SLR-EP – 16

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
CONCRETE TECHNOLOGY

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Assume suitable data **if necessary** and mention it **clearly**.*
*4) Figures to **right** indicate **full** marks.*
*5) **Use** of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Which of the following is not a composition of cement ?
   a) Tricalcium silicate b) Diacalcium silicate
   c) Tricalcium aluminate d) Dicalcium aluminate

2) At 28 days of curing concrete attains a strength of
   a) 20 to 25% b) 60 to 70% c) 65 to 80% d) 90 to 95%

3) As the workability increases compaction factor
   a) Decreases b) Increases c) Remains same d) None of these

4) The volume of one bag of cement is taken as
   a) 35 liters b) 70 liters c) 35 m^3 d) 70 m^3

5) Workability of concrete mix with low water cement ratio is determined by
   a) Tensile strength test b) Slump cone test
   c) Compaction Factor test d) Flexural strength test

6) The process of proper and accurate measurement of concrete ingredients for uniformity proportion, is known as
   a) Curing b) Mixing c) Grading d) Batching

7) The tensile strength of concrete is about _____ of its compressive strength.
   a) 10 to 15% b) 30 to 40% c) 50% d) 60 to 75%

8) Which of the following is not cement in the real sense ?
   a) blast-furnace-slag cement b) low heat cement
   c) high alumina cement d) None of the above

9) The function of fine aggregate
   a) to assist in producing workability and uniformity in the mixture
   b) to assist the cement paste to hold the coarse aggregate particles in suspension
   c) to promote plasticity in the mixture prevent possible segregation of paste and coarse aggregate
   d) all of the above

10) Gap grading is one in which ?
   a) one or more intermediate fractions are absent
   b) the particle fall within a narrow limit of size fractions
   c) combination of fractions of FA and CA
   d) all the particles are of uniform size

11) Addition of Pozzolanic material results in
   a) Improved workability
   b) Reduction in heat of hydration
   c) Increased resistance to sulphate attack
   d) All of the above

12) The workability of concrete using Vee-Bee test is measured in
   a) mm b) cm c) min d) sec

13) Shrinkage increases with
   a) Increase in the water-cement ratio
   b) Increase in cement content
   c) Decrease in humidity
   d) All of the above

14) The strength of concrete is decreased by
   a) Vibration b) Impact
   c) Fatigue d) None of the above

_____

SLR-EP – 16

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
CONCRETE TECHNOLOGY

Day and Date : Tuesday, 13-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data if* ***necessary*** *and mention it* ***clearly****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Write a short note on **any seven** (**4** marks **each**) : **(7×4=28)**
   a) Bogue's Compounds
   b) Importance of shape and texture of aggregate
   c) Bulking of sand
   d) Plasticizers and super plasticizers
   e) Rapid hardening cement
   f) Compaction Factor Test
   g) Importance of grading of aggregates
   h) Factors affecting workability
   i) Gap Grading
   j) Mixing of concrete.

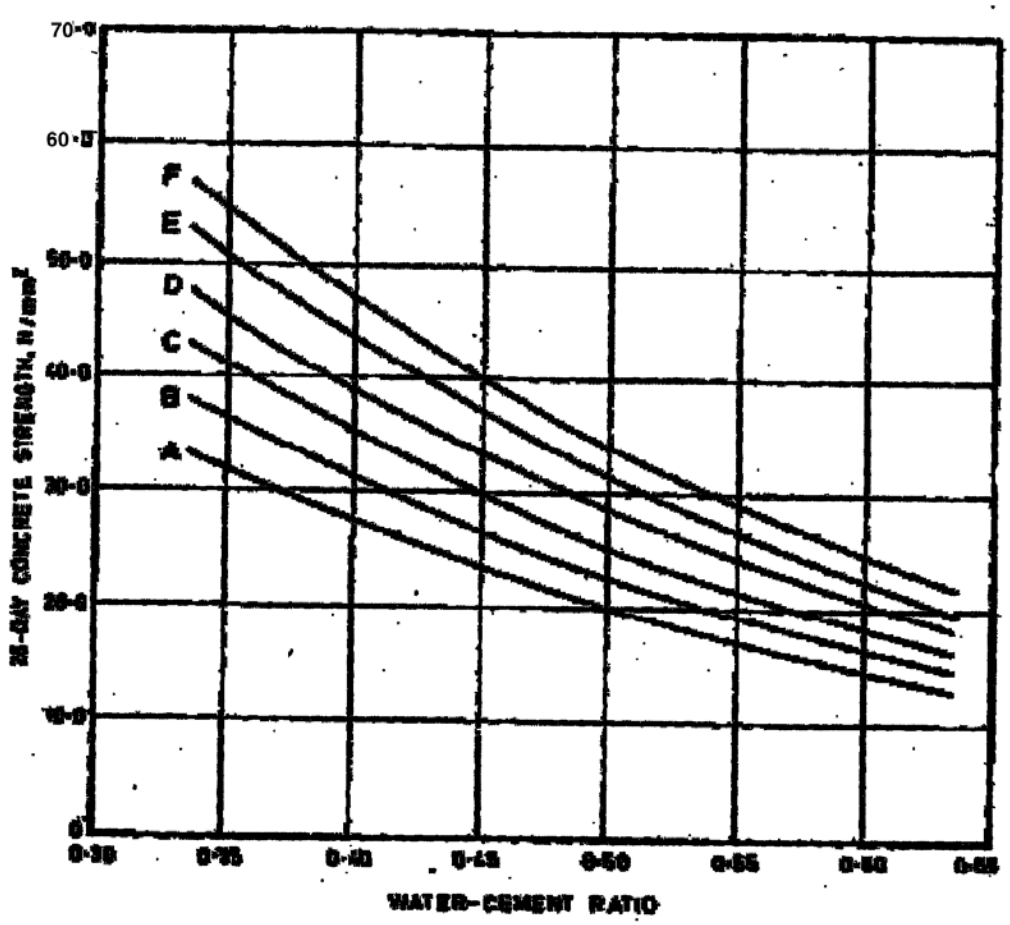
SECTION – II

3. Design a concrete mix of grade M25 as per ACI Method for following data : **16**

   Concrete is to be used for R.C.C. work of residential building.
   1) Cement to be used – OPC 53 grade
   2) Workability required – 80 – 100 mm Slump (Medium Workability)
   3) Degree of control = Very Good
   4) Method of concrete placing – Pumping
   5) Max. size of aggregate – 20 mm, angular
   6) Test data for material
      a) Specific gravity of Cement = 3.15, FA = 2.60 and CA = 2.90
      b) Dry Rodded Bulk Density of FA = 1880 kg/m^3 and CA = 1760 kg/m^3
      c) Water absorption of FA = 2% and CA = 1%
      d) Moisture content of FA = 2% and CA = 0%.

7) Sieve Analysis

	IS Sieve Size (mm)		40	20	10	4.75	2.36	1.18	0.6	0.3	0.15	
	% Passing	CA I	100	100	88	12	03	–	–	–	–	
		CA II	100	92	14	03	–	–	–	–	–	
		FA	–	–	100	89	70	35	19	08	02	



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 : IS10262-1982)

Table No. 1 : Value for the factor K Himsworth Constant.

Percentage of result allowed to fall below the minimum	Value K
0.1	3.09
0.6	2.50
1.0	2.33
2.5	1.96
5.0	1.65
6.6	1.50
16.0	1

Table No. 2 : Suggested values for standard deviation.

Sr. No.	Placing and Mixing Condition	Degree of Control	Standard Deviation (MPa)
1	Dried aggregates, Completely accurate grading, exact water/cement ratio, controlled temperature curing	Laboratory Precision	1.3
2	Weigh-batching of all materials, control of aggregate grading, 3 sizes of aggregates plus sand, control of water added to allow for moisture content of aggregates, allowance for weight of aggregate and sand displaced by water, continual supervision	Excellent	2.8
3	Weigh-batching of all materials, control of aggregate grading, control of water added to allow for moisture content of aggregates, continual supervision	High	3.50
4	Weigh-batching of all materials, control of aggregate grading, control of water added, frequent supervision	Very Good	4.20
5	Weigh-batching of all materials, water content controlled by inspection of mix, periodic check of workability, use of two sizes of aggregate (Fine and Coarse), only intermittent supervision	Good	5.70
6	Volume batching of all aggregates allowing for bulking of sand, weigh batching of cement, water content controlled by inspection of mix, intermittent supervision	Fair	6.50
7	Volume batching of all materials use of all in aggregate, little or no supervision	Poor Uncontrolled	8.50

Table No. 3 : Approximate mixing water requirements for different slumps and maximum size of aggregate.

Sr. No.	Slump Value (mm)	Water, kg/cum of concrete, for maximum size of coarse aggregate							
		10 mm	12.5 mm	20 mm	25 mm	40 mm	50 mm	70 mm	150 mm
1	30 to 50	205	200	185	180	160	155	145	125
2	80 to 100	225	215	200	195	175	170	160	140
3	150 to 180	240	230	210	205	185	180	170	–
4	Approximate air content (%)	3	2.50	2	1.50	1	0.50	0.30	0.20

Ref : ACI Manual 211.1

Notes : The above values are maximum, for reasonably well shaped angular aggregate graded with acceptable limits.

1) The quantities of mixing water can be used to compute cement factors for trial batches.
2) For aggregates greater than 40 mm, the slump values are based on slump tests after removal of particles greater than 40 mm by wet screening.

Table No. 4 : Requirements of ACI 318-89, for W/C ratio and strength for special exposure conditions.

Sr. No.	Exposure condition	Maximum W/C ratio,	Minimum Design strength (MPa)
1	Concrete intended to be watertight		
	a) Exposed to fresh water	0.50	25
	b) Exposed to brackish or sea water	0.45	30
2	Concrete exposed to freezing and thawing in a moist condition		
	a) Kerbs, gutters, gurad rail or thin sections	0.45	30
	b) Other elements	0.50	25
	c) In presence of de-icing chemicals	0.45	30
3	For corrosion protection of reinforced concrete exposed to deicing salts, brackish water, sea water or spray from these sources	0.40	30

Table No. 5 : Dry bulk volume of coarse aggregate per unit valume of concrete.

Maximum size of aggregate	Volume of rodded coarse aggregate per unit volume of concrete for different fineness moduli of sand			
	2.40	2.60	2.80	3.00
10 mm	0.50	0.48	0.46	0.44
12.5 mm	0.59	0.57	0.55	0.53
20 mm	0.66	0.64	0.62	0.60
25 mm	0.71	0.69	0.67	0.65
40 mm	0.76	0.74	0.72	0.70
50 mm	0.78	0.76	0.74	0.72
70 mm	0.81	0.79	0.77	0.75
150 mm	0.87	0.85	0.83	0.81

Notes :

1) These volumes are selected from empirical relationships to produce concrete with a degree of workability suitable for usual RC construction, for less workable concrete, such as that required for concrete pavements they may be increased by about 10 percent, for more workable concrete, such as that required for pumped concrete, they may be decrease by about 10 percent.
2) Fineness modulus of sand = sum of cumulative ratios retained on sieved with square opening of about 0.15, 0.30, 0.60, 1.18, 2.36 and 4.75 mm.

Table No. 6 : First estimate of the weight of fresh concrete.

Sr. No.	Maximum size of aggregate	First estimate of concrete weight (kg/cum)	
		Non air entrained Concrete	Air Entrained Concrete
1	10 mm	2285	2190
2	12.5 mm	2315	2235
3	20 mm	2355	2280
4	25 mm	2375	2315
5	40 mm	2420	2355
6	50 mm	2445	2375
7	70 mm	2465	2400
8	150 mm	2505	2435

Notes :

1) Above values are based on concrete of medium richness (cement content 330 kg/cum), medium slump and specific gravity of aggregate = 2.70.

2) If required, the estimate of weight may be refined as follows based on available information : for every 5 kg difference in mixing water from values for 80 to 10 mm slump, correct the weight per cum by 8 kg in the opposite direction ; for every 20 kg difference in cement content from 330 kg, correct the weight per cum by 3 kg in same direction ; for every 0.1 value by which the aggregate specific gravity deviates from 2.70, correct the concrete weight by 70 kg in same direction.

OR

Explain stepwise procedure used for concrete mix design by IS code method.

4. Write a short note on **any three** : **(3×4=12)**
   1) Shrinkage of concrete
   2) Effect of W/C ratio on durability of concrete
   3) Nominal mix concrete
   4) Light weight concrete
   5) Factors affecting quality control of concrete.

SLR-EP – 16

Seat No.	

Set Q

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CONCRETE TECHNOLOGY

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MCQ/Objective Type Questions

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   a) blast-furnace-slag cement b) low heat cement
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2) The function of fine aggregate
   a) to assist in producing workability and uniformity in the mixture
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   c) to promote plasticity in the mixture prevent possible segregation of paste and coarse aggregate
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SLR-EP – 16

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SECTION – I

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SECTION – II

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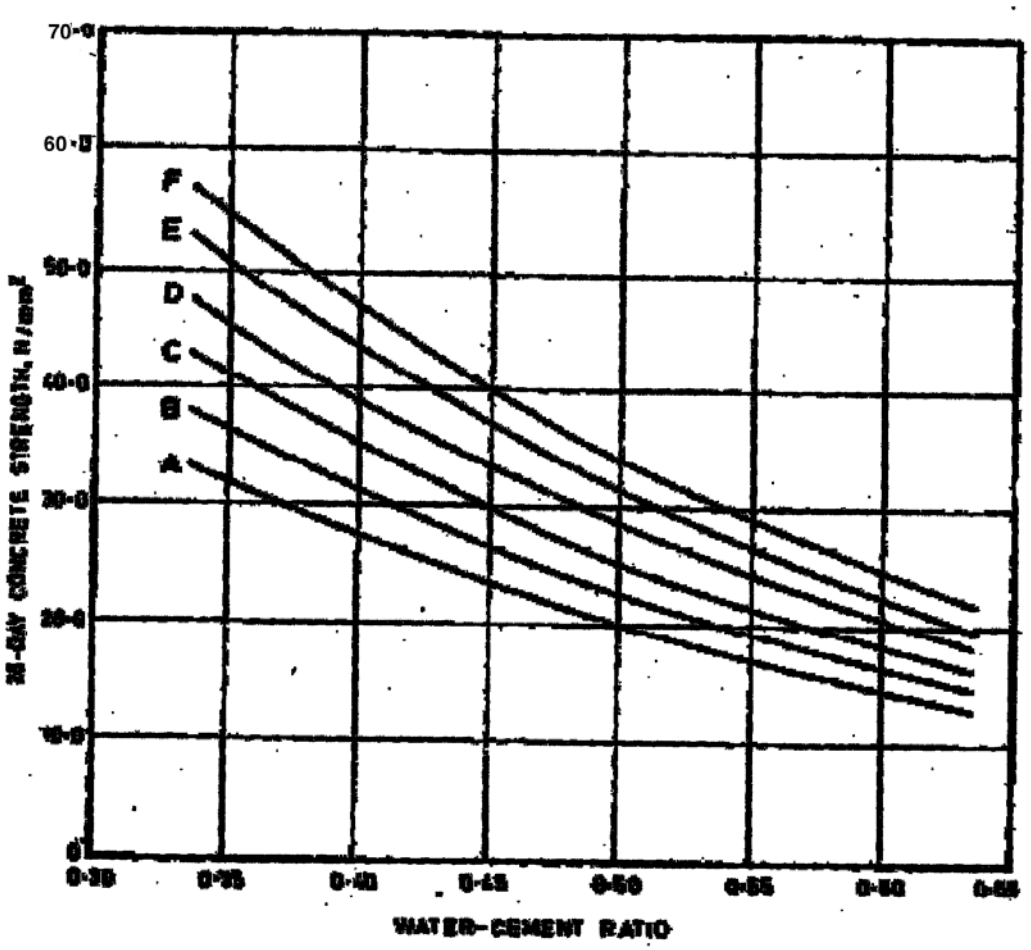

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Fig. 1 relationship between free water-cement ratio and concrete strength for different cement strengths (Ref : IS10262-1982)

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Sr. No.	Placing and Mixing Condition	Degree of Control	Standard Deviation (MPa)
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3	Weigh-batching of all materials, control of aggregate grading, control of water added to allow for moisture content of aggregates, continual supervision	High	3.50
4	Weigh-batching of all materials, control of aggregate grading, control of water added, frequent supervision	Very Good	4.20
5	Weigh-batching of all materials, water content controlled by inspection of mix, periodic check of workability, use of two sizes of aggregate (Fine and Coarse), only intermittent supervision	Good	5.70
6	Volume batching of all aggregates allowing for bulking of sand, weigh batching of cement, water content controlled by inspection of mix, intermittent supervision	Fair	6.50
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Sr. No.	Slump Value (mm)	Water, kg/cum of concrete, for maximum size of coarse aggregate							
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2	80 to 100	225	215	200	195	175	170	160	140
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4	Approximate air content (%)	3	2.50	2	1.50	1	0.50	0.30	0.20

Ref : ACI Manual 211.1

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	b) Other elements	0.50	25
	c) In presence of de-icing chemicals	0.45	30
3	For corrosion protection of reinforced concrete exposed to deicing salts, brackish water, sea water or spray from these sources	0.40	30

Table No. 5 : Dry bulk volume of coarse aggregate per unit valume of concrete.

Maximum size of aggregate	Volume of rodded coarse aggregate per unit volume of concrete for different fineness moduli of sand			
	2.40	2.60	2.80	3.00
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12.5 mm	0.59	0.57	0.55	0.53
20 mm	0.66	0.64	0.62	0.60
25 mm	0.71	0.69	0.67	0.65
40 mm	0.76	0.74	0.72	0.70
50 mm	0.78	0.76	0.74	0.72
70 mm	0.81	0.79	0.77	0.75
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Notes :

1) These volumes are selected from empirical relationships to produce concrete with a degree of workability suitable for usual RC construction, for less workable concrete, such as that required for concrete pavements they may be increased by about 10 percent, for more workable concrete, such as that required for pumped concrete, they may be decrease by about 10 percent.
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Notes :

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SLR-EP – 16

Seat No.	

Set R

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CONCRETE TECHNOLOGY

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MCQ/Objective Type Questions

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   a) Tensile strength test b) Slump cone test
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SLR-EP – 16

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
CONCRETE TECHNOLOGY

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SECTION – I

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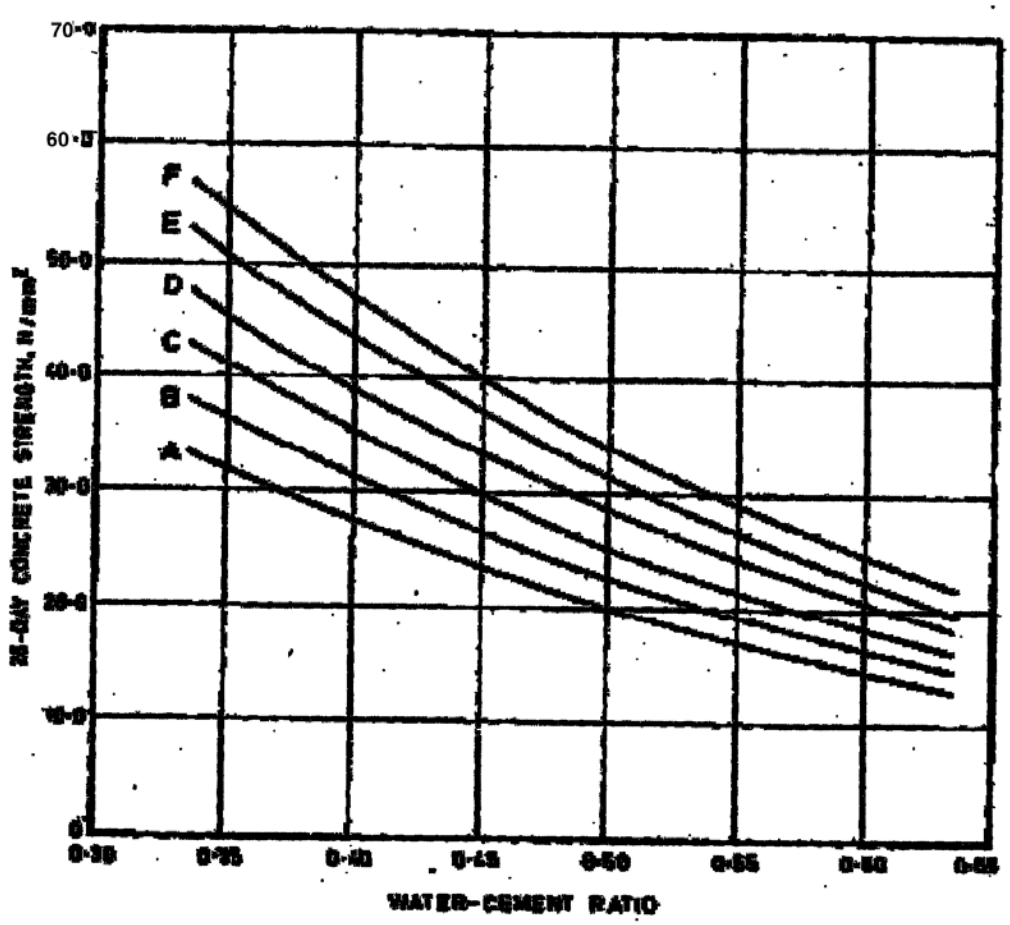
   Concrete is to be used for R.C.C. work of residential building.
   1) Cement to be used – OPC 53 grade
   2) Workability required – 80 – 100 mm Slump (Medium Workability)
   3) Degree of control = Very Good
   4) Method of concrete placing – Pumping
   5) Max. size of aggregate – 20 mm, angular
   6) Test data for material
      a) Specific gravity of Cement = 3.15, FA = 2.60 and CA = 2.90
      b) Dry Rodded Bulk Density of FA = 1880 kg/m^3 and CA = 1760 kg/m^3
      c) Water absorption of FA = 2% and CA = 1%
      d) Moisture content of FA = 2% and CA = 0%.

7) Sieve Analysis

	IS Sieve Size (mm)		40	20	10	4.75	2.36	1.18	0.6	0.3	0.15	
	% Passing	CA I	100	100	88	12	03	–	–	–	–	
		CA II	100	92	14	03	–	–	–	–	–	
		FA	–	–	100	89	70	35	19	08	02	



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 : IS10262-1982)

Table No. 1 : Value for the factor K Himsworth Constant.

Percentage of result allowed to fall below the minimum	Value K
0.1	3.09
0.6	2.50
1.0	2.33
2.5	1.96
5.0	1.65
6.6	1.50
16.0	1

Table No. 2 : Suggested values for standard deviation.

