1.5 b) ½
   c) 1/2.5 d) ¼

5) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is ___.
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

6) With increase in the size of footing the bearing capacity of footing on clay _____.
   a) Increases b) Decreases
   c) Remains same d) None of these

7) In case of Well Foundation, grip length is defined as the _____.
   a) Length below the top of well cap to the cutting edge
   b) Length between bottom of the well cap to the cutting edge
   c) Length between minimum scour level and bottom of the well
   d) Length between maximum scour level and bottom of the well

8) The scour depth as per Lacey's formulae is given by _____.
   a) $0.473(Q/f)^{1/3}$ b) $0.573(Q/f)^{1/3}$
   c) $0.673(Q/f)^{1/3}$ d) $0.773(Q/f)^{1/3}$

9) When the frequency of the exciting force in a forced vibration of a body or a system equals one of the natural frequencies of the body or system, the amplitude of motion tends to become excessively large. This condition or phenomenon is called _____.
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   c) Negative damping d) Free Vibration

10) When the allowable soil pressure is low and expected differential settlement for spread footing is high, the best choice is _____ foundation.
   a) Raft b) Trapezoidal
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11) The negative skin friction on pile develops when _____.
   a) The soil in which it is driven in sandy soil
   b) The surrounding soil settles more than pile
   c) The ground water table rises
   d) The soil near the tip is clay

12) The seismic refraction method cannot be need if the wave velocity in the lower layer is _____ that in the upper layer.
   a) Greater than b) Less than
   c) More than 4 times d) Less than 4 times

13) The bearing capacity of soil supporting a footing of size 1.5m x 1.5m will not be affected by the presence of water table located at a depth _____ below base of footing.
   a) 0.5m b) 1.0m
   c) 1.5m d) 2.0m

14) Gross and net bearing capacities will be the same when the structure is founded at _____.
   a) Ground Level b) At a depth 2m below GL
   c) At a depth 4m below GL d) It is not possible

SLR-FM-82

Seat No.	

Set R

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 4 & Q. No. 8 is compulsory. Attempt any two questions from remaining questions from each sections.
2) Figures to the right indicate full marks.
3) Assume suitable data and mention it clearly.

Section – I

Q.2 a) Discuss the depth of explorations necessary for various types of foundations. **03**

b) Explain Geophysical Exploration with neat sketches. **06**

Q.3 a) Explain various types of shear failure of soil? **03**

b) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kn/m^3. The shear strength parameters are c = 0 and Φ = 35^0. Determine F.O.S w.r.t shear failure for the water table 4 m below G.L. Use Terzaghi's equation. **06**

Q.4 a) Explain in which situation raft foundation is needed? What are the IS Code provision for it? **04**

b) As per IS code rigid method analysis, analyze and find the maximum stresses at the corners of the Raft foundation shown below in fig 1. All columns are in square shape of size 400 x 400 mm. **06**

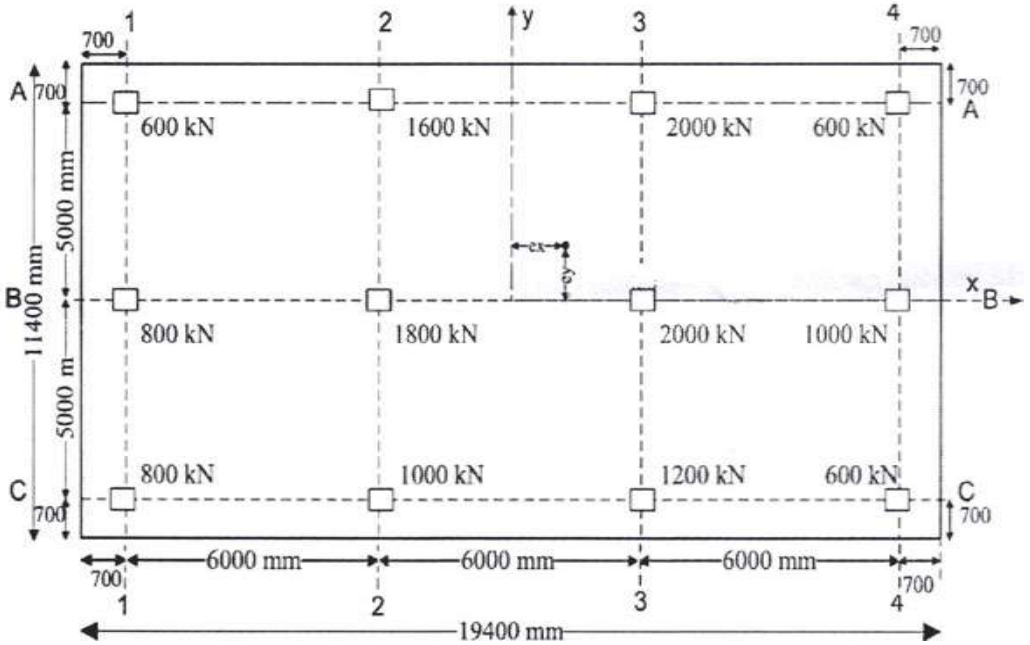

Fig. 1

Q.5	**a)**	Discuss the characteristics of Black Cotton soil.	**03**
	b)	Boussinesq equation for vertical stress distribution.	**06**

Section – II

Q.6	**a)**	Explain types of piles with neat sketch.	**03**
	b)	A group of 9 piles with 3 piles in row were driven into a soft clay extending from ground level up to a great depth. The dia and the length of piles were 30 cm and 10 m respectively. The unconfined compressive strength of the clay is 70 kpa. If the piles are placed at 90 cm c/c, compute the allowable load on the pile group on the of shear failure criteria. Take factor of safety = 2.5 For φu = 0, Nc = 9.	**06**
Q.7	**a)**	Explain Pneumatic caisson with neat sketch.	**03**
	b)	What are the various components of well foundation? Explain the design of individual component of the Well Foundation.	**06**
Q.8	**a)**	Resonance occurs at a frequency of 20 cps in vertical vibration of a test block 1m x 1m x 1m. Calculate the coefficient of elastic uniform compression.	**06**
	b)	Draw the sketch of block foundation with all 6 degrees of freedom? (3 translation and 3 rotation)	**04**
Q.9	**Write short notes on any three**		**09**
	a)	Methods of Underpinning	
	b)	Box caisson	
	c)	Pile cap	
	d)	Vibration absorbers	
	e)	Criteria for satisfaction performance of machine foundation	

Seat No.	

Set | S

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) With increase in the size of footing the bearing capacity of footing on clay _____.
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2) In case of Well Foundation, grip length is defined as the _____.
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   c) Rectangular d) None of the above

6) The negative skin friction on pile develops when _____.
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8) The bearing capacity of soil supporting a footing of size 1.5m x 1.5m will not be affected by the presence of water table located at a depth _____ below base of footing.
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   c) Cutting edge d) Steining

Seat No.	

Set **S**

B.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF FOUNDATIONS

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 4 & Q. No. 8 is compulsory. Attempt any two questions from remaining questions from each sections.
2) Figures to the right indicate full marks.
3) Assume suitable data and mention it clearly.

Section – I

Q.2 **a)** Discuss the depth of explorations necessary for various types of foundations. **03**

b) Explain Geophysical Exploration with neat sketches. **06**

Q.3 **a)** Explain various types of shear failure of soil? **03**

b) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kn/m^3. The shear strength parameters are c = 0 and Φ = 35^0. Determine F.O.S w.r.t shear failure for the water table 4 m below G.L. Use Terzaghi's equation. **06**

Q.4 **a)** Explain in which situation raft foundation is needed? What are the IS Code provision for it? **04**

b) As per IS code rigid method analysis, analyze and find the maximum stresses at the corners of the Raft foundation shown below in fig 1. All columns are in square shape of size 400 x 400 mm. **06**

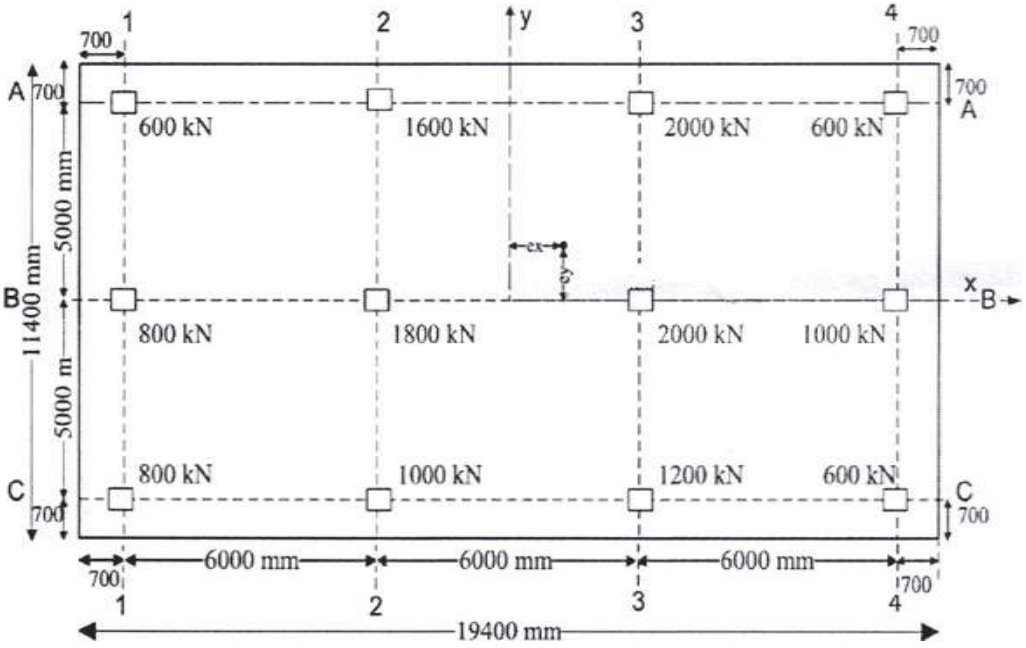

Fig. 1

Q.5	**a)**	Discuss the characteristics of Black Cotton soil.	**03**
	b)	Boussinesq equation for vertical stress distribution.	**06**

Section – II

Q.6	**a)**	Explain types of piles with neat sketch.	**03**
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Q.8	**a)**	Resonance occurs at a frequency of 20 cps in vertical vibration of a test block 1m x 1m x 1m. Calculate the coefficient of elastic uniform compression.	**06**
	b)	Draw the sketch of block foundation with all 6 degrees of freedom? (3 translation and 3 rotation)	**04**
Q.9	**Write short notes on any three**		**09**
	a)	Methods of Underpinning	
	b)	Box caisson	
	c)	Pile cap	
	d)	Vibration absorbers	
	e)	Criteria for satisfaction performance of machine foundation	

SLR-FM-83

Seat No.	

Set P

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Use of IS Codes are allowed
4) Assume suitable data if necessary and mention it clearly before the Solution.
5) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) The minimum percentage of reinforcements in case of water tanks having thickness more than 450 mm is _____.
   a) 0.3% b) 0.2%
   c) 0.12% d) 0.15%

2) Minimum spacing of end bearing piles as per IS 2911 is _____.
   a) 2.0 times the shaft diameter
   b) 2.5 times the shaft diameter
   c) 3.0 times the shaft diameter
   d) none of these

3) The spacing of the reinforcements in flat slab is restricted to _____.
   a) two times the slab depth
   b) three times the slab depth
   c) 300mm
   d) 450mm

4) As per IS the spacing of situ ribs in case of grid floors should not be more than _____.
   a) 1.5m b) 1.75m
   c) 1.0m d) 1.20m

5) The minimum percentage of reinforcements in case of base slab of water tanks
   a) 0.3% b) 0.2%
   c) 0.12% d) 0.15%

6) The radial shear in case of circular water tank is given by _____ with usual notations.
   a) Qr = qr/2 b) Qr = 1.5 qr/2
   c) Qr = qr/3 d) Qr = 1.5qr/3

7) The thickness of simply supported circular slab is taken as _____.
   a) 1/15 to 1/20th radius of slab b) 1/10 to 1/15th radius of slab
   c) 1/20 to 1/25th radius of slab d) none of these

8) For simply supported circular slab, if the total factored super imposed load inclusive of self weight is 11.625KN/m^2, then the circumferential moment is _____ KNm

a) 19.62 b) 20.62
c) 18.62 d) 18.672

9) As per IS the permissible shear stress in concrete in case of combined footing is given by _____.

a) 0.25 $(f_{ck})^{1/2}$ b) 0.36$(f_{ck})^{1/2}$
c) 0.16 $(f_{ck})^{1/3}$ d) 0.16 $(f_{ck})^{1/2}$

10) Meridional thrust and circumferential force develops in case of _____ of water tanks.

a) domes b) cylindrical wall
c) base slab d) none of these

11) In approximate method of design of circular water tanks one can design the lower portion h as a cantilever _____.

a) H/3 or 1m whichever is more
b) H/4 or 1m whichever is more
c) H/4 or 1.5m whichever is more
d) H/3 or 1.2m whichever is more

12) Hoop tension in case of circular water tanks is given by formula _____.

a) wHD/2 b) wHD/3
c) wHD/4 d) none of these

13) The minimum free board in case of water tanks is approximately taken as

a) 200mm b) 450mm
c) 750mm d) 500mm

14) The maximum deflection coefficient for fixed circular slab at center is

a) 3/64 b) 1/64
c) 5/64 d) 2/64

Seat No.	

Set **P**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Attempt any two questions from each section.
2) Figures to the right indicate full marks.

Section – I

Q.2 Design interior panel of flat slab floor system for a ware house 24 m X 24m divided into panel of 6m X 6m. **14**
Loading class = 5KN/m^2
Material M20 gade of concrete and Fe415 grade of steel
Column size 400mm diameter
Sketch the reinforcement details in an interior panel of flat slab.

Q.3 Design a combined footing to support two columns of size 300mm X 300mm and 400mm X 400mm carrying 800KN and 1200 KN loads respectively. These columns are located 3.6m apart and column carrying 800 KN is flush with the property line. Assume SBC of 200KN/m^2. Assume M20 grade of concrete Fe 415 grade of steel. **14**

Q.4 An RC column of size 500mm X 500mm is supported on four piles of 300mm diameter (bored cast in situ piles). The column carries a load of 1000KN, a moment of 300KNm in x-x direction, and a sheer force of 50 KN on top of the pile. Design pile cap assuming M25 grade of concrete and Fe 415 grade of steel. Further, assume that the piles are capable of resisting the reaction from the pile cap. **14**

Section – II

Q.5 Design a flat bottom elevated water tank of diameter 9.5m and total height 4m which is supported by ring beam of 7m diameter. The ring beam is to be supported by six columns equally placed. Use M25 grade of concrete and Fe415 grade of steel. Design following components of the water tank **14**
a) cylindrical wall
b) bottom slab

Q.6 Design an open water tank of size 4m X 9m X 4m deep resting on firm ground. Use M25 grade of concrete and Fe415 grade of steel. Approximate method may be used for the analysis. **14**

Q.7 Design a underground water tank for the following data: **14**
a) capacity of tank =75000 lit
b) density of soil =16KN/m^3
c) angle of repose =30°
d) grade of concrete = M25
e) grade of steel = Fe415
f) unit weight of water = 9.8 KN/m^3
g) live load on roof slab =2 KN/m^2

Seat No.	

Set **Q**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Use of IS Codes are allowed
4) Assume suitable data if necessary and mention it clearly before the Solution.
5) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) For simply supported circular slab, if the total factored super imposed load inclusive of self weight is 11.625KN/m^2, then the circumferential moment is _____ KNm
   a) 19.62 b) 20.62
   c) 18.62 d) 18.672

2) As per IS the permissible shear stress in concrete in case of combined footing is given by _____.
   a) 0.25 $(f_{ck})^{1/2}$ b) 0.36$(f_{ck})^{1/2}$
   c) 0.16 $(f_{ck})^{1/3}$ d) 0.16 $(f_{ck})^{1/2}$

3) Meridional thrust and circumferential force develops in case of _____ of water tanks.
   a) domes b) cylindrical wall
   c) base slab d) none of these

4) In approximate method of design of circular water tanks one can design the lower portion h as a cantilever _____.
   a) H/3 or 1m whichever is more
   b) H/4 or 1m whichever is more
   c) H/4 or 1.5m whichever is more
   d) H/3 or 1.2m whichever is more

5) Hoop tension in case of circular water tanks is given by formula _____.
   a) wHD/2 b) wHD/3
   c) wHD/4 d) none of these

6) The minimum free board in case of water tanks is approximately taken as
   a) 200mm b) 450mm
   c) 750mm d) 500mm

7) The maximum deflection coefficient for fixed circular slab at center is
   a) 3/64 b) 1/64
   c) 5/64 d) 2/64

8) The minimum percentage of reinforcements in case of water tanks having thickness more than 450 mm is _____.
   a) 0.3% b) 0.2%
   c) 0.12% d) 0.15%

9) Minimum spacing of end bearing piles as per IS 2911 is _____.
   a) 2.0 times the shaft diameter
   b) 2.5 times the shaft diameter
   c) 3.0 times the shaft diameter
   d) none of these

10) The spacing of the reinforcements in flat slab is restricted to _____.
   a) two times the slab depth
   b) three times the slab depth
   c) 300mm
   d) 450mm

11) As per IS the spacing of situ ribs in case of grid floors should not be more than _____.
   a) 1.5m b) 1.75m
   c) 1.0m d) 1.20m

12) The minimum percentage of reinforcements in case of base slab of water tanks
   a) 0.3% b) 0.2%
   c) 0.12% d) 0.15%

13) The radial shear in case of circular water tank is given by _____ with usual notations.
   a) Qr = qr/2 b) Qr = 1.5 qr/2
   c) Qr = qr/3 d) Qr = 1.5qr/3

14) The thickness of simply supported circular slab is taken as _____.
   a) 1/15 to 1/20th radius of slab b) 1/10 to 1/15th radius of slab
   c) 1/20 to 1/25th radius of slab d) none of these

Seat No.	

Set **Q**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Attempt any two questions from each section.
2) Figures to the right indicate full marks.

Section – I

Q.2 Design interior panel of flat slab floor system for a ware house 24 m X 24m divided into panel of 6m X 6m. **14**
Loading class = 5KN/m^2
Material M20 gade of concrete and Fe415 grade of steel
Column size 400mm diameter
Sketch the reinforcement details in an interior panel of flat slab.

Q.3 Design a combined footing to support two columns of size 300mm X 300mm and 400mm X 400mm carrying 800KN and 1200 KN loads respectively. These columns are located 3.6m apart and column carrying 800 KN is flush with the property line. Assume SBC of 200KN/m^2. Assume M20 grade of concrete Fe 415 grade of steel. **14**

Q.4 An RC column of size 500mm X 500mm is supported on four piles of 300mm diameter (bored cast in situ piles). The column carries a load of 1000KN, a moment of 300KNm in x-x direction, and a sheer force of 50 KN on top of the pile. Design pile cap assuming M25 grade of concrete and Fe 415 grade of steel. Further, assume that the piles are capable of resisting the reaction from the pile cap. **14**

Section – II

Q.5 Design a flat bottom elevated water tank of diameter 9.5m and total height 4m which is supported by ring beam of 7m diameter. The ring beam is to be supported by six columns equally placed. Use M25 grade of concrete and Fe415 grade of steel. Design following components of the water tank **14**
a) cylindrical wall
b) bottom slab

Q.6 Design an open water tank of size 4m X 9m X 4m deep resting on firm ground. Use M25 grade of concrete and Fe415 grade of steel. Approximate method may be used for the analysis. **14**

Q.7 Design a underground water tank for the following data: **14**
a) capacity of tank =75000 lit
b) density of soil =16KN/m^3
c) angle of repose =30°
d) grade of concrete = M25
e) grade of steel = Fe415
f) unit weight of water = 9.8 KN/m^3
g) live load on roof slab =2 KN/m^2

Seat No.	