Sr. No.	Placing and Mixing Condition	Degree of Control	Standard Deviation (MPa)
1	Dried aggregates, Completely accurate grading, exact water/cement ratio, controlled temperature curing	Laboratory Precision	1.3
2	Weigh-batching of all materials, control of aggregate grading, 3 sizes of aggregates plus sand, control of water added to allow for moisture content of aggregates, allowance for weight of aggregate and sand displaced by water, continual supervision	Excellent	2.8
3	Weigh-batching of all materials, control of aggregate grading, control of water added to allow for moisture content of aggregates, continual supervision	High	3.50
4	Weigh-batching of all materials, control of aggregate grading, control of water added, frequent supervision	Very Good	4.20
5	Weigh-batching of all materials, water content controlled by inspection of mix, periodic check of workability, use of two sizes of aggregate (Fine and Coarse), only intermittent supervision	Good	5.70
6	Volume batching of all aggregates allowing for bulking of sand, weigh batching of cement, water content controlled by inspection of mix, intermittent supervision	Fair	6.50
7	Volume batching of all materials use of all in aggregate, little or no supervision	Poor Uncontrolled	8.50

Table No. 3 : Approximate mixing water requirements for different slumps and maximum size of aggregate.

Sr. No.	Slump Value (mm)	Water, kg/cum of concrete, for maximum size of coarse aggregate							
		10 mm	12.5 mm	20 mm	25 mm	40 mm	50 mm	70 mm	150 mm
1	30 to 50	205	200	185	180	160	155	145	125
2	80 to 100	225	215	200	195	175	170	160	140
3	150 to 180	240	230	210	205	185	180	170	–
4	Approximate air content (%)	3	2.50	2	1.50	1	0.50	0.30	0.20

Ref : ACI Manual 211.1

Notes : The above values are maximum, for reasonably well shaped angular aggregate graded with acceptable limits.

1) The quantities of mixing water can be used to compute cement factors for trial batches.
2) For aggregates greater than 40 mm, the slump values are based on slump tests after removal of particles greater than 40 mm by wet screening.

Table No. 4 : Requirements of ACI 318-89, for W/C ratio and strength for special exposure conditions.

Sr. No.	Exposure condition	Maximum W/C ratio,	Minimum Design strength (MPa)
1	Concrete intended to be watertight		
	a) Exposed to fresh water	0.50	25
	b) Exposed to brackish or sea water	0.45	30
2	Concrete exposed to freezing and thawing in a moist condition		
	a) Kerbs, gutters, gurad rail or thin sections	0.45	30
	b) Other elements	0.50	25
	c) In presence of de-icing chemicals	0.45	30
3	For corrosion protection of reinforced concrete exposed to deicing salts, brackish water, sea water or spray from these sources	0.40	30

Table No. 5 : Dry bulk volume of coarse aggregate per unit valume of concrete.

Maximum size of aggregate	Volume of rodded coarse aggregate per unit volume of concrete for different fineness moduli of sand			
	2.40	2.60	2.80	3.00
10 mm	0.50	0.48	0.46	0.44
12.5 mm	0.59	0.57	0.55	0.53
20 mm	0.66	0.64	0.62	0.60
25 mm	0.71	0.69	0.67	0.65
40 mm	0.76	0.74	0.72	0.70
50 mm	0.78	0.76	0.74	0.72
70 mm	0.81	0.79	0.77	0.75
150 mm	0.87	0.85	0.83	0.81

Notes :

1) These volumes are selected from empirical relationships to produce concrete with a degree of workability suitable for usual RC construction, for less workable concrete, such as that required for concrete pavements they may be increased by about 10 percent, for more workable concrete, such as that required for pumped concrete, they may be decrease by about 10 percent.
2) Fineness modulus of sand = sum of cumulative ratios retained on sieved with square opening of about 0.15, 0.30, 0.60, 1.18, 2.36 and 4.75 mm.

Table No. 6 : First estimate of the weight of fresh concrete.

Sr. No.	Maximum size of aggregate	First estimate of concrete weight (kg/cum)	
		Non air entrained Concrete	Air Entrained Concrete
1	10 mm	2285	2190
2	12.5 mm	2315	2235
3	20 mm	2355	2280
4	25 mm	2375	2315
5	40 mm	2420	2355
6	50 mm	2445	2375
7	70 mm	2465	2400
8	150 mm	2505	2435

Notes :

1) Above values are based on concrete of medium richness (cement content 330 kg/cum), medium slump and specific gravity of aggregate = 2.70.

2) If required, the estimate of weight may be refined as follows based on available information : for every 5 kg difference in mixing water from values for 80 to 10 mm slump, correct the weight per cum by 8 kg in the opposite direction ; for every 20 kg difference in cement content from 330 kg, correct the weight per cum by 3 kg in same direction ; for every 0.1 value by which the aggregate specific gravity deviates from 2.70, correct the concrete weight by 70 kg in same direction.

OR

Explain stepwise procedure used for concrete mix design by IS code method.

4. Write a short note on **any three** : **(3×4=12)**

1) Shrinkage of concrete
2) Effect of W/C ratio on durability of concrete
3) Nominal mix concrete
4) Light weight concrete
5) Factors affecting quality control of concrete.

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SLR-EP – 16

Seat No.	

Set S

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
CONCRETE TECHNOLOGY

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Assume suitable data **if necessary** and mention it **clearly**.*
*4) Figures to **right** indicate **full** marks.*
*5) **Use** of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Gap grading is one in which ?
   a) one or more intermediate fractions are absent
   b) the particle fall within a narrow limit of size fractions
   c) combination of fractions of FA and CA
   d) all the particles are of uniform size

2) Addition of Pozzolanic material results in
   a) Improved workability
   b) Reduction in heat of hydration
   c) Increased resistance to sulphate attack
   d) All of the above

3) The workability of concrete using Vee-Bee test is measured in
   a) mm b) cm c) min d) sec

4) Shrinkage increases with
   a) Increase in the water-cement ratio
   b) Increase in cement content
   c) Decrease in humidity
   d) All of the above

5) The strength of concrete is decreased by
   a) Vibration b) Impact
   c) Fatigue d) None of the above

6) Which of the following is not a composition of cement ?
   a) Tricalcium silicate b) Diacalcium silicate
   c) Tricalcium aluminate d) Dicalcium aluminate

7) At 28 days of curing concrete attains a strength of
   a) 20 to 25% b) 60 to 70% c) 65 to 80% d) 90 to 95%

8) As the workability increases compaction factor
   a) Decreases b) Increases c) Remains same d) None of these

9) The volume of one bag of cement is taken as
   a) 35 liters b) 70 liters c) 35 m^3 d) 70 m^3

10) Workability of concrete mix with low water cement ratio is determined by
   a) Tensile strength test b) Slump cone test
   c) Compaction Factor test d) Flexural strength test

11) The process of proper and accurate measurement of concrete ingredients for uniformity proportion, is known as
   a) Curing b) Mixing c) Grading d) Batching

12) The tensile strength of concrete is about _____ of its compressive strength.
   a) 10 to 15% b) 30 to 40% c) 50% d) 60 to 75%

13) Which of the following is not cement in the real sense ?
   a) blast-furnace-slag cement b) low heat cement
   c) high alumina cement d) None of the above

14) The function of fine aggregate
   a) to assist in producing workability and uniformity in the mixture
   b) to assist the cement paste to hold the coarse aggregate particles in suspension
   c) to promote plasticity in the mixture prevent possible segregation of paste and coarse aggregate
   d) all of the above

_____

SLR-EP – 16

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
CONCRETE TECHNOLOGY

Day and Date : Tuesday, 13-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data if* ***necessary*** *and mention it* ***clearly****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Write a short note on **any seven** (**4** marks **each**) : **(7×4=28)**
   a) Bogue's Compounds
   b) Importance of shape and texture of aggregate
   c) Bulking of sand
   d) Plasticizers and super plasticizers
   e) Rapid hardening cement
   f) Compaction Factor Test
   g) Importance of grading of aggregates
   h) Factors affecting workability
   i) Gap Grading
   j) Mixing of concrete.

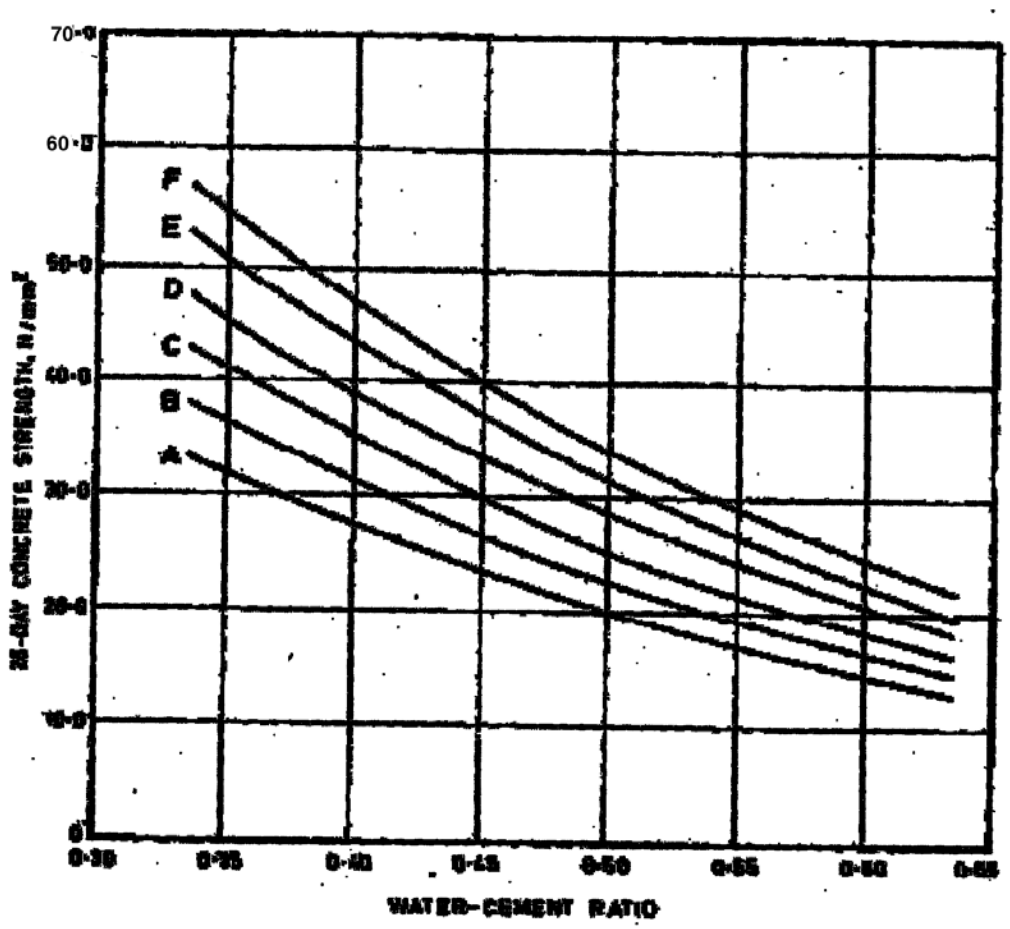
SECTION – II

3. Design a concrete mix of grade M25 as per ACI Method for following data : **16**

   Concrete is to be used for R.C.C. work of residential building.
   1) Cement to be used – OPC 53 grade
   2) Workability required – 80 – 100 mm Slump (Medium Workability)
   3) Degree of control = Very Good
   4) Method of concrete placing – Pumping
   5) Max. size of aggregate – 20 mm, angular
   6) Test data for material
      a) Specific gravity of Cement = 3.15, FA = 2.60 and CA = 2.90
      b) Dry Rodded Bulk Density of FA = 1880 kg/m^3 and CA = 1760 kg/m^3
      c) Water absorption of FA = 2% and CA = 1%
      d) Moisture content of FA = 2% and CA = 0%.

7)Sieve Analysis

	IS Sieve Size (mm)		40	20	10	4.75	2.36	1.18	0.6	0.3	0.15	
	% Passing	CA I	100	100	88	12	03	–	–	–	–	
		CA II	100	92	14	03	–	–	–	–	–	
		FA	–	–	100	89	70	35	19	08	02	



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 : IS10262-1982)

Table No. 1 : Value for the factor K Himsworth Constant.

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0.1	3.09
0.6	2.50
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Table No. 2 : Suggested values for standard deviation.

Sr. No.	Placing and Mixing Condition	Degree of Control	Standard Deviation (MPa)
1	Dried aggregates, Completely accurate grading, exact water/cement ratio, controlled temperature curing	Laboratory Precision	1.3
2	Weigh-batching of all materials, control of aggregate grading, 3 sizes of aggregates plus sand, control of water added to allow for moisture content of aggregates, allowance for weight of aggregate and sand displaced by water, continual supervision	Excellent	2.8
3	Weigh-batching of all materials, control of aggregate grading, control of water added to allow for moisture content of aggregates, continual supervision	High	3.50
4	Weigh-batching of all materials, control of aggregate grading, control of water added, frequent supervision	Very Good	4.20
5	Weigh-batching of all materials, water content controlled by inspection of mix, periodic check of workability, use of two sizes of aggregate (Fine and Coarse), only intermittent supervision	Good	5.70
6	Volume batching of all aggregates allowing for bulking of sand, weigh batching of cement, water content controlled by inspection of mix, intermittent supervision	Fair	6.50
7	Volume batching of all materials use of all in aggregate, little or no supervision	Poor Uncontrolled	8.50

Table No. 3 : Approximate mixing water requirements for different slumps and maximum size of aggregate.

Sr. No.	Slump Value (mm)	Water, kg/cum of concrete, for maximum size of coarse aggregate							
		10 mm	12.5 mm	20 mm	25 mm	40 mm	50 mm	70 mm	150 mm
1	30 to 50	205	200	185	180	160	155	145	125
2	80 to 100	225	215	200	195	175	170	160	140
3	150 to 180	240	230	210	205	185	180	170	–
4	Approximate air content (%)	3	2.50	2	1.50	1	0.50	0.30	0.20

Ref : ACI Manual 211.1

Notes : The above values are maximum, for reasonably well shaped angular aggregate graded with acceptable limits.

1) The quantities of mixing water can be used to compute cement factors for trial batches.
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Table No. 4 : Requirements of ACI 318-89, for W/C ratio and strength for special exposure conditions.

Sr. No.	Exposure condition	Maximum W/C ratio,	Minimum Design strength (MPa)
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	a) Exposed to fresh water	0.50	25
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	a) Kerbs, gutters, gurad rail or thin sections	0.45	30
	b) Other elements	0.50	25
	c) In presence of de-icing chemicals	0.45	30
3	For corrosion protection of reinforced concrete exposed to deicing salts, brackish water, sea water or spray from these sources	0.40	30

Table No. 5 : Dry bulk volume of coarse aggregate per unit valume of concrete.

Maximum size of aggregate	Volume of rodded coarse aggregate per unit volume of concrete for different fineness moduli of sand			
	2.40	2.60	2.80	3.00
10 mm	0.50	0.48	0.46	0.44
12.5 mm	0.59	0.57	0.55	0.53
20 mm	0.66	0.64	0.62	0.60
25 mm	0.71	0.69	0.67	0.65
40 mm	0.76	0.74	0.72	0.70
50 mm	0.78	0.76	0.74	0.72
70 mm	0.81	0.79	0.77	0.75
150 mm	0.87	0.85	0.83	0.81

Notes :

1) These volumes are selected from empirical relationships to produce concrete with a degree of workability suitable for usual RC construction, for less workable concrete, such as that required for concrete pavements they may be increased by about 10 percent, for more workable concrete, such as that required for pumped concrete, they may be decrease by about 10 percent.
2) Fineness modulus of sand = sum of cumulative ratios retained on sieved with square opening of about 0.15, 0.30, 0.60, 1.18, 2.36 and 4.75 mm.

Table No. 6 : First estimate of the weight of fresh concrete.

Sr. No.	Maximum size of aggregate	First estimate of concrete weight (kg/cum)	
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4	25 mm	2375	2315
5	40 mm	2420	2355
6	50 mm	2445	2375
7	70 mm	2465	2400
8	150 mm	2505	2435

Notes :

1) Above values are based on concrete of medium richness (cement content 330 kg/cum), medium slump and specific gravity of aggregate = 2.70.

2) If required, the estimate of weight may be refined as follows based on available information : for every 5 kg difference in mixing water from values for 80 to 10 mm slump, correct the weight per cum by 8 kg in the opposite direction ; for every 20 kg difference in cement content from 330 kg, correct the weight per cum by 3 kg in same direction ; for every 0.1 value by which the aggregate specific gravity deviates from 2.70, correct the concrete weight by 70 kg in same direction.

OR

Explain stepwise procedure used for concrete mix design by IS code method.

4. Write a short note on **any three** : **(3×4=12)**

1) Shrinkage of concrete
2) Effect of W/C ratio on durability of concrete
3) Nominal mix concrete
4) Light weight concrete
5) Factors affecting quality control of concrete.

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SLR-EP – 17

Seat No.	

Set **P**

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – I

Day and Date : Thursday, 15-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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

1. Choose the correct answer : **14**

1) Factor of safety is equal to
   a) ultimate stress-yield stress b) yield stress-permissible stress
   c) yield stress/permissible stress d) all of the above

2) In case of _____ metals, proof stress is used instead of yield stress.
   a) brittle b) ductile c) heavy d) light

3) A column under eccentric loading is subjected to
   a) direct stress only b) direct and bending stress
   c) bending stress only d) shear stress only

4) Modulus of rigidity is equal to
   a) linear stress/linear strain b) bending stress/bending strain
   c) bending strain/bending stress d) shear stress/shear strain

5) Value of Poisson's ratio ranges from
   a) 0.1 to 0.25 b) 0.25 to 0.5 c) 0.5 to 0.75 d) 0.75 to 1.00

6) Elongation produced due to self weight in a bar of cross sectional area A, length l and weight W having modulus of elasticity E, hung vertically at top end is
   a) 2 Wl /AE b) 2 WA/El c) Wl /2AE d) Wl /4 AE

7) The change in _____ between any two points is the area of the _____ diagram between these points.
   a) B.M., S.F. b) S.F., B.M. c) Loading, SF d) SF, loading

8) Shear stress variation is
   a) Linear b) Polynomial c) Parabolic d) None

P.T.O.

9) For a beam of rectangular cross section, the ratio $\tau max/\tau av$ is

a) 2 b) 1 c) 1.5 d) None

10) The torque transmitted by a hollow shaft of outer diameter (D) and inner diameter (d)

a) $\frac{\pi}{4} fs\left(\frac{D^2 - d^2}{D}\right)$ b) $\frac{\pi}{16} fs\left(\frac{D^3 - d^3}{D}\right)$

c) $\frac{\pi}{16} fs\left(\frac{D^4 - d^4}{D}\right)$ d) $\frac{\pi}{32} fs\left(\frac{D^4 - d^4}{D}\right)$

11) A shaft turns at 150 rpm under a torque of 1500 N-m. Power transmitted is

a) 15π kW b) 10π kW c) 7.5π kW d) 5π kW

12) The unit of Torque in SI units

a) kg-m b) kg-cm c) N-m d) N/m^2

13) The energy absorbed in a body, when it is strained within the elastic limits, is known as

a) strain energy b) resilience

c) proof resilience d) modulus of resilience

14) Resilience of a material is considered when it is subject to

a) frequent heat treatment b) fatigue

c) creep d) shock loading

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SLR-EP – 17

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – I

Day and Date : Thursday, 15-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) In Section – **I**, Question No. **2** is **compulsory**, solve **any two** from the **remaining**.*
*2) In Section – **II**, Question No. **6** is **compulsory**, solve **any two** from the **remaining**.*
*3) Assume suitable data, if **necessary** and mention it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*

SECTION – I

2. Solve **any four** of the following : **10**
   1) Explain stress strain curve for ductile materials. Draw neat sketch.
   2) Define Modulus of Rigidity, Modulus of Elasticity and Poisson's ratio.
   3) Draw typical shear stress distribution diagram for circular and rectangular sections.
   4) Give assumptions made in theory of bending.
   5) Obtain the criteria regarding eccentricity for no tensile stress at the base of dam section.
   6) Draw typical shear force and bending moment diagram for a cantilever of length L subjected to point load P kN at free end.

3. a) Give relationships between : **2**
      i) Young's modulus and modulus of rigidity.
      ii) Young's modulus and Bulk modulus.
   b) A 1400 mm long steel bar is acted upon by forces as shown in Fig. 1. Determine the total elongation of the bar. Take E = 200 Gpa. Take diameters of :
      1) part A = 30 mm
      2) part B = 40 mm
      3) part C = 30 mm. **7**

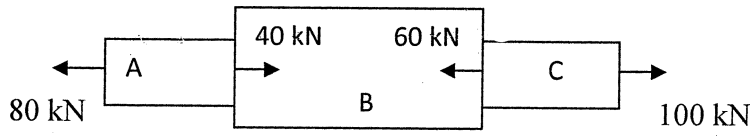

Fig. 1

4. Draw SFD and BMD for the beam loaded as shown in Fig. 2. At points C and D there are internal Hinges. **9**

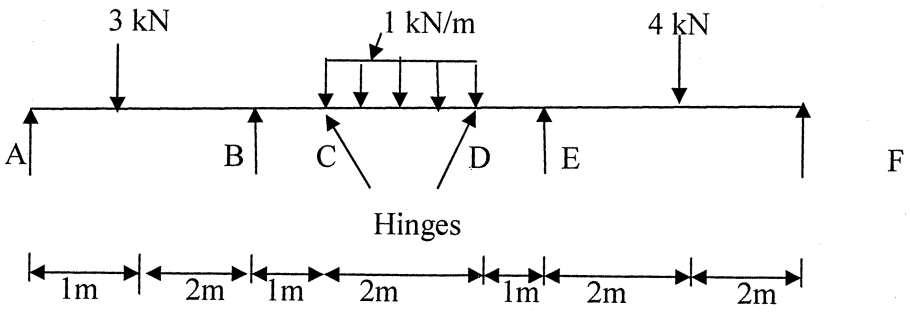

Fig. 2

5. a) Draw kern of a section for :
   i) Circular section
   ii) Rectangular section. **2**

   b) A 10 m high trapezoidal section of a masonry dam is 2 m wide at top and 4 m wide at the base. It retains 8 m deep water on the vertical side. Determine the maximum and minimum stress intensities at its base section. Take the weight of masonry as 20 kN/m^3. **7**

SECTION – II

6. A T-shaped cross-section of a beam as shown in Fig. No. 3 is subjected to vertical shear force of 100 kN. Calculate the shear stress at the neutral axis and at the junction of the web and the flange. Moment of inertia about the neutral axis is 1.134×10^8 mm^4. **10**

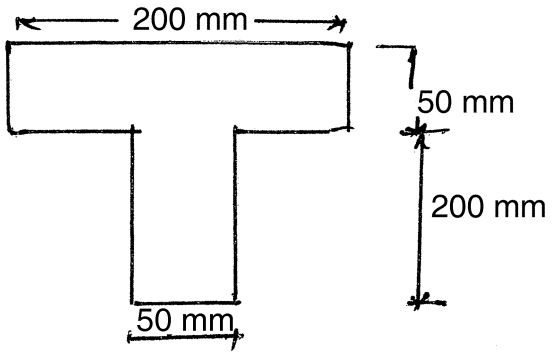

Fig. 3

7. A flitched beam consists of wooden joist 120 mm wide and 200 mm deep strengthened by steel plate 10 mm thick and 180 mm deep one on either side of the joist. If the stresses in wood and steel are not to exceed 7 N/mm^2 and 120 N/mm^2, find the moment of resistance of the beam. Take $E_{steel} = 20\ E_{wood}$. **9**

8. a) If a shaft tuning at N rpm transmits P kilo watts and it is subjected to mean torque T Nm, write expression for Power Transmitted by shaft. **2**

   b) A solid shaft 125 mm in diameter transmits 120 kW at 160 rpm. Find the maximum shear stress induced in the shaft. Find also the angle of twist in length of 7.5 m. Take $C = 8 \times 10^4$ N/mm^2. **7**

9. a) Write a expression for strain energy due to axial load. **2**

   b) A cylindrical air receiver for a compressor is having 2 m internal diameter and it is made of plates 12 mm thick. If hoop stress is not to exceed 90 N/mm^2 and axial stress is not to exceed 60 N/mm^2, find maximum safe air pressure. **7**

Set P

SLR-EP – 17

Seat No.	