Set **R**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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3) Use of IS Codes are allowed
4) Assume suitable data if necessary and mention it clearly before the Solution.
5) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) The minimum percentage of reinforcements in case of base slab of water tanks
   a) 0.3% b) 0.2%
   c) 0.12% d) 0.15%

2) The radial shear in case of circular water tank is given by _____ with usual notations.
   a) Qr = qr/2 b) Qr = 1.5 qr/2
   c) Qr = qr/3 d) Qr = 1.5qr/3

3) The thickness of simply supported circular slab is taken as _____.
   a) 1/15 to 1/20th radius of slab b) 1/10 to 1/15th radius of slab
   c) 1/20 to 1/25th radius of slab d) none of these

4) For simply supported circular slab, if the total factored super imposed load inclusive of self weight is 11.625KN/m^2, then the circumferential moment is _____ KNm
   a) 19.62 b) 20.62
   c) 18.62 d) 18.672

5) As per IS the permissible shear stress in concrete in case of combined footing is given by _____.
   a) 0.25 $(f_{ck})^{1/2}$ b) 0.36$(f_{ck})^{1/2}$
   c) 0.16 $(f_{ck})^{1/3}$ d) 0.16 $(f_{ck})^{1/2}$

6) Meridional thrust and circumferential force develops in case of _____ of water tanks.
   a) domes b) cylindrical wall
   c) base slab d) none of these

7) In approximate method of design of circular water tanks one can design the lower portion h as a cantilever _____.
   a) H/3 or 1m whichever is more
   b) H/4 or 1m whichever is more
   c) H/4 or 1.5m whichever is more
   d) H/3 or 1.2m whichever is more

8) Hoop tension in case of circular water tanks is given by formula _____.
   a) wHD/2 b) wHD/3
   c) wHD/4 d) none of these

9) The minimum free board in case of water tanks is approximately taken as
   a) 200mm b) 450mm
   c) 750mm d) 500mm

10) The maximum deflection coefficient for fixed circular slab at center is
   a) 3/64 b) 1/64
   c) 5/64 d) 2/64

11) The minimum percentage of reinforcements in case of water tanks having thickness more than 450 mm is _____.
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12) Minimum spacing of end bearing piles as per IS 2911 is _____.
   a) 2.0 times the shaft diameter
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   c) 3.0 times the shaft diameter
   d) none of these

13) The spacing of the reinforcements in flat slab is restricted to _____.
   a) two times the slab depth
   b) three times the slab depth
   c) 300mm
   d) 450mm

14) As per IS the spacing of situ ribs in case of grid floors should not be more than _____.
   a) 1.5m b) 1.75m
   c) 1.0m d) 1.20m

Seat No.	

Set **R**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Attempt any two questions from each section.
2) Figures to the right indicate full marks.

Section – I

Q.2 Design interior panel of flat slab floor system for a ware house 24 m X 24m divided into panel of 6m X 6m. **14**
Loading class = 5KN/m^2
Material M20 gade of concrete and Fe415 grade of steel
Column size 400mm diameter
Sketch the reinforcement details in an interior panel of flat slab.

Q.3 Design a combined footing to support two columns of size 300mm X 300mm and 400mm X 400mm carrying 800KN and 1200 KN loads respectively. These columns are located 3.6m apart and column carrying 800 KN is flush with the property line. Assume SBC of 200KN/m^2. Assume M20 grade of concrete Fe 415 grade of steel. **14**

Q.4 An RC column of size 500mm X 500mm is supported on four piles of 300mm diameter (bored cast in situ piles). The column carries a load of 1000KN, a moment of 300KNm in x-x direction, and a sheer force of 50 KN on top of the pile. Design pile cap assuming M25 grade of concrete and Fe 415 grade of steel. Further, assume that the piles are capable of resisting the reaction from the pile cap. **14**

Section – II

Q.5 Design a flat bottom elevated water tank of diameter 9.5m and total height 4m which is supported by ring beam of 7m diameter. The ring beam is to be supported by six columns equally placed. Use M25 grade of concrete and Fe415 grade of steel. Design following components of the water tank **14**
a) cylindrical wall
b) bottom slab

Q.6 Design an open water tank of size 4m X 9m X 4m deep resting on firm ground. Use M25 grade of concrete and Fe415 grade of steel. Approximate method may be used for the analysis. **14**

Q.7 Design a underground water tank for the following data: **14**
a) capacity of tank =75000 lit
b) density of soil =16KN/m^3
c) angle of repose =30°
d) grade of concrete = M25
e) grade of steel = Fe415
f) unit weight of water = 9.8 KN/m^3
g) live load on roof slab =2 KN/m^2

Seat No.	

Set **S**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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3) Use of IS Codes are allowed
4) Assume suitable data if necessary and mention it clearly before the Solution.
5) Draw the appropriate sketches whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Meridional thrust and circumferential force develops in case of _____ of water tanks.
   a) domes b) cylindrical wall
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2) In approximate method of design of circular water tanks one can design the lower portion h as a cantilever _____.
   a) H/3 or 1m whichever is more
   b) H/4 or 1m whichever is more
   c) H/4 or 1.5m whichever is more
   d) H/3 or 1.2m whichever is more

3) Hoop tension in case of circular water tanks is given by formula _____.
   a) wHD/2 b) wHD/3
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4) The minimum free board in case of water tanks is approximately taken as
   a) 200mm b) 450mm
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5) The maximum deflection coefficient for fixed circular slab at center is
   a) 3/64 b) 1/64
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6) The minimum percentage of reinforcements in case of water tanks having thickness more than 450 mm is _____.
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   a) 2.0 times the shaft diameter
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8) The spacing of the reinforcements in flat slab is restricted to _____.
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   c) 1.0m d) 1.20m

10) The minimum percentage of reinforcements in case of base slab of water tanks
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11) The radial shear in case of circular water tank is given by _____ with usual notations.
   a) Qr = qr/2 b) Qr = 1.5 qr/2
   c) Qr = qr/3 d) Qr = 1.5qr/3

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   a) 1/15 to 1/20th radius of slab b) 1/10 to 1/15th radius of slab
   c) 1/20 to 1/25th radius of slab d) none of these

13) For simply supported circular slab, if the total factored super imposed load inclusive of self weight is 11.625KN/m^2, then the circumferential moment is _____ KNm
   a) 19.62 b) 20.62
   c) 18.62 d) 18.672

14) As per IS the permissible shear stress in concrete in case of combined footing is given by _____.
   a) 0.25 $(f_{ck})^{1/2}$ b) 0.36$(f_{ck})^{1/2}$
   c) 0.16 $(f_{ck})^{1/3}$ d) 0.16 $(f_{ck})^{1/2}$

SLR-FM-83

Seat No.	

Set S

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
ADVANCED DESIGN OF CONCRETE STRUCTURES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Attempt any two questions from each section.
2) Figures to the right indicate full marks.

Section – I

Q.2 Design interior panel of flat slab floor system for a ware house 24 m X 24m divided into panel of 6m X 6m. **14**
Loading class = 5KN/m^2
Material M20 gade of concrete and Fe415 grade of steel
Column size 400mm diameter
Sketch the reinforcement details in an interior panel of flat slab.

Q.3 Design a combined footing to support two columns of size 300mm X 300mm and 400mm X 400mm carrying 800KN and 1200 KN loads respectively. These columns are located 3.6m apart and column carrying 800 KN is flush with the property line. Assume SBC of 200KN/m^2. Assume M20 grade of concrete Fe 415 grade of steel. **14**

Q.4 An RC column of size 500mm X 500mm is supported on four piles of 300mm diameter (bored cast in situ piles). The column carries a load of 1000KN, a moment of 300KNm in x-x direction, and a sheer force of 50 KN on top of the pile. Design pile cap assuming M25 grade of concrete and Fe 415 grade of steel. Further, assume that the piles are capable of resisting the reaction from the pile cap. **14**

Section – II

Q.5 Design a flat bottom elevated water tank of diameter 9.5m and total height 4m which is supported by ring beam of 7m diameter. The ring beam is to be supported by six columns equally placed. Use M25 grade of concrete and Fe415 grade of steel. Design following components of the water tank **14**
a) cylindrical wall
b) bottom slab

Q.6 Design an open water tank of size 4m X 9m X 4m deep resting on firm ground. Use M25 grade of concrete and Fe415 grade of steel. Approximate method may be used for the analysis. **14**

Q.7 Design a underground water tank for the following data: **14**
a) capacity of tank =75000 lit
b) density of soil =16KN/m^3
c) angle of repose =30°
d) grade of concrete = M25
e) grade of steel = Fe415
f) unit weight of water = 9.8 KN/m^3
g) live load on roof slab =2 KN/m^2

SLR-FM-84

Seat No.	

Set P

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Identify the INCORRECT option.
   a) “Measure” involves collection of data relating to quality, cost, throughput time etc.
   b) “Analyze” uses data collected from previous step to understand cause-and-effect relationship and to identify sources of variability
   c) "Define" imposes creative thinking to about the specific change that can be made in the process.
   d) “Control” completes all remaining project and to hand off the improved process to the owner along with a process control plan.

2) Six sigma implementations can be divided into three generations. Which of the following option is INCORRECT?
   a) The first generation focused on defect elimination and variability reduction
   b) Second generation mainly focused on integrating the above with improved business performance through cost reduction.
   c) Third generation is marked by focus on creating value throughout the organization and for its stakeholders.
   d) All options are FALSE

3) Improving quality through small, incremental improvements is a characteristic of what type of quality management system?
   a) Just-in-time b) Six Sigma
   c) Kaizen d) Total Quality Management

4) The following is (are) the type(s) of flow process chart: Man type, Material type, Equipment type. The correct answer is: _____.
   a) All of these b) Material and Equipment type
   c) Man and Material type d) Only man type

5) Work study is most useful in _____.
   a) improving industrial relations
   b) Where production activities are involved
   c) In judging the rating of machines
   d) In judging the output of a man and improving it

6) Work study is also recognized as _____.
   a) Both Time and motion study b) None of these
   c) Motion study d) Time study

7) In process charts, the symbol used for storage is _____.
   a) Square b) Triangle
   c) Arrow d) Circle

8) In process charts, the symbol used for inspection is _____.
   a) Circle b) Arrow
   c) Square d) Triangle

9) The correct order of procedure in method study is _____.
   a) Select - Record - Examine - Develop - Define - Install - Maintain
   b) Select - Record - Examine - Define - Develop - Install - Maintain
   c) Select - Define - Examine - Develop - Record - Install - Maintain
   d) Select - Record - Develop - Examine - Define - Install - Maintain

10) Analysis of Therbligs is most closely related to _____.
   a) all of these b) motion study
   c) methods analysis d) work sampling

11) A _____ is based on film analysis.
   a) Operation flow chart b) Outline process chart
   c) String diagram d) SIMO chart

12) In SIMO chart, the movements are recorded against time measured in _____.
   a) Winks b) Micro seconds
   c) Seconds d) Minutes

13) Functional analysis is _____ step of value engineering job plan.
   a) I b) II
   c) III d) IV

14) Aesthetic aspects of the product are majorly related to _____.
   a) Use value b) Esteem value
   c) Cost value d) Exchange value

Seat No.	

Set **P**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Explain advantages of Work study? **06**
b) State and explain the eight steps or procedures in Method study. **06**

Q.3 **a)** In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle time (in minutes)	Number of times observed
20	2
24	1
29	1
32	1

From the above statement**,**
1) Determine the standard time using the experienced industrial engineer's worker rating. **02**
2) Find the standard time using the worker rating of inexperienced industrial engineer. **02**

b) Explain recording techniques for the motion study. **04**

Q.4 **a)** Explain Total Quality Management. **04**
b) Explain 'KAIZEN'. **04**

Q.5 **a)** Explain 5S Techniques. **04**
b) Explain Contributions by Dr J. M. Juran **04**

Section – II

Q.6 **a)** State and explain Steps of work sampling procedure. **06**
b) An office worker wants to perform work sampling for task T. It was estimated that employees are idle 20% of the time. An office worker would like to take a work sample with accuracy of 4% desired confidence level of 95.45%. Assuming Z value as 2 for confidence level of 95.45%, calculate the number of samples required. **06**

Q.7 **a)** What are the objectives of value engineering and Value Analysis? **04**
b) Write a short note on Fault Tree Analysis (FTA). **04**

Q.8 **a)** Write a short note on Failure mode and effects analysis (FMEA). **04**
b) Discuss types of failures in reliability analysis. **04**

Q.9 **a)** Write a note on Techniques in Value Analysis. **04**

b) Three contractors A, B, and C are bidding for a project. A has half the chance that B has. B has two thirds as likely as C for the award of contract. What is the probability of each contractor, if only he gets the contract? **04**

SLR-FM-84

Seat No.	

Set Q

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) In process charts, the symbol used for inspection is _____.
   a) Circle b) Arrow
   c) Square d) Triangle

2) The correct order of procedure in method study is _____.
   a) Select - Record - Examine - Develop - Define - Install - Maintain
   b) Select - Record - Examine - Define - Develop - Install - Maintain
   c) Select - Define - Examine - Develop - Record - Install - Maintain
   d) Select - Record - Develop - Examine - Define - Install - Maintain

3) Analysis of Therbligs is most closely related to _____.
   a) all of these b) motion study
   c) methods analysis d) work sampling

4) A _____ is based on film analysis.
   a) Operation flow chart b) Outline process chart
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6) Functional analysis is _____ step of value engineering job plan.
   a) I b) II
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7) Aesthetic aspects of the product are majorly related to _____.
   a) Use value b) Esteem value
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8) Identify the INCORRECT option.
   a) “Measure” involves collection of data relating to quality, cost, throughput time etc.
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   c) Man and Material type
   d) Only man type

12) Work study is most useful in _____.
   a) improving industrial relations
   b) Where production activities are involved
   c) In judging the rating of machines
   d) In judging the output of a man and improving it

13) Work study is also recognized as _____.
   a) Both Time and motion study
   b) None of these
   c) Motion study
   d) Time study

14) In process charts, the symbol used for storage is _____.
   a) Square
   b) Triangle
   c) Arrow
   d) Circle

Seat No.	

Set **Q**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Explain advantages of Work study? **06**
b) State and explain the eight steps or procedures in Method study. **06**

Q.3 **a)** In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle time (in minutes)	Number of times observed
20	2
24	1
29	1
32	1

From the above statement**,**
1) Determine the standard time using the experienced industrial engineer's worker rating. **02**
2) Find the standard time using the worker rating of inexperienced industrial engineer. **02**

b) Explain recording techniques for the motion study. **04**

Q.4 **a)** Explain Total Quality Management. **04**
b) Explain 'KAIZEN'. **04**

Q.5 **a)** Explain 5S Techniques. **04**
b) Explain Contributions by Dr J. M. Juran **04**

Section – II

Q.6 **a)** State and explain Steps of work sampling procedure. **06**
b) An office worker wants to perform work sampling for task T. It was estimated that employees are idle 20% of the time. An office worker would like to take a work sample with accuracy of 4% desired confidence level of 95.45%. Assuming Z value as 2 for confidence level of 95.45%, calculate the number of samples required. **06**

Q.7 **a)** What are the objectives of value engineering and Value Analysis? **04**
b) Write a short note on Fault Tree Analysis (FTA). **04**

Q.8 **a)** Write a short note on Failure mode and effects analysis (FMEA). **04**
b) Discuss types of failures in reliability analysis. **04**

Q.9 **a)** Write a note on Techniques in Value Analysis. **04**

b) Three contractors A, B, and C are bidding for a project. A has half the chance that B has. B has two thirds as likely as C for the award of contract. What is the probability of each contractor, if only he gets the contract? **04**

Seat No.	

Set **R**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Work study is most useful in _____.
   a) improving industrial relations
   b) Where production activities are involved
   c) In judging the rating of machines
   d) In judging the output of a man and improving it

2) Work study is also recognized as _____.
   a) Both Time and motion study b) None of these
   c) Motion study d) Time study

3) In process charts, the symbol used for storage is _____.
   a) Square b) Triangle
   c) Arrow d) Circle

4) In process charts, the symbol used for inspection is _____.
   a) Circle b) Arrow
   c) Square d) Triangle

5) The correct order of procedure in method study is _____.
   a) Select - Record - Examine - Develop - Define - Install - Maintain
   b) Select - Record - Examine - Define - Develop - Install - Maintain
   c) Select - Define - Examine - Develop - Record - Install - Maintain
   d) Select - Record - Develop - Examine - Define - Install - Maintain

6) Analysis of Therbligs is most closely related to _____.
   a) all of these b) motion study
   c) methods analysis d) work sampling

7) A _____ is based on film analysis.
   a) Operation flow chart b) Outline process chart
   c) String diagram d) SIMO chart

8) In SIMO chart, the movements are recorded against time measured in _____.
   a) Winks b) Micro seconds
   c) Seconds d) Minutes

9) Functional analysis is _____ step of value engineering job plan.
   a) I b) II
   c) III d) IV

10) Aesthetic aspects of the product are majorly related to _____.
   a) Use value
   b) Esteem value
   c) Cost value
   d) Exchange value

11) Identify the INCORRECT option.
   a) “Measure” involves collection of data relating to quality, cost, throughput time etc.
   b) “Analyze” uses data collected from previous step to understand cause-and-effect relationship and to identify sources of variability
   c) "Define" imposes creative thinking to about the specific change that can be made in the process.
   d) “Control” completes all remaining project and to hand off the improved process to the owner along with a process control plan.

12) Six sigma implementations can be divided into three generations. Which of the following option is INCORRECT?
   a) The first generation focused on defect elimination and variability reduction
   b) Second generation mainly focused on integrating the above with improved business performance through cost reduction.
   c) Third generation is marked by focus on creating value throughout the organization and for its stakeholders.
   d) All options are FALSE

13) Improving quality through small, incremental improvements is a characteristic of what type of quality management system?
   a) Just-in-time
   b) Six Sigma
   c) Kaizen
   d) Total Quality Management

14) The following is (are) the type(s) of flow process chart: Man type, Material type, Equipment type. The correct answer is: _____.
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   b) Material and Equipment type
   c) Man and Material type
   d) Only man type

Seat No.	

Set **R**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Explain advantages of Work study? **06**
b) State and explain the eight steps or procedures in Method study. **06**

Q.3 **a)** In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle time (in minutes)	Number of times observed
20	2
24	1
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From the above statement**,**
1) Determine the standard time using the experienced industrial engineer's worker rating. **02**
2) Find the standard time using the worker rating of inexperienced industrial engineer. **02**

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Q.4 **a)** Explain Total Quality Management. **04**
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Q.5 **a)** Explain 5S Techniques. **04**
b) Explain Contributions by Dr J. M. Juran **04**

Section – II

Q.6 **a)** State and explain Steps of work sampling procedure. **06**
b) An office worker wants to perform work sampling for task T. It was estimated that employees are idle 20% of the time. An office worker would like to take a work sample with accuracy of 4% desired confidence level of 95.45%. Assuming Z value as 2 for confidence level of 95.45%, calculate the number of samples required. **06**

Q.7 **a)** What are the objectives of value engineering and Value Analysis? **04**
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Q.8 **a)** Write a short note on Failure mode and effects analysis (FMEA). **04**
b) Discuss types of failures in reliability analysis. **04**

Q.9 **a)** Write a note on Techniques in Value Analysis. **04**

b) Three contractors A, B, and C are bidding for a project. A has half the chance that B has. B has two thirds as likely as C for the award of contract. What is the probability of each contractor, if only he gets the contract? **04**

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Seat No.		Set	S

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

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   c) methods analysis d) work sampling

2) A _____ is based on film analysis.
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4) Functional analysis is _____ step of value engineering job plan.
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   a) “Measure” involves collection of data relating to quality, cost, throughput time etc.
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   d) Only man type

10) Work study is most useful in _____.
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12) In process charts, the symbol used for storage is _____.
   a) Square
   b) Triangle
   c) Arrow
   d) Circle

13) In process charts, the symbol used for inspection is _____.
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   b) Arrow
   c) Square
   d) Triangle

14) The correct order of procedure in method study is _____.
   a) Select - Record - Examine - Develop - Define - Install - Maintain
   b) Select - Record - Examine - Define - Develop - Install - Maintain
   c) Select - Define - Examine - Develop - Record - Install - Maintain
   d) Select - Record - Develop - Examine - Define - Install - Maintain

Seat No.	

Set **S**

B.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019
Civil Engineering
MANAGERIAL TECHNIQUES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 and Q. No. 6 are compulsory.
2) Solve any two questions from each section.
3) Figures to the right indicate full marks.

Section – I

Q.2 **a)** Explain advantages of Work study? **06**
b) State and explain the eight steps or procedures in Method study. **06**

Q.3 **a)** In a welding shop, a direct time study was done on a welding operation. One inexperienced industrial engineer and one experienced industrial engineer conducted the study simultaneously. They agreed precisely on cycle time but their opinion on rating the worker differed. The experienced engineer rated the worker 100% and the other engineer rated the worker 120%. They used a 10% allowance.

Cycle time (in minutes)	Number of times observed
20	2
24	1
29	1
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From the above statement**,**
1) Determine the standard time using the experienced industrial engineer's worker rating. **02**
2) Find the standard time using the worker rating of inexperienced industrial engineer. **02**

b) Explain recording techniques for the motion study. **04**

Q.4 **a)** Explain Total Quality Management. **04**
b) Explain 'KAIZEN'. **04**

Q.5 **a)** Explain 5S Techniques. **04**
b) Explain Contributions by Dr J. M. Juran **04**

Section – II

Q.6 **a)** State and explain Steps of work sampling procedure. **06**
b) An office worker wants to perform work sampling for task T. It was estimated that employees are idle 20% of the time. An office worker would like to take a work sample with accuracy of 4% desired confidence level of 95.45%. Assuming Z value as 2 for confidence level of 95.45%, calculate the number of samples required. **06**

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Q.8 **a)** Write a short note on Failure mode and effects analysis (FMEA). **04**
b) Discuss types of failures in reliability analysis. **04**

Q.9 **a)** Write a note on Techniques in Value Analysis. **04**

b) Three contractors A, B, and C are bidding for a project. A has half the chance that B has. B has two thirds as likely as C for the award of contract. What is the probability of each contractor, if only he gets the contract? **04**

SLR-FM-89

Seat No.	

Set P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Write the correct option for each question.
3) While solving MCQ IS 456-2000, IS 3370 and IS 1343 are not allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In water tank, for Fe_{500} the permissible tensile stress is _____. **01**
   a) 125 N/mm^2 b) 150 N/mm^2
   c) 130 N/mm^2 d) 190 N/mm^2

2) The horizontal portion of a step in a stairs case, is known as _____. **01**
   a) Rise b) Tread
   c) Winder d) Flight

3) The minimum width of stem slab at bottom is _____ for cantilever retaining wall. **01**
   a) H/15 b) H/12
   c) H/18 d) H/20

4) After pre-stressing process is completed, a loss of stress is due to _____. **01**
   a) Shrinkage of concrete b) Creep of Concrete
   c) Elastic shortening of concrete d) All of above

5) The loss of stress due to curvature effect depends upon _____. **01**
   a) Alignment b) Midpoint
   c) Centerline d) Exterior point

6) 'P' is the pre-stressed force applied to tendon of a rectangular pre-stressed beam whose area of cross section is (A) and sectional modulus is (Z). The minimum stress on the beam subjected to a maximum bending moment is _____. **01**
   a) f = (P/A) - (Z/M) b) f = (A/P) - (M/Z)
   c) f = (P/A) - (M/Z) d) f = (P/A) - (M/6Z)

7) The stability of retaining wall is checked for which of the following condition? **01**
   a) Overturning about toe b) Overturning about heal
   c) Both of above d) None of these

8) The algebraic sum of bending moments due to prestress and external loads is called as _____. **01**
   a) Primary prestressing moment
   b) Secondary prestressing moment
   c) Resulting moment
   d) All of above

9) Find the area and the depth of foundation required for a column carrying on axial load of 1250kN. The safe bearing capacity of the soil is 120kN/m^2. The soil at the sight weighs 18 kN/m^3 and has an angle of repose of 30^o. **02**

a) 11.46 m^2, 0.74 m
b) 12.46 m^2, 0.75 m
c) 10 m^2, 0. 6 m
d) 11 m^2, 0.8 m

10) A concrete beam of rectangular cross section 200 mm x 400 mm is prestressed with a force of 400 kN at an eccentricity of 100 mm. The maximum compressive stress in the concrete is _____. **02**

a) 7.5 Mpa
b) 12.5 Mpa
c) 5 Mpa
d) 2.5 Mpa

11) The circular water tank having a capacity of 400000 liters and water depth 4 m including free board of 200 mm. Calculate the diameter of tank _____. **02**

a) 11.5m
b) 11.57 m
c) 12 m
d) 11.2m

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. II and Q. No. VI are compulsory.
2) Solve any two from Q. No. III to Q. No. V and Q. No. VII to Q. No. IX questions from each section.
3) Use of IS 456, IS 1343 and IS 3370 part IV and non programmable calculator are allowed.
4) Draw neat sketch's where required and Assume suitable data if required and state it clearly.

Section – I

Q.2 Design the dog-legged type staircase for a residential building using following data floor to floor height = 3.2 m, No. of flight per floor = 2, size of steps =175 mm riser and 250 mm tread, live load is 3 kN/m^2 and assume width of stair is 1.0 m. Use M_{20} concrete and Fe_{415} steel. The stair is supported at top and bottom risers by beam spanning parallel with risers at the landing slab on either side. **08**

Q.3 Design the stem slab of a cantilever retaining wall, if the overall height is 5.5m. SBC of soil is 200 kN/m^2, angle of repose of the soil is 30^0 and unit weight of soil 18 kN/m^2, super imposed load due to traffic is 12 kN/m^2, width of the slab base is 3.2 m, toe projection is 0.6 m. Use M_{25} concrete and Fe_{500} steel. **10**

Q.4 Design a circular water tank having capacity 500000 liters, resting on firm ground is free at top and bottom is fixed. Depth of water 3 m, assume free board of 300 mm and solve by IS code method. Use M_{25} concrete and Fe_{500} steel. **10**

Q.5 Design a rectangular footing for column axially loaded of size 230 mm × 550 mm carrying 1100 kN load. The SBC of soil is 180 kN/m^2. Use M_{20} concrete and Fe_{415} steel. Sketch the details of reinforcement. **10**

Section – II

Q.6 A prestressed concrete beam 250 mm x 750 mm is prestressed by a parabolic cable located at an eccentricity of 125mm at mid span and zero at the supports. If the beam has a span of 10 m and carries a uniformly distributed load of 6 kN/m, find the effective prestressing force necessary in the cable for zero shear stress in the beam. For this condition find the stress at mid span section. Concrete weighs at 25 kN/m^2. **08**

Q.7 A post tensioned concrete beam 250 mm x 400 mm has a span of 12m. The beam is prestressed by steel wires of area 350mm^2 provided at a uniform eccentricity of 60 mm with an initial prestress of 1150 N/mm^2. Determine the percentage loss of stress in the wires. Take E_s= 210 kN/mm^2, E_c= 35 kN/mm^2, Ultimate creep strain = 22 x 10^{-6}mm/mm per N/mm^2, Shrinkage of concrete = 215 x 10^{-6}, Relaxation of steel stress = 5% of the initial stress. Anchorage Slip = 1.25mm, Friction coefficient for wave effect K = 0.00015m. **10**

Q.8 Design PSC I section beam for the following span=18m, superimposed load of 38 kN/m, cube strength of concrete at 28 days is 35kN/m^2, safe stress in concrete at transfer= 0.5 fck, allowable tensile stress in concrete is 0.129√(fck), safe stress in steel is 60 % of ultimate stress, total loss of stress 18%, ultimate stress in steel 1400 MPa. **10**

Q.9 A prestressed concrete beam 400 mm wide and 800 mm deep. Determine the horizontal, vertical and shear stresses at the point Q(600,600), with bottom of the end block is origin. Find also the principal stresses at Q. the tendons are placed at an eccentricity of 100 mm. The anchor plate is 300 mm wide and 200 mm deep. The prestressing force is 1050 kN. **10**

Kz	Kq
-2.47	0.251

SLR-FM-89

Seat No.	

Set Q

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

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SLR-FM-89

Seat No.	

Set Q

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. II and Q. No. VI are compulsory.
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Section – I

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Q.3 Design the stem slab of a cantilever retaining wall, if the overall height is 5.5m. SBC of soil is 200 kN/m^2, angle of repose of the soil is 30^0 and unit weight of soil 18 kN/m^2, super imposed load due to traffic is 12 kN/m^2, width of the slab base is 3.2 m, toe projection is 0.6 m. Use M_{25} concrete and Fe_{500} steel. **10**

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Q.5 Design a rectangular footing for column axially loaded of size 230 mm × 550 mm carrying 1100 kN load. The SBC of soil is 180 kN/m^2. Use M_{20} concrete and Fe_{415} steel. Sketch the details of reinforcement. **10**

Section – II

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Q.7 A post tensioned concrete beam 250 mm x 400 mm has a span of 12m. The beam is prestressed by steel wires of area 350mm^2 provided at a uniform eccentricity of 60 mm with an initial prestress of 1150 N/mm^2. Determine the percentage loss of stress in the wires. Take E_s= 210 kN/mm^2, E_c= 35 kN/mm^2, Ultimate creep strain = 22 x 10^{-6}mm/mm per N/mm^2, Shrinkage of concrete = 215 x 10^{-6}, Relaxation of steel stress = 5% of the initial stress. Anchorage Slip = 1.25mm, Friction coefficient for wave effect K = 0.00015m. **10**

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Kz	Kq
-2.47	0.251

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Write the correct option for each question.
3) While solving MCQ IS 456-2000, IS 3370 and IS 1343 are not allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The minimum width of stem slab at bottom is _____ for cantilever retaining wall. **01**
   a) H/15 b) H/12
   c) H/18 d) H/20

2) After pre-stressing process is completed, a loss of stress is due to _____. **01**
   a) Shrinkage of concrete b) Creep of Concrete
   c) Elastic shortening of concrete d) All of above

3) The loss of stress due to curvature effect depends upon _____. **01**
   a) Alignment b) Midpoint
   c) Centerline d) Exterior point

4) 'P' is the pre-stressed force applied to tendon of a rectangular pre-stressed beam whose area of cross section is (A) and sectional modulus is (Z). The minimum stress on the beam subjected to a maximum bending moment is _____. **01**
   a) f = (P/A) - (Z/M) b) f = (A/P) - (M/Z)
   c) f = (P/A) - (M/Z) d) f = (P/A) - (M/6Z)

5) The stability of retaining wall is checked for which of the following condition? **01**
   a) Overturning about toe b) Overturning about heal
   c) Both of above d) None of these

6) The algebraic sum of bending moments due to prestress and external loads is called as _____. **01**
   a) Primary prestressing moment
   b) Secondary prestressing moment
   c) Resulting moment
   d) All of above

7) In water tank, for Fe_{500} the permissible tensile stress is _____. **01**
   a) 125 N/mm^2 b) 150 N/mm^2
   c) 130 N/mm^2 d) 190 N/mm^2

8) The horizontal portion of a step in a stairs case, is known as _____. **01**
   a) Rise b) Tread
   c) Winder d) Flight

9) The circular water tank having a capacity of 400000 liters and water depth 4 m including free board of 200 mm. Calculate the diameter of tank _____. **02**

a) 11.5m b) 11.57 m

c) 12 m d) 11.2m

10) Find the area and the depth of foundation required for a column carrying on axial load of 1250kN. The safe bearing capacity of the soil is 120kN/m^2. The soil at the sight weighs 18 kN/m^3 and has an angle of repose of 30^o. **02**

a) 11.46 m^2, 0.74 m b) 12.46 m^2, 0.75 m

c) 10 m^2, 0. 6 m d) 11 m^2, 0.8 m

11) A concrete beam of rectangular cross section 200 mm x 400 mm is prestressed with a force of 400 kN at an eccentricity of 100 mm. The maximum compressive stress in the concrete is _____. **02**

a) 7.5 Mpa b) 12.5 Mpa

c) 5 Mpa d) 2.5 Mpa

SLR-FM-89

Seat No.	

Set R

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. II and Q. No. VI are compulsory.
2) Solve any two from Q. No. III to Q. No. V and Q. No. VII to Q. No. IX questions from each section.
3) Use of IS 456, IS 1343 and IS 3370 part IV and non programmable calculator are allowed.
4) Draw neat sketch's where required and Assume suitable data if required and state it clearly.

Section – I

Q.2 Design the dog-legged type staircase for a residential building using following data floor to floor height = 3.2 m, No. of flight per floor = 2, size of steps =175 mm riser and 250 mm tread, live load is 3 kN/m^2 and assume width of stair is 1.0 m. Use M_{20} concrete and Fe_{415} steel. The stair is supported at top and bottom risers by beam spanning parallel with risers at the landing slab on either side. **08**

Q.3 Design the stem slab of a cantilever retaining wall, if the overall height is 5.5m. SBC of soil is 200 kN/m^2, angle of repose of the soil is 30^0 and unit weight of soil 18 kN/m^2, super imposed load due to traffic is 12 kN/m^2, width of the slab base is 3.2 m, toe projection is 0.6 m. Use M_{25} concrete and Fe_{500} steel. **10**

Q.4 Design a circular water tank having capacity 500000 liters, resting on firm ground is free at top and bottom is fixed. Depth of water 3 m, assume free board of 300 mm and solve by IS code method. Use M_{25} concrete and Fe_{500} steel. **10**

Q.5 Design a rectangular footing for column axially loaded of size 230 mm × 550 mm carrying 1100 kN load. The SBC of soil is 180 kN/m^2. Use M_{20} concrete and Fe_{415} steel. Sketch the details of reinforcement. **10**

Section – II

Q.6 A prestressed concrete beam 250 mm x 750 mm is prestressed by a parabolic cable located at an eccentricity of 125mm at mid span and zero at the supports. If the beam has a span of 10 m and carries a uniformly distributed load of 6 kN/m, find the effective prestressing force necessary in the cable for zero shear stress in the beam. For this condition find the stress at mid span section. Concrete weighs at 25 kN/m^2. **08**

Q.7 A post tensioned concrete beam 250 mm x 400 mm has a span of 12m. The beam is prestressed by steel wires of area 350mm^2 provided at a uniform eccentricity of 60 mm with an initial prestress of 1150 N/mm^2. Determine the percentage loss of stress in the wires. Take E_s= 210 kN/mm^2, E_c= 35 kN/mm^2, Ultimate creep strain = 22 x 10^{-6}mm/mm per N/mm^2, Shrinkage of concrete = 215 x 10^{-6}, Relaxation of steel stress = 5% of the initial stress. Anchorage Slip = 1.25mm, Friction coefficient for wave effect K = 0.00015m. **10**

Q.8 Design PSC I section beam for the following span=18m, superimposed load of 38 kN/m, cube strength of concrete at 28 days is 35kN/m^2, safe stress in concrete at transfer= 0.5 fck, allowable tensile stress in concrete is 0.129√(fck), safe stress in steel is 60 % of ultimate stress, total loss of stress 18%, ultimate stress in steel 1400 MPa. **10**

Q.9 A prestressed concrete beam 400 mm wide and 800 mm deep. Determine the horizontal, vertical and shear stresses at the point Q(600,600), with bottom of the end block is origin. Find also the principal stresses at Q. the tendons are placed at an eccentricity of 100 mm. The anchor plate is 300 mm wide and 200 mm deep. The prestressing force is 1050 kN. **10**

Kz	Kq
-2.47	0.251

SLR-FM-89

Seat No.	

Set S

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – II

Day & Date: Friday, 22-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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1) The stability of retaining wall is checked for which of the following condition? **01**
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c) 12 m
d) 11.2m

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF CONCRETE STRUCTURES – II

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. II and Q. No. VI are compulsory.
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4) Draw neat sketch's where required and Assume suitable data if required and state it clearly.

Section – I

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Q.3 Design the stem slab of a cantilever retaining wall, if the overall height is 5.5m. SBC of soil is 200 kN/m^2, angle of repose of the soil is 30^0 and unit weight of soil 18 kN/m^2, super imposed load due to traffic is 12 kN/m^2, width of the slab base is 3.2 m, toe projection is 0.6 m. Use M_{25} concrete and Fe_{500} steel. **10**

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Q.5 Design a rectangular footing for column axially loaded of size 230 mm × 550 mm carrying 1100 kN load. The SBC of soil is 180 kN/m^2. Use M_{20} concrete and Fe_{415} steel. Sketch the details of reinforcement. **10**

Section – II

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Kz	Kq
-2.47	0.251

SLR-FM-90

Seat No.	

Set P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) _____ aims to influence certain key vocational decisions while recognizing that there are many other things that can't and perhaps should not be decided at the outset.
   a) Structural Plan
   b) Comprehensive Plan
   c) Developmental Plan
   d) None of these

2) _____ means building houses along the routes of communications radiating from a human settlement.
   a) Satellite town b) Ribbon development
   c) Ekistics d) Neighburhood

3) A piece of land divided into more than 8 parcels, each of which is to be sold separately is called _____.
   a) Layout b) Subdivision of land
   c) Both 'a' and 'b' d) Neither 'a' nor 'b'

4) _____ zoning is intended to provide a reward-based system to encourage development that meets established urban development goals.
   a) Euclidean
   b) Performance
   c) Incentive
   d) Design-based

5) _____ Zoning regulates not the type of land use, but the form that land use may take.
   a) Euclidean
   b) Performance
   c) Incentive
   d) Form-based

6) With the classification of town planning, which types are not square or rectangular shaped?
   a) Dandaka b) Sarvatobhadra
   c) Karmuka d) Nandyavarka

7) The town should be divided into different _____ so that suitable rules and regulations can be framed for each of them.
   a) Planning division
   b) Planning Units
   c) Sectors
   d) Land use zones

8) Ekistics is the science dealing with _____.
   a) Synthesizing factor affecting human settlement
   b) Using natural elements in planning
   c) Socioeconomic study
   d) Diagnostic survey

9) A prefab construction material consisting of hollow EPS foam blocks that are stacked and glued together on-site, creating the form that is filled with reinforcing bars and concrete.
   a) Structural insulated panels (SIPs)
   b) Insulating concrete forms (ICFS)
   c) Steel framing
   d) Concrete framing

10) Developmental Plan involves _____.
   a) plan that singles out for attention of certain aspect of the environment, usually the land uses, the main movement systems and the location of critical facilities and buildings
   b) plan seeks to combine in one document the prescriptions for all aspects of city development
   c) a plan for the development or redevelopment or improvement of the area within the jurisdiction of a planning authority.
   d) all the above

11) General land use planning deals with _____.
   a) Residential
   b) Institutional
   c) Forests
   d) Commercial

12) Which of the following is not an excavating equipment?
   a) Power Shovel
   b) Back Hoe
   c) Scrapper
   d) Dragline

13) _____ is used to level the ground and spreads the loose material.
   a) Excavator
   b) Grader
   c) Scraper
   d) None of these

14) _____ type of excavator is used for digging below, at or above operating level in a vertical range.
   a) Skimmer
   b) Clamshell
   c) Dragline
   d) Back trench

SLR-FM-90

Seat No.	