Set Q

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – I

Day and Date : Thursday, 15-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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

1. Choose the correct answer : **14**

1) Shear stress variation is
   a) Linear b) Polynomial
   c) Parabolic d) None

2) For a beam of rectangular cross section, the ratio $\tau max/\tau av$ is
   a) 2 b) 1 c) 1.5 d) None

3) The torque transmitted by a hollow shaft of outer diameter (D) and inner diameter (d)
   a) $\frac{\pi}{4} fs\left(\frac{D^2 - d^2}{D}\right)$ b) $\frac{\pi}{16} fs\left(\frac{D^3 - d^3}{D}\right)$
   c) $\frac{\pi}{16} fs\left(\frac{D^4 - d^4}{D}\right)$ d) $\frac{\pi}{32} fs\left(\frac{D^4 - d^4}{D}\right)$

4) A shaft turns at 150 rpm under a torque of 1500 N-m. Power transmitted is
   a) 15π kW b) 10π kW c) 7.5π kW d) 5π kW

5) The unit of Torque in SI units
   a) kg-m b) kg-cm c) N-m d) N/m^2

6) The energy absorbed in a body, when it is strained within the elastic limits, is known as
   a) strain energy b) resilience
   c) proof resilience d) modulus of resilience

P.T.O.

7) Resilience of a material is considered when it is subject to
   a) frequent heat treatment b) fatigue
   c) creep d) shock loading

8) Factor of safety is equal to
   a) ultimate stress-yield stress b) yield stress-permissible stress
   c) yield stress/permissible stress d) all of the above

9) In case of _____ metals, proof stress is used instead of yield stress.
   a) brittle b) ductile c) heavy d) light

10) A column under eccentric loading is subjected to
   a) direct stress only b) direct and bending stress
   c) bending stress only d) shear stress only

11) Modulus of rigidity is equal to
   a) linear stress/linear strain b) bending stress/bending strain
   c) bending strain/bending stress d) shear stress/shear strain

12) Value of Poisson's ratio ranges from
   a) 0.1 to 0.25 b) 0.25 to 0.5 c) 0.5 to 0.75 d) 0.75 to 1.00

13) Elongation produced due to self weight in a bar of cross sectional area A, length l and weight W having modulus of elasticity E, hung vertically at top end is
   a) 2 Wl /AE b) 2 WA/El c) Wl /2AE d) Wl /4 AE

14) The change in _____ between any two points is the area of the _____ diagram between these points.
   a) B.M., S.F. b) S.F., B.M. c) Loading, SF d) SF, loading

_____

SLR-EP – 17

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – I

Day and Date : Thursday, 15-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) In Section – **I**, Question No. **2** is **compulsory**, solve **any two** from the **remaining**.*
*2) In Section – **II**, Question No. **6** is **compulsory**, solve **any two** from the **remaining**.*
*3) Assume suitable data, if **necessary** and mention it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*

SECTION – I

2. Solve **any four** of the following : **10**
   1) Explain stress strain curve for ductile materials. Draw neat sketch.
   2) Define Modulus of Rigidity, Modulus of Elasticity and Poisson's ratio.
   3) Draw typical shear stress distribution diagram for circular and rectangular sections.
   4) Give assumptions made in theory of bending.
   5) Obtain the criteria regarding eccentricity for no tensile stress at the base of dam section.
   6) Draw typical shear force and bending moment diagram for a cantilever of length L subjected to point load P kN at free end.

3. a) Give relationships between : **2**
      i) Young's modulus and modulus of rigidity.
      ii) Young's modulus and Bulk modulus.
   b) A 1400 mm long steel bar is acted upon by forces as shown in Fig. 1. Determine the total elongation of the bar. Take E = 200 Gpa. Take diameters of :
      1) part A = 30 mm
      2) part B = 40 mm
      3) part C = 30 mm. **7**

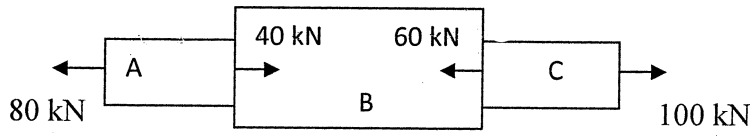

Fig. 1

4. Draw SFD and BMD for the beam loaded as shown in Fig. 2. At points C and D there are internal Hinges. **9**

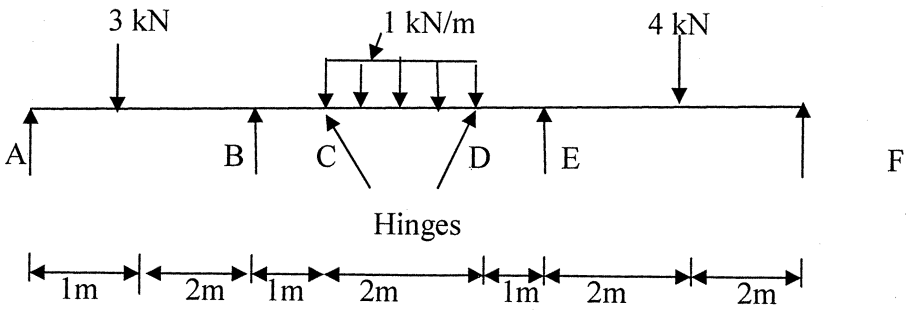

Fig. 2

5. a) Draw kern of a section for :
   i) Circular section
   ii) Rectangular section. **2**

   b) A 10 m high trapezoidal section of a masonry dam is 2 m wide at top and 4 m wide at the base. It retains 8 m deep water on the vertical side. Determine the maximum and minimum stress intensities at its base section. Take the weight of masonry as 20 kN/m^3. **7**

SECTION – II

6. A T-shaped cross-section of a beam as shown in Fig. No. 3 is subjected to vertical shear force of 100 kN. Calculate the shear stress at the neutral axis and at the junction of the web and the flange. Moment of inertia about the neutral axis is 1.134×10^8 mm^4. **10**

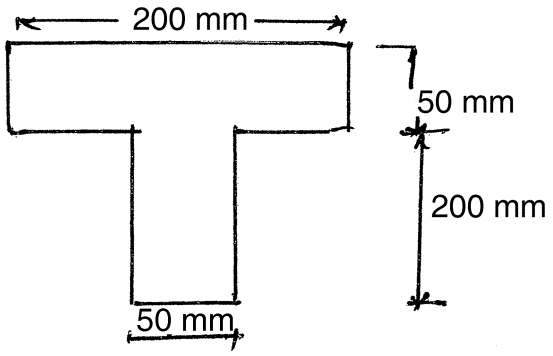

Fig. 3

7. A flitched beam consists of wooden joist 120 mm wide and 200 mm deep strengthened by steel plate 10 mm thick and 180 mm deep one on either side of the joist. If the stresses in wood and steel are not to exceed 7 N/mm^2 and 120 N/mm^2, find the moment of resistance of the beam. Take $E_{steel} = 20\ E_{wood}$. **9**

8. a) If a shaft tuning at N rpm transmits P kilo watts and it is subjected to mean torque T Nm, write expression for Power Transmitted by shaft. **2**

   b) A solid shaft 125 mm in diameter transmits 120 kW at 160 rpm. Find the maximum shear stress induced in the shaft. Find also the angle of twist in length of 7.5 m. Take $C = 8 \times 10^4$ N/mm^2. **7**

9. a) Write a expression for strain energy due to axial load. **2**

   b) A cylindrical air receiver for a compressor is having 2 m internal diameter and it is made of plates 12 mm thick. If hoop stress is not to exceed 90 N/mm^2 and axial stress is not to exceed 60 N/mm^2, find maximum safe air pressure. **7**

Set Q

SLR-EP – 17

Seat No.	

Set R

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – I

Day and Date : Thursday, 15-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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

1. Choose the correct answer : **14**

1) Value of Poisson's ratio ranges from
a) 0.1 to 0.25 b) 0.25 to 0.5 c) 0.5 to 0.75 d) 0.75 to 1.00

2) Elongation produced due to self weight in a bar of cross sectional area A, length l and weight W having modulus of elasticity E, hung vertically at top end is
a) 2 Wl /AE b) 2 WA/El c) Wl /2AE d) Wl /4 AE

3) The change in _____ between any two points is the area of the _____ diagram between these points.
a) B.M., S.F. b) S.F., B.M. c) Loading, SF d) SF, loading

4) Shear stress variation is
a) Linear b) Polynomial c) Parabolic d) None

5) For a beam of rectangular cross section, the ratio $\tau max/\tau av$ is
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6) The torque transmitted by a hollow shaft of outer diameter (D) and inner diameter (d)

a) $\frac{\pi}{4} fs\left(\frac{D^2 - d^2}{D}\right)$ b) $\frac{\pi}{16} fs\left(\frac{D^3 - d^3}{D}\right)$

c) $\frac{\pi}{16} fs\left(\frac{D^4 - d^4}{D}\right)$ d) $\frac{\pi}{32} fs\left(\frac{D^4 - d^4}{D}\right)$

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P.T.O.

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a) kg-m b) kg-cm c) N-m d) N/m^2

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_____

SLR-EP – 17

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – I

Day and Date : Thursday, 15-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) In Section – **I**, Question No. **2** is **compulsory**, solve **any two** from the **remaining**.*
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SECTION – I

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3. a) Give relationships between : **2**
      i) Young's modulus and modulus of rigidity.
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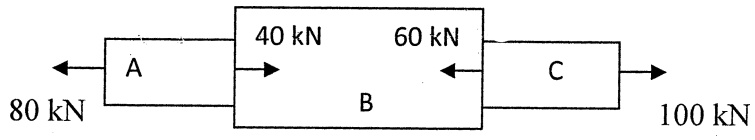

Fig. 1

4. Draw SFD and BMD for the beam loaded as shown in Fig. 2. At points C and D there are internal Hinges. **9**

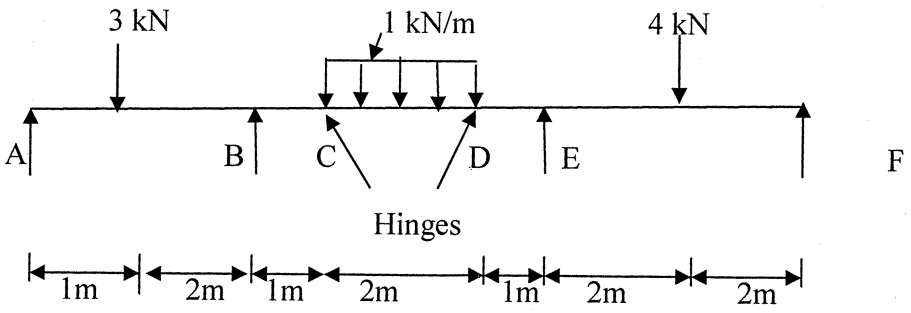

Fig. 2

5. a) Draw kern of a section for :
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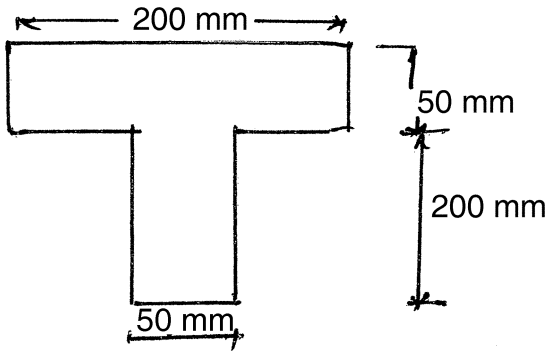

Fig. 3

7. A flitched beam consists of wooden joist 120 mm wide and 200 mm deep strengthened by steel plate 10 mm thick and 180 mm deep one on either side of the joist. If the stresses in wood and steel are not to exceed 7 N/mm^2 and 120 N/mm^2, find the moment of resistance of the beam. Take $E_{steel} = 20\ E_{wood}$. **9**

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Set R

SLR-EP – 17

Seat No.	

Set S

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – I

Day and Date : Thursday, 15-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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Duration : 30 Minutes Marks : 14

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P.T.O.

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_____

SLR-EP – 17

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – I

Day and Date : Thursday, 15-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) In Section – **I**, Question No. **2** is **compulsory**, solve **any two** from the **remaining**.*
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SECTION – I

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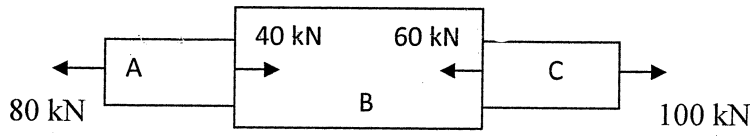

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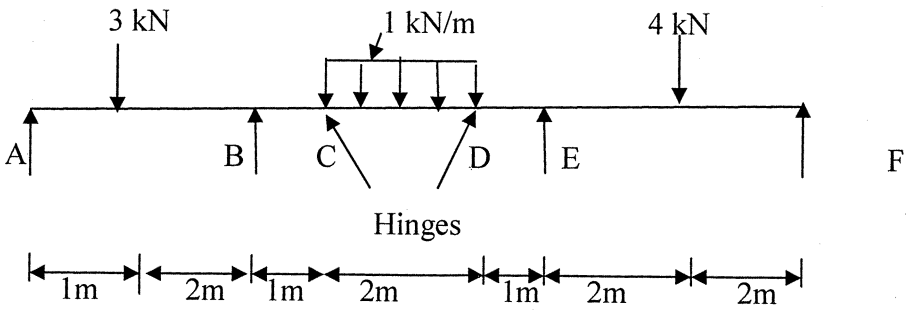

Fig. 2

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SECTION – II

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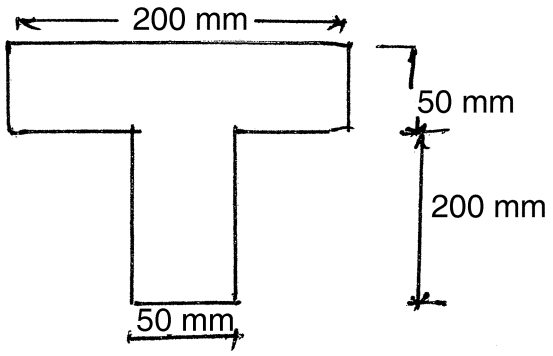

Fig. 3

7. A flitched beam consists of wooden joist 120 mm wide and 200 mm deep strengthened by steel plate 10 mm thick and 180 mm deep one on either side of the joist. If the stresses in wood and steel are not to exceed 7 N/mm^2 and 120 N/mm^2, find the moment of resistance of the beam. Take $E_{steel} = 20\ E_{wood}$. **9**

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9. a) Write a expression for strain energy due to axial load. **2**

   b) A cylindrical air receiver for a compressor is having 2 m internal diameter and it is made of plates 12 mm thick. If hoop stress is not to exceed 90 N/mm^2 and axial stress is not to exceed 60 N/mm^2, find maximum safe air pressure. **7**

Set S

SLR-EP – 18

Seat No.	

Set P

S.E. Civil (Part – I) (CGPA) Examination, 2016
SURVEYING – I

Day and Date : Saturday, 17-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** suitable data if necessary but mention it **clearly**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **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

1. Choose the correct answer : **(14×1=14)**

1) The size of theodolite is defined according to the
   a) Diameter of graduated horizontal circle
   b) Length of telescope
   c) Height of the standard
   d) Diameter of telescope

2) The focusing lens in modern theodolite is a
   a) Internal b) External
   c) Both of these d) None of these

3) 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

4) A deflection angle is
   a) Always less than 90°
   b) Always between 90° to 180°
   c) Equal to the difference between the 180° and included angle
   d) Equal to the difference between 360° and the included angle.

5) Face Left and face right observations eliminate _____ error.
   a) Eccentricity b) Graduation
   c) Index d) a) and c)

P.T.O.

6) If 'n' is the number of sides of a traverse, while traversing anticlockwise, the sum of included angle will be
   a) $(2n - 4) \times 90°$ b) $(2n + 4) \times 90°$
   c) $(2n \pm 4) \times 90°$ d) $360°$

7) Most accurate estimate of volume, is given by
   a) Mean Area formula b) End Area formula
   c) Prismoidal formula d) Trapezoidal rule

8) Nautical sextant is used for
   a) Taking the sounding b) Locating the sounding
   c) Measuring the distance d) Measuring vertical angle

9) Proportional compass is used for measurement of
   a) Included angle b) Magnetic Bearing
   c) Redrawing with other scale d) none of these

10) Geodimeter can be used for
   a) Day time observations b) Night observations
   c) Both Day-Night observations d) None of these

11) In solution of two point problem, the auxiliary station is selected so that angle at each point should
   a) Be acute b) Not be acute c) $< 90°$ d) $> 90°$

12) The most rapid method of orientation of plane table is
   a) Magnetic compass b) Back sighting
   c) Two point problem d) Three point problem

13) Prismoidal rule is preferred for volume during
   a) Preliminary estimate b) Final estimate
   c) Both of these d) None of these

14) 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

SLR-EP – 18

Seat No.	

S.E. Civil (Part – I) (CGPA) Examination, 2016
SURVEYING – I

Day and Date : Saturday, 17-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** suitable data if necessary but mention it **clearly**.*
*2) Q. No. **2** and Q. No. **6** is **compulsory**.*
*3) Answer **any two** questions out of Q. No. **3, 4, 5**.*
*4) Answer **any two** questions out of Q. No. **7, 8, 9**.*
*5) Make suitable assumptions if required but mention it **clearly**.*

SECTION – I

2. a) The following notes refer to reciprocal levels taken with one level :

Inst. at	Staff readings on		Remark
	A	B	Distance between
P	1.824	2.748	P and Q = 1010 m
Q	0.928	1.606	RL of P = 126.386

Find :
I) True RL of B
II) The combined correction for curvature and refraction
III) The angular error in the collimation adjustment. **6**

b) Define sensitiveness of bubble. How the sensitiveness of a bubble is determined ? **4**

3. a) The table below gives the lengths and bearings of the lines of a traverse ABCDA. Balance the traverse by using third rule : **5**

Line	Length (m)	Reduced Bearing
AB	225	S 39°18′E
BC	656	N 34°58′55″E
CD	120	N 21°18′34″W
DA	668	S 47°23′13″W

b) Differentiate between the following : **4**
i) Bowditch and transit rule
ii) Consecutive and independent coordinates.

4. a) A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities : **6**

Line	**Length (m)**	**WCB**
AB	500	98° 30′
BC	620	30° 20′
CD	468	298° 30′
DE	?	230° 0′
EA	?	150° 10′

   b) Explain repetition method of measurement of horizontal angle. **3**

5. a) What is Nautical Sextant ? Explain in detail working of it. **5**
   b) Write a short note on :
      i) Abney Level or
      ii) Proportional compass. **4**

SECTION – II

6. a) Explain the properties of electromagnetic waves. **4**
   b) A road at a constant R. L. 160.000 m runs from North to South. The ground from East to west is level. The ground level along centre line of the road are as follows :

Chainage (m)	0	15	30	45	60	75	90
RL of Ground (m)	157.6	158.20	158.80	157.90	158.50	159.10	159.40

   Find the volume of the embankment in cubic metre for a road 7.2 m wide at formation level with side slopes 1.5 to 1 by trapezoidal and prismoidal rule. **6**

7. a) Explain “Three point problem” and describe the solution by Bessel’s method. **5**
   b) State the various methods of plane table survey and explain any one method. **4**

8. a) Explain characteristics of contour lines with neat sketch. **5**
   b) Describe direct methods of contouring. **4**

9. a) Calculate the area of the zero circle with the following data : **5**

IR	**FR**	**Position of Anchor Point**	**Remark**
7.775	4.825	Outside the figure	The zero crosses the index mark once clockwise
2.325	8.755	Inside the figure	The zero crosses the index mark twice anticlockwise

   Tracing arm set to the natural scale M = 100 cm^2.
   b) Write short note on : Co-ordinate Method. **4**

Set P

SLR-EP – 18

Seat No.	

Set Q

S.E. Civil (Part – I) (CGPA) Examination, 2016
SURVEYING – I

Day and Date : Saturday, 17-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** suitable data if necessary but mention it **clearly**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **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

1. Choose the correct answer : **(14×1=14)**

1) Nautical sextant is used for
   a) Taking the sounding b) Locating the sounding
   c) Measuring the distance d) Measuring vertical angle

2) Proportional compass is used for measurement of
   a) Included angle b) Magnetic Bearing
   c) Redrawing with other scale d) none of these

3) Geodimeter can be used for
   a) Day time observations b) Night observations
   c) Both Day-Night observations d) None of these

4) In solution of two point problem, the auxiliary station is selected so that angle at each point should
   a) Be acute b) Not be acute c) $< 90°$ d) $> 90°$

5) The most rapid method of orientation of plane table is
   a) Magnetic compass b) Back sighting
   c) Two point problem d) Three point problem

6) Prismoidal rule is preferred for volume during
   a) Preliminary estimate b) Final estimate
   c) Both of these d) None of these

P.T.O.

7) 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

8) The size of theodolite is defined according to the
   a) Diameter of graduated horizontal circle
   b) Length of telescope
   c) Height of the standard
   d) Diameter of telescope

9) The focusing lens in modern theodolite is a
   a) Internal
   b) External
   c) Both of these
   d) None of these

10) 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

11) A deflection angle is
   a) Always less than 90°
   b) Always between 90° to 180°
   c) Equal to the difference between the 180° and included angle
   d) Equal to the difference between 360° and the included angle

12) Face Left and face right observations eliminate _____ error.
   a) Eccentricity
   b) Graduation
   c) Index
   d) a) and c)

13) If 'n' is the number of sides of a traverse, while traversing anticlockwise, the sum of included angle will be
   a) $(2n - 4) \times 90°$
   b) $(2n + 4) \times 90°$
   c) $(2n \pm 4) \times 90°$
   d) 360°

14) Most accurate estimate of volume, is given by
   a) Mean Area formula
   b) End Area formula
   c) Prismoidal formula
   d) Trapezoidal rule

_____

SLR-EP – 18

Seat No.	

S.E. Civil (Part – I) (CGPA) Examination, 2016
SURVEYING – I

Day and Date : Saturday, 17-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** suitable data if necessary but mention it **clearly**.*
*2) Q. No. **2** and Q. No. **6** is **compulsory**.*
*3) Answer **any two** questions out of Q. No. **3, 4, 5**.*
*4) Answer **any two** questions out of Q. No. **7, 8, 9**.*
*5) Make suitable assumptions if required but mention it **clearly**.*

SECTION – I

2. a) The following notes refer to reciprocal levels taken with one level :

Inst. at	Staff readings on		Remark
	A	B	Distance between
P	1.824	2.748	P and Q = 1010 m
Q	0.928	1.606	RL of P = 126.386

Find :
I) True RL of B
II) The combined correction for curvature and refraction
III) The angular error in the collimation adjustment. **6**

b) Define sensitiveness of bubble. How the sensitiveness of a bubble is determined ? **4**

3. a) The table below gives the lengths and bearings of the lines of a traverse ABCDA. Balance the traverse by using third rule : **5**

Line	Length (m)	Reduced Bearing
AB	225	S 39°18′E
BC	656	N 34°58′55″E
CD	120	N 21°18′34″W
DA	668	S 47°23′13″W

b) Differentiate between the following : **4**
i) Bowditch and transit rule
ii) Consecutive and independent coordinates.

4. a) A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities : **6**

Line	**Length (m)**	**WCB**
AB	500	98° 30′
BC	620	30° 20′
CD	468	298° 30′
DE	?	230° 0′
EA	?	150° 10′

   b) Explain repetition method of measurement of horizontal angle. **3**

5. a) What is Nautical Sextant ? Explain in detail working of it. **5**
   b) Write a short note on :
      i) Abney Level or
      ii) Proportional compass. **4**

SECTION – II

6. a) Explain the properties of electromagnetic waves. **4**
   b) A road at a constant R. L. 160.000 m runs from North to South. The ground from East to west is level. The ground level along centre line of the road are as follows :

Chainage (m)	0	15	30	45	60	75	90
RL of Ground (m)	157.6	158.20	158.80	157.90	158.50	159.10	159.40

   Find the volume of the embankment in cubic metre for a road 7.2 m wide at formation level with side slopes 1.5 to 1 by trapezoidal and prismoidal rule. **6**

7. a) Explain “Three point problem” and describe the solution by Bessel’s method. **5**
   b) State the various methods of plane table survey and explain any one method. **4**

8. a) Explain characteristics of contour lines with neat sketch. **5**
   b) Describe direct methods of contouring. **4**

9. a) Calculate the area of the zero circle with the following data : **5**

IR	**FR**	**Position of Anchor Point**	**Remark**
7.775	4.825	Outside the figure	The zero crosses the index mark once clockwise
2.325	8.755	Inside the figure	The zero crosses the index mark twice anticlockwise

   Tracing arm set to the natural scale M = 100 cm^2.
   b) Write short note on : Co-ordinate Method. **4**

Set Q

SLR-EP – 18

Seat No.	

Set R

S.E. Civil (Part – I) (CGPA) Examination, 2016
SURVEYING – I

Day and Date : Saturday, 17-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** suitable data if necessary but mention it **clearly**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **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

1. Choose the correct answer : **(14×1=14)**

1) Face Left and face right observations eliminate _____ error.
   a) Eccentricity b) Graduation
   c) Index d) a) and c)

2) If 'n' is the number of sides of a traverse, while traversing anticlockwise, the sum of included angle will be
   a) $(2n - 4) \times 90°$ b) $(2n + 4) \times 90°$
   c) $(2n \pm 4) \times 90°$ d) 360°

3) Most accurate estimate of volume, is given by
   a) Mean Area formula b) End Area formula
   c) Prismoidal formula d) Trapezoidal rule

4) Nautical sextant is used for
   a) Taking the sounding b) Locating the sounding
   c) Measuring the distance d) Measuring vertical angle

5) Proportional compass is used for measurement of
   a) Included angle b) Magnetic Bearing
   c) Redrawing with other scale d) none of these

6) Geodimeter can be used for
   a) Day time observations b) Night observations
   c) Both Day-Night observations d) None of these

P.T.O.

7) In solution of two point problem, the auxiliary station is selected so that angle at each point should
   a) Be acute b) Not be acute c) $< 90°$ d) $> 90°$

8) The most rapid method of orientation of plane table is
   a) Magnetic compass b) Back sighting
   c) Two point problem d) Three point problem

9) Prismoidal rule is preferred for volume during
   a) Preliminary estimate b) Final estimate
   c) Both of these d) None of these

10) 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

11) The size of theodolite is defined according to the
   a) Diameter of graduated horizontal circle
   b) Length of telescope
   c) Height of the standard
   d) Diameter of telescope

12) The focusing lens in modern theodolite is a
   a) Internal b) External
   c) Both of these d) None of these

13) Vernier is a device for measuring fractional part of the smallest division on
   a) Horizontal plate b) Vertical plate
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   a) Always less than 90°
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SLR-EP – 18

Seat No.	

S.E. Civil (Part – I) (CGPA) Examination, 2016
SURVEYING – I

Day and Date : Saturday, 17-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** suitable data if necessary but mention it **clearly**.*
*2) Q. No. **2** and Q. No. **6** is **compulsory**.*
*3) Answer **any two** questions out of Q. No. **3, 4, 5**.*
*4) Answer **any two** questions out of Q. No. **7, 8, 9**.*
*5) Make suitable assumptions if required but mention it **clearly**.*

SECTION – I

2. a) The following notes refer to reciprocal levels taken with one level :

Inst. at	Staff readings on		Remark
	A	B	Distance between
P	1.824	2.748	P and Q = 1010 m
Q	0.928	1.606	RL of P = 126.386

Find :
I) True RL of B
II) The combined correction for curvature and refraction
III) The angular error in the collimation adjustment. **6**

b) Define sensitiveness of bubble. How the sensitiveness of a bubble is determined ? **4**

3. a) The table below gives the lengths and bearings of the lines of a traverse ABCDA. Balance the traverse by using third rule : **5**

Line	Length (m)	Reduced Bearing
AB	225	S 39°18′E
BC	656	N 34°58′55″E
CD	120	N 21°18′34″W
DA	668	S 47°23′13″W

b) Differentiate between the following : **4**
i) Bowditch and transit rule
ii) Consecutive and independent coordinates.

4. a) A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities : **6**

Line	**Length (m)**	**WCB**
AB	500	98° 30′
BC	620	30° 20′
CD	468	298° 30′
DE	?	230° 0′
EA	?	150° 10′

   b) Explain repetition method of measurement of horizontal angle. **3**

5. a) What is Nautical Sextant ? Explain in detail working of it. **5**
   b) Write a short note on :
      i) Abney Level or
      ii) Proportional compass. **4**

SECTION – II

6. a) Explain the properties of electromagnetic waves. **4**
   b) A road at a constant R. L. 160.000 m runs from North to South. The ground from East to west is level. The ground level along centre line of the road are as follows :

Chainage (m)	0	15	30	45	60	75	90
RL of Ground (m)	157.6	158.20	158.80	157.90	158.50	159.10	159.40

   Find the volume of the embankment in cubic metre for a road 7.2 m wide at formation level with side slopes 1.5 to 1 by trapezoidal and prismoidal rule. **6**

7. a) Explain “Three point problem” and describe the solution by Bessel’s method. **5**
   b) State the various methods of plane table survey and explain any one method. **4**

8. a) Explain characteristics of contour lines with neat sketch. **5**
   b) Describe direct methods of contouring. **4**

9. a) Calculate the area of the zero circle with the following data : **5**

IR	**FR**	**Position of Anchor Point**	**Remark**
7.775	4.825	Outside the figure	The zero crosses the index mark once clockwise
2.325	8.755	Inside the figure	The zero crosses the index mark twice anticlockwise

   Tracing arm set to the natural scale M = 100 cm^2.
   b) Write short note on : Co-ordinate Method. **4**

Set R

SLR-EP – 18

Seat No.	

Set S

S.E. Civil (Part – I) (CGPA) Examination, 2016
SURVEYING – I

Day and Date : Saturday, 17-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** suitable data if necessary but mention it **clearly**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **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

1. Choose the correct answer : **(14×1=14)**

1) Geodimeter can be used for
   a) Day time observations b) Night observations
   c) Both Day-Night observations d) None of these

2) In solution of two point problem, the auxiliary station is selected so that angle at each point should
   a) Be acute b) Not be acute c) $< 90°$ d) $> 90°$

3) The most rapid method of orientation of plane table is
   a) Magnetic compass b) Back sighting
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4) Prismoidal rule is preferred for volume during
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5) Area of zero circle comes into account in
   a) Anchor pt. outside case b) Anchor pt. inside case
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6) The size of theodolite is defined according to the
   a) Diameter of graduated horizontal circle
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   d) Diameter of telescope

P.T.O.

7) The focusing lens in modern theodolite is a
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9) A deflection angle is
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11) If 'n' is the number of sides of a traverse, while traversing anticlockwise, the sum of included angle will be
   a) $(2n - 4) \times 90°$ b) $(2n + 4) \times 90°$
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   a) Mean Area formula b) End Area formula
   c) Prismoidal formula d) Trapezoidal rule

13) Nautical sextant is used for
   a) Taking the sounding b) Locating the sounding
   c) Measuring the distance d) Measuring vertical angle

14) Proportional compass is used for measurement of
   a) Included angle b) Magnetic Bearing
   c) Redrawing with other scale d) none of these

_____

SLR-EP – 18

Seat No.	

S.E. Civil (Part – I) (CGPA) Examination, 2016
SURVEYING – I

Day and Date : Saturday, 17-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** suitable data if necessary but mention it **clearly**.*
*2) Q. No. **2** and Q. No. **6** is **compulsory**.*
*3) Answer **any two** questions out of Q. No. **3, 4, 5**.*
*4) Answer **any two** questions out of Q. No. **7, 8, 9**.*
*5) Make suitable assumptions if required but mention it **clearly**.*

SECTION – I

2. a) The following notes refer to reciprocal levels taken with one level :

Inst. at	Staff readings on		Remark
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Find :
I) True RL of B
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III) The angular error in the collimation adjustment. **6**

b) Define sensitiveness of bubble. How the sensitiveness of a bubble is determined ? **4**

3. a) The table below gives the lengths and bearings of the lines of a traverse ABCDA. Balance the traverse by using third rule : **5**

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DA	668	S 47°23′13″W

b) Differentiate between the following : **4**
i) Bowditch and transit rule
ii) Consecutive and independent coordinates.

4. a) A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities : **6**

Line	**Length (m)**	**WCB**
AB	500	98° 30′
BC	620	30° 20′
CD	468	298° 30′
DE	?	230° 0′
EA	?	150° 10′

   b) Explain repetition method of measurement of horizontal angle. **3**

5. a) What is Nautical Sextant ? Explain in detail working of it. **5**
   b) Write a short note on :
      i) Abney Level or
      ii) Proportional compass. **4**

SECTION – II

6. a) Explain the properties of electromagnetic waves. **4**
   b) A road at a constant R. L. 160.000 m runs from North to South. The ground from East to west is level. The ground level along centre line of the road are as follows :

Chainage (m)	0	15	30	45	60	75	90
RL of Ground (m)	157.6	158.20	158.80	157.90	158.50	159.10	159.40

   Find the volume of the embankment in cubic metre for a road 7.2 m wide at formation level with side slopes 1.5 to 1 by trapezoidal and prismoidal rule. **6**

7. a) Explain “Three point problem” and describe the solution by Bessel’s method. **5**
   b) State the various methods of plane table survey and explain any one method. **4**

8. a) Explain characteristics of contour lines with neat sketch. **5**
   b) Describe direct methods of contouring. **4**

9. a) Calculate the area of the zero circle with the following data : **5**

IR	**FR**	**Position of Anchor Point**	**Remark**
7.775	4.825	Outside the figure	The zero crosses the index mark once clockwise
2.325	8.755	Inside the figure	The zero crosses the index mark twice anticlockwise

   Tracing arm set to the natural scale M = 100 cm^2.
   b) Write short note on : Co-ordinate Method. **4**

Set S

SLR-EP – 19

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Tuesday, 20-12-2016 Total Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Section – ***I*** *to be written in answerbook.*
3) Section – ***II*** *to be drawn on* ***half imperial drawing sheet****. Use* ***both*** *sides of the sheet.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) ***Assume*** *suitable data* ***wherever*** *necessary and mention it clearly.*
6) Retain ***all*** *projection/construction lines on drawing sheet.*
7) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
8) ***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

1. State whether following statement is **True** or **false** : **14**

1) PCC means Plain Cured Concrete.

2) Surkhi is a mortar made from burnt brick bats.

3) In framed structure, the function of main walls is to transfer the load.

4) Wall footing is provided in Load bearing structure.

5) Combined footing is provided for single column.

6) CRS is a type of stone masonry.

7) If modular brick is cut along length in half then it is called as half closure.

P.T.O.

8) Flemish bond is mostly used brick bond as compared to English bond.

9) Horns are provided to fix door frame inside the walls.

10) Mullion divides door or window vertically.

11) Landing is the biggest tread of half-turned staircase.

12) Voussoirs of an arch remains in tesion.

13) Roof sloping in two directions is called as hip roof.

14) A.C. sheets means Asian Cement sheets.

SLR-EP – 19

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Tuesday, 20-12-2016 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Section – **I** to be written in answerbook.*
*3) Section – **II** to be drawn on **half imperial drawing sheet**. Use **both** sides of the sheet.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever** necessary and mention it clearly.*
*6) Retain **all** projection/construction lines on drawing sheet.*

SECTION – I

2. Attempt **any seven** questions : **(7×4=28)**

a) Explain importance of through stone in stone masonry with neat sketch.

b) Write in detail requirements of building stone.

c) Draw isometric shapes of

i) Lean-to-roof ii) Gable roof
iii) King Closure iv) 3/4th Bat.

d) Draw neat labeled Section and Plan of

i) Quarter Turn Staircase
ii) Double Flight Straight Staircase

e) Draw neat labeled elevation of semicircular arch.

f) Compare strap footing with combined footing with sketches.

g) Write about field testing of bricks and cement.

h) Enlist functional requirements of building as whole and explain any two in detail.

i) Draw labeled cross-section of fixing Vitrified tiles on RCC slab.

j) Enlist different types of doors and draw neat labeled elevation of any one.

SECTION – II

3. A) Draw to a scale of 1 : 10, detailed section, front elevation and sectional elevation for framed T. W. Double leaf door half glazed and half paneled. Use following data (All dimensions are in mm) : **14**

   a) Clear operating = 1200 × 2100

   b) Wood Section for frame = 100 × 75

   c) Wood section for styles and rails = 100 × 40

   d) Obscured Glass = 5 mm thick at top-side of shutter

   e) Panel – 20 mm thick plywood

   f) Show various fixtures at proper location.

   OR

   Draw to the scale of 1 :10 elevation and plan of alternate courses of 'L' shaped one brick and one and half brick thick brick wall in English bond.

   B) Design and draw to scale 1 : 30, plan and vertical section for Dog-legged R.C.C. Stair for a residential building. Use following data : **14**

   1) Storey height = 3100 mm

   2) Width of flight = 1000 mm

   3) Railing – 50 mm thick RCC Pardi

   4) Reinforcement details not necessary

   5) Write step by step calculation on sheet with pencil only.

   OR

   Draw to scale 1 : 10

   a) Cross section

   b) Part plan showing all the layers partly-open of RCC slab with ceramic tiles flooring laid on cement mortar bed with cement float. Use following data :

      1) RCC slab thickness = 150 mm

      2) Cement mortar bed thickness = 30 mm

      3) Cement float thickness = 02 mm

      4) Size Ceramic Tile = 450 mm × 450 mm × 15 mm

      5) Slab supported on RCC beam of size 230 × 300 mm

      6) Thickness of brick wall = 230 mm including plaster

      7) Provide 10 mm height skirting of ceramic tile.

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SLR-EP – 19

Seat No.	

Set Q

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Tuesday, 20-12-2016 Total Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
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4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) ***Assume*** *suitable data* ***wherever*** *necessary and mention it clearly.*
6) Retain ***all*** *projection/construction lines on drawing sheet.*
7) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
8) ***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

1. State whether following statement is **True** or **false** : **14**

1) Flemish bond is mostly used brick bond as compared to English bond.

2) Horns are provided to fix door frame inside the walls.

3) Mullion divides door or window vertically.

4) Landing is the biggest tread of half-turned staircase.

5) Voussoirs of an arch remains in tesion.

6) Roof sloping in two directions is called as hip roof.

7) A.C. sheets means Asian Cement sheets.

8) PCC means Plain Cured Concrete.

9) Surkhi is a mortar made from burnt brick bats.

10) In framed structure, the function of main walls is to transfer the load.

11) Wall footing is provided in Load bearing structure.

12) Combined footing is provided for single column.

13) CRS is a type of stone masonry.

14) If modular brick is cut along length in half then it is called as half closure.

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SLR-EP – 19

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Tuesday, 20-12-2016 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Section – **I** to be written in answerbook.*
*3) Section – **II** to be drawn on **half imperial drawing sheet**. Use **both** sides of the sheet.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever** necessary and mention it clearly.*
*6) Retain **all** projection/construction lines on drawing sheet.*

SECTION – I

2. Attempt **any seven** questions : **(7×4=28)**

a) Explain importance of through stone in stone masonry with neat sketch.

b) Write in detail requirements of building stone.

c) Draw isometric shapes of
   i) Lean-to-roof ii) Gable roof
   iii) King Closure iv) 3/4th Bat.

d) Draw neat labeled Section and Plan of
   i) Quarter Turn Staircase
   ii) Double Flight Straight Staircase

e) Draw neat labeled elevation of semicircular arch.

f) Compare strap footing with combined footing with sketches.

g) Write about field testing of bricks and cement.

h) Enlist functional requirements of building as whole and explain any two in detail.

i) Draw labeled cross-section of fixing Vitrified tiles on RCC slab.

j) Enlist different types of doors and draw neat labeled elevation of any one.

SECTION – II

3. A) Draw to a scale of 1 : 10, detailed section, front elevation and sectional elevation for framed T. W. Double leaf door half glazed and half paneled. Use following data (All dimensions are in mm) : **14**

   a) Clear operating = 1200 × 2100

   b) Wood Section for frame = 100 × 75

   c) Wood section for styles and rails = 100 × 40

   d) Obscured Glass = 5 mm thick at top-side of shutter

   e) Panel – 20 mm thick plywood

   f) Show various fixtures at proper location.

   OR

   Draw to the scale of 1 :10 elevation and plan of alternate courses of 'L' shaped one brick and one and half brick thick brick wall in English bond.

   B) Design and draw to scale 1 : 30, plan and vertical section for Dog-legged R.C.C. Stair for a residential building. Use following data : **14**

   1) Storey height = 3100 mm

   2) Width of flight = 1000 mm

   3) Railing – 50 mm thick RCC Pardi

   4) Reinforcement details not necessary

   5) Write step by step calculation on sheet with pencil only.

   OR

   Draw to scale 1 : 10

   a) Cross section

   b) Part plan showing all the layers partly-open of RCC slab with ceramic tiles flooring laid on cement mortar bed with cement float. Use following data :

      1) RCC slab thickness = 150 mm

      2) Cement mortar bed thickness = 30 mm

      3) Cement float thickness = 02 mm

      4) Size Ceramic Tile = 450 mm × 450 mm × 15 mm

      5) Slab supported on RCC beam of size 230 × 300 mm

      6) Thickness of brick wall = 230 mm including plaster

      7) Provide 10 mm height skirting of ceramic tile.

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SLR-EP – 19

Seat No.	

Set R

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Tuesday, 20-12-2016 Total Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Section – ***I*** *to be written in answerbook.*
3) Section – ***II*** *to be drawn on* ***half imperial drawing sheet****. Use* ***both*** *sides of the sheet.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) ***Assume*** *suitable data* ***wherever*** *necessary and mention it clearly.*
6) Retain ***all*** *projection/construction lines on drawing sheet.*
7) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
8) ***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

1. State whether following statement is **True** or **false** : **14**

1) Combined footing is provided for single column.

2) CRS is a type of stone masonry.

3) If modular brick is cut along length in half then it is called as half closure.

4) Flemish bond is mostly used brick bond as compared to English bond.

5) Horns are provided to fix door frame inside the walls.

6) Mullion divides door or window vertically.

7) Landing is the biggest tread of half-turned staircase.

P.T.O.

8) Voussoirs of an arch remains in tesion.

9) Roof sloping in two directions is called as hip roof.

10) A.C. sheets means Asian Cement sheets.

11) PCC means Plain Cured Concrete.

12) Surkhi is a mortar made from burnt brick bats.

13) In framed structure, the function of main walls is to transfer the load.

14) Wall footing is provided in Load bearing structure.

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SLR-EP – 19

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Tuesday, 20-12-2016 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Section – **I** to be written in answerbook.*
*3) Section – **II** to be drawn on **half imperial drawing sheet**. Use **both** sides of the sheet.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever** necessary and mention it clearly.*
*6) Retain **all** projection/construction lines on drawing sheet.*

SECTION – I

2. Attempt **any seven** questions : **(7×4=28)**

a) Explain importance of through stone in stone masonry with neat sketch.

b) Write in detail requirements of building stone.

c) Draw isometric shapes of
   i) Lean-to-roof ii) Gable roof
   iii) King Closure iv) $3/4^{th}$ Bat.

d) Draw neat labeled Section and Plan of
   i) Quarter Turn Staircase
   ii) Double Flight Straight Staircase

e) Draw neat labeled elevation of semicircular arch.

f) Compare strap footing with combined footing with sketches.

g) Write about field testing of bricks and cement.

h) Enlist functional requirements of building as whole and explain any two in detail.

i) Draw labeled cross-section of fixing Vitrified tiles on RCC slab.

j) Enlist different types of doors and draw neat labeled elevation of any one.

SECTION – II

3. A) Draw to a scale of 1 : 10, detailed section, front elevation and sectional elevation for framed T. W. Double leaf door half glazed and half paneled. Use following data (All dimensions are in mm) : **14**

   a) Clear operating = 1200 × 2100

   b) Wood Section for frame = 100 × 75

   c) Wood section for styles and rails = 100 × 40

   d) Obscured Glass = 5 mm thick at top-side of shutter

   e) Panel – 20 mm thick plywood

   f) Show various fixtures at proper location.

   OR

   Draw to the scale of 1 :10 elevation and plan of alternate courses of 'L' shaped one brick and one and half brick thick brick wall in English bond.

   B) Design and draw to scale 1 : 30, plan and vertical section for Dog-legged R.C.C. Stair for a residential building. Use following data : **14**

   1) Storey height = 3100 mm

   2) Width of flight = 1000 mm

   3) Railing – 50 mm thick RCC Pardi

   4) Reinforcement details not necessary

   5) Write step by step calculation on sheet with pencil only.