Set P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question no.2 and Question no.6 is compulsory.
2) Attempt any two out of Q.3 to Q.5. Attempt any two out of Q.7 to Q.9.
2) Figures to right indicate full marks.

Section – I

Q.2 Explain with suitable sketches. **12**
a) Necessity of Town Planning
b) Planning of Chandigarh town

Q.3 Write detailed note on. **08**
a) necessity of Land acquisition
b) Neighburhood unit planning

Q.4 Explain **08**
a) Types of Surveys for town planning.
b) Planning for the Village.

Q.5 Write detailed note on. **08**
a) Growth pattern of towns
b) Town aesthetics

Section – II

Q.6 Explain with suitable sketches. **12**
a) Power Shovel
b) Clamshell

Q.7 Write detailed note on. **08**
a) Mechanized construction
b) Cycle time calculation for scraper

Q.8 Explain **08**
a) Types of hoisting equipments
b) Precast construction

Q.9 Write detailed note on. **08**
a) Floating and dredging equipment
b) Safety measures in construction

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Ekistics is the science dealing with _____.
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   b) Using natural elements in planning
   c) Socioeconomic study
   d) Diagnostic survey

2) A prefab construction material consisting of hollow EPS foam blocks that are stacked and glued together on-site, creating the form that is filled with reinforcing bars and concrete.
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6) _____ is used to level the ground and spreads the loose material.
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   d) None of these

9) _____ means building houses along the routes of communications radiating from a human settlement.
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10) A piece of land divided into more than 8 parcels, each of which is to be sold separately is called _____.
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11) _____ zoning is intended to provide a reward-based system to encourage development that meets established urban development goals.
   a) Euclidean
   b) Performance
   c) Incentive
   d) Design-based

12) _____ Zoning regulates not the type of land use, but the form that land use may take.
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14) The town should be divided into different _____ so that suitable rules and regulations can be framed for each of them.
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   b) Planning Units
   c) Sectors
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Seat No.	

Set Q

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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Section – I

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b) Planning for the Village.

Q.5 Write detailed note on. **08**
a) Growth pattern of towns
b) Town aesthetics

Section – II

Q.6 Explain with suitable sketches. **12**
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Q.7 Write detailed note on. **08**
a) Mechanized construction
b) Cycle time calculation for scraper

Q.8 Explain **08**
a) Types of hoisting equipments
b) Precast construction

Q.9 Write detailed note on. **08**
a) Floating and dredging equipment
b) Safety measures in construction

SLR-FM-90

Seat No.	

Set R

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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SLR-FM-90

Seat No.	

Set R

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

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Section – I

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Section – II

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Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day & Date: Saturday, 23-11-2019 Max. Marks: 70
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Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Developmental Plan involves _____.
   a) plan that singles out for attention of certain aspect of the environment, usually the land uses, the main movement systems and the location of critical facilities and buildings
   b) plan seeks to combine in one document the prescriptions for all aspects of city development
   c) a plan for the development or redevelopment or improvement of the area within the jurisdiction of a planning authority.
   d) all the above

2) General land use planning deals with _____.
   a) Residential
   b) Institutional
   c) Forests
   d) Commercial

3) Which of the following is not an excavating equipment?
   a) Power Shovel
   b) Back Hoe
   c) Scrapper
   d) Dragline

4) _____ is used to level the ground and spreads the loose material.
   a) Excavator b) Grader
   c) Scraper d) None of these

5) _____ type of excavator is used for digging below, at or above operating level in a vertical range.
   a) Skimmer b) Clamshell
   c) Dragline d) Back trench

6) _____ aims to influence certain key vocational decisions while recognizing that there are many other things that can't and perhaps should not be decided at the outset.
   a) Structural Plan
   b) Comprehensive Plan
   c) Developmental Plan
   d) None of these

7) _____ means building houses along the routes of communications radiating from a human settlement.
   a) Satellite town
   b) Ribbon development
   c) Ekistics
   d) Neighburhood

8) A piece of land divided into more than 8 parcels, each of which is to be sold separately is called _____.
   a) Layout
   b) Subdivision of land
   c) Both ‘a’ and ‘b’
   d) Neither ‘a’ nor ‘b’

9) _____ zoning is intended to provide a reward-based system to encourage development that meets established urban development goals.
   a) Euclidean
   b) Performance
   c) Incentive
   d) Design-based

10) _____ Zoning regulates not the type of land use, but the form that land use may take.
   a) Euclidean
   b) Performance
   c) Incentive
   d) Form-based

11) With the classification of town planning, which types are not square or rectangular shaped?
   a) Dandaka
   b) Sarvatobhadra
   c) Karmuka
   d) Nandyavarka

12) The town should be divided into different _____ so that suitable rules and regulations can be framed for each of them.
   a) Planning division
   b) Planning Units
   c) Sectors
   d) Land use zones

13) Ekistics is the science dealing with _____.
   a) Synthesizing factor affecting human settlement
   b) Using natural elements in planning
   c) Socioeconomic study
   d) Diagnostic survey

14) A prefab construction material consisting of hollow EPS foam blocks that are stacked and glued together on-site, creating the form that is filled with reinforcing bars and concrete.
   a) Structural insulated panels (SIPs)
   b) Insulating concrete forms (ICFS)
   c) Steel framing
   d) Concrete framing

SLR-FM-90

Seat No.	

Set S

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question no.2 and Question no.6 is compulsory.
2) Attempt any two out of Q.3 to Q.5. Attempt any two out of Q.7 to Q.9.
2) Figures to right indicate full marks.

Section – I

Q.2 Explain with suitable sketches. **12**
a) Necessity of Town Planning
b) Planning of Chandigarh town

Q.3 Write detailed note on. **08**
a) necessity of Land acquisition
b) Neighburhood unit planning

Q.4 Explain **08**
a) Types of Surveys for town planning.
b) Planning for the Village.

Q.5 Write detailed note on. **08**
a) Growth pattern of towns
b) Town aesthetics

Section – II

Q.6 Explain with suitable sketches. **12**
a) Power Shovel
b) Clamshell

Q.7 Write detailed note on. **08**
a) Mechanized construction
b) Cycle time calculation for scraper

Q.8 Explain **08**
a) Types of hoisting equipments
b) Precast construction

Q.9 Write detailed note on. **08**
a) Floating and dredging equipment
b) Safety measures in construction

SLR-FM-92

Seat No.	

Set P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GROUND IMPROVEMENT TECHNIQUES

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
3) Figures to the right indicate full marks.
4) Illustrate your answer with suitable sketch for theory questions.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In case of physical and chemical modification soil is _____.
   a) preloaded
   b) admixtures are added to soil
   c) soil is reinforced
   d) none of these

2) Roller most suitable for compacting sandy soil is _____.
   a) Vibratory roller b) Smooth wheel roller
   c) Pneumatic tired roller d) Sheep foot roller

3) Quality of compaction in the field is considered to be good if _____.
   a) OMC is less and MDD is large
   b) OMC is large and MDD is less
   c) ZAV line is close to peak point of compaction curve
   d) ZAV line is far away from peak point of compaction curve

4) In case of modified compaction test soil sample is compacted in _____.
   a) single layer b) 2 layer
   c) 3 layers d) 5 layer

5) For square grid, relation between spacing S and effective diameter d_e is _____.
   a) $d_e = 1.005S$ b) $d_e = 1.05S$
   c) $d_e = 1.5S$ d) $d_e = 1.13S$

6) Suitability number of backfill material is 25; it implies backfill material is _____.
   a) Excellent b) Good
   c) Fair d) None of these

7) Equipotential line is parallel to _____.
   a) Pervious boundary b) Impervious boundary
   c) Flow line d) None of these

8) In Priebe method the value of poisons ratio of stone column material was assumed to be _____.
   a) 1/2 b) 1/3
   c) 1/4 d) 1/5

9) No discontinuity is there in case of _____ due to lateral displacement of soil.
   a) Stone column b) Sand drain
   c) PVD d) None of these

10) Coefficient of friction between soil and other material is given by _____.
   a) $\tan \varphi$ b) $\tan \mu$
   c) $\tan \delta$ d) None of these

11) Synonym for penetration grouting is _____.
   a) Intrusion grouting b) Jet grouting
   c) Permeation grouting d) Fracture grouting

12) Deep dynamic compaction is normally used if depth of improvement needed is _____.
   a) < 1m b) < 5m
   c) 5 – 10m d) None of these

13) Minimum factor of safety against sliding of wall is _____.
   a) 1.2 b) 1.5
   c) 2.0 d) 2.5

14) Most suitable method of ground improvement when large boulders are present in the soil _____.
   a) Rapid Impact Compaction b) Deep Dynamic Compaction
   c) Vibro Compaction d) Blasting

SLR-FM-92

Seat No.	

Set P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GROUND IMPROVEMENT TECHNIQUES

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 5 & Q. No. 9 are compulsory.
2) Attempt any two questions from each section.
3) Figures to the right indicate full marks.
4) Illustrate your answer with suitable sketch for theory questions.

Section - I

Q.2 **Write short notes. (Any Three)** **09**
- **a)** Classification of ground improvement techniques
- **b)** Blasting
- **c)** Deep well system
- **b)** Sand drain

Q.3 **a**) What is the safe distance of a building from blasting location if the detonator used for blasting has mass of 10kg (equivalent to TNT) and Hopkinson's number is 0.105? **03**

b) Calculate area improvement ratio and area replacement ratio for the stone column of diameter 0.8m spaced at 1.3m c/c in **06**
i) square grid
ii) triangular grid

Q.4 **a)** What is dewatering? What is purpose of dewatering during construction and post construction? **04**

b) With a neat sketch explain electro osmosis method of dewatering. **05**

Q.5 Site investigation report for airport reveals following details. **10**
Soil strata - soft clayey soil up to 10m followed by sand. soil properties $C_v = 1 \times 10^{-7}\ m^2/yr$, $C_h = 1.5 \times 10^{-6} m^2/yr$. It is intended to use PVD system with triangular grid. Design the system. [Time available to begin the construction after one year.]

Section - II

Q.6 **Write short notes. (Any Three)** **09**

a) Soil nails
b) Slope stabilization
c) Grouting
d) Reinforced earth

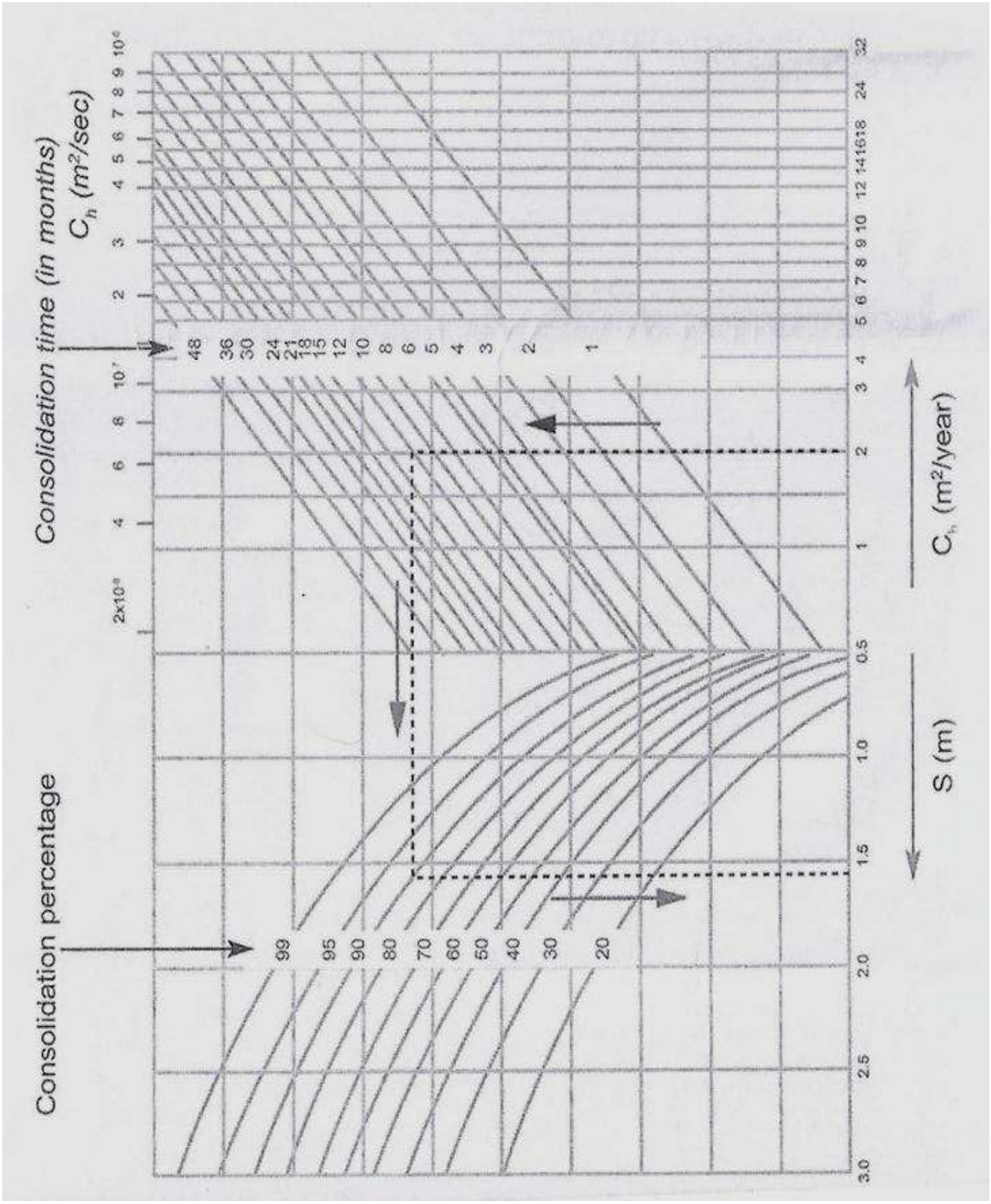
Q.7 **a)** Discuss the thermal method of soil modification. **04**

b) Explain lime stabilization mechanism in brief. **05**

Q.8 **a)** With a sketch explain grouting equipment. **04**

b) What is grout monitoring? How monitoring is done. **05**

Q.9 Design a reinforced earth wall of height 10m. Backfill Soil properties are $\gamma = 17\text{kN/m}^3$ $\varphi = 35^\circ$. Galvanized steel ties are to be used for reinforcement $Fy = 267$Mpa. Assume $\delta = 20°$. **10**


Consolidation time (in months)
C_h (m^2/sec)
Consolidation percentage
C_h (m^2/year)
S (m)

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GROUND IMPROVEMENT TECHNIQUES

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
3) Figures to the right indicate full marks.
4) Illustrate your answer with suitable sketch for theory questions.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) In Priebe method the value of poisons ratio of stone column material was assumed to be _____.
   a) 1/2 b) 1/3
   c) 1/4 d) 1/5

2) No discontinuity is there in case of _____ due to lateral displacement of soil.
   a) Stone column b) Sand drain
   c) PVD d) None of these

3) Coefficient of friction between soil and other material is given by _____.
   a) $\tan\varphi$ b) $\tan\mu$
   c) $\tan\delta$ d) None of these

4) Synonym for penetration grouting is _____.
   a) Intrusion grouting b) Jet grouting
   c) Permeation grouting d) Fracture grouting

5) Deep dynamic compaction is normally used if depth of improvement needed is _____.
   a) < 1m b) < 5m
   c) 5 – 10m d) None of these

6) Minimum factor of safety against sliding of wall is _____.
   a) 1.2 b) 1.5
   c) 2.0 d) 2.5

7) Most suitable method of ground improvement when large boulders are present in the soil _____.
   a) Rapid Impact Compaction b) Deep Dynamic Compaction
   c) Vibro Compaction d) Blasting

8) In case of physical and chemical modification soil is _____.
   a) preloaded
   b) admixtures are added to soil
   c) soil is reinforced
   d) none of these

9) Roller most suitable for compacting sandy soil is _____.
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   c) ZAV line is close to peak point of compaction curve
   d) ZAV line is far away from peak point of compaction curve

11) In case of modified compaction test soil sample is compacted in _____.
   a) single layer
   b) 2 layer
   c) 3 layers
   d) 5 layer

12) For square grid, relation between spacing S and effective diameter d_e is _____.
   a) $d_e = 1.005S$
   b) $d_e = 1.05S$
   c) $d_e = 1.5S$
   d) $d_e = 1.13S$

13) Suitability number of backfill material is 25; it implies backfill material is _____.
   a) Excellent
   b) Good
   c) Fair
   d) None of these

14) Equipotential line is parallel to _____.
   a) Pervious boundary
   b) Impervious boundary
   c) Flow line
   d) None of these

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GROUND IMPROVEMENT TECHNIQUES

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 5 & Q. No. 9 are compulsory.
2) Attempt any two questions from each section.
3) Figures to the right indicate full marks.
4) Illustrate your answer with suitable sketch for theory questions.

Section - I

Q.2 **Write short notes. (Any Three)** **09**
- **a)** Classification of ground improvement techniques
- **b)** Blasting
- **c)** Deep well system
- **b)** Sand drain

Q.3 **a**) What is the safe distance of a building from blasting location if the detonator used for blasting has mass of 10kg (equivalent to TNT) and Hopkinson's number is 0.105? **03**

b) Calculate area improvement ratio and area replacement ratio for the stone column of diameter 0.8m spaced at 1.3m c/c in **06**
i) square grid
ii) triangular grid

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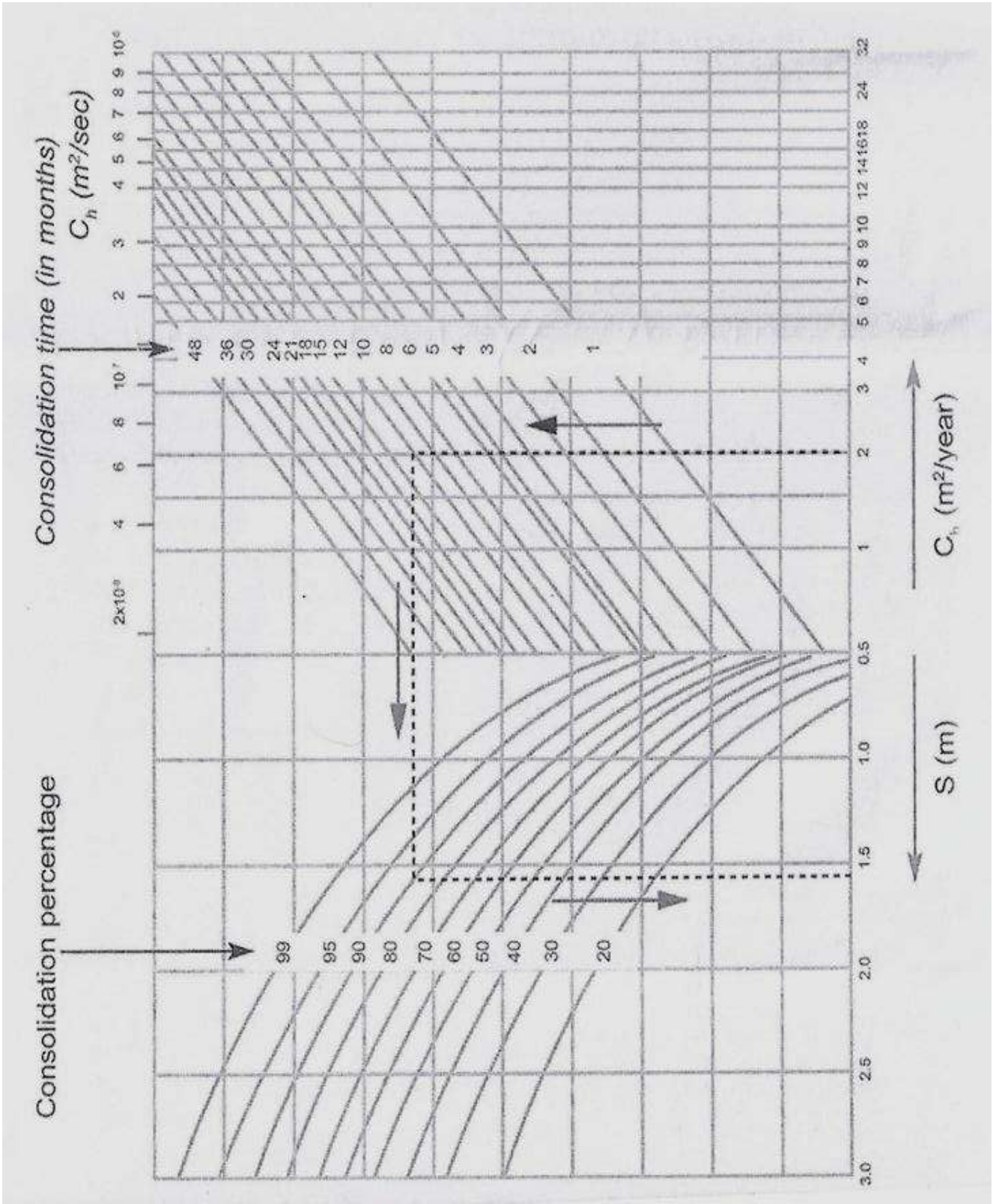
Soil strata - soft clayey soil up to 10m followed by sand. soil properties $C_v = 1 \times 10^{-7}\ m^2/yr$, $C_h = 1.5 \times 10^{-6} m^2/yr$. It is intended to use PVD system with triangular grid. Design the system. [Time available to begin the construction after one year.]