   OR

   Draw to scale 1 : 10

   a) Cross section

   b) Part plan showing all the layers partly-open of RCC slab with ceramic tiles flooring laid on cement mortar bed with cement float. Use following data :

      1) RCC slab thickness = 150 mm

      2) Cement mortar bed thickness = 30 mm

      3) Cement float thickness = 02 mm

      4) Size Ceramic Tile = 450 mm × 450 mm × 15 mm

      5) Slab supported on RCC beam of size 230 × 300 mm

      6) Thickness of brick wall = 230 mm including plaster

      7) Provide 10 mm height skirting of ceramic tile.

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SLR-EP – 19

Seat No.	

Set S

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Tuesday, 20-12-2016 Total Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Section – ***I*** *to be written in answerbook.*
3) Section – ***II*** *to be drawn on* ***half imperial drawing sheet****. Use* ***both*** *sides of the sheet.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) ***Assume*** *suitable data* ***wherever*** *necessary and mention it clearly.*
6) Retain ***all*** *projection/construction lines on drawing sheet.*
7) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
8) ***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

1. State whether following statement is **True** or **false** : **14**

1) Mullion divides door or window vertically.

2) Landing is the biggest tread of half-turned staircase.

3) Voussoirs of an arch remains in tesion.

4) Roof sloping in two directions is called as hip roof.

5) A.C. sheets means Asian Cement sheets.

6) PCC means Plain Cured Concrete.

7) Surkhi is a mortar made from burnt brick bats.

P.T.O.

8) In framed structure, the function of main walls is to transfer the load.

9) Wall footing is provided in Load bearing structure.

10) Combined footing is provided for single column.

11) CRS is a type of stone masonry.

12) If modular brick is cut along length in half then it is called as half closure.

13) Flemish bond is mostly used brick bond as compared to English bond.

14) Horns are provided to fix door frame inside the walls.

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SLR-EP – 19

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Tuesday, 20-12-2016 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Section – **I** to be written in answerbook.*
*3) Section – **II** to be drawn on **half imperial drawing sheet**. Use **both** sides of the sheet.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever** necessary and mention it clearly.*
*6) Retain **all** projection/construction lines on drawing sheet.*

SECTION – I

2. Attempt **any seven** questions : **(7×4=28)**

a) Explain importance of through stone in stone masonry with neat sketch.

b) Write in detail requirements of building stone.

c) Draw isometric shapes of
   i) Lean-to-roof ii) Gable roof
   iii) King Closure iv) $3/4^{th}$ Bat.

d) Draw neat labeled Section and Plan of
   i) Quarter Turn Staircase
   ii) Double Flight Straight Staircase

e) Draw neat labeled elevation of semicircular arch.

f) Compare strap footing with combined footing with sketches.

g) Write about field testing of bricks and cement.

h) Enlist functional requirements of building as whole and explain any two in detail.

i) Draw labeled cross-section of fixing Vitrified tiles on RCC slab.

j) Enlist different types of doors and draw neat labeled elevation of any one.

SECTION – II

3. A) Draw to a scale of 1 : 10, detailed section, front elevation and sectional elevation for framed T. W. Double leaf door half glazed and half paneled. Use following data (All dimensions are in mm) : **14**

   a) Clear operating = 1200 × 2100

   b) Wood Section for frame = 100 × 75

   c) Wood section for styles and rails = 100 × 40

   d) Obscured Glass = 5 mm thick at top-side of shutter

   e) Panel – 20 mm thick plywood

   f) Show various fixtures at proper location.

   OR

   Draw to the scale of 1 :10 elevation and plan of alternate courses of 'L' shaped one brick and one and half brick thick brick wall in English bond.

   B) Design and draw to scale 1 : 30, plan and vertical section for Dog-legged R.C.C. Stair for a residential building. Use following data : **14**

   1) Storey height = 3100 mm

   2) Width of flight = 1000 mm

   3) Railing – 50 mm thick RCC Pardi

   4) Reinforcement details not necessary

   5) Write step by step calculation on sheet with pencil only.

   OR

   Draw to scale 1 : 10

   a) Cross section

   b) Part plan showing all the layers partly-open of RCC slab with ceramic tiles flooring laid on cement mortar bed with cement float. Use following data :

      1) RCC slab thickness = 150 mm

      2) Cement mortar bed thickness = 30 mm

      3) Cement float thickness = 02 mm

      4) Size Ceramic Tile = 450 mm × 450 mm × 15 mm

      5) Slab supported on RCC beam of size 230 × 300 mm

      6) Thickness of brick wall = 230 mm including plaster

      7) Provide 10 mm height skirting of ceramic tile.

SLR-EP – 20

Seat No.	

Set **P**

S.E. (Civil) (Part – I) Examination, 2016
(CGPA)
FLUID MECHANICS – I

Day and Date : Thursday, 22-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Draw **neat** figures **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Piezometer measures _____ pressure only.
a) atmospheric b) gauge c) absolute d) all

2) Newton's law of viscosity is given by the relation
a) $\tau = u.\, du/dy$ b) $\tau = \sqrt{u}.\, du/dy$ c) $\tau = u^2.\, du/dy$ d) $\tau = u^3.\, du/dy$

3) If the Reynold's number is more than 4000 the flow in pipe is called as
a) Laminar b) Transitional c) Turbulent d) Steady

4) An ice cube is floating in a glass of water as the ice cube melta the water level
a) Remain constant b) Rise
c) Fall d) None

5) The pressure of liquid on a surface will always act _____ to the surface.
a) 45° b) 60° c) parallel d) normal

6) The unit of surface tension is
a) N/m b) N/m^2 c) N/m^3 d) Kg/m^3

7) The position of meta centre (M) remain below C.G. of body, the body remain in state of _____ equilibrium.
a) Unstable b) Stable c) Neutral d) All

8) The total energy line is always higher than the hydraulic gradient line, the vertical distance between the two representing
   a) The pressure head b) The piezometric head
   c) The velocity head d) None of the above

9) If the Reynold's number is more than 5×10^5, the boundary layer is called
   a) Laminar boundary layer b) Turbulent boundary layer
   c) Either of the above d) None of the above

10) The co-efficient of discharge of an orificemeter is _____ that of venturimeter.
   a) Equal to b) Much smaller than
   c) More than d) Any of these

11) Darcy-Weisbach equation is used to find loss of head due to
   a) sudden enlargement b) sudden contraction
   c) friction d) none of the above

12) Pipe network system is solved by
   a) Pascal's law b) Stokes law c) Couttee's law d) Hardy cross

13) In case of laminar flow, the loss of pressure head is proportional to
   a) velocity b) velocity^2 c) velocity^3 d) none

14) Loss of head at the entrance of pipe is given by
   a) $\frac{v^2}{2g}$ b) $\frac{v}{g}$ c) $0.5\frac{v^2}{2g}$ d) $\frac{v^3}{2g}$

_____

SLR-EP – 20

Seat No.	

S.E. (Civil) (Part – I) Examination, 2016
(CGPA)
FLUID MECHANICS – I

Day and Date : Thursday, 22-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. **5** is **compulsory** and solve **any one** question from remaining questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume correct data **wherever** necessary.*
*4) **Use** of non-programmable **calculator** is permitted.*
*5) Attempt **all** questions from Section **I**.*
*6) Draw **neat** figures **wherever** necessary.*

SECTION – I

2. Solve **any two** : **10**

a) Explain the following terms
   a) specific weight
   b) viscosity
   c) surface tension
   d) capillarity

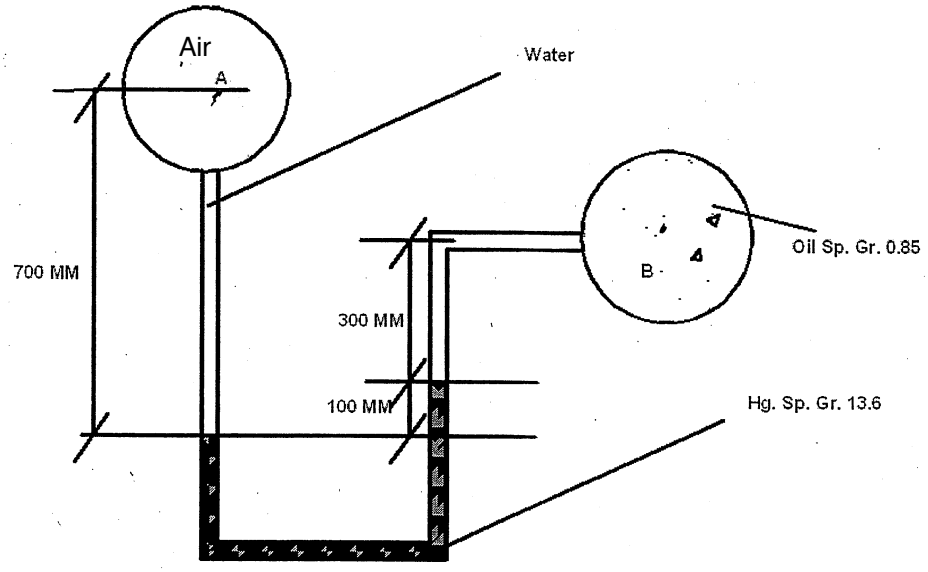
b) A plate having an area of 0.6 m^2 is sliding down the inclined plane at 30° to the horizontal with velocity 0.4 m/s. There is a cusion of fluid 2 mm thick between the plate and the plane. Find the viscosity of fluid if the weight of plate is 300 N.

c) Define Pascal's law and derive the equation for it.

3. Solve **any two** : **12**

a) A rectangular vertical door 2.4 m × 1.2 m is hinged at 18 cm below the top and 18 cm above the bottom. One vertical side and one clamp at the centre of other edge. The door is subjected to water pressure on one side and the depth of water above the top is 1.4 m. Calculate reaction at the hinges and at the clamp.

b) Figure shows a differential manometer connected to two points A and B. At a air pressure is 100 KN/ m^2. Find absolute pressure at B.



c) Derive the equation for the centre of pressure ($\bar{h}$) for inclined immersed bodies. Draw neat sketch.

4. Write short note on **any two** : **6**

1) Metacenter and metacentric height
2) Buoyancy and types of equilibrium
3) Stream function and velocity potential.

SECTION – II

5. a) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation. **7**

b) A pipe line carrying oil of specific gravity 0.8, changes in diameter from 300 mm at a position A to 500 mm diameter to a position B which is 5 m at a higher level. If the pressures at A and B are 19.62 N/cm^2 and 14.91 N/cm^2 resp. and the discharge is 150 lit/sec. Determine the loss of head and direction of flow. **7**

6. a) Explain **6**

   i) HGL and TEL

   ii) Syphon

   b) Derive the expression for loss of head due to friction in pipes. **5**

   c) Find the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400 mm. The rate of the flow of water through the pipe is 250 lit/s. **3**

7. a) Explain the 'Hardy Cross' method of solving pipe network. **5**

   b) The velocity distribution in the boundary layer is given by $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$. **6**

   Calculate :

   i) Displacement Thickness

   ii) Momentum Thickness.

   c) Explain hydrodynamically smooth and rough boundaries. **3**

Set P

SLR-EP – 20

Seat No.	

Set **Q**

S.E. (Civil) (Part – I) Examination, 2016
(CGPA)
FLUID MECHANICS – I

Day and Date : Thursday, 22-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Draw **neat** figures **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The total energy line is always higher than the hydraulic gradient line, the vertical distance between the two representing
   a) The pressure head b) The piezometric head
   c) The velocity head d) None of the above

2) If the Reynold's number is more than 5×10^5, the boundary layer is called
   a) Laminar boundary layer b) Turbulent boundary layer
   c) Either of the above d) None of the above

3) The co-efficient of discharge of an orificemeter is _____ that of venturimeter.
   a) Equal to b) Much smaller than
   c) More than d) Any of these

4) Darcy-Weisbach equation is used to find loss of head due to
   a) sudden enlargement b) sudden contraction
   c) friction d) none of the above

5) Pipe network system is solved by
   a) Pascal's law b) Stokes law c) Couttee's law d) Hardy cross

6) In case of laminar flow, the loss of pressure head is proportional to
   a) velocity b) velocity^2 c) velocity^3 d) none

7) Loss of head at the entrance of pipe is given by

a) $\frac{v^2}{2g}$ b) $\frac{v}{g}$ c) $0.5\frac{v^2}{2g}$ d) $\frac{v^3}{2g}$

8) Piezometer measures _____ pressure only.
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9) Newton's law of viscosity is given by the relation

a) $\tau = u.\, du/dy$ b) $\tau = \sqrt{u}.\, du/dy$ c) $\tau = u^2.\, du/dy$ d) $\tau = u^3.\, du/dy$

10) If the Reynold's number is more than 4000 the flow in pipe is called as
a) Laminar b) Transitional c) Turbulent d) Steady

11) An ice cube is floating in a glass of water as the ice cube melta the water level
a) Remain constant b) Rise
c) Fall d) None

12) The pressure of liquid on a surface will always act _____ to the surface.

a) 45° b) 60° c) parallel d) normal

13) The unit of surface tension is
a) N/m b) N/m^2 c) N/m^3 d) Kg/m^3

14) The position of meta centre (M) remain below C.G. of body, the body remain in state of _____ equilibrium.
a) Unstable b) Stable c) Neutral d) All

_____

SLR-EP – 20

Seat No.	

S.E. (Civil) (Part – I) Examination, 2016
(CGPA)
FLUID MECHANICS – I

Day and Date : Thursday, 22-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. **5** is **compulsory** and solve **any one** question from remaining questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume correct data **wherever** necessary.*
*4) **Use** of non-programmable **calculator** is permitted.*
*5) Attempt **all** questions from Section **I**.*
*6) Draw **neat** figures **wherever** necessary.*

SECTION – I

2. Solve **any two** : **10**

a) Explain the following terms
   a) specific weight
   b) viscosity
   c) surface tension
   d) capillarity

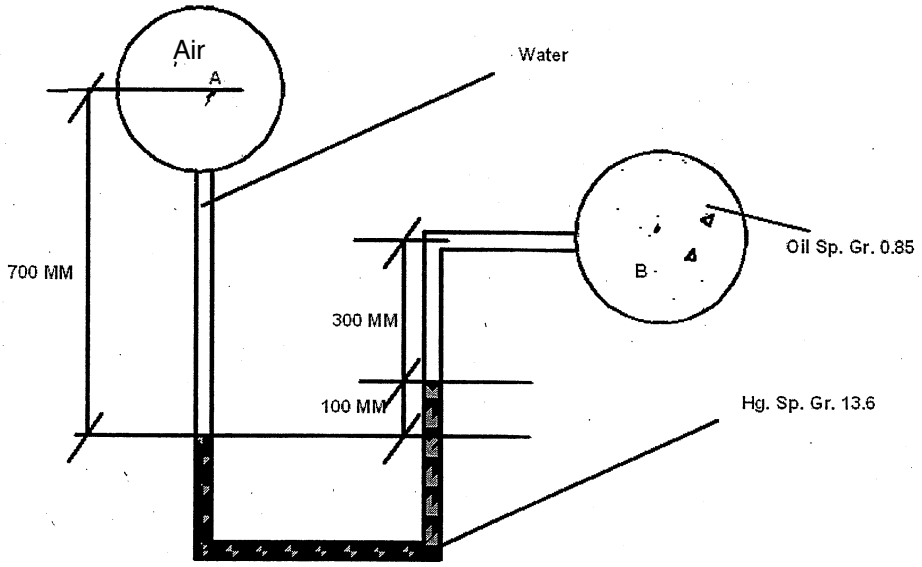
b) A plate having an area of 0.6 m^2 is sliding down the inclined plane at 30° to the horizontal with velocity 0.4 m/s. There is a cusion of fluid 2 mm thick between the plate and the plane. Find the viscosity of fluid if the weight of plate is 300 N.

c) Define Pascal's law and derive the equation for it.

3. Solve **any two** : **12**

a) A rectangular vertical door 2.4 m × 1.2 m is hinged at 18 cm below the top and 18 cm above the bottom. One vertical side and one clamp at the centre of other edge. The door is subjected to water pressure on one side and the depth of water above the top is 1.4 m. Calculate reaction at the hinges and at the clamp.

b) Figure shows a differential manometer connected to two points A and B. At a air pressure is 100 KN/ m^2. Find absolute pressure at B.



c) Derive the equation for the centre of pressure ($\hbar$) for inclined immersed bodies. Draw neat sketch.

4. Write short note on **any two** : **6**

1) Metacenter and metacentric height
2) Buoyancy and types of equilibrium
3) Stream function and velocity potential.

SECTION – II

5. a) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation. **7**

b) A pipe line carrying oil of specific gravity 0.8, changes in diameter from 300 mm at a position A to 500 mm diameter to a position B which is 5 m at a higher level. If the pressures at A and B are 19.62 N/cm^2 and 14.91 N/cm^2 resp. and the discharge is 150 lit/sec. Determine the loss of head and direction of flow. **7**

6. a) Explain **6**

   i) HGL and TEL

   ii) Syphon

   b) Derive the expression for loss of head due to friction in pipes. **5**

   c) Find the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400 mm. The rate of the flow of water through the pipe is 250 lit/s. **3**

7. a) Explain the 'Hardy Cross' method of solving pipe network. **5**

   b) The velocity distribution in the boundary layer is given by $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$. **6**

   Calculate :

   i) Displacement Thickness

   ii) Momentum Thickness.

   c) Explain hydrodynamically smooth and rough boundaries. **3**

Set Q

SLR-EP – 20

Seat No.	

Set R

S.E. (Civil) (Part – I) Examination, 2016
(CGPA)
FLUID MECHANICS – I

Day and Date : Thursday, 22-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Draw **neat** figures **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The pressure of liquid on a surface will always act _____ to the surface.
a) 45° b) 60° c) parallel d) normal

2) The unit of surface tension is
a) N/m b) N/m^2 c) N/m^3 d) Kg/m^3

3) The position of meta centre (M) remain below C.G. of body, the body remain in state of _____ equilibrium.
a) Unstable b) Stable c) Neutral d) All

4) The total energy line is always higher than the hydraulic gradient line, the vertical distance between the two representing
a) The pressure head b) The piezometric head
c) The velocity head d) None of the above

5) If the Reynold's number is more than 5×10^5, the boundary layer is called
a) Laminar boundary layer b) Turbulent boundary layer
c) Either of the above d) None of the above

6) The co-efficient of discharge of an orificemeter is _____ that of venturimeter.
a) Equal to b) Much smaller than
c) More than d) Any of these

7) Darcy-Weisbach equation is used to find loss of head due to
   a) sudden enlargement b) sudden contraction
   c) friction d) none of the above

8) Pipe network system is solved by
   a) Pascal's law b) Stokes law c) Couttee's law d) Hardy cross

9) In case of laminar flow, the loss of pressure head is proportional to
   a) velocity b) velocity^2 c) velocity^3 d) none

10) Loss of head at the entrance of pipe is given by
   a) $\frac{v^2}{2g}$ b) $\frac{v}{g}$ c) $0.5\frac{v^2}{2g}$ d) $\frac{v^3}{2g}$

11) Piezometer measures _____ pressure only.
   a) atmospheric b) gauge c) absolute d) all

12) Newton's law of viscosity is given by the relation
   a) $\tau = u.\, du/dy$ b) $\tau = \sqrt{u}.\, du/dy$ c) $\tau = u^2.\, du/dy$ d) $\tau = u^3.\, du/dy$

13) If the Reynold's number is more than 4000 the flow in pipe is called as
   a) Laminar b) Transitional c) Turbulent d) Steady

14) An ice cube is floating in a glass of water as the ice cube melta the water level
   a) Remain constant b) Rise
   c) Fall d) None

_____

SLR-EP – 20

Seat No.	

S.E. (Civil) (Part – I) Examination, 2016
(CGPA)
FLUID MECHANICS – I

Day and Date : Thursday, 22-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. **5** is **compulsory** and solve **any one** question from remaining questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume correct data **wherever** necessary.*
*4) **Use** of non-programmable **calculator** is permitted.*
*5) Attempt **all** questions from Section **I**.*
*6) Draw **neat** figures **wherever** necessary.*

SECTION – I

2. Solve **any two** : **10**

a) Explain the following terms
   a) specific weight
   b) viscosity
   c) surface tension
   d) capillarity

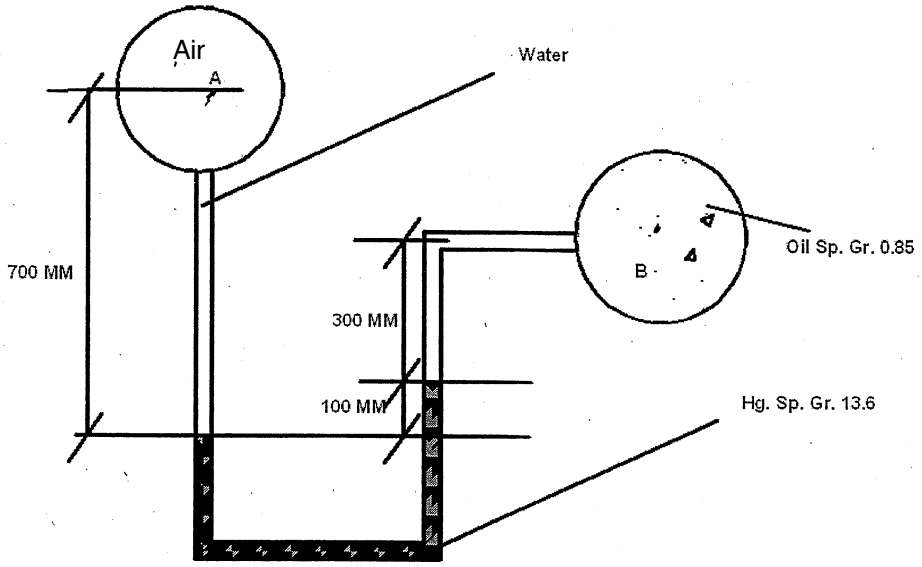
b) A plate having an area of 0.6 m^2 is sliding down the inclined plane at 30° to the horizontal with velocity 0.4 m/s. There is a cusion of fluid 2 mm thick between the plate and the plane. Find the viscosity of fluid if the weight of plate is 300 N.

c) Define Pascal's law and derive the equation for it.

3. Solve **any two** : **12**

a) A rectangular vertical door 2.4 m × 1.2 m is hinged at 18 cm below the top and 18 cm above the bottom. One vertical side and one clamp at the centre of other edge. The door is subjected to water pressure on one side and the depth of water above the top is 1.4 m. Calculate reaction at the hinges and at the clamp.

b) Figure shows a differential manometer connected to two points A and B. At a air pressure is 100 KN/ m^2. Find absolute pressure at B.



c) Derive the equation for the centre of pressure ($\hbar$) for inclined immersed bodies. Draw neat sketch.