Section - II

Q.6	**Write short notes. (Any Three)**		**09**
	a)	Soil nails	
	b)	Slope stabilization	
	c)	Grouting	
	d)	Reinforced earth	
Q.7	**a)**	Discuss the thermal method of soil modification.	**04**
	b)	Explain lime stabilization mechanism in brief.	**05**
Q.8	**a)**	With a sketch explain grouting equipment.	**04**
	b)	What is grout monitoring? How monitoring is done.	**05**
Q.9	Design a reinforced earth wall of height 10m. Backfill Soil properties are $\gamma = 17\text{kN/m}^3$ $\varphi = 35^\circ$. Galvanized steel ties are to be used for reinforcement $Fy = 267$Mpa. Assume $\delta = 20°$.		**10**


Consolidation time (in months)
C_h (m^2/sec)
Consolidation percentage
C_h (m^2/year)
S (m)

SLR-FM-92

Seat No.	

Set R

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GROUND IMPROVEMENT TECHNIQUES

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
3) Figures to the right indicate full marks.
4) Illustrate your answer with suitable sketch for theory questions.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) For square grid, relation between spacing S and effective diameter d_e is _____.
   a) $d_e = 1.005S$ b) $d_e = 1.05S$
   c) $d_e = 1.5S$ d) $d_e = 1.13S$

2) Suitability number of backfill material is 25; it implies backfill material is _____.
   a) Excellent b) Good
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4) In Priebe method the value of poisons ratio of stone column material was assumed to be _____.
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10) Most suitable method of ground improvement when large boulders are present in the soil _____.
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11) In case of physical and chemical modification soil is _____.
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   d) 5 layer

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GROUND IMPROVEMENT TECHNIQUES

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 5 & Q. No. 9 are compulsory.
2) Attempt any two questions from each section.
3) Figures to the right indicate full marks.
4) Illustrate your answer with suitable sketch for theory questions.

Section - I

Q.2 **Write short notes. (Any Three)** **09**
- **a)** Classification of ground improvement techniques
- **b)** Blasting
- **c)** Deep well system
- **b)** Sand drain

Q.3 **a**) What is the safe distance of a building from blasting location if the detonator used for blasting has mass of 10kg (equivalent to TNT) and Hopkinson's number is 0.105? **03**

b) Calculate area improvement ratio and area replacement ratio for the stone column of diameter 0.8m spaced at 1.3m c/c in **06**
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Section - II

Q.6 **Write short notes. (Any Three)** **09**

a) Soil nails
b) Slope stabilization
c) Grouting
d) Reinforced earth

Q.7 **a)** Discuss the thermal method of soil modification. **04**

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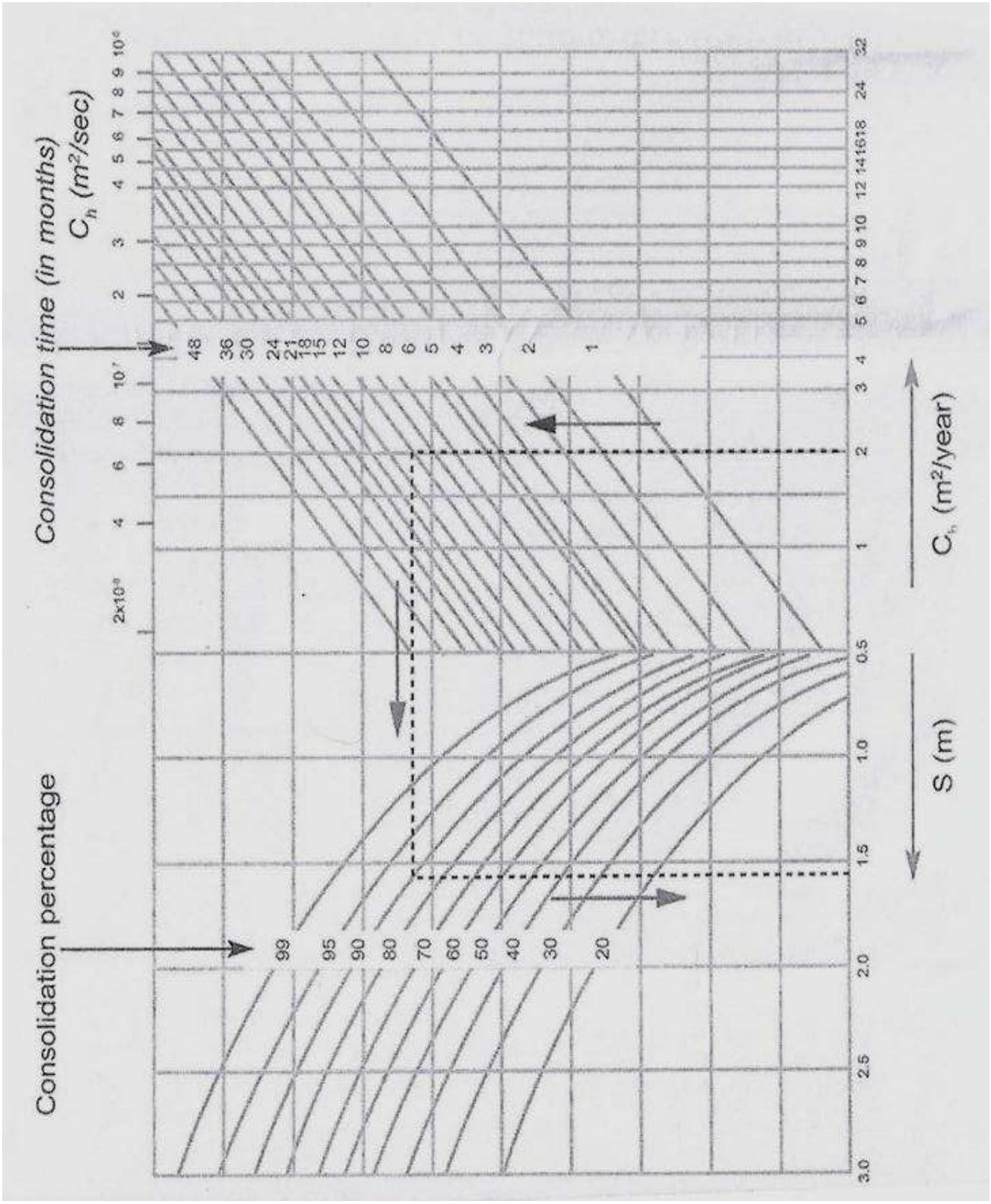
Consolidation time (in months)
C_h (m^2/sec)
Consolidation percentage
C_h (m^2/year)
S (m)

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GROUND IMPROVEMENT TECHNIQUES

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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   c) 5 – 10m d) None of these

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   c) PVD d) None of these

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
GROUND IMPROVEMENT TECHNIQUES

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 5 & Q. No. 9 are compulsory.
2) Attempt any two questions from each section.
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Section - I

Q.2 **Write short notes. (Any Three)** **09**
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Section - II

Q.6 **Write short notes. (Any Three)** **09**

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c) Grouting
d) Reinforced earth

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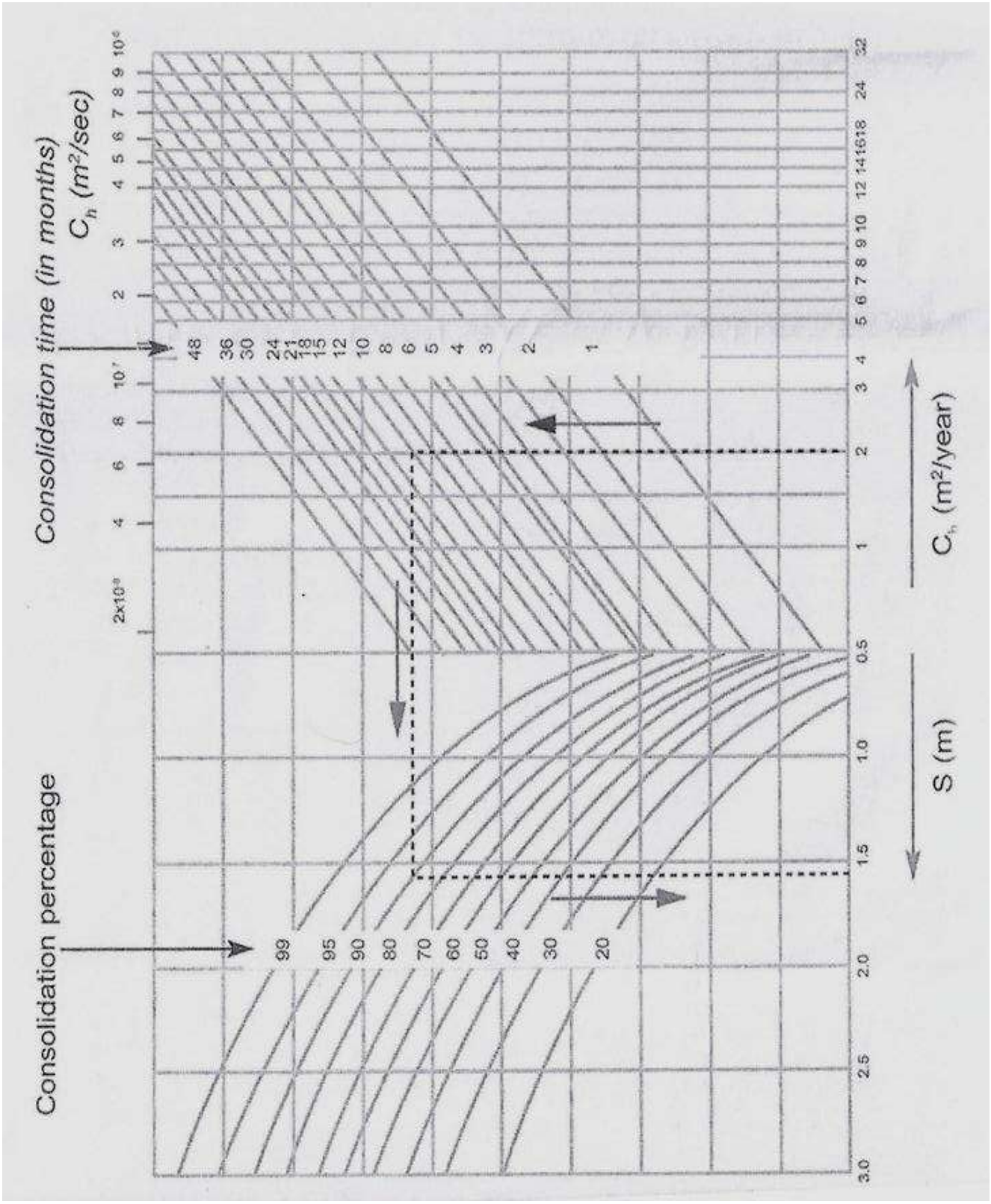
Consolidation time (in months)
C_h (m^2/sec)
Consolidation percentage
C_h (m^2/year)
S (m)

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRAFFIC ENGINEERING & CONTROL

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume any missing data suitably and mention it clearly

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose correct alternatives from the options and rewrite the sentence. 14

1) In Level of service 'A', the service provided to roadway traffic is _____.
   a) Forced flow operations at low speeds
   b) Approaches unstable flow
   c) Zone of stable flow
   d) Free flow, with low volumes and high speed

2) As per IRC:67-2001, a traffic sign indicating the Give Way on a road should be of, _____.
   a) Circular shape with white background and red border
   b) Triangular shape with white background and red border
   c) Triangular shape with red background and white border
   d) Circular shape with red background and white border

3) Density of the traffic stream is measured in _____.
   a) Vehicles/hour b) Vehicles/Km
   c) No of vehicles d) Vehicles/Hour/Lane

4) Which among the following is the fundamental equation of traffic flow?
   a) q=k/vs b) q=kxvs
   c) v=qxk d) $q=k^2xvs$

5) When volume of the road reaches maximum flow or the capacity, the volume capacity ratio approaches to a value of, _____.
   a) 1.0 b) 1.5
   c) 0.0 d) 0.5

6) The objects appear darker than the road surface, this principal is known as _____.
   a) Silhouette b) Reverse silhouette
   c) Lamps d) Head lights

7) The cross roads with one-way regulation on one road and other cross road with two way, the total conflict points are _____.
   a) 6 b) 24
   c) 11 d) 28

8) It was noted that on a section of road, the free speed was 80kmph and the jam density was 70vpkm. The maximum flow in vph that could be expected on this road is _____.
   a) 800 b) 1400
   c) 2800 d) 5600

9) A traffic stream in a particular direction of a two lane road is moving with a constant speed of 50 kmph, with an average headway of 2.52 seconds. The longitudinal distance between two consecutive vehicles is _____.
   a) 30m b) 35m
   c) 38m d) 42m

10) In signal design as per Indian Roads Congress specifications, if the sum of the ratios of normal flows to saturation flow of two directional traffic flows is 0.50 and the total lost time per cycle is 10 seconds, the optimum cycle length in seconds is _____.
   a) 100 b) 80
   c) 60 d) 40

11) Two broken yellow line marking at center of road indicates _____.
   a) No passing allowed on both side
   b) Passing allowed on one side
   c) Passing allowed on both side
   d) Passing allowed only for left side vehicle

12) The average spacing between vehicles in traffic stream is 50m. The density (in veh/km) of stress is _____.
   a) 40 b) 50
   c) 20 d) 30

13) A vehicle travelling at a speed of 30kmph was stopped by applying brakes and the skid marks were 5.8m, average skid resistance, 'f' of the pavement surface is, _____.
   a) 0.61 b) 0.55
   c) 0.15 d) 0.99

14) An isolated three-phase traffic signal is designed by Webster's method. The critical flow ratios for three phases are 0.2, 0.3 and 0.25 respectively and lost time per phase is 4 seconds. The optimum cycle length (in sec) is, _____.
   a) 92 b) 82
   c) 62 d) 42

Seat No.	

Set | P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRAFFIC ENGINEERING & CONTROL

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No.2 and Q. No. 6 are compulsory;
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Section - I

Q.2 Attempt any two of the following questions. **08**

a) What are the objects and scope of traffic engineering? Explain briefly.

b) Mention the methods available for OD survey. Explain in detail about home questionnaire survey.

c) A vehicle of weight 2.0 tonne skids through a distance equal to 40m before colliding with another parked vehicle of weight 1.0 tonne. After collision both the vehicles skid through a distance equal to 12m before stopping. Compute the initial speed of the moving vehicle. Assume average coefficient of friction as 0.5.

Q.3 Attempt the following questions. **10**

a) Discuss the various types of on street parking with their advantages and disadvantages.

b) Define the term capacity. Explain terms basic capacity, possible capacity and practical capacity.

Q.4 Attempt the following questions. **10**

a) Mention the methods of conducting spot speed studies. What are the various objects and applications of spot speed studies? Explain briefly.

b) Write a short note on
1) Level of Service
2) Passenger Car Unit
3) Collision and Condition Diagram

Q.5 Attempt the following questions.

From an in-out survey conducted for a parking area consisting of 40 bays, the initial count was found to be 25. Table-1 gives the result of the survey. The number of vehicles coming in and out of the parking lot for a time interval of 5 minutes is as shown in the Table-1 below. Find the accumulation, total parking load, average occupancy and efficiency of the parking lot. **10**

Table-1-In-Out Survey data

In-out survey data		
Time	In	Out
5	3	2
10	2	4
15	4	2
20	5	4
25	7	3
30	8	2

In-out survey data		
Time	In	Out
35	2	7
40	4	2
45	6	4
50	4	1
55	3	3
60	2	5

Section - II

Q.6 Attempt any two of the following questions. **08**

a) Explain regulations concerning to the
1) Drivers
2) speed limits in Rural and Urban area

b) Explain the purpose of below traffic control devices with neat sketches.
1) Hazard Markers
2) Roadway Delineators
3) Object Markers
4) Rumble strips

c) Write a short note on ITS applications in urban transport system.

Q.7 Attempt the following questions. **10**

a) Write a brief note on applications of
1) Pneumatic Tube Detectors & Inductive Detector Loop (IDE)
2) Video Image Detection & Infra-red Sensors

b) Explain the function of
1) Accelerating and De-accelerating lanes
2) Right protect lanes

Q.8 Attempt the following questions. **10**

a) Explain the difference between fixed time signals and vehicle actuated signals.

b) Explain the application of
1) Bump Integrator
2) Portable Skid Resistance Tester

Q.9 Attempt the following questions. **10**

Define, cycle, Interval and Phase. The average normal flow of traffic on cross roads 1 and 2 during design period are 440 and 280PCU per hour, the saturation flow values on these roads are estimated as 1300 and 1100 PCU per hour respectively. The all-red time required for pedestrian crossing is 12 sec. Design two phase traffic signal with pedestrian crossing by Webster's method. Sketch the phase diagram.