4. Write short note on **any two** : **6**

1) Metacenter and metacentric height
2) Buoyancy and types of equilibrium
3) Stream function and velocity potential.

SECTION – II

5. a) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation. **7**

b) A pipe line carrying oil of specific gravity 0.8, changes in diameter from 300 mm at a position A to 500 mm diameter to a position B which is 5 m at a higher level. If the pressures at A and B are 19.62 N/cm^2 and 14.91 N/cm^2 resp. and the discharge is 150 lit/sec. Determine the loss of head and direction of flow. **7**

6. a) Explain **6**

   i) HGL and TEL

   ii) Syphon

   b) Derive the expression for loss of head due to friction in pipes. **5**

   c) Find the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400 mm. The rate of the flow of water through the pipe is 250 lit/s. **3**

7. a) Explain the 'Hardy Cross' method of solving pipe network. **5**

   b) The velocity distribution in the boundary layer is given by $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$. **6**

   Calculate :

   i) Displacement Thickness

   ii) Momentum Thickness.

   c) Explain hydrodynamically smooth and rough boundaries. **3**

Set R

SLR-EP – 20

Seat No.	

Set **S**

S.E. (Civil) (Part – I) Examination, 2016
(CGPA)
FLUID MECHANICS – I

Day and Date : Thursday, 22-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) Draw ***neat*** *figures* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The co-efficient of discharge of an orificemeter is _____ that of venturimeter.
a) Equal to b) Much smaller than
c) More than d) Any of these

2) Darcy-Weisbach equation is used to find loss of head due to
a) sudden enlargement b) sudden contraction
c) friction d) none of the above

3) Pipe network system is solved by
a) Pascal's law b) Stokes law c) Couttee's law d) Hardy cross

4) In case of laminar flow, the loss of pressure head is proportional to
a) velocity b) velocity^2 c) velocity^3 d) none

5) Loss of head at the entrance of pipe is given by
a) $\frac{v^2}{2g}$ b) $\frac{v}{g}$ c) $0.5\,\frac{v^2}{2g}$ d) $\frac{v^3}{2g}$

6) Piezometer measures _____ pressure only.
a) atmospheric b) gauge c) absolute d) all

7) Newton's law of viscosity is given by the relation
a) $\tau = u.\, du/dy$ b) $\tau = \sqrt{u}.\, du/dy$ c) $\tau = u^2.\, du/dy$ d) $\tau = u^3.\, du/dy$

8) If the Reynold's number is more than 4000 the flow in pipe is called as
   a) Laminar b) Transitional c) Turbulent d) Steady

9) An ice cube is floating in a glass of water as the ice cube melta the water level
   a) Remain constant b) Rise
   c) Fall d) None

10) The pressure of liquid on a surface will always act _____ to the surface.
   a) 45° b) 60° c) parallel d) normal

11) The unit of surface tension is
   a) N/m b) N/m^2 c) N/m^3 d) Kg/m^3

12) The position of meta centre (M) remain below C.G. of body, the body remain in state of _____ equilibrium.
   a) Unstable b) Stable c) Neutral d) All

13) The total energy line is always higher than the hydraulic gradient line, the vertical distance between the two representing
   a) The pressure head b) The piezometric head
   c) The velocity head d) None of the above

14) If the Reynold's number is more than 5×10^5, the boundary layer is called
   a) Laminar boundary layer b) Turbulent boundary layer
   c) Either of the above d) None of the above

_____

SLR-EP – 20

Seat No.	

S.E. (Civil) (Part – I) Examination, 2016
(CGPA)
FLUID MECHANICS – I

Day and Date : Thursday, 22-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. **5** is **compulsory** and solve **any one** question from remaining questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume correct data **wherever** necessary.*
*4) **Use** of non-programmable **calculator** is permitted.*
*5) Attempt **all** questions from Section **I**.*
*6) Draw **neat** figures **wherever** necessary.*

SECTION – I

2. Solve **any two** : **10**

a) Explain the following terms
   a) specific weight
   b) viscosity
   c) surface tension
   d) capillarity

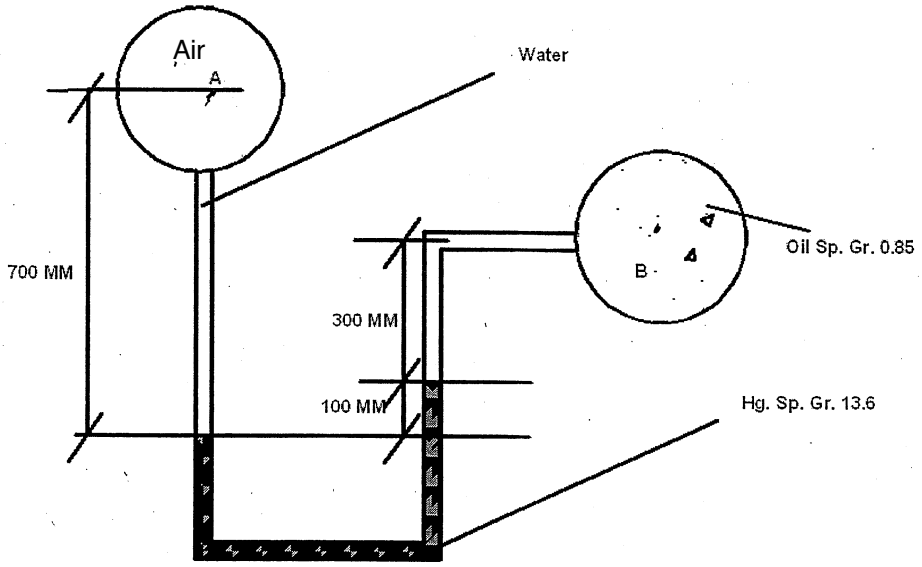
b) A plate having an area of 0.6 m^2 is sliding down the inclined plane at 30° to the horizontal with velocity 0.4 m/s. There is a cusion of fluid 2 mm thick between the plate and the plane. Find the viscosity of fluid if the weight of plate is 300 N.

c) Define Pascal's law and derive the equation for it.

3. Solve **any two** : **12**

a) A rectangular vertical door 2.4 m × 1.2 m is hinged at 18 cm below the top and 18 cm above the bottom. One vertical side and one clamp at the centre of other edge. The door is subjected to water pressure on one side and the depth of water above the top is 1.4 m. Calculate reaction at the hinges and at the clamp.

b) Figure shows a differential manometer connected to two points A and B. At a air pressure is 100 KN/ m^2. Find absolute pressure at B.



c) Derive the equation for the centre of pressure ($\hbar$) for inclined immersed bodies. Draw neat sketch.

4. Write short note on **any two** : **6**

1) Metacenter and metacentric height
2) Buoyancy and types of equilibrium
3) Stream function and velocity potential.

SECTION – II

5. a) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation. **7**

b) A pipe line carrying oil of specific gravity 0.8, changes in diameter from 300 mm at a position A to 500 mm diameter to a position B which is 5 m at a higher level. If the pressures at A and B are 19.62 N/cm^2 and 14.91 N/cm^2 resp. and the discharge is 150 lit/sec. Determine the loss of head and direction of flow. **7**

6. a) Explain **6**

   i) HGL and TEL

   ii) Syphon

   b) Derive the expression for loss of head due to friction in pipes. **5**

   c) Find the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400 mm. The rate of the flow of water through the pipe is 250 lit/s. **3**

7. a) Explain the 'Hardy Cross' method of solving pipe network. **5**

   b) The velocity distribution in the boundary layer is given by $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - \left(\frac{y}{\delta}\right)^2$. **6**

   Calculate :

   i) Displacement Thickness

   ii) Momentum Thickness.

   c) Explain hydrodynamically smooth and rough boundaries. **3**

Set S

SLR-EP – 21

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
ENGINEERING GEOLOGY

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Question Number* ***1, 2*** *and* ***6*** *is* ***compulsory****.*
2) Attempt ***any two*** *questions from Q. No.* ***3*** *to* ***5*** *and Q. No.* ***7*** *to* ***9****.*
3) ***Draw*** *neat and labelled diagram* ***wherever*** *necessary.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct answer : **14**

1) The colour of mineral powder is called _____
   a) Luster b) Streak
   c) Cleavage d) None of these

2) _____ is a concordant igneous intrusion in folded regions.
   a) Phacolith b) Laccolith
   c) Lopolith d) Sill

3) _____ is a plutonic igneous rock.
   a) Basalt b) Pitchstone
   c) Granite d) Pumice

4) Reverse fault is one in which the hanging wall appears to have moved _____ relative to footwall.
   a) Upward b) Downward
   c) Equally d) None of these

5) In _____ fold both the limb almost horizontal.
   a) Recumbent b) Open fold
   c) Close d) Overturned

P.T.O.

6) A stream is said to be in the _____ stage when its cuts valley downward with its base level.

a) Youth b) Mature

c) Old d) None of these

7) Break down of pre-existing rock is called _____

a) Erosion b) Deposition

c) Transportation d) Weathering

8) A volcano through which only gases are given off is known as _____

a) Pyroclasts b) Fumaroles

c) Hot springs d) Geysers

9) The maximum destruction occurred because of _____ earthquake wave.

a) Primary b) Secondary

c) Love d) R

10) _____ is the capacity of a rock to transmit water.

a) Porosity b) Permeability

c) Durability d) Resistance

11) The _____ dams are constructed mainly by soil or earth material.

a) Gravity b) Arch

c) Buttress d) Earth

12) The _____ is a terminal support of the bridge.

a) Abutment b) Piers

c) Span d) Deck

13) The rock excavated beyond the required cross section of the tunnel is known as _____

a) Lining b) Overbreak

c) Support d) Silting

14) If tightly jointed rocks present below the dam, then there will be _____

a) Leakage of water b) No leakage of water

c) No storage of water d) All of these

_____

SLR-EP – 21

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
ENGINEERING GEOLOGY

Day and Date : Saturday, 24-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Question Number **1, 2** and **6** is **compulsory**.*
*2) Attempt **any two** questions from Q. No. **3** to **5** and Q. No. **7** to **9**.*
*3) **Draw** neat and labelled diagram **wherever** necessary.*

SECTION – I

2. Write short notes **any five** : **10**

   1) Define mineral
   2) Waterfall
   3) Names the different sediments
   4) Outlier
   5) Dyke
   6) Vesicular structure.

3. a) Describe Rock cycle. **5**

   b) Explain internal structure of earth. **4**

4. a) Explain Amphibole group of mineral. **5**

   b) Explain causes of volcano. **4**

5. a) Define fold ? Explain any two types of fold. **5**

   b) Explain agents of metamorphic rock. **4**

SECTION – II

6. Write short notes **any five** : **10**
   1) Define aquifer
   2) Seismic waves
   3) Define landslide
   4) Name the building stones in India.
   5) What is gravity dam ?
   6) What is suspension bridge ?
7. a) Explain zones of ground water. **5**
   b) Explain precautions of earthquake. **4**
8. a) Explain tunnel in folded strata. **5**
   b) Explain types of bridges. **4**
9. a) Explain preventions of landslide. **5**
   b) Explain needs of rain water harvesting. **4**

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SLR-EP – 21

Seat No.	

Set **Q**

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
ENGINEERING GEOLOGY

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Question Number* ***1, 2*** *and* ***6*** *is* ***compulsory****.*
2) Attempt ***any two*** *questions from Q. No.* ***3*** *to* ***5*** *and Q. No.* ***7*** *to* ***9****.*
3) ***Draw*** *neat and labelled diagram* ***wherever*** *necessary.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct answer : **14**

1) A volcano through which only gases are given off is known as _____
   a) Pyroclasts b) Fumaroles
   c) Hot springs d) Geysers

2) The maximum destruction occurred because of _____ earthquake wave.
   a) Primary b) Secondary
   c) Love d) R

3) _____ is the capacity of a rock to transmit water.
   a) Porosity b) Permeability
   c) Durability d) Resistance

4) The _____ dams are constructed mainly by soil or earth material.
   a) Gravity b) Arch
   c) Buttress d) Earth

5) The _____ is a terminal support of the bridge.
   a) Abutment b) Piers
   c) Span d) Deck

P.T.O.

6) The rock excavated beyond the required cross section of the tunnel is known as _____

a) Lining b) Overbreak

c) Support d) Silting

7) If tightly jointed rocks present below the dam, then there will be _____

a) Leakage of water b) No leakage of water

c) No storage of water d) All of these

8) The colour of mineral powder is called _____

a) Luster b) Streak

c) Cleavage d) None of these

9) _____ is a concordant igneous intrusion in folded regions.

a) Phacolith b) Laccolith

c) Lopolith d) Sill

10) _____ is a plutonic igneous rock.

a) Basalt b) Pitchstone

c) Granite d) Pumice

11) Reverse fault is one in which the hanging wall appears to have moved _____ relative to footwall.

a) Upward b) Downward

c) Equally d) None of these

12) In _____ fold both the limb almost horizontal.

a) Recumbent b) Open fold

c) Close d) Overturned

13) A stream is said to be in the _____ stage when its cuts valley downward with its base level.

a) Youth b) Mature

c) Old d) None of these

14) Break down of pre-existing rock is called _____

a) Erosion b) Deposition

c) Transportation d) Weathering

_____

SLR-EP – 21

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
ENGINEERING GEOLOGY

Day and Date : Saturday, 24-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Question Number **1, 2** and **6** is **compulsory**.*
*2) Attempt **any two** questions from Q. No. **3** to **5** and Q. No. **7** to **9**.*
*3) **Draw** neat and labelled diagram **wherever** necessary.*

SECTION – I

2. Write short notes **any five** : **10**

   1) Define mineral
   2) Waterfall
   3) Names the different sediments
   4) Outlier
   5) Dyke
   6) Vesicular structure.

3. a) Describe Rock cycle. **5**

   b) Explain internal structure of earth. **4**

4. a) Explain Amphibole group of mineral. **5**

   b) Explain causes of volcano. **4**

5. a) Define fold ? Explain any two types of fold. **5**

   b) Explain agents of metamorphic rock. **4**

SECTION – II

6. Write short notes **any five** : **10**
   1) Define aquifer
   2) Seismic waves
   3) Define landslide
   4) Name the building stones in India.
   5) What is gravity dam ?
   6) What is suspension bridge ?
7. a) Explain zones of ground water. **5**
   b) Explain precautions of earthquake. **4**
8. a) Explain tunnel in folded strata. **5**
   b) Explain types of bridges. **4**
9. a) Explain preventions of landslide. **5**
   b) Explain needs of rain water harvesting. **4**

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SLR-EP – 21

Seat No.	

Set **R**

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
ENGINEERING GEOLOGY

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Question Number* ***1, 2*** *and* ***6*** *is* ***compulsory****.*
2) Attempt ***any two*** *questions from Q. No.* ***3*** *to* ***5*** *and Q. No.* ***7*** *to* ***9****.*
3) ***Draw*** *neat and labelled diagram* ***wherever*** *necessary.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct answer : **14**

1) In _____ fold both the limb almost horizontal.
   a) Recumbent b) Open fold
   c) Close d) Overturned

2) A stream is said to be in the _____ stage when its cuts valley downward with its base level.
   a) Youth b) Mature
   c) Old d) None of these

3) Break down of pre-existing rock is called _____
   a) Erosion b) Deposition
   c) Transportation d) Weathering

4) A volcano through which only gases are given off is known as _____
   a) Pyroclasts b) Fumaroles
   c) Hot springs d) Geysers

5) The maximum destruction occurred because of _____ earthquake wave.
   a) Primary b) Secondary
   c) Love d) R

P.T.O.

6) _____ is the capacity of a rock to transmit water.
   a) Porosity b) Permeability
   c) Durability d) Resistance

7) The _____ dams are constructed mainly by soil or earth material.
   a) Gravity b) Arch
   c) Buttress d) Earth

8) The _____ is a terminal support of the bridge.
   a) Abutment b) Piers
   c) Span d) Deck

9) The rock excavated beyond the required cross section of the tunnel is known as _____
   a) Lining b) Overbreak
   c) Support d) Silting

10) If tightly jointed rocks present below the dam, then there will be _____
   a) Leakage of water b) No leakage of water
   c) No storage of water d) All of these

11) The colour of mineral powder is called _____
   a) Luster b) Streak
   c) Cleavage d) None of these

12) _____ is a concordant igneous intrusion in folded regions.
   a) Phacolith b) Laccolith
   c) Lopolith d) Sill

13) _____ is a plutonic igneous rock.
   a) Basalt b) Pitchstone
   c) Granite d) Pumice

14) Reverse fault is one in which the hanging wall appears to have moved _____ relative to footwall.
   a) Upward b) Downward
   c) Equally d) None of these

_____

SLR-EP – 21

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
ENGINEERING GEOLOGY

Day and Date : Saturday, 24-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Question Number **1, 2** and **6** is **compulsory**.*
*2) Attempt **any two** questions from Q. No. **3** to **5** and Q. No. **7** to **9**.*
*3) **Draw** neat and labelled diagram **wherever** necessary.*

SECTION – I

2. Write short notes **any five** : **10**
   1) Define mineral
   2) Waterfall
   3) Names the different sediments
   4) Outlier
   5) Dyke
   6) Vesicular structure.

3. a) Describe Rock cycle. **5**
   b) Explain internal structure of earth. **4**

4. a) Explain Amphibole group of mineral. **5**
   b) Explain causes of volcano. **4**

5. a) Define fold ? Explain any two types of fold. **5**
   b) Explain agents of metamorphic rock. **4**

SECTION – II

6. Write short notes **any five** : **10**
   1) Define aquifer
   2) Seismic waves
   3) Define landslide
   4) Name the building stones in India.
   5) What is gravity dam ?
   6) What is suspension bridge ?
7. a) Explain zones of ground water. **5**
   b) Explain precautions of earthquake. **4**
8. a) Explain tunnel in folded strata. **5**
   b) Explain types of bridges. **4**
9. a) Explain preventions of landslide. **5**
   b) Explain needs of rain water harvesting. **4**

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SLR-EP – 21

Seat No.	

Set S

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
ENGINEERING GEOLOGY

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Question Number* ***1, 2*** *and* ***6*** *is* ***compulsory****.*
2) Attempt ***any two*** *questions from Q. No.* ***3*** *to* ***5*** *and Q. No.* ***7*** *to* ***9****.*
3) ***Draw*** *neat and labelled diagram* ***wherever*** *necessary.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct answer : **14**

1) _____ is the capacity of a rock to transmit water.

a) Porosity b) Permeability

c) Durability d) Resistance

2) The _____ dams are constructed mainly by soil or earth material.

a) Gravity b) Arch

c) Buttress d) Earth

3) The _____ is a terminal support of the bridge.

a) Abutment b) Piers

c) Span d) Deck

4) The rock excavated beyond the required cross section of the tunnel is known as _____

a) Lining b) Overbreak

c) Support d) Silting

P.T.O.

5) If tightly jointed rocks present below the dam, then there will be _____
   a) Leakage of water b) No leakage of water
   c) No storage of water d) All of these
6) The colour of mineral powder is called _____
   a) Luster b) Streak
   c) Cleavage d) None of these
7) _____ is a concordant igneous intrusion in folded regions.
   a) Phacolith b) Laccolith
   c) Lopolith d) Sill
8) _____ is a plutonic igneous rock.
   a) Basalt b) Pitchstone
   c) Granite d) Pumice
9) Reverse fault is one in which the hanging wall appears to have moved _____ relative to footwall.
   a) Upward b) Downward
   c) Equally d) None of these
10) In _____ fold both the limb almost horizontal.
   a) Recumbent b) Open fold
   c) Close d) Overturned
11) A stream is said to be in the _____ stage when its cuts valley downward with its base level.
   a) Youth b) Mature
   c) Old d) None of these
12) Break down of pre-existing rock is called _____
   a) Erosion b) Deposition
   c) Transportation d) Weathering
13) A volcano through which only gases are given off is known as _____
   a) Pyroclasts b) Fumaroles
   c) Hot springs d) Geysers
14) The maximum destruction occurred because of _____ earthquake wave.
   a) Primary b) Secondary
   c) Love d) R

_____

SLR-EP – 21

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2016
ENGINEERING GEOLOGY

Day and Date : Saturday, 24-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Question Number* ***1, 2*** *and* ***6*** *is* ***compulsory****.*
2) Attempt ***any two*** *questions from Q. No.* ***3*** *to* ***5*** *and Q. No.* ***7*** *to* ***9****.*
3) ***Draw*** *neat and labelled diagram* ***wherever*** *necessary.*

SECTION – I

2. Write short notes **any five** : **10**

   1) Define mineral
   2) Waterfall
   3) Names the different sediments
   4) Outlier
   5) Dyke
   6) Vesicular structure.

3. a) Describe Rock cycle. **5**

   b) Explain internal structure of earth. **4**

4. a) Explain Amphibole group of mineral. **5**

   b) Explain causes of volcano. **4**

5. a) Define fold ? Explain any two types of fold. **5**

   b) Explain agents of metamorphic rock. **4**

SECTION – II

6. Write short notes **any five** : **10**
   1) Define aquifer
   2) Seismic waves
   3) Define landslide
   4) Name the building stones in India.
   5) What is gravity dam ?
   6) What is suspension bridge ?
7. a) Explain zones of ground water. **5**
   b) Explain precautions of earthquake. **4**
8. a) Explain tunnel in folded strata. **5**
   b) Explain types of bridges. **4**
9. a) Explain preventions of landslide. **5**
   b) Explain needs of rain water harvesting. **4**

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SLR-EP – 22

Seat No.	

Set P

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – II

Day and Date : Monday, 21-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data if necessary but mention it* ***clearly****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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

1. Choose the most appropriate answer : **(14×1=14)**

1) Given the effective length of column, the buckling of column occurs about _____ **1**
   a) The axis having the largest M. I.
   b) The axis having the least M. I.
   c) An axis having M. I. between the least and the largest
   d) None of above

2) A long column with fixed ends can carry load _____ as compared to a column having one end fixed and other free **1**
   a) 4 times b) 8 times c) 16 times d) None

3) Identify the stress which can exist on a principal plane, amongst the following. **1**
   a) Shear stress b) Bending stress
   c) Compressive stress d) None

4) Mohr's circle is a graphical method to find **1**
   a) Bending stresses b) Combined stresses
   c) Maximum shear stresses d) None

5) Maximum shear stress theory is also called as **1**
   a) Beltrami theory b) Haigh theory c) Tresca theory d) None

6) Maximum Principal Stress Theory was postulated by **1**
   a) St. Venant b) Rankine c) Mohr d) Tresca

7) Rankine's formula is an empirical formula which is used for **1**
   a) Long columns b) Short columns
   c) Both a) and b) d) None

8) Strain energy stored due to bending per unit volume of the member is equal to **1**
a) M^2 ds/EI b) M^2 ds/2EI c) M. ds/2EI d) M^3 ds/2EI

9) Castigliano's second theorem is applicable to **1**
a) Determinate structures b) Indeterminate structures
c) Both a) and b) d) None

10) A cantilever of span L, is subjected to point load W at its free end. Slope at the free end will be equal to **1**
a) 2WL/EI b) WL^2/2EI c) WL^2/EI d) EI/2W

11) Mecaulay's method for finding slope and deflection in beams is extension of **1**
a) Moment area method b) Strain energy method
c) Double Integration method d) Conjugate beam method

12) When the length of uniformly distributed loading is shorter than the span of beam, the 01 absolute maximum bending moment occurs at the center of the span when the loading is **1**
a) Starting from left end b) Starting from right end
c) Symmetrically placed d) Unsymmetrically placed

13) The slope at any section of the given beam is equal to the _____ at the corresponding section of the conjugate beam. **1**
a) axial force b) Bending moment
c) Shear force d) Twisting force

14) Maximum slope of a simply supported beam of span L, subjected to point load W at centre is equal to **1**
a) WL^2/16EI b) WL^3/12EI c) WL^3/16EI d) WL^3/48EI

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SLR-EP – 22

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – II

Day and Date : Monday, 21-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *and Q.* ***6*** *are* ***compulsory****; attempt* ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *from Section* ***I*** *and* ***any two*** *out of Q.* ***7*** *to Q.* ***9*** *from Section* ***II****.*
2) ***Assume*** *suitable data if necessary but mention in* ***clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. A 1.5 m long column has a circular cross section of 50 mm diameter. One end of column is fixed and the other end is free. Taking factor of safety of 3, calculate the safe load using **10**
   i) Rankine's formula Take fc = 560 N/mm^2 and α =1/1600.
   ii) Eular's formula : Young's modulus for steel E = 2.1×10^5 N/mm^2.

3. At a point in material two planes AB and BC which are at right angles to each other and carry shear stress of intensity 24.5 N/mm^2. Also these planes carry tensile stress of 50 N/mm^2 and compressive stress of 25 N/mm^2 respectively. Determine principal planes and the principal stresses. Also determine the maximum shear stress and planes on which it acts. **9**

4. a) Define Equivalent Twisting moment and also write its expression in terms of bending moment. **2**
   b) A solid circular shaft is supported on bearings 1 m apart. The shaft transmits 500 kW power at 300 rpm by belt drive with pulley located at the middle of the shaft. The belt exerts a total pull of 5 kN. If permissible shear stress is 50 N/mm^2 find the diameter of shaft. **7**

5. a) Draw a neat sketch of three hinged arch and also show various forces acting at any section. **3**
   b) A circular rod is to withstand a bending Moment of 30 kN – m and torque of 25 kN-m. Determine the diameter of the bar if the yield stress of the material is 250 MPa and Factor of safety is 2. Use maximum shear stress theory. **6**

SECTION – II

6. a) Enlist different methods for finding slope and deflection of beams. **2**

   b) The middle half of the beam as shown in Fig. no.1 has a moment of inertia twice that of the rest the beam and carries a point load W at mid span. Determine the mid span deflection using conjugate beam method. **8**

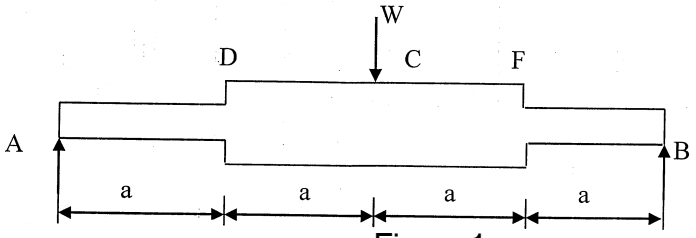

Figure 1

7. a) State Castigliano's first theorem. **2**

   b) Find the vertical deflection of the joint D of the frame as shown in Fig. no. 2. All members have the same cross sectional area A. The diagonal members are at 45° with the horizontal. **7**

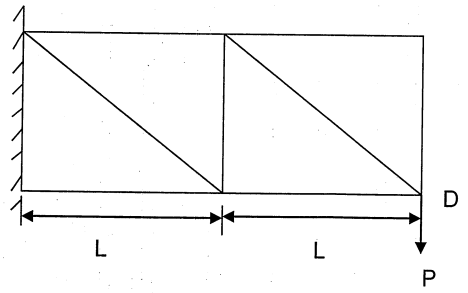

Figure 2

8. a) State Muller Breslau's principle. **2**

   b) A simply supported beam AB has a span of 20 m. Draw influence lines for R_A, R_B and also for shear force and moment at section x-x at a distance of 5 m from A. **7**

9. a) Define Influence line diagram. **2**

   b) The load system as shown in Figure no. 3 moves from left to right on a girder span 10 m. Find the maximum bending moment which can occur under the 80 kN load. **7**

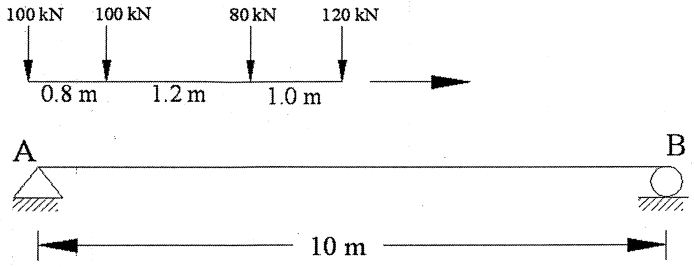

Figure 3

Set P

SLR-EP – 22

Seat No.	

Set Q

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – II

Day and Date : Monday, 21-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data if necessary but mention it* ***clearly****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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

1. Choose the most appropriate answer : **(14×1=14)**

1) Strain energy stored due to bending per unit volume of the member is equal to **1**
a) M^2 ds/EI b) M^2 ds/2EI c) M. ds/2EI d) M^3 ds/2EI

2) Castigliano's second theorem is applicable to **1**
a) Determinate structures b) Indeterminate structures
c) Both a) and b) d) None

3) A cantilever of span L, is subjected to point load W at its free end. Slope at the free end will be equal to **1**
a) 2WL/EI b) WL^2/2EI c) WL^2/EI d) EI/2W

4) Mecaulay's method for finding slope and deflection in beams is extension of **1**
a) Moment area method b) Strain energy method
c) Double Integration method d) Conjugate beam method

5) When the length of uniformly distributed loading is shorter than the span of beam, the 01 absolute maximum bending moment occurs at the center of the span when the loading is **1**
a) Starting from left end b) Starting from right end
c) Symmetrically placed d) Unsymmetrically placed

6) The slope at any section of the given beam is equal to the _____ at the corresponding section of the conjugate beam. **1**
a) axial force b) Bending moment
c) Shear force d) Twisting force

7) Maximum slope of a simply supported beam of span L, subjected to point load W at centre is equal to **1**
a) WL^2/16EI b) WL^3/12EI c) WL^3/16EI d) WL^3/48EI

P.T.O.

7) Given the effective length of column, the buckling of column occurs about _____ **1**
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   c) An axis having M. I. between the least and the largest
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9) A long column with fixed ends can carry load _____ as compared to a column having one end fixed and other free **1**
   a) 4 times b) 8 times c) 16 times d) None

10) Identify the stress which can exist on a principal plane, amongst the following. **1**
   a) Shear stress b) Bending stress
   c) Compressive stress d) None

11) Mohr's circle is a graphical method to find **1**
   a) Bending stresses b) Combined stresses
   c) Maximum shear stresses d) None

12) Maximum shear stress theory is also called as **1**
   a) Beltrami theory b) Haigh theory c) Tresca theory d) None

13) Maximum Principal Stress Theory was postulated by **1**
   a) St. Venant b) Rankine c) Mohr d) Tresca

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   a) Long columns b) Short columns
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_____

SLR-EP – 22

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – II

Day and Date : Monday, 21-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *and Q.* ***6*** *are* ***compulsory****; attempt* ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *from Section* ***I*** *and* ***any two*** *out of Q.* ***7*** *to Q.* ***9*** *from Section* ***II****.*
2) ***Assume*** *suitable data if necessary but mention in* ***clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. A 1.5 m long column has a circular cross section of 50 mm diameter. One end of column is fixed and the other end is free. Taking factor of safety of 3, calculate the safe load using **10**
   i) Rankine's formula Take fc = 560 N/mm^2 and α =1/1600.
   ii) Eular's formula : Young's modulus for steel E = 2.1×10^5 N/mm^2.

3. At a point in material two planes AB and BC which are at right angles to each other and carry shear stress of intensity 24.5 N/mm^2. Also these planes carry tensile stress of 50 N/mm^2 and compressive stress of 25 N/mm^2 respectively. Determine principal planes and the principal stresses. Also determine the maximum shear stress and planes on which it acts. **9**

4. a) Define Equivalent Twisting moment and also write its expression in terms of bending moment. **2**
   b) A solid circular shaft is supported on bearings 1 m apart. The shaft transmits 500 kW power at 300 rpm by belt drive with pulley located at the middle of the shaft. The belt exerts a total pull of 5 kN. If permissible shear stress is 50 N/mm^2 find the diameter of shaft. **7**

5. a) Draw a neat sketch of three hinged arch and also show various forces acting at any section. **3**
   b) A circular rod is to withstand a bending Moment of 30 kN – m and torque of 25 kN-m. Determine the diameter of the bar if the yield stress of the material is 250 MPa and Factor of safety is 2. Use maximum shear stress theory. **6**

SECTION – II

6. a) Enlist different methods for finding slope and deflection of beams. **2**

   b) The middle half of the beam as shown in Fig. no.1 has a moment of inertia twice that of the rest the beam and carries a point load W at mid span. Determine the mid span deflection using conjugate beam method. **8**

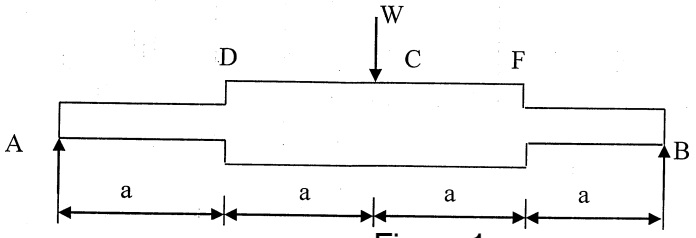

Figure 1

7. a) State Castigliano's first theorem. **2**

   b) Find the vertical deflection of the joint D of the frame as shown in Fig. no. 2. All members have the same cross sectional area A. The diagonal members are at 45° with the horizontal. **7**

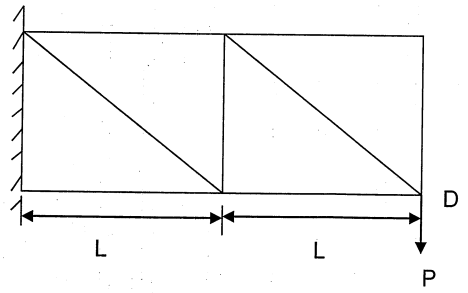

Figure 2

8. a) State Muller Breslau's principle. **2**

   b) A simply supported beam AB has a span of 20 m. Draw influence lines for R_A, R_B and also for shear force and moment at section x-x at a distance of 5 m from A. **7**

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   b) The load system as shown in Figure no. 3 moves from left to right on a girder span 10 m. Find the maximum bending moment which can occur under the 80 kN load. **7**

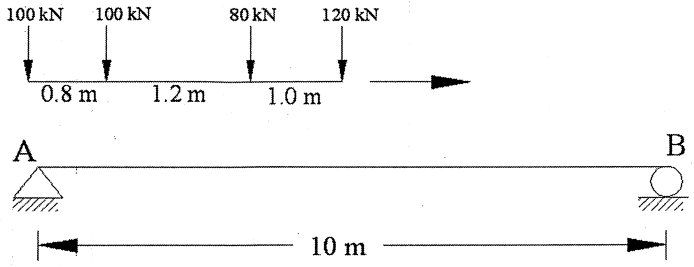

Figure 3

Set Q

SLR-EP – 22

Seat No.	

Set R

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – II

Day and Date : Monday, 21-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data if necessary but mention it* ***clearly****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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

1. Choose the most appropriate answer : **(14×1=14)**

1) Maximum shear stress theory is also called as **1**
a) Beltrami theory b) Haigh theory c) Tresca theory d) None

2) Maximum Principal Stress Theory was postulated by **1**
a) St. Venant b) Rankine c) Mohr d) Tresca

3) Rankine's formula is an empirical formula which is used for **1**
a) Long columns b) Short columns
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5) Castigliano's second theorem is applicable to **1**
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6) A cantilever of span L, is subjected to point load W at its free end. Slope at the free end will be equal to **1**
a) 2WL/EI b) WL^2/2EI c) WL^2/EI d) EI/2W

7) Mecaulay's method for finding slope and deflection in beams is extension of **1**
a) Moment area method b) Strain energy method
c) Double Integration method d) Conjugate beam method

8) When the length of uniformly distributed loading is shorter than the span of beam, the 01 absolute maximum bending moment occurs at the center of the span when the loading is **1**
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P.T.O.

9) The slope at any section of the given beam is equal to the _____ at the corresponding section of the conjugate beam. **1**
   a) axial force b) Bending moment
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10) Maximum slope of a simply supported beam of span L, subjected to point load W at centre is equal to **1**
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   c) Compressive stress d) None

14) Mohr's circle is a graphical method to find **1**
   a) Bending stresses b) Combined stresses
   c) Maximum shear stresses d) None

_____

SLR-EP – 22

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – II

Day and Date : Monday, 21-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *and Q.* ***6*** *are* ***compulsory****; attempt* ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *from Section* ***I*** *and* ***any two*** *out of Q.* ***7*** *to Q.* ***9*** *from Section* ***II****.*
2) ***Assume*** *suitable data if necessary but mention in* ***clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. A 1.5 m long column has a circular cross section of 50 mm diameter. One end of column is fixed and the other end is free. Taking factor of safety of 3, calculate the safe load using **10**
   i) Rankine's formula Take fc = 560 N/mm^2 and α =1/1600.
   ii) Eular's formula : Young's modulus for steel E = 2.1×10^5 N/mm^2.

3. At a point in material two planes AB and BC which are at right angles to each other and carry shear stress of intensity 24.5 N/mm^2. Also these planes carry tensile stress of 50 N/mm^2 and compressive stress of 25 N/mm^2 respectively. Determine principal planes and the principal stresses. Also determine the maximum shear stress and planes on which it acts. **9**

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   b) A solid circular shaft is supported on bearings 1 m apart. The shaft transmits 500 kW power at 300 rpm by belt drive with pulley located at the middle of the shaft. The belt exerts a total pull of 5 kN. If permissible shear stress is 50 N/mm^2 find the diameter of shaft. **7**

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SECTION – II

6. a) Enlist different methods for finding slope and deflection of beams. **2**

   b) The middle half of the beam as shown in Fig. no.1 has a moment of inertia twice that of the rest the beam and carries a point load W at mid span. Determine the mid span deflection using conjugate beam method. **8**

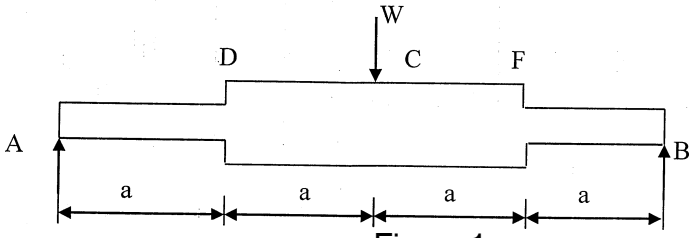

Figure 1

7. a) State Castigliano's first theorem. **2**

   b) Find the vertical deflection of the joint D of the frame as shown in Fig. no. 2. All members have the same cross sectional area A. The diagonal members are at 45° with the horizontal. **7**

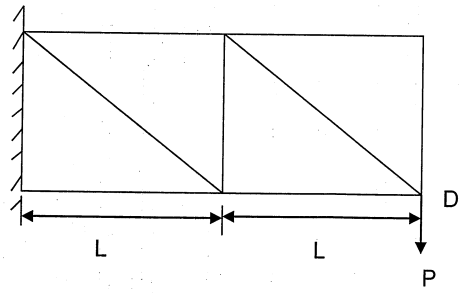

Figure 2

8. a) State Muller Breslau's principle. **2**

   b) A simply supported beam AB has a span of 20 m. Draw influence lines for R_A, R_B and also for shear force and moment at section x-x at a distance of 5 m from A. **7**

9. a) Define Influence line diagram. **2**

   b) The load system as shown in Figure no. 3 moves from left to right on a girder span 10 m. Find the maximum bending moment which can occur under the 80 kN load. **7**

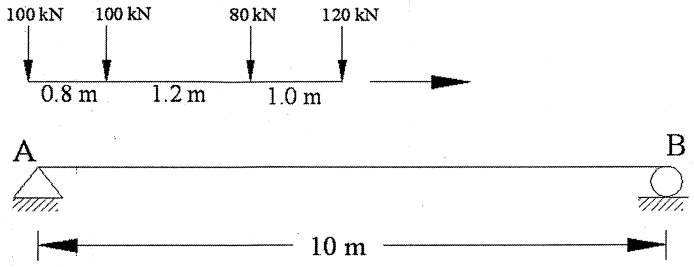

Figure 3

SLR-EP – 22

Seat No.	

Set **S**

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – II

Day and Date : Monday, 21-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data if necessary but mention it* ***clearly****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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

1. Choose the most appropriate answer : **(14×1=14)**

1) A cantilever of span L, is subjected to point load W at its free end. Slope at the free end will be equal to **1**
   a) 2WL/EI b) $WL^2/2EI$ c) WL^2/EI d) EI/2W

2) Mecaulay's method for finding slope and deflection in beams is extension of **1**
   a) Moment area method b) Strain energy method
   c) Double Integration method d) Conjugate beam method

3) When the length of uniformly distributed loading is shorter than the span of beam, the 01 absolute maximum bending moment occurs at the center of the span when the loading is **1**
   a) Starting from left end b) Starting from right end
   c) Symmetrically placed d) Unsymmetrically placed

4) The slope at any section of the given beam is equal to the _____ at the corresponding section of the conjugate beam. **1**
   a) axial force b) Bending moment
   c) Shear force d) Twisting force

5) Maximum slope of a simply supported beam of span L, subjected to point load W at centre is equal to **1**
   a) $WL^2/16EI$ b) $WL^3/12EI$ c) $WL^3/16EI$ d) $WL^3/48EI$

6) Given the effective length of column, the buckling of column occurs about _____ **1**
   a) The axis having the largest M. I.
   b) The axis having the least M. I.
   c) An axis having M. I. between the least and the largest
   d) None of above

P.T.O.

7) A long column with fixed ends can carry load _____ as compared to a column having one end fixed and other free **1**
   a) 4 times b) 8 times c) 16 times d) None

8) Identify the stress which can exist on a principal plane, amongst the following. **1**
   a) Shear stress b) Bending stress
   c) Compressive stress d) None

9) Mohr's circle is a graphical method to find **1**
   a) Bending stresses b) Combined stresses
   c) Maximum shear stresses d) None

10) Maximum shear stress theory is also called as **1**
   a) Beltrami theory b) Haigh theory c) Tresca theory d) None

11) Maximum Principal Stress Theory was postulated by **1**
   a) St. Venant b) Rankine c) Mohr d) Tresca

12) Rankine's formula is an empirical formula which is used for **1**
   a) Long columns b) Short columns
   c) Both a) and b) d) None

13) Strain energy stored due to bending per unit volume of the member is equal to **1**
   a) M^2 ds/EI b) M^2 ds/2EI c) M. ds/2EI d) M^3 ds/2EI

14) Castigliano's second theorem is applicable to **1**
   a) Determinate structures b) Indeterminate structures
   c) Both a) and b) d) None

_____

SLR-EP – 22

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
STRUCTURAL MECHANICS – II

Day and Date : Monday, 21-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *and Q.* ***6*** *are* ***compulsory****; attempt* ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *from Section* ***I*** *and* ***any two*** *out of Q.* ***7*** *to Q.* ***9*** *from Section* ***II****.*

2) ***Assume*** *suitable data if necessary but mention in* ***clearly****.*

3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. A 1.5 m long column has a circular cross section of 50 mm diameter. One end of column is fixed and the other end is free. Taking factor of safety of 3, calculate the safe load using **10**

   i) Rankine's formula Take fc = 560 N/mm^2 and α =1/1600.

   ii) Eular's formula : Young's modulus for steel E = 2.1×10^5 N/mm^2.

3. At a point in material two planes AB and BC which are at right angles to each other and carry shear stress of intensity 24.5 N/mm^2. Also these planes carry tensile stress of 50 N/mm^2 and compressive stress of 25 N/mm^2 respectively. Determine principal planes and the principal stresses. Also determine the maximum shear stress and planes on which it acts. **9**

4. a) Define Equivalent Twisting moment and also write its expression in terms of bending moment. **2**

   b) A solid circular shaft is supported on bearings 1 m apart. The shaft transmits 500 kW power at 300 rpm by belt drive with pulley located at the middle of the shaft. The belt exerts a total pull of 5 kN. If permissible shear stress is 50 N/mm^2 find the diameter of shaft. **7**

5. a) Draw a neat sketch of three hinged arch and also show various forces acting at any section. **3**

   b) A circular rod is to withstand a bending Moment of 30 kN – m and torque of 25 kN-m. Determine the diameter of the bar if the yield stress of the material is 250 MPa and Factor of safety is 2. Use maximum shear stress theory. **6**

SECTION – II

6. a) Enlist different methods for finding slope and deflection of beams. **2**

   b) The middle half of the beam as shown in Fig. no.1 has a moment of inertia twice that of the rest the beam and carries a point load W at mid span. Determine the mid span deflection using conjugate beam method. **8**

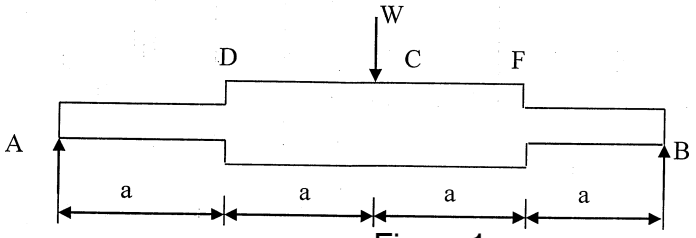

Figure 1

7. a) State Castigliano's first theorem. **2**

   b) Find the vertical deflection of the joint D of the frame as shown in Fig. no. 2. All members have the same cross sectional area A. The diagonal members are at 45° with the horizontal. **7**

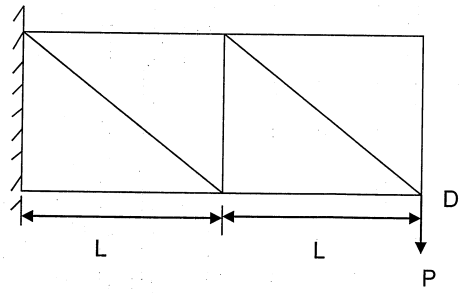

Figure 2

8. a) State Muller Breslau's principle. **2**

   b) A simply supported beam AB has a span of 20 m. Draw influence lines for R_A, R_B and also for shear force and moment at section x-x at a distance of 5 m from A. **7**

9. a) Define Influence line diagram. **2**

   b) The load system as shown in Figure no. 3 moves from left to right on a girder span 10 m. Find the maximum bending moment which can occur under the 80 kN load. **7**

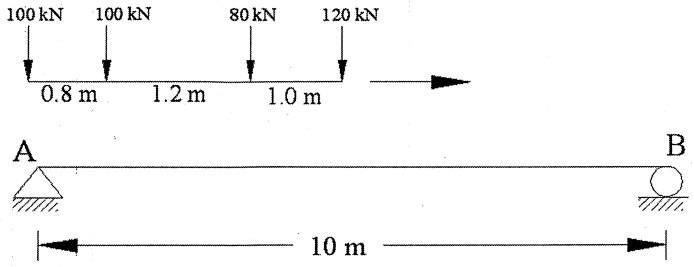

Figure 3

Set S

SLR-EP – 23

Seat No.	