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRAFFIC ENGINEERING & CONTROL

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose correct alternatives from the options and rewrite the sentence. 14

1) It was noted that on a section of road, the free speed was 80kmph and the jam density was 70vpkm. The maximum flow in vph that could be expected on this road is _____.
   a) 800 b) 1400
   c) 2800 d) 5600

2) A traffic stream in a particular direction of a two lane road is moving with a constant speed of 50 kmph, with an average headway of 2.52 seconds. The longitudinal distance between two consecutive vehicles is _____.
   a) 30m b) 35m
   c) 38m d) 42m

3) In signal design as per Indian Roads Congress specifications, if the sum of the ratios of normal flows to saturation flow of two directional traffic flows is 0.50 and the total lost time per cycle is 10 seconds, the optimum cycle length in seconds is _____.
   a) 100 b) 80
   c) 60 d) 40

4) Two broken yellow line marking at center of road indicates _____.
   a) No passing allowed on both side
   b) Passing allowed on one side
   c) Passing allowed on both side
   d) Passing allowed only for left side vehicle

5) The average spacing between vehicles in traffic stream is 50m. The density (in veh/km) of stress is _____.
   a) 40 b) 50
   c) 20 d) 30

6) A vehicle travelling at a speed of 30kmph was stopped by applying brakes and the skid marks were 5.8m, average skid resistance, ‘f’ of the pavement surface is, _____.
   a) 0.61 b) 0.55
   c) 0.15 d) 0.99

7) An isolated three-phase traffic signal is designed by Webster's method. The critical flow ratios for three phases are 0.2, 0.3 and 0.25 respectively and lost time per phase is 4 seconds. The optimum cycle length (in sec) is, _____.
   a) 92 b) 82
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8) In Level of service 'A', the service provided to roadway traffic is _____.
   a) Forced flow operations at low speeds
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   c) Zone of stable flow
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9) As per IRC:67-2001, a traffic sign indicating the Give Way on a road should be of, _____.
   a) Circular shape with white background and red border
   b) Triangular shape with white background and red border
   c) Triangular shape with red background and white border
   d) Circular shape with red background and white border

10) Density of the traffic stream is measured in _____.
   a) Vehicles/hour b) Vehicles/Km
   c) No of vehicles d) Vehicles/Hour/Lane

11) Which among the following is the fundamental equation of traffic flow?
   a) q=k/vs b) q=kxvs
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12) When volume of the road reaches maximum flow or the capacity, the volume capacity ratio approaches to a value of, _____.
   a) 1.0 b) 1.5
   c) 0.0 d) 0.5

13) The objects appear darker than the road surface, this principal is known as _____.
   a) Silhouette b) Reverse silhouette
   c) Lamps d) Head lights

14) The cross roads with one-way regulation on one road and other cross road with two way, the total conflict points are _____.
   a) 6 b) 24
   c) 11 d) 28

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
TRAFFIC ENGINEERING & CONTROL

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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Section - I

Q.2 Attempt any two of the following questions. **08**

a) What are the objects and scope of traffic engineering? Explain briefly.

b) Mention the methods available for OD survey. Explain in detail about home questionnaire survey.

c) A vehicle of weight 2.0 tonne skids through a distance equal to 40m before colliding with another parked vehicle of weight 1.0 tonne. After collision both the vehicles skid through a distance equal to 12m before stopping. Compute the initial speed of the moving vehicle. Assume average coefficient of friction as 0.5.

Q.3 Attempt the following questions. **10**

a) Discuss the various types of on street parking with their advantages and disadvantages.

b) Define the term capacity. Explain terms basic capacity, possible capacity and practical capacity.

Q.4 Attempt the following questions. **10**

a) Mention the methods of conducting spot speed studies. What are the various objects and applications of spot speed studies? Explain briefly.

b) Write a short note on
1) Level of Service
2) Passenger Car Unit
3) Collision and Condition Diagram

Q.5 Attempt the following questions.

From an in-out survey conducted for a parking area consisting of 40 bays, the initial count was found to be 25. Table-1 gives the result of the survey. The number of vehicles coming in and out of the parking lot for a time interval of 5 minutes is as shown in the Table-1 below. Find the accumulation, total parking load, average occupancy and efficiency of the parking lot. **10**

Table-1-In-Out Survey data

In-out survey data		
Time	In	Out
5	3	2
10	2	4
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25	7	3
30	8	2

In-out survey data		
Time	In	Out
35	2	7
40	4	2
45	6	4
50	4	1
55	3	3
60	2	5

Section - II

Q.6 Attempt any two of the following questions. **08**

a) Explain regulations concerning to the
1) Drivers
2) speed limits in Rural and Urban area

b) Explain the purpose of below traffic control devices with neat sketches.
1) Hazard Markers
2) Roadway Delineators
3) Object Markers
4) Rumble strips

c) Write a short note on ITS applications in urban transport system.

Q.7 Attempt the following questions. **10**

a) Write a brief note on applications of
1) Pneumatic Tube Detectors & Inductive Detector Loop (IDE)
2) Video Image Detection & Infra-red Sensors

b) Explain the function of
1) Accelerating and De-accelerating lanes
2) Right protect lanes

Q.8 Attempt the following questions. **10**

a) Explain the difference between fixed time signals and vehicle actuated signals.

b) Explain the application of
1) Bump Integrator
2) Portable Skid Resistance Tester

Q.9 Attempt the following questions. **10**

Define, cycle, Interval and Phase. The average normal flow of traffic on cross roads 1 and 2 during design period are 440 and 280PCU per hour, the saturation flow values on these roads are estimated as 1300 and 1100 PCU per hour respectively. The all-red time required for pedestrian crossing is 12 sec. Design two phase traffic signal with pedestrian crossing by Webster's method. Sketch the phase diagram.

Seat No.	

Set **R**

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Civil Engineering
TRAFFIC ENGINEERING & CONTROL

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose correct alternatives from the options and rewrite the sentence. 14

1) When volume of the road reaches maximum flow or the capacity, the volume capacity ratio approaches to a value of, _____.
   a) 1.0 b) 1.5
   c) 0.0 d) 0.5

2) The objects appear darker than the road surface, this principal is known as _____.
   a) Silhouette b) Reverse silhouette
   c) Lamps d) Head lights

3) The cross roads with one-way regulation on one road and other cross road with two way, the total conflict points are _____.
   a) 6 b) 24
   c) 11 d) 28

4) It was noted that on a section of road, the free speed was 80kmph and the jam density was 70vpkm. The maximum flow in vph that could be expected on this road is _____.
   a) 800 b) 1400
   c) 2800 d) 5600

5) A traffic stream in a particular direction of a two lane road is moving with a constant speed of 50 kmph, with an average headway of 2.52 seconds. The longitudinal distance between two consecutive vehicles is _____.
   a) 30m b) 35m
   c) 38m d) 42m

6) In signal design as per Indian Roads Congress specifications, if the sum of the ratios of normal flows to saturation flow of two directional traffic flows is 0.50 and the total lost time per cycle is 10 seconds, the optimum cycle length in seconds is _____.
   a) 100 b) 80
   c) 60 d) 40

7) Two broken yellow line marking at center of road indicates _____.
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8) The average spacing between vehicles in traffic stream is 50m. The density (in veh/km) of stress is _____.
   a) 40 b) 50
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9) A vehicle travelling at a speed of 30kmph was stopped by applying brakes and the skid marks were 5.8m, average skid resistance, 'f' of the pavement surface is, _____.
   a) 0.61 b) 0.55
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10) An isolated three-phase traffic signal is designed by Webster's method. The critical flow ratios for three phases are 0.2, 0.3 and 0.25 respectively and lost time per phase is 4 seconds. The optimum cycle length (in sec) is, _____.
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11) In Level of service 'A', the service provided to roadway traffic is _____.
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   b) Triangular shape with white background and red border
   c) Triangular shape with red background and white border
   d) Circular shape with red background and white border

13) Density of the traffic stream is measured in _____.
   a) Vehicles/hour b) Vehicles/Km
   c) No of vehicles d) Vehicles/Hour/Lane

14) Which among the following is the fundamental equation of traffic flow?
   a) q=k/vs b) q=kxvs
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Seat No.	

Set **R**

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Civil Engineering
TRAFFIC ENGINEERING & CONTROL

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Section - I

Q.2 Attempt any two of the following questions. **08**

a) What are the objects and scope of traffic engineering? Explain briefly.

b) Mention the methods available for OD survey. Explain in detail about home questionnaire survey.

c) A vehicle of weight 2.0 tonne skids through a distance equal to 40m before colliding with another parked vehicle of weight 1.0 tonne. After collision both the vehicles skid through a distance equal to 12m before stopping. Compute the initial speed of the moving vehicle. Assume average coefficient of friction as 0.5.

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Section - II

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Seat No.	

Set | S

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   b) Triangular shape with white background and red border
   c) Triangular shape with red background and white border
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   b) 35m
   c) 38m
   d) 42m

Seat No.	

Set **S**

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Civil Engineering
TRAFFIC ENGINEERING & CONTROL

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Section - I

Q.2 Attempt any two of the following questions. **08**

a) What are the objects and scope of traffic engineering? Explain briefly.

b) Mention the methods available for OD survey. Explain in detail about home questionnaire survey.

c) A vehicle of weight 2.0 tonne skids through a distance equal to 40m before colliding with another parked vehicle of weight 1.0 tonne. After collision both the vehicles skid through a distance equal to 12m before stopping. Compute the initial speed of the moving vehicle. Assume average coefficient of friction as 0.5.

Q.3 Attempt the following questions. **10**

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a) Mention the methods of conducting spot speed studies. What are the various objects and applications of spot speed studies? Explain briefly.

b) Write a short note on
1) Level of Service
2) Passenger Car Unit
3) Collision and Condition Diagram

Q.5 Attempt the following questions.

From an in-out survey conducted for a parking area consisting of 40 bays, the initial count was found to be 25. Table-1 gives the result of the survey. The number of vehicles coming in and out of the parking lot for a time interval of 5 minutes is as shown in the Table-1 below. Find the accumulation, total parking load, average occupancy and efficiency of the parking lot. **10**

Table-1-In-Out Survey data

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Section - II

Q.6 Attempt any two of the following questions. **08**

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SLR-FM-94

Seat No.	

Set P

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INFRASTRUCTURAL ENGINEERING

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Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes In Answer Book.
2) Figure on right indicates full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
(Each MCQ questions carries 2 marks)

1) Which of the following is not role of government in Public Private Partnership?
   a) Ensure transparency
   b) Expertise and innovation
   c) Ensure value for money
   d) Identify needs in terms of output

2) Which of the following is role of private sector in Public Private Partnership?
   a) Access to private finance
   b) Providing the facility & service
   c) Sufficient return to investors
   d) All of the above

3) Which of the following is not type of contract?
   a) Service contracts
   b) Design build
   c) Lease-develop-Operate or Buy
   d) Lease-develop-Operate and Buy

4) Which of the following is not one of the key challenges for sustainability?
   a) Water b) Waste
   c) Energy d) Rural development

5) What is meant by the term BOO _____.
   a) Build Operate Own b) Build Opt Operate
   c) Build Own Operate d) Building Own Operate

6) Which of the following is suitable as VGF scheme?
   a) Viability Gap Funding scheme
   b) Volatile Gap Funding scheme
   c) Viability Gap Finance scheme
   d) Volatile Growth Funding scheme

7) Which of the following is correct term for DBFM?
   a) Design Build Finance Maintain
   b) Design Build Finance Manage
   c) Design Building Finance Maintain
   d) Develop Build Finance Manage

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INFRASTRUCTURAL ENGINEERING

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 is compulsory. Solve any three questions from Section - I.
2) Q. No. 6 is compulsory. Solve any three questions from Section - II.
3) Assume necessary data if required and mention it clearly
4) Figures to right indicate full marks.

Section I

Q.2	State the major problems with the transport sector in India?	**10**
Q.3	Explain the challenges in privatization of water supply.	**09**
Q.4	What are the points to be considered in Public Private Partnership to protect the public interest?	**09**
Q.5	Explain in detail project management execution activities?	**09**

Section –II

Q.6	Draw and explain a schematic diagram of work flow of five phase project management.	**10**
Q.7	Explain the BOT (Annuity) model?	**09**
Q.8	Explain the role of asset management in risk reduction?	**09**
Q.9	What are the main advantages of adopting sustainability principles for building & infrastructure?	**09**

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INFRASTRUCTURAL ENGINEERING

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes In Answer Book.
2) Figure on right indicates full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
(Each MCQ questions carries 2 marks)

1) What is meant by the term BOO _____.
   a) Build Operate Own b) Build Opt Operate
   c) Build Own Operate d) Building Own Operate

2) Which of the following is suitable as VGF scheme?
   a) Viability Gap Funding scheme
   b) Volatile Gap Funding scheme
   c) Viability Gap Finance scheme
   d) Volatile Growth Funding scheme

3) Which of the following is correct term for DBFM?
   a) Design Build Finance Maintain
   b) Design Build Finance Manage
   c) Design Building Finance Maintain
   d) Develop Build Finance Manage

4) Which of the following is not role of government in Public Private Partnership?
   a) Ensure transparency
   b) Expertise and innovation
   c) Ensure value for money
   d) Identify needs in terms of output

5) Which of the following is role of private sector in Public Private Partnership?
   a) Access to private finance
   b) Providing the facility & service
   c) Sufficient return to investors
   d) All of the above

6) Which of the following is not type of contract?
   a) Service contracts
   b) Design build
   c) Lease-develop-Operate or Buy
   d) Lease-develop-Operate and Buy

7) Which of the following is not one of the key challenges for sustainability?
   a) Water b) Waste
   c) Energy d) Rural development

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INFRASTRUCTURAL ENGINEERING

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 is compulsory. Solve any three questions from Section - I.
2) Q. No. 6 is compulsory. Solve any three questions from Section - II.
3) Assume necessary data if required and mention it clearly
4) Figures to right indicate full marks.

Section I

Q.2	State the major problems with the transport sector in India?	**10**
Q.3	Explain the challenges in privatization of water supply.	**09**
Q.4	What are the points to be considered in Public Private Partnership to protect the public interest?	**09**
Q.5	Explain in detail project management execution activities?	**09**

Section –II

Q.6	Draw and explain a schematic diagram of work flow of five phase project management.	**10**
Q.7	Explain the BOT (Annuity) model?	**09**
Q.8	Explain the role of asset management in risk reduction?	**09**
Q.9	What are the main advantages of adopting sustainability principles for building & infrastructure?	**09**

SLR-FM-94

Seat No.	

Set R

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INFRASTRUCTURAL ENGINEERING

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes In Answer Book.
2) Figure on right indicates full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
(Each MCQ questions carries 2 marks)

1) Which of the following is not type of contract?
   a) Service contracts
   b) Design build
   c) Lease-develop-Operate or Buy
   d) Lease-develop-Operate and Buy

2) Which of the following is not one of the key challenges for sustainability?
   a) Water b) Waste
   c) Energy d) Rural development

3) What is meant by the term BOO _____.
   a) Build Operate Own b) Build Opt Operate
   c) Build Own Operate d) Building Own Operate

4) Which of the following is suitable as VGF scheme?
   a) Viability Gap Funding scheme
   b) Volatile Gap Funding scheme
   c) Viability Gap Finance scheme
   d) Volatile Growth Funding scheme

5) Which of the following is correct term for DBFM?
   a) Design Build Finance Maintain
   b) Design Build Finance Manage
   c) Design Building Finance Maintain
   d) Develop Build Finance Manage

6) Which of the following is not role of government in Public Private Partnership?
   a) Ensure transparency
   b) Expertise and innovation
   c) Ensure value for money
   d) Identify needs in terms of output

7) Which of the following is role of private sector in Public Private Partnership?
   a) Access to private finance
   b) Providing the facility & service
   c) Sufficient return to investors
   d) All of the above

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INFRASTRUCTURAL ENGINEERING

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 is compulsory. Solve any three questions from Section - I.
2) Q. No. 6 is compulsory. Solve any three questions from Section - II.
3) Assume necessary data if required and mention it clearly
4) Figures to right indicate full marks.

Section I

Q.2	State the major problems with the transport sector in India?	**10**
Q.3	Explain the challenges in privatization of water supply.	**09**
Q.4	What are the points to be considered in Public Private Partnership to protect the public interest?	**09**
Q.5	Explain in detail project management execution activities?	**09**

Section –II

Q.6	Draw and explain a schematic diagram of work flow of five phase project management.	**10**
Q.7	Explain the BOT (Annuity) model?	**09**
Q.8	Explain the role of asset management in risk reduction?	**09**
Q.9	What are the main advantages of adopting sustainability principles for building & infrastructure?	**09**

SLR-FM-94

Seat No.	

Set S

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INFRASTRUCTURAL ENGINEERING

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes In Answer Book.
2) Figure on right indicates full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
(Each MCQ questions carries 2 marks)

1) Which of the following is suitable as VGF scheme?
   a) Viability Gap Funding scheme
   b) Volatile Gap Funding scheme
   c) Viability Gap Finance scheme
   d) Volatile Growth Funding scheme

2) Which of the following is correct term for DBFM?
   a) Design Build Finance Maintain
   b) Design Build Finance Manage
   c) Design Building Finance Maintain
   d) Develop Build Finance Manage

3) Which of the following is not role of government in Public Private Partnership?
   a) Ensure transparency
   b) Expertise and innovation
   c) Ensure value for money
   d) Identify needs in terms of output

4) Which of the following is role of private sector in Public Private Partnership?
   a) Access to private finance
   b) Providing the facility & service
   c) Sufficient return to investors
   d) All of the above

5) Which of the following is not type of contract?
   a) Service contracts
   b) Design build
   c) Lease-develop-Operate or Buy
   d) Lease-develop-Operate and Buy

6) Which of the following is not one of the key challenges for sustainability?
   a) Water b) Waste
   c) Energy d) Rural development

7) What is meant by the term BOO _____.
   a) Build Operate Own b) Build Opt Operate
   c) Build Own Operate d) Building Own Operate

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
INFRASTRUCTURAL ENGINEERING

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 2 is compulsory. Solve any three questions from Section - I.
2) Q. No. 6 is compulsory. Solve any three questions from Section - II.
3) Assume necessary data if required and mention it clearly
4) Figures to right indicate full marks.

Section I

Q.2	State the major problems with the transport sector in India?	**10**
Q.3	Explain the challenges in privatization of water supply.	**09**
Q.4	What are the points to be considered in Public Private Partnership to protect the public interest?	**09**
Q.5	Explain in detail project management execution activities?	**09**

Section –II

Q.6	Draw and explain a schematic diagram of work flow of five phase project management.	**10**
Q.7	Explain the BOT (Annuity) model?	**09**
Q.8	Explain the role of asset management in risk reduction?	**09**
Q.9	What are the main advantages of adopting sustainability principles for building & infrastructure?	**09**

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SOLID AND HAZARDOUS & WASTE MANAGEMENT

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question number 1 is compulsory. It should be solved in first 30 minutes In Answer Book.
2) Figure on right indicates full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Mechanical grinders are used for _____.
   a) Reducing size b) Reducing volume
   c) Anaerobic process d) None of these

2) Mechanical size reduction operation includes _____.
   a) Shredding b) Grinding
   c) Milling d) All of these

3) Sanitary landfills may cause troubles during _____.
   a) peak summers b) peak winters
   c) peak monsoons d) None

4) The biomedical waste management act were enacted in _____.
   a) 1976 b) 1988
   c) 1998 d) 1980

5) A good way of dealing with the solid waste problem is _____.
   a) Landfilling b) Recycling
   c) Both (a) & (b) d) None of these

6) _____ process improves efficiency of solid waste management _____.
   a) Disposal b) Collection
   c) Processing d) Composting

7) _____ composting requires large area.
   a) Manual composting b) Mechanical composting
   c) Open window composting d) Trenching

8) _____ is a liquid that passes through solid waste and extract suspended impurities from it.
   a) Distilled water b) Municipal waste
   c) Leachate d) Sludge

9) _____ is a biological method of disposal of municipal solid waste.
   a) Shredding b) Landfills
   c) Pulverization d) composting

10) Substances that emit ionizing radiation are defined as _____.
   a) Hazardous waste b) Radioactive wastes
   c) Flammable wastes d) Biological wastes

11) Hazardous biomedical wastes are generated in _____.
   a) Hospitals
   b) Biological research facilities
   c) Industrial biological conversion process
   d) All of above

12) Separation, processing of solid waste are used to reduce _____.
   a) Volume of S.W
   b) Weight of S.W
   c) Both a) and b)
   d) None of these

13) The final functional element in solid waste management system is _____.
   a) Transfer & transportation
   b) Collection
   c) Processing & recovery
   d) Disposal

14) The pyrolysis process of SWM is _____.
   a) Endothermic
   b) Exothermic
   c) Heterothermic
   d) None of these

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SOLID AND HAZARDOUS & WASTE MANAGEMENT

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 is compulsory. Solve any two from Q. No. 3, 4 & 5.
2) Q.No.6 is compulsory. Solve any two from Q. No. 7, 8 & 9.
3) Figures to the right indicate full marks.
4) Assume suitable data wherever needed & mention it clearly.

Section I

Q.2 Solve any two. **08**

a) Write advantages and disadvantages of Incineration treatment.

b) Distinguish between Indore method and Bangalore method of composting.

c) Write the use of different industrial waste.

Q.3 Solve All. **10**

a) Describe the effect of following on composting process
1) C/N ratio
2) Temperature
3) Moisture content
4) pH
5) Particle size

b) Explain the functional elements of municipal solid waste management with flow diagram.

Q.4 Solve All. **10**

a) Write a note on recovery of Bio-gas energy from organic solid waste.

b) State and explain briefly the various methods of handling and processing of solid waste.

Q.5 b) Estimate the Moisture Content of solid waste sample of 100kg using the following data. **10**

Sr. No	Component	% by mass	% by MC (Moisture Content)
1	Food waste	16	65
2	Paper	36	08
3	Cardboards	05	05
4	Plastics	10	02
5	Grass	12	55
6	Wood	08	04
7	Metals	13	03

S**ection-II**

Q.6 Solve any two. **08**

a) Explain the different techniques used to control contamination of ground water.

b) Explain in detail any one case study of hazards.

c) Write site selection criteria for sanitary landfilling.

Q.7 Solve All. **10**

a) Define Hazardous waste. Explain in brief characteristics of Hazardous waste.

b) Write a note on waste minimization and resource recovery.

Q.8 Solve All. **10**

a) Write a note on 'Risk assessment and management'.

b) Explain natural and manmade hazards with examples.

Q.9 Write Short Notes. **10**

a) Storage and transportation of hazardous waste

b) Factors affecting the composting process.

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SOLID AND HAZARDOUS & WASTE MANAGEMENT

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question number 1 is compulsory. It should be solved in first 30 minutes In Answer Book.
2) Figure on right indicates full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) _____ is a liquid that passes through solid waste and extract suspended impurities from it.
   a) Distilled water b) Municipal waste
   c) Leachate d) Sludge

2) _____ is a biological method of disposal of municipal solid waste.
   a) Shredding b) Landfills
   c) Pulverization d) composting

3) Substances that emit ionizing radiation are defined as _____.
   a) Hazardous waste b) Radioactive wastes
   c) Flammable wastes d) Biological wastes

4) Hazardous biomedical wastes are generated in _____.
   a) Hospitals
   b) Biological research facilities
   c) Industrial biological conversion process
   d) All of above

5) Separation, processing of solid waste are used to reduce _____.
   a) Volume of S.W b) Weight of S.W
   c) Both a) and b) d) None of these

6) The final functional element in solid waste management system is _____.
   a) Transfer & transportation b) Collection
   c) Processing & recovery d) Disposal

7) The pyrolysis process of SWM is _____.
   a) Endothermic b) Exothermic
   c) Heterothermic d) None of these

8) Mechanical grinders are used for _____.
   a) Reducing size b) Reducing volume
   c) Anaerobic process d) None of these

9) Mechanical size reduction operation includes _____.
   a) Shredding b) Grinding
   c) Milling d) All of these

10) Sanitary landfills may cause troubles during _____.
   a) peak summers b) peak winters
   c) peak monsoons d) None

11) The biomedical waste management act were enacted in _____.
   a) 1976 b) 1988
   c) 1998 d) 1980

12) A good way of dealing with the solid waste problem is _____.
   a) Landfilling b) Recycling
   c) Both (a) & (b) d) None of these

13) _____ process improves efficiency of solid waste management _____.
   a) Disposal b) Collection
   c) Processing d) Composting

14) _____ composting requires large area.
   a) Manual composting b) Mechanical composting
   c) Open window composting d) Trenching

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SOLID AND HAZARDOUS & WASTE MANAGEMENT

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 is compulsory. Solve any two from Q. No. 3, 4 & 5.
2) Q.No.6 is compulsory. Solve any two from Q. No. 7, 8 & 9.
3) Figures to the right indicate full marks.
4) Assume suitable data wherever needed & mention it clearly.

Section I

Q.2 Solve any two. **08**

a) Write advantages and disadvantages of Incineration treatment.
b) Distinguish between Indore method and Bangalore method of composting.
c) Write the use of different industrial waste.

Q.3 Solve All. **10**

a) Describe the effect of following on composting process
1) C/N ratio
2) Temperature
3) Moisture content
4) pH
5) Particle size

b) Explain the functional elements of municipal solid waste management with flow diagram.

Q.4 Solve All. **10**

a) Write a note on recovery of Bio-gas energy from organic solid waste.
b) State and explain briefly the various methods of handling and processing of solid waste.

Q.5 b) Estimate the Moisture Content of solid waste sample of 100kg using the following data. **10**

Sr. No	Component	% by mass	% by MC (Moisture Content)
1	Food waste	16	65
2	Paper	36	08
3	Cardboards	05	05
4	Plastics	10	02
5	Grass	12	55
6	Wood	08	04
7	Metals	13	03

S**ection-II**

Q.6 Solve any two. **08**

a) Explain the different techniques used to control contamination of ground water.

b) Explain in detail any one case study of hazards.

c) Write site selection criteria for sanitary landfilling.

Q.7 Solve All. **10**

a) Define Hazardous waste. Explain in brief characteristics of Hazardous waste.

b) Write a note on waste minimization and resource recovery.

Q.8 Solve All. **10**

a) Write a note on 'Risk assessment and management'.

b) Explain natural and manmade hazards with examples.

Q.9 Write Short Notes. **10**

a) Storage and transportation of hazardous waste

b) Factors affecting the composting process.

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SOLID AND HAZARDOUS & WASTE MANAGEMENT

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question number 1 is compulsory. It should be solved in first 30 minutes In Answer Book.
2) Figure on right indicates full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) A good way of dealing with the solid waste problem is _____.
   a) Landfilling b) Recycling
   c) Both (a) & (b) d) None of these

2) _____ process improves efficiency of solid waste management _____.
   a) Disposal b) Collection
   c) Processing d) Composting

3) _____ composting requires large area.
   a) Manual composting b) Mechanical composting
   c) Open window composting d) Trenching

4) _____ is a liquid that passes through solid waste and extract suspended impurities from it.
   a) Distilled water b) Municipal waste
   c) Leachate d) Sludge

5) _____ is a biological method of disposal of municipal solid waste.
   a) Shredding b) Landfills
   c) Pulverization d) composting

6) Substances that emit ionizing radiation are defined as _____.
   a) Hazardous waste b) Radioactive wastes
   c) Flammable wastes d) Biological wastes

7) Hazardous biomedical wastes are generated in _____.
   a) Hospitals
   b) Biological research facilities
   c) Industrial biological conversion process
   d) All of above

8) Separation, processing of solid waste are used to reduce _____.
   a) Volume of S.W b) Weight of S.W
   c) Both a) and b) d) None of these

9) The final functional element in solid waste management system is _____.
   a) Transfer & transportation b) Collection
   c) Processing & recovery d) Disposal

10) The pyrolysis process of SWM is _____.
   a) Endothermic b) Exothermic
   c) Heterothermic d) None of these

11) Mechanical grinders are used for _____.
   a) Reducing size b) Reducing volume
   c) Anaerobic process d) None of these

12) Mechanical size reduction operation includes _____.
   a) Shredding b) Grinding
   c) Milling d) All of these

13) Sanitary landfills may cause troubles during _____.
   a) peak summers b) peak winters
   c) peak monsoons d) None

14) The biomedical waste management act were enacted in _____.
   a) 1976 b) 1988
   c) 1998 d) 1980

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SOLID AND HAZARDOUS & WASTE MANAGEMENT

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 is compulsory. Solve any two from Q. No. 3, 4 & 5.
2) Q.No.6 is compulsory. Solve any two from Q. No. 7, 8 & 9.
3) Figures to the right indicate full marks.
4) Assume suitable data wherever needed & mention it clearly.

Section I

Q.2 Solve any two. **08**

a) Write advantages and disadvantages of Incineration treatment.

b) Distinguish between Indore method and Bangalore method of composting.

c) Write the use of different industrial waste.

Q.3 Solve All. **10**

a) Describe the effect of following on composting process
1) C/N ratio
2) Temperature
3) Moisture content
4) pH
5) Particle size

b) Explain the functional elements of municipal solid waste management with flow diagram.

Q.4 Solve All. **10**

a) Write a note on recovery of Bio-gas energy from organic solid waste.

b) State and explain briefly the various methods of handling and processing of solid waste.

Q.5 b) Estimate the Moisture Content of solid waste sample of 100kg using the following data. **10**

Sr. No	Component	% by mass	% by MC (Moisture Content)
1	Food waste	16	65
2	Paper	36	08
3	Cardboards	05	05
4	Plastics	10	02
5	Grass	12	55
6	Wood	08	04
7	Metals	13	03

S**ection-II**

Q.6 Solve any two. **08**

a) Explain the different techniques used to control contamination of ground water.

b) Explain in detail any one case study of hazards.

c) Write site selection criteria for sanitary landfilling.

Q.7 Solve All. **10**

a) Define Hazardous waste. Explain in brief characteristics of Hazardous waste.

b) Write a note on waste minimization and resource recovery.

Q.8 Solve All. **10**

a) Write a note on 'Risk assessment and management'.

b) Explain natural and manmade hazards with examples.

Q.9 Write Short Notes. **10**

a) Storage and transportation of hazardous waste

b) Factors affecting the composting process.

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SOLID AND HAZARDOUS & WASTE MANAGEMENT

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Question number 1 is compulsory. It should be solved in first 30 minutes In Answer Book.
2) Figure on right indicates full marks.
3) Assume suitable data wherever needed & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Substances that emit ionizing radiation are defined as _____.
   a) Hazardous waste b) Radioactive wastes
   c) Flammable wastes d) Biological wastes

2) Hazardous biomedical wastes are generated in _____.
   a) Hospitals
   b) Biological research facilities
   c) Industrial biological conversion process
   d) All of above

3) Separation, processing of solid waste are used to reduce _____.
   a) Volume of S.W b) Weight of S.W
   c) Both a) and b) d) None of these

4) The final functional element in solid waste management system is _____.
   a) Transfer & transportation b) Collection
   c) Processing & recovery d) Disposal

5) The pyrolysis process of SWM is _____.
   a) Endothermic b) Exothermic
   c) Heterothermic d) None of these

6) Mechanical grinders are used for _____.
   a) Reducing size b) Reducing volume
   c) Anaerobic process d) None of these

7) Mechanical size reduction operation includes _____.
   a) Shredding b) Grinding
   c) Milling d) All of these

8) Sanitary landfills may cause troubles during _____.
   a) peak summers b) peak winters
   c) peak monsoons d) None

9) The biomedical waste management act were enacted in _____.
   a) 1976 b) 1988
   c) 1998 d) 1980

10) A good way of dealing with the solid waste problem is _____.
   a) Landfilling b) Recycling
   c) Both (a) & (b) d) None of these

11) _____ process improves efficiency of solid waste management _____.
   a) Disposal b) Collection
   c) Processing d) Composting

12) _____ composting requires large area.
   a) Manual composting b) Mechanical composting
   c) Open window composting d) Trenching

13) _____ is a liquid that passes through solid waste and extract suspended impurities from it.
   a) Distilled water b) Municipal waste
   c) Leachate d) Sludge

14) _____ is a biological method of disposal of municipal solid waste.
   a) Shredding b) Landfills
   c) Pulverization d) composting

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
SOLID AND HAZARDOUS & WASTE MANAGEMENT

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.2 is compulsory. Solve any two from Q. No. 3, 4 & 5.
2) Q.No.6 is compulsory. Solve any two from Q. No. 7, 8 & 9.
3) Figures to the right indicate full marks.
4) Assume suitable data wherever needed & mention it clearly.

Section I

Q.2 Solve any two. **08**

a) Write advantages and disadvantages of Incineration treatment.

b) Distinguish between Indore method and Bangalore method of composting.

c) Write the use of different industrial waste.

Q.3 Solve All. **10**

a) Describe the effect of following on composting process
1) C/N ratio
2) Temperature
3) Moisture content
4) pH
5) Particle size

b) Explain the functional elements of municipal solid waste management with flow diagram.

Q.4 Solve All. **10**

a) Write a note on recovery of Bio-gas energy from organic solid waste.

b) State and explain briefly the various methods of handling and processing of solid waste.

Q.5 b) Estimate the Moisture Content of solid waste sample of 100kg using the following data. **10**

Sr. No	Component	% by mass	% by MC (Moisture Content)
1	Food waste	16	65
2	Paper	36	08
3	Cardboards	05	05
4	Plastics	10	02
5	Grass	12	55
6	Wood	08	04
7	Metals	13	03

S**ection-II**

Q.6 Solve any two. **08**

a) Explain the different techniques used to control contamination of ground water.

b) Explain in detail any one case study of hazards.

c) Write site selection criteria for sanitary landfilling.

Q.7 Solve All. **10**

a) Define Hazardous waste. Explain in brief characteristics of Hazardous waste.

b) Write a note on waste minimization and resource recovery.

Q.8 Solve All. **10**

a) Write a note on 'Risk assessment and management'.

b) Explain natural and manmade hazards with examples.

Q.9 Write Short Notes. **10**

a) Storage and transportation of hazardous waste

b) Factors affecting the composting process.

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF BRIDGES

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The minimum width of carriage way for a two lane bridge is _____.
   a) 4.25m b) 10m
   c) 6m d) 7.5m

2) Culvert is the type of bridge whose span is _____.
   a) Between 6m-60m b) Above 60m
   c) Less than 6m d) None of these

3) In designing deck slab maximum bending moment develops when the IRC class AA tracked vehicle is placed _____.
   a) Adjacent to support b) At the center of span
   c) At quarter span d) Anywhere on span

4) As per crack control criteria of IRC-21, the spacing of main reinforced bar shall not exceed _____.
   a) 100mm b) 300mm
   c) 200mm d) 150mm

5) Simply supported span requires _____.
   a) Fixed bearing at both ends
   b) Expansion bearing at both ends
   c) Fixed bearing at one end and expansion bearing at the other
   d) Either a or b, both are correct

6) The toe and heel of the base slab are so proportioned that is eccentricity of resultant is limited to _____.
   a) 1/3 of the base width b) 1/6 of the base width
   c) 2/3 of the base width d) 1/2 of the base width

7) The wearing coat specified in the Indian standard codes on reinforced concrete deck slab is in the range of _____.
   a) 25 to 40mm b) 40 to 60 mm
   c) 75 to 100 mm d) none of these

8) According to Courbon's method of analysis, the ratio of depth of cross beam to main girder in a Tee beam slab bridge deck should be at least _____.
   a) 0.5 b) 0.75
   c) 1 d) 1.2

9) The minimum number of cross beams in a T bridge should be _____.
   a) 3 b) 5
   c) 6 d) None of these

10) The shape factor of an elastomeric pad bearing designed to support a bridge girder should have value in the range of _____.
   a) 4 to 8 b) 6 to 12
   c) 12 to 16 d) 16 to 20

11) Span is called as economical span when _____.
   a) Cost of substructure should be equal to cost of superstructure.
   b) Cost of substructure should be greater than Cost of superstructure.
   c) Cost of substructure should be less than Cost of superstructure.
   d) Does not depend on cost.

12) Section III or IRC bridge codes is related with _____.
   a) Loads and stress
   b) Foundation and substructure
   c) Cement concrete (plain and reinforced)
   d) Steel road bridges

13) Pigeaud's curves are used to calculate _____.
   a) Bending moment coefficients b) Load factor
   c) Impact factor d) Effective span

14) As per crack control criteria of IRC-21, the diameter of bar in slabs shall not exceed _____.
   a) 36mm b) 32mm
   c) 25mm d) 40mm

SLR-FM-98

Seat No.	

Set P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF BRIDGES

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Solve any three questions each from Section I and Section II.
2) Q No. 4 & Q No.6 is compulsory.
3) Assume suitable data if necessary and mention it clearly.

Section I

Q.2 Answer the following

a) Enlist the various loads to be considered for the analysis of bridges? Explain any one in detail. **05**

b) Discuss the IRC class B loading. **04**

Q.3 Design a solid deck slab for Two lane bridge for following data. **09**

a) Effective span - 6 m
b) Carriage way width - 7.5 m
c) Kerb - 600 x 275 on both side
d) Live load - IRC Class A (two lane)
e) Wearing coat - 110 mm thick
f) Use M-25 concrete and Fe-415 steel
g) Use $\alpha = 2.72$

Q.4 A RCC 'T' beam type bridge having deck slab of 200 mm thick, wearing coat of 100 mm thick, four longitudinal girders and five cross girders. Design the exterior longitudinal girder. Use following additional data, **10**

a) Carriage way width - 7.5 m
b) Span of bridge - 16m
c) Live Load - IRC class AA Tracked
d) Kerb - 600 mm wide, 400 mm deep
e) Web thickness for Longitudinal and cross girder - 300 mm
f) Longitudinal Girder spacing - 275 mm
g) Use M-25 concrete and Fe-415 steel

Q.5 Write the step wise procedure of design of Slab Panel using Pigeaud's theory. Also discuss the limitation of the same. **09**

Section – II

Q.6 Verify the adequacy of pier for the following data: **10**
Top width of pier - 1.8 m, Height of pier up to springing level - 10 m, C/C distance of bearing - 1.1 m, Side batter 1:14, HFL - 1.4 m below the bearing level, Span of bridge - 16 m, Self-weight of the superstructure = 200 kN/m , Live load - IRC class AA tracked, Material of pier = M20 concrete

Q.7 Verify the suitability of abutment as shown in the fig 7.1. Use following data **09**
Density of soil - 17 kN/m^3, Friction angle of soil (ø) = 31^o.
Coefficient of friction - 0.5, Live load IRC class AA tracked.

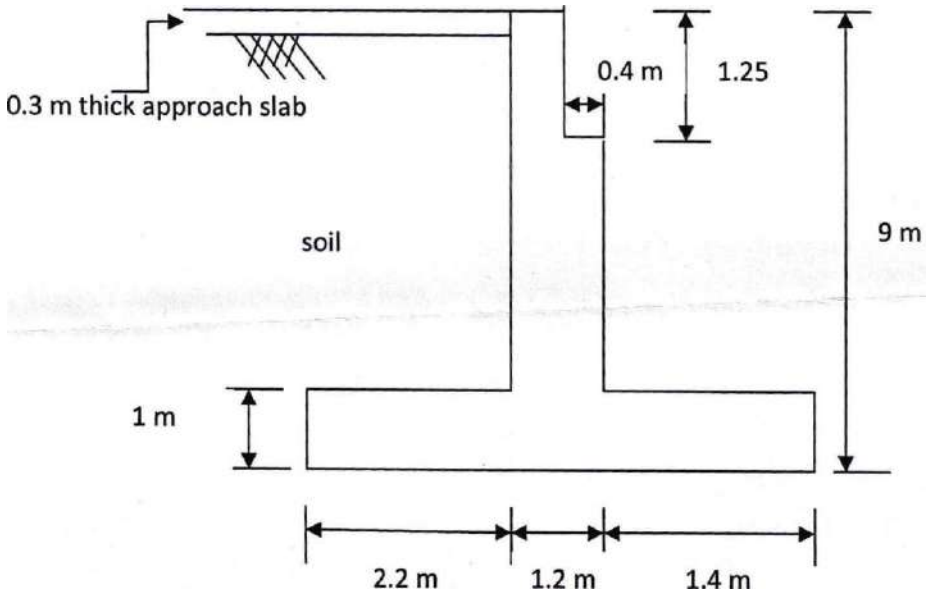

Fig no 7.1

Q.8 **a)** Design a elastomeric unreinforced bearing pad for following data **05**
Vertical load (sustained) = 170 kN,
Vertical load (dynamic) = 50 kN,
Horizontal force = 90 kN
Modulus of rigidity of elastomer - 1.1 N/mm^2
coefficient of friction = 0.4

b) Write a note on inspection of bridges **04**

Q.9 **Write a note on following. (Any Three)** **09**

a) Caisson foundation for bridges
b) Maintenance of bridge
c) Expansion joints
d) Instruments required for bridge inspection

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF BRIDGES

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) According to Courbon's method of analysis, the ratio of depth of cross beam to main girder in a Tee beam slab bridge deck should be at least _____.
   a) 0.5 b) 0.75
   c) 1 d) 1.2

2) The minimum number of cross beams in a T bridge should be _____.
   a) 3 b) 5
   c) 6 d) None of these

3) The shape factor of an elastomeric pad bearing designed to support a bridge girder should have value in the range of _____.
   a) 4 to 8 b) 6 to 12
   c) 12 to 16 d) 16 to 20

4) Span is called as economical span when _____.
   a) Cost of substructure should be equal to cost of superstructure.
   b) Cost of substructure should be greater than Cost of superstructure.
   c) Cost of substructure should be less than Cost of superstructure.
   d) Does not depend on cost.

5) Section III or IRC bridge codes is related with _____.
   a) Loads and stress
   b) Foundation and substructure
   c) Cement concrete (plain and reinforced)
   d) Steel road bridges

6) Pigeaud's curves are used to calculate _____.
   a) Bending moment coefficients b) Load factor
   c) Impact factor d) Effective span

7) As per crack control criteria of IRC-21, the diameter of bar in slabs shall not exceed _____.
   a) 36mm b) 32mm
   c) 25mm d) 40mm

8) The minimum width of carriage way for a two lane bridge is _____.
   a) 4.25m b) 10m
   c) 6m d) 7.5m

9) Culvert is the type of bridge whose span is _____.
   a) Between 6m-60m b) Above 60m
   c) Less than 6m d) None of these

10) In designing deck slab maximum bending moment develops when the IRC class AA tracked vehicle is placed _____.
   a) Adjacent to support
   b) At the center of span
   c) At quarter span
   d) Anywhere on span

11) As per crack control criteria of IRC-21, the spacing of main reinforced bar shall not exceed _____.
   a) 100mm
   b) 300mm
   c) 200mm
   d) 150mm

12) Simply supported span requires _____.
   a) Fixed bearing at both ends
   b) Expansion bearing at both ends
   c) Fixed bearing at one end and expansion bearing at the other
   d) Either a or b, both are correct

13) The toe and heel of the base slab are so proportioned that is eccentricity of resultant is limited to _____.
   a) 1/3 of the base width
   b) 1/6 of the base width
   c) 2/3 of the base width
   d) 1/2 of the base width

14) The wearing coat specified in the Indian standard codes on reinforced concrete deck slab is in the range of _____.
   a) 25 to 40mm
   b) 40 to 60 mm
   c) 75 to 100 mm
   d) none of these

Seat No.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF BRIDGES

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Solve any three questions each from Section I and Section II.
2) Q No. 4 & Q No.6 is compulsory.
3) Assume suitable data if necessary and mention it clearly.

Section I

Q.2 Answer the following

a) Enlist the various loads to be considered for the analysis of bridges? Explain any one in detail. **05**

b) Discuss the IRC class B loading. **04**

Q.3 Design a solid deck slab for Two lane bridge for following data. **09**

a) Effective span - 6 m
b) Carriage way width - 7.5 m
c) Kerb - 600 x 275 on both side
d) Live load - IRC Class A (two lane)
e) Wearing coat - 110 mm thick
f) Use M-25 concrete and Fe-415 steel
g) Use $\alpha = 2.72$

Q.4 A RCC 'T' beam type bridge having deck slab of 200 mm thick, wearing coat of 100 mm thick, four longitudinal girders and five cross girders. Design the exterior longitudinal girder. Use following additional data, **10**

a) Carriage way width - 7.5 m
b) Span of bridge - 16m
c) Live Load - IRC class AA Tracked
d) Kerb - 600 mm wide, 400 mm deep
e) Web thickness for Longitudinal and cross girder - 300 mm
f) Longitudinal Girder spacing - 275 mm
g) Use M-25 concrete and Fe-415 steel

Q.5 Write the step wise procedure of design of Slab Panel using Pigeaud's theory. Also discuss the limitation of the same. **09**

Section – II

Q.6 Verify the adequacy of pier for the following data: **10**
Top width of pier - 1.8 m, Height of pier up to springing level - 10 m, C/C distance of bearing - 1.1 m, Side batter 1:14, HFL - 1.4 m below the bearing level, Span of bridge - 16 m, Self-weight of the superstructure = 200 kN/m , Live load - IRC class AA tracked, Material of pier = M20 concrete

Q.7 Verify the suitability of abutment as shown in the fig 7.1. Use following data **09**
Density of soil - 17 kN/m^3, Friction angle of soil (ø) = 31^o.
Coefficient of friction - 0.5, Live load IRC class AA tracked.

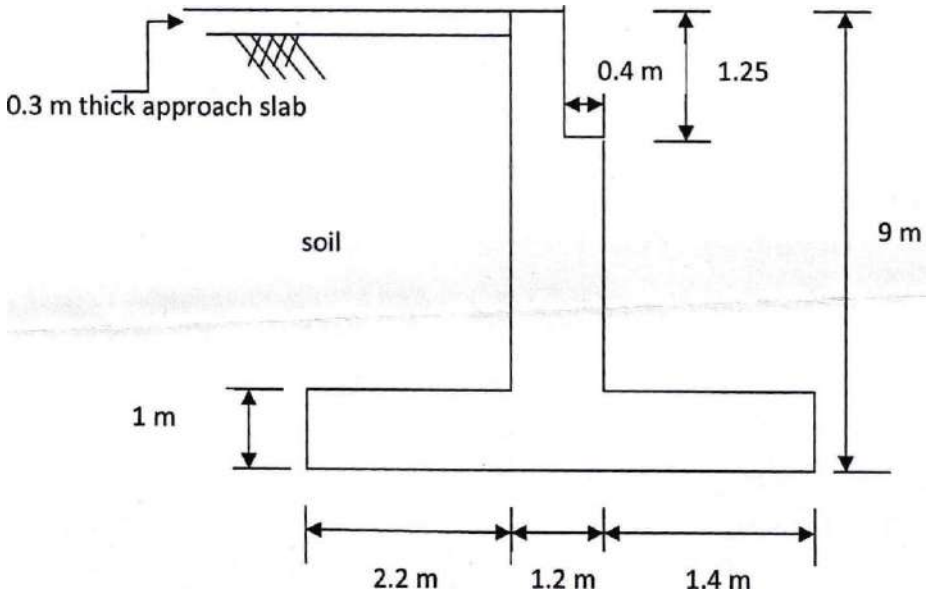

Fig no 7.1

Q.8 **a)** Design a elastomeric unreinforced bearing pad for following data **05**
Vertical load (sustained) = 170 kN,
Vertical load (dynamic) = 50 kN,
Horizontal force = 90 kN
Modulus of rigidity of elastomer - 1.1 N/mm^2
coefficient of friction = 0.4

b) Write a note on inspection of bridges **04**

Q.9 **Write a note on following. (Any Three)** **09**

a) Caisson foundation for bridges
b) Maintenance of bridge
c) Expansion joints
d) Instruments required for bridge inspection

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF BRIDGES

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) Simply supported span requires _____.
   a) Fixed bearing at both ends
   b) Expansion bearing at both ends
   c) Fixed bearing at one end and expansion bearing at the other
   d) Either a or b, both are correct

2) The toe and heel of the base slab are so proportioned that is eccentricity of resultant is limited to _____.
   a) 1/3 of the base width b) 1/6 of the base width
   c) 2/3 of the base width d) 1/2 of the base width

3) The wearing coat specified in the Indian standard codes on reinforced concrete deck slab is in the range of _____.
   a) 25 to 40mm b) 40 to 60 mm
   c) 75 to 100 mm d) none of these

4) According to Courbon's method of analysis, the ratio of depth of cross beam to main girder in a Tee beam slab bridge deck should be at least _____.
   a) 0.5 b) 0.75
   c) 1 d) 1.2

5) The minimum number of cross beams in a T bridge should be _____.
   a) 3 b) 5
   c) 6 d) None of these

6) The shape factor of an elastomeric pad bearing designed to support a bridge girder should have value in the range of _____.
   a) 4 to 8 b) 6 to 12
   c) 12 to 16 d) 16 to 20

7) Span is called as economical span when _____.
   a) Cost of substructure should be equal to cost of superstructure.
   b) Cost of substructure should be greater than Cost of superstructure.
   c) Cost of substructure should be less than Cost of superstructure.
   d) Does not depend on cost.

8) Section III or IRC bridge codes is related with _____.
   a) Loads and stress
   b) Foundation and substructure
   c) Cement concrete (plain and reinforced)
   d) Steel road bridges

9) Pigeaud's curves are used to calculate _____.
   a) Bending moment coefficients b) Load factor
   c) Impact factor d) Effective span

10) As per crack control criteria of IRC-21, the diameter of bar in slabs shall not exceed _____.
   a) 36mm b) 32mm
   c) 25mm d) 40mm

11) The minimum width of carriage way for a two lane bridge is _____.
   a) 4.25m b) 10m
   c) 6m d) 7.5m

12) Culvert is the type of bridge whose span is _____.
   a) Between 6m-60m b) Above 60m
   c) Less than 6m d) None of these

13) In designing deck slab maximum bending moment develops when the IRC class AA tracked vehicle is placed _____.
   a) Adjacent to support b) At the center of span
   c) At quarter span d) Anywhere on span

14) As per crack control criteria of IRC-21, the spacing of main reinforced bar shall not exceed _____.
   a) 100mm b) 300mm
   c) 200mm d) 150mm

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF BRIDGES

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Solve any three questions each from Section I and Section II.
2) Q No. 4 & Q No.6 is compulsory.
3) Assume suitable data if necessary and mention it clearly.

Section I

Q.2 Answer the following

a) Enlist the various loads to be considered for the analysis of bridges? Explain any one in detail. **05**

b) Discuss the IRC class B loading. **04**

Q.3 Design a solid deck slab for Two lane bridge for following data. **09**

a) Effective span - 6 m
b) Carriage way width - 7.5 m
c) Kerb - 600 x 275 on both side
d) Live load - IRC Class A (two lane)
e) Wearing coat - 110 mm thick
f) Use M-25 concrete and Fe-415 steel
g) Use $\alpha = 2.72$

Q.4 A RCC 'T' beam type bridge having deck slab of 200 mm thick, wearing coat of 100 mm thick, four longitudinal girders and five cross girders. Design the exterior longitudinal girder. Use following additional data, **10**

a) Carriage way width - 7.5 m
b) Span of bridge - 16m
c) Live Load - IRC class AA Tracked
d) Kerb - 600 mm wide, 400 mm deep
e) Web thickness for Longitudinal and cross girder - 300 mm
f) Longitudinal Girder spacing - 275 mm
g) Use M-25 concrete and Fe-415 steel

Q.5 Write the step wise procedure of design of Slab Panel using Pigeaud's theory. Also discuss the limitation of the same. **09**

Section – II

Q.6 Verify the adequacy of pier for the following data: **10**
Top width of pier - 1.8 m, Height of pier up to springing level - 10 m, C/C distance of bearing - 1.1 m, Side batter 1:14, HFL - 1.4 m below the bearing level, Span of bridge - 16 m, Self-weight of the superstructure = 200 kN/m , Live load - IRC class AA tracked, Material of pier = M20 concrete

Q.7 Verify the suitability of abutment as shown in the fig 7.1. Use following data **09**
Density of soil - 17 kN/m^3, Friction angle of soil (ø) = 31^o.
Coefficient of friction - 0.5, Live load IRC class AA tracked.

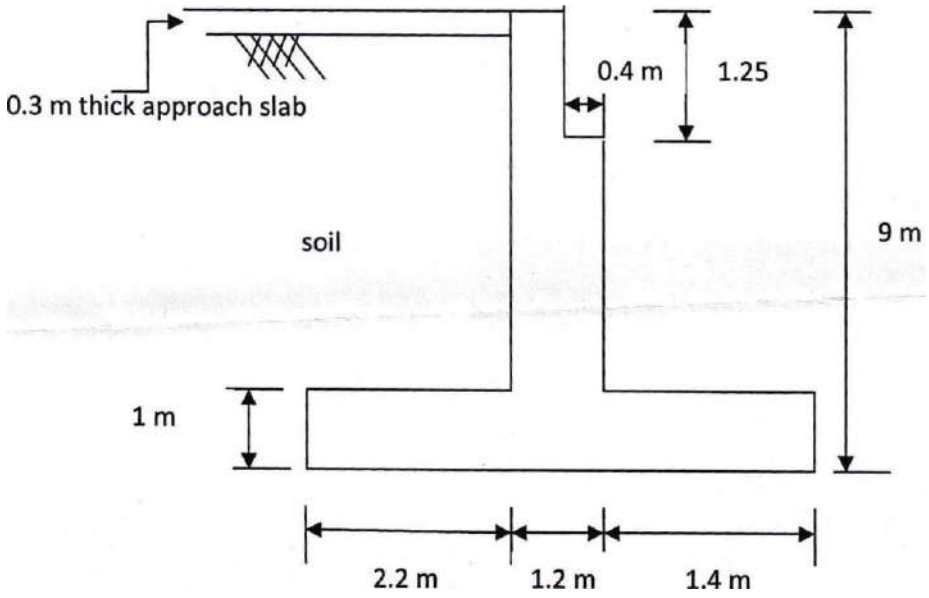

Fig no 7.1

Q.8 **a)** Design a elastomeric unreinforced bearing pad for following data **05**
Vertical load (sustained) = 170 kN,
Vertical load (dynamic) = 50 kN,
Horizontal force = 90 kN
Modulus of rigidity of elastomer - 1.1 N/mm^2
coefficient of friction = 0.4

b) Write a note on inspection of bridges **04**

Q.9 **Write a note on following. (Any Three)** **09**

a) Caisson foundation for bridges
b) Maintenance of bridge
c) Expansion joints
d) Instruments required for bridge inspection

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF BRIDGES

Day & Date: Monday, 25-11-2019 Max. Marks: 70
Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The shape factor of an elastomeric pad bearing designed to support a bridge girder should have value in the range of _____.
   a) 4 to 8 b) 6 to 12
   c) 12 to 16 d) 16 to 20

2) Span is called as economical span when _____.
   a) Cost of substructure should be equal to cost of superstructure.
   b) Cost of substructure should be greater than Cost of superstructure.
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3) Section III or IRC bridge codes is related with _____.
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4) Pigeaud's curves are used to calculate _____.
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10) Simply supported span requires _____.
   a) Fixed bearing at both ends
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   a) 1/3 of the base width b) 1/6 of the base width
   c) 2/3 of the base width d) 1/2 of the base width

12) The wearing coat specified in the Indian standard codes on reinforced concrete deck slab is in the range of _____.
   a) 25 to 40mm b) 40 to 60 mm
   c) 75 to 100 mm d) none of these

13) According to Courbon's method of analysis, the ratio of depth of cross beam to main girder in a Tee beam slab bridge deck should be at least _____.
   a) 0.5 b) 0.75
   c) 1 d) 1.2

14) The minimum number of cross beams in a T bridge should be _____.
   a) 3 b) 5
   c) 6 d) None of these

SLR-FM-98

Seat No.	

Set S

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Civil Engineering
DESIGN OF BRIDGES

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Solve any three questions each from Section I and Section II.
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Section I

Q.2 Answer the following

a) Enlist the various loads to be considered for the analysis of bridges? Explain any one in detail. **05**

b) Discuss the IRC class B loading. **04**

Q.3 Design a solid deck slab for Two lane bridge for following data. **09**

a) Effective span - 6 m
b) Carriage way width - 7.5 m
c) Kerb - 600 x 275 on both side
d) Live load - IRC Class A (two lane)
e) Wearing coat - 110 mm thick
f) Use M-25 concrete and Fe-415 steel
g) Use $\alpha = 2.72$

Q.4 A RCC 'T' beam type bridge having deck slab of 200 mm thick, wearing coat of 100 mm thick, four longitudinal girders and five cross girders. Design the exterior longitudinal girder. Use following additional data, **10**

a) Carriage way width - 7.5 m
b) Span of bridge - 16m
c) Live Load - IRC class AA Tracked
d) Kerb - 600 mm wide, 400 mm deep
e) Web thickness for Longitudinal and cross girder - 300 mm
f) Longitudinal Girder spacing - 275 mm
g) Use M-25 concrete and Fe-415 steel

Q.5 Write the step wise procedure of design of Slab Panel using Pigeaud's theory. Also discuss the limitation of the same. **09**

Section – II

Q.6 Verify the adequacy of pier for the following data: **10**
Top width of pier - 1.8 m, Height of pier up to springing level - 10 m, C/C distance of bearing - 1.1 m, Side batter 1:14, HFL - 1.4 m below the bearing level, Span of bridge - 16 m, Self-weight of the superstructure = 200 kN/m , Live load - IRC class AA tracked, Material of pier = M20 concrete

Q.7 Verify the suitability of abutment as shown in the fig 7.1. Use following data **09**
Density of soil - 17 kN/m^3, Friction angle of soil (Ø) = 31^o.
Coefficient of friction - 0.5, Live load IRC class AA tracked.

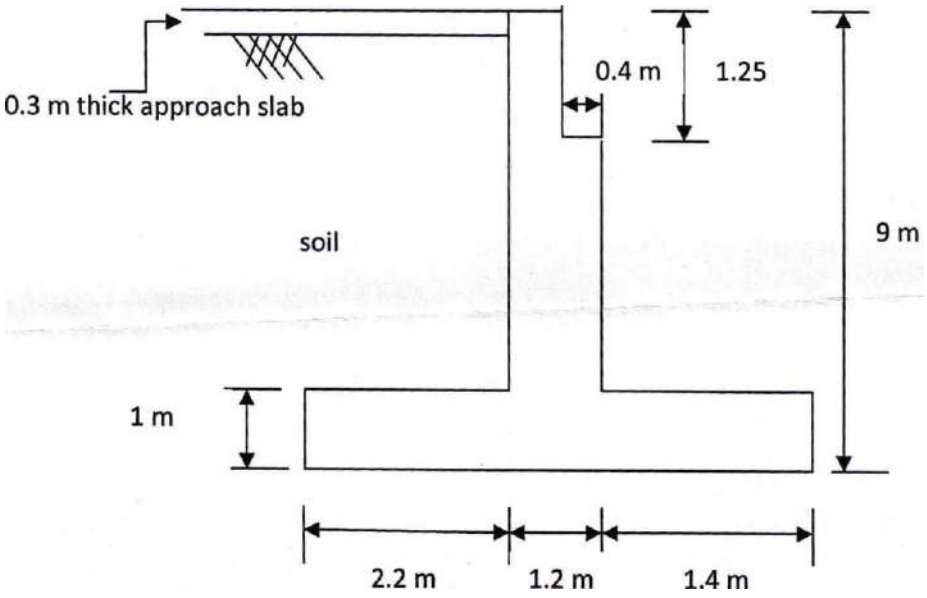

Fig no 7.1

Q.8 **a)** Design a elastomeric unreinforced bearing pad for following data **05**
Vertical load (sustained) = 170 kN,
Vertical load (dynamic) = 50 kN,
Horizontal force = 90 kN
Modulus of rigidity of elastomer - 1.1 N/mm^2
coefficient of friction = 0.4

b) Write a note on inspection of bridges **04**

Q.9 **Write a note on following. (Any Three)** **09**

a) Caisson foundation for bridges
b) Maintenance of bridge
c) Expansion joints
d) Instruments required for bridge inspection