Set P

S.E. (Civil) (Part – II) (CGPA Pattern) Examination, 2016
SURVEYING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N.B. : *I) In Section – **I**, Q. No. **2** and in Section – **II**, Q. No. **9** is **compulsory**.*
*II) Solve **any two full** questions from Q. No. **3** to Q. No. **5** and for Section two, solve **any two full** questions from Q. No. **6** to Q. No. **7**.*
*III) Assume suitable data, **if necessary** and mention it **clearly**.*
*IV) Figures to **right** indicate **full** marks.*
*V) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*VI) **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

1. MCQ (**Each 1** mark) : **14**

1) The stadia diaphragm is provided for measuring
   a) Elevation b) Bearing
   c) Horizontal distance d) None of these

2) An anallatic lens is provided to make the additive constant equal to
   a) 100 b) 0 c) 90 d) 190

3) The substance bar is used to measure
   a) Vertical distance b) Horizontal distance
   c) Elevation d) None of these

4) As the distance between the tacheometer and staff increases, the staff intercept by stadia hair,
   a) Increases b) Decreases
   c) Remains constant d) None of these

5) The radius of one degree curve is
   a) 1719 m b) 1760 m
   c) 2000 m d) 2100 m

6) The relation between the radius of curve (R) and degree of curve (D) of a curve is

a) $R = \frac{D}{1719}$ b) $R = \frac{1719}{D}$ c) $\frac{R}{D} = 1719$ d) None of these

7) Geostationary satellite have
   a) same distance from earth's centre
   b) same speed as earth's rotation
   c) same mass with global weight
   d) same angle with geodetic stations

8) Which of the following can't be achieved by remote sensing ?
   a) Detection of forest fire b) Detection of pollutants
   c) Prevention of earthquakes d) Land use pattern

9) The energy of quantum in remote sensing, is
   a) directly proportional to its wavelength
   b) inversely proportional to its wavelength
   c) directly proportional to its square of its wavelength
   d) inversely proportional to square of its wavelength

10) A passive sensor uses which of the following sources of energy.
   a) sun b) flash light
   c) it's own source d) moon

11) Which one of the following is long wave length radiation in remote sensing techniques ?
   a) Ultraviolet b) X-ray c) Infrared d) Gamma ray

12) Line in polygon method in GIS is characterised of
   a) raster overlay b) vector overlay
   c) buffer operation d) intersecting operation

13) In a route surveying, the most suitable method of contouring is
   a) by squares b) by radial lines
   c) by cross-sections d) by tacheometer

14) GPS is used for finding
   a) latitude, longitude, altitude b) speed
   c) trip distance d) all of the above

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SLR-EP – 23

Seat No.	

S.E. (Civil) (Part – II) (CGPA Pattern) Examination, 2016
SURVEYING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: I) In Section – **I**, Q. No. **2** and in Section – **II**, Q. No. **9** is **compulsory**.*
*II) Solve **any two full** questions from Q. No. **3** to Q. No. **5** and for Section two, solve **any two full** questions from Q. No. **6** to Q. No. **7**.*
*III) Assume suitable data, **if necessary** and mention it **clearly**.*
*IV) Figures to **right** indicate **full** marks.*

SECTION – I

2. Attempt **any two** (**each 4** mark) : **8**
   a) Write short note on auto reduction tacheometer.
   b) Derive an expression for an ideal transition curve.
   c) What do you understand by GPS ? Give an overview of GPS.

3. a) Describe the method of determining the constant of a tacheometer from field measurements. **5**
   b) A tacheometer was set up at a station 'C' and the following readings were obtained on staff vertically held. **5**

Inst. station	Staff station	Vertical angle	Hair readings	Remark
C	B.M.	– 5°, 20'	1.50, 1.800, 2.450	R:L. of B.M. = 750.50 m
C	D	+ 8° 12'	0.750, 1.500, 2.250	

   Calculate the horizontal distance 'CD', and RL of 'D', when the constant of instrument are 100 and 0.15.

4. a) What do you understand by the following forms of curves and where are they generally used ? **5**
      i) Lemniscate ii) Compound iii) Reverse curve.
   b) Two tangents intersects at a chainage of 1000 m, the deflection angle being 30°, calculate all the necessary data, for setting out a circular curve of radius 200 m, by the method of offsets from the chord produced, taking peg internal of 20 m ? **5**

5. a) What are the three segments of GPS ? Describe them briefly. **5**

   b) Tabulate the data required for setting out a curve by the deflection angle method, by considering the following information : **5**

      i) Angle of intersection = 145°
      ii) Chainage of point of intersection = 1580 m
      iii) Degree of curve = 5°
      iv) Least count of theodolite = 20″
      v) Peg interval = 30 m.

SECTION – II

6. a) The scale of an aerial photograph is 1 cm = 160 m and the size of the photograph is 20 cm × 20 cm. If the longitudinal lap is 65% and the side lap is 35%, determine the number of photograph required to cover an area of 232 sq.km. **5**

   b) What do you understand by electromagnetic spectrum ? State the wavelength regions along with their uses for remote sensing applications. **5**

7. a) Explain Rater and Vector data structures. **5**

   b) Briefly describe the applications of GIS. Discuss how closely GIS is related to remote sensing. **5**

8. a) Explain project surveys carried out for Tunnel with respect to specifications, preliminary and location survey. **5**

   b) Explain setting of project surveys for building set out with respect to specifications, preliminary and location survey. **5**

9. Attempt **any two** (**each 4** marks) : **8**

   a) What do you understand by remote sensing ? Distinguish between active and passive RST.

   b) Define GIS. Explain data sources for GIS.

   c) Write note on “Route surveying” with respect to reconnaissance and location survey.

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SLR-EP – 23

Seat No.	

Set Q

S.E. (Civil) (Part – II) (CGPA Pattern) Examination, 2016
SURVEYING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N.B. : *I) In Section – **I**, Q. No. **2** and in Section – **II**, Q. No. **9** is **compulsory**.*
*II) Solve **any two full** questions from Q. No. **3** to Q. No. **5** and for Section two, solve **any two full** questions from Q. No. **6** to Q. No. **7**.*
*III) Assume suitable data, **if necessary** and mention it **clearly**.*
*IV) Figures to **right** indicate **full** marks.*
*V) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*VI) **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

1. MCQ (**each 1** mark) : **14**

1) Which of the following can't be achieved by remote sensing ?
   a) Detection of forest fire b) Detection of pollutants
   c) Prevention of earthquakes d) Land use pattern

2) The energy of quantum in remote sensing, is
   a) directly proportional to its wavelength
   b) inversely proportional to its wavelength
   c) directly proportional to its square of its wavelength
   d) inversely proportional to square of its wavelength

3) A passive sensor uses which of the following sources of energy.
   a) sun b) flash light c) it's own source d) moon

4) Which one of the following is long wave length radiation in remote sensing techniques ?
   a) Ultraviolet b) X-ray c) Infrared d) Gamma ray

5) Line in polygon method in GIS is characterised of
   a) raster overlay b) vector overlay
   c) buffer operation d) intersecting operation

P.T.O.

6) In a route surveying, the most suitable method of contouring is
   a) by squares b) by radial lines
   c) by cross-sections d) by tacheometer

7) GPS is used for finding
   a) latitude, longitude, altitude b) speed
   c) trip distance d) all of the above

8) The stadia diaphragm is provided for measuring
   a) Elevation b) Bearing
   c) Horizontal distance d) None of these

9) An anallatic lens is provided to make the additive constant equal to
   a) 100 b) 0 c) 90 d) 190

10) The substance bar is used to measure
   a) Vertical distance b) Horizontal distance
   c) Elevation d) None of these

11) As the distance between the tacheometer and staff increases, the staff intercept by stadia hair,
   a) Increases b) Decreases
   c) Remains constant d) None of these

12) The radius of one degree curve is
   a) 1719 m b) 1760 m
   c) 2000 m d) 2100 m

13) The relation between the radius of curve (R) and degree of curve (D) of a curve is

   a) $R = \frac{D}{1719}$ b) $R = \frac{1719}{D}$ c) $\frac{R}{D} = 1719$ d) None of these

14) Geostationary satellite have
   a) same distance from earth's centre
   b) same speed as earth's rotation
   c) same mass with global weight
   d) same angle with geodetic stations

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SLR-EP – 23

Seat No.	

S.E. (Civil) (Part – II) (CGPA Pattern) Examination, 2016
SURVEYING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: I) In Section – **I**, Q. No. **2** and in Section – **II**, Q. No. **9** is **compulsory**.*
*II) Solve **any two full** questions from Q. No. **3** to Q. No. **5** and for Section two, solve **any two full** questions from Q. No. **6** to Q. No. **7**.*
*III) Assume suitable data, **if necessary** and mention it **clearly**.*
*IV) Figures to **right** indicate **full** marks.*

SECTION – I

2. Attempt **any two** (**each 4** mark) : **8**
   a) Write short note on auto reduction tacheometer.
   b) Derive an expression for an ideal transition curve.
   c) What do you understand by GPS ? Give an overview of GPS.

3. a) Describe the method of determining the constant of a tacheometer from field measurements. **5**
   b) A tacheometer was set up at a station 'C' and the following readings were obtained on staff vertically held. **5**

Inst. station	Staff station	Vertical angle	Hair readings	Remark
C	B.M.	– 5°, 20'	1.50, 1.800, 2.450	R:L. of B.M. = 750.50 m
C	D	+ 8° 12'	0.750, 1.500, 2.250	

   Calculate the horizontal distance 'CD', and RL of 'D', when the constant of instrument are 100 and 0.15.

4. a) What do you understand by the following forms of curves and where are they generally used ? **5**
      i) Lemniscate ii) Compound iii) Reverse curve.
   b) Two tangents intersects at a chainage of 1000 m, the deflection angle being 30°, calculate all the necessary data, for setting out a circular curve of radius 200 m, by the method of offsets from the chord produced, taking peg internal of 20 m ? **5**

5. a) What are the three segments of GPS ? Describe them briefly. **5**

   b) Tabulate the data required for setting out a curve by the deflection angle method, by considering the following information : **5**

      i) Angle of intersection = 145°
      ii) Chainage of point of intersection = 1580 m
      iii) Degree of curve = 5°
      iv) Least count of theodolite = 20″
      v) Peg interval = 30 m.

SECTION – II

6. a) The scale of an aerial photograph is 1 cm = 160 m and the size of the photograph is 20 cm × 20 cm. If the longitudinal lap is 65% and the side lap is 35%, determine the number of photograph required to cover an area of 232 sq.km. **5**

   b) What do you understand by electromagnetic spectrum ? State the wavelength regions along with their uses for remote sensing applications. **5**

7. a) Explain Rater and Vector data structures. **5**

   b) Briefly describe the applications of GIS. Discuss how closely GIS is related to remote sensing. **5**

8. a) Explain project surveys carried out for Tunnel with respect to specifications, preliminary and location survey. **5**

   b) Explain setting of project surveys for building set out with respect to specifications, preliminary and location survey. **5**

9. Attempt **any two** (**each 4** marks) : **8**

   a) What do you understand by remote sensing ? Distinguish between active and passive RST.

   b) Define GIS. Explain data sources for GIS.

   c) Write note on “Route surveying” with respect to reconnaissance and location survey.

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SLR-EP – 23

Seat No.	

Set R

S.E. (Civil) (Part – II) (CGPA Pattern) Examination, 2016
SURVEYING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N.B. : *I) In Section – **I**, Q. No. **2** and in Section – **II**, Q. No. **9** is **compulsory**.*
*II) Solve **any two full** questions from Q. No. **3** to Q. No. **5** and for Section two, solve **any two full** questions from Q. No. **6** to Q. No. **7**.*
*III) Assume suitable data, **if necessary** and mention it **clearly**.*
*IV) Figures to **right** indicate **full** marks.*
*V) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*VI) **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

1. MCQ (**Each 1** mark) : **14**

1) The radius of one degree curve is
   a) 1719 m b) 1760 m
   c) 2000 m d) 2100 m

2) The relation between the radius of curve (R) and degree of curve (D) of a curve is

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4) Which of the following can't be achieved by remote sensing ?
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P.T.O.

5) The energy of quantum in remote sensing, is
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7) Which one of the following is long wave length radiation in remote sensing techniques ?
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8) Line in polygon method in GIS is characterised of
   a) raster overlay b) vector overlay
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9) In a route surveying, the most suitable method of contouring is
   a) by squares b) by radial lines
   c) by cross-sections d) by tacheometer

10) GPS is used for finding
   a) latitude, longitude, altitude b) speed
   c) trip distance d) all of the above

11) The stadia diaphragm is provided for measuring
   a) Elevation b) Bearing
   c) Horizontal distance d) None of these

12) An anallatic lens is provided to make the additive constant equal to
   a) 100 b) 0 c) 90 d) 190

13) The substance bar is used to measure
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   c) Elevation d) None of these

14) As the distance between the tacheometer and staff increases, the staff intercept by stadia hair,
   a) Increases b) Decreases
   c) Remains constant d) None of these

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SLR-EP – 23

Seat No.	

S.E. (Civil) (Part – II) (CGPA Pattern) Examination, 2016
SURVEYING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: I) In Section – **I**, Q. No. **2** and in Section – **II**, Q. No. **9** is **compulsory**.*
*II) Solve **any two full** questions from Q. No. **3** to Q. No. **5** and for Section two, solve **any two full** questions from Q. No. **6** to Q. No. **7**.*
*III) Assume suitable data, **if necessary** and mention it **clearly**.*
*IV) Figures to **right** indicate **full** marks.*

SECTION – I

2. Attempt **any two** (**each 4** mark) : **8**
   a) Write short note on auto reduction tacheometer.
   b) Derive an expression for an ideal transition curve.
   c) What do you understand by GPS ? Give an overview of GPS.

3. a) Describe the method of determining the constant of a tacheometer from field measurements. **5**
   b) A tacheometer was set up at a station 'C' and the following readings were obtained on staff vertically held. **5**

Inst. station	Staff station	Vertical angle	Hair readings	Remark
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   Calculate the horizontal distance 'CD', and RL of 'D', when the constant of instrument are 100 and 0.15.

4. a) What do you understand by the following forms of curves and where are they generally used ? **5**
      i) Lemniscate ii) Compound iii) Reverse curve.
   b) Two tangents intersects at a chainage of 1000 m, the deflection angle being 30°, calculate all the necessary data, for setting out a circular curve of radius 200 m, by the method of offsets from the chord produced, taking peg internal of 20 m ? **5**

5. a) What are the three segments of GPS ? Describe them briefly. **5**

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      ii) Chainage of point of intersection = 1580 m
      iii) Degree of curve = 5°
      iv) Least count of theodolite = 20″
      v) Peg interval = 30 m.

SECTION – II

6. a) The scale of an aerial photograph is 1 cm = 160 m and the size of the photograph is 20 cm × 20 cm. If the longitudinal lap is 65% and the side lap is 35%, determine the number of photograph required to cover an area of 232 sq.km. **5**

   b) What do you understand by electromagnetic spectrum ? State the wavelength regions along with their uses for remote sensing applications. **5**

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   b) Explain setting of project surveys for building set out with respect to specifications, preliminary and location survey. **5**

9. Attempt **any two** (**each 4** marks) : **8**

   a) What do you understand by remote sensing ? Distinguish between active and passive RST.

   b) Define GIS. Explain data sources for GIS.

   c) Write note on “Route surveying” with respect to reconnaissance and location survey.

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SLR-EP – 23

Seat No.	

Set S

S.E. (Civil) (Part – II) (CGPA Pattern) Examination, 2016
SURVEYING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N.B. : *I) In Section – **I**, Q. No. **2** and in Section – **II**, Q. No. **9** is **compulsory**.*
*II) Solve **any two full** questions from Q. No. **3** to Q. No. **5** and for Section two, solve **any two full** questions from Q. No. **6** to Q. No. **7**.*
*III) Assume suitable data, **if necessary** and mention it **clearly**.*
*IV) Figures to **right** indicate **full** marks.*
*V) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*VI) **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

1. MCQ (**Each 1** mark) : **14**

1) A passive sensor uses which of the following sources of energy.
   a) sun b) flash light
   c) it's own source d) moon

2) Which one of the following is long wave length radiation in remote sensing techniques ?
   a) Ultraviolet b) X-ray c) Infrared d) Gamma ray

3) Line in polygon method in GIS is characterised of
   a) raster overlay b) vector overlay
   c) buffer operation d) intersecting operation

4) In a route surveying, the most suitable method of contouring is
   a) by squares b) by radial lines
   c) by cross-sections d) by tacheometer

5) GPS is used for finding
   a) latitude, longitude, altitude b) speed
   c) trip distance d) all of the above

P.T.O.

6) The stadia diaphragm is provided for measuring
   a) Elevation b) Bearing
   c) Horizontal distance d) None of these

7) An anallatic lens is provided to make the additive constant equal to
   a) 100 b) 0 c) 90 d) 190

8) The substance bar is used to measure
   a) Vertical distance b) Horizontal distance
   c) Elevation d) None of these

9) As the distance between the tacheometer and staff increases, the staff intercept by stadia hair,
   a) Increases b) Decreases
   c) Remains constant d) None of these

10) The radius of one degree curve is
   a) 1719 m b) 1760 m
   c) 2000 m d) 2100 m

11) The relation between the radius of curve (R) and degree of curve (D) of a curve is

   a) $R = \frac{D}{1719}$ b) $R = \frac{1719}{D}$ c) $\frac{R}{D} = 1719$ d) None of these

12) Geostationary satellite have
   a) same distance from earth's centre
   b) same speed as earth's rotation
   c) same mass with global weight
   d) same angle with geodetic stations

13) Which of the following can't be achieved by remote sensing ?
   a) Detection of forest fire b) Detection of pollutants
   c) Prevention of earthquakes d) Land use pattern

14) The energy of quantum in remote sensing, is
   a) directly proportional to its wavelength
   b) inversely proportional to its wavelength
   c) directly proportional to its square of its wavelength
   d) inversely proportional to square of its wavelength

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SLR-EP – 23

Seat No.	

S.E. (Civil) (Part – II) (CGPA Pattern) Examination, 2016
SURVEYING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: I) In Section – **I**, Q. No. **2** and in Section – **II**, Q. No. **9** is **compulsory**.*
*II) Solve **any two full** questions from Q. No. **3** to Q. No. **5** and for Section two, solve **any two full** questions from Q. No. **6** to Q. No. **7**.*
*III) Assume suitable data, **if necessary** and mention it **clearly**.*
*IV) Figures to **right** indicate **full** marks.*

SECTION – I

2. Attempt **any two** (**each 4** mark) : **8**
   a) Write short note on auto reduction tacheometer.
   b) Derive an expression for an ideal transition curve.
   c) What do you understand by GPS ? Give an overview of GPS.

3. a) Describe the method of determining the constant of a tacheometer from field measurements. **5**
   b) A tacheometer was set up at a station 'C' and the following readings were obtained on staff vertically held. **5**

Inst. station	Staff station	Vertical angle	Hair readings	Remark
C	B.M.	– 5°, 20'	1.50, 1.800, 2.450	R:L. of B.M. = 750.50 m
C	D	+ 8° 12'	0.750, 1.500, 2.250	

   Calculate the horizontal distance 'CD', and RL of 'D', when the constant of instrument are 100 and 0.15.

4. a) What do you understand by the following forms of curves and where are they generally used ? **5**
      i) Lemniscate ii) Compound iii) Reverse curve.
   b) Two tangents intersects at a chainage of 1000 m, the deflection angle being 30°, calculate all the necessary data, for setting out a circular curve of radius 200 m, by the method of offsets from the chord produced, taking peg internal of 20 m ? **5**

5. a) What are the three segments of GPS ? Describe them briefly. **5**

   b) Tabulate the data required for setting out a curve by the deflection angle method, by considering the following information : **5**

      i) Angle of intersection = 145°
      ii) Chainage of point of intersection = 1580 m
      iii) Degree of curve = 5°
      iv) Least count of theodolite = 20″
      v) Peg interval = 30 m.

SECTION – II

6. a) The scale of an aerial photograph is 1 cm = 160 m and the size of the photograph is 20 cm × 20 cm. If the longitudinal lap is 65% and the side lap is 35%, determine the number of photograph required to cover an area of 232 sq.km. **5**

   b) What do you understand by electromagnetic spectrum ? State the wavelength regions along with their uses for remote sensing applications. **5**

7. a) Explain Rater and Vector data structures. **5**

   b) Briefly describe the applications of GIS. Discuss how closely GIS is related to remote sensing. **5**

8. a) Explain project surveys carried out for Tunnel with respect to specifications, preliminary and location survey. **5**

   b) Explain setting of project surveys for building set out with respect to specifications, preliminary and location survey. **5**

9. Attempt **any two** (**each 4** marks) : **8**

   a) What do you understand by remote sensing ? Distinguish between active and passive RST.

   b) Define GIS. Explain data sources for GIS.

   c) Write note on “Route surveying” with respect to reconnaissance and location survey.

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SLR-EP – 24

Seat No.	

Set P

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Wednesday, 23-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 7.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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

1. A) State whether following statements are correct or wrong. (Mention answer in words as correct or wrong only). **(1×7=7)**

1) The Semi detached building is building which is detached on two sides.

2) The built up area for residential building of plot size more the 1000 sqm should be 33.33 percent or 1/3rd for ground coverage.

3) The front open spaces for street width 7.5 m to 18 m should have minimum 3 m.

4) No sunshade shall be permitted on road less than 9 m in width or on road having no foot paths.

5) The height of a store room shall be not less than 2.2 m.

6) For the detached building the minimum plot size should be above 250 sqm.

7) For the proper lighting and ventilation of rooms for dry hot climate the opening should be one tenth of floor area.

B) Select correct option from the given options and fill in the gap (Mention answer in words **only**). **(1×7=7)**

1) Wind effect is a _____ type of ventilation.

a) mechanical b) natural c) combined d) other

2) Exhaust fan system is used in ____ type of ventilation.

a) mechanical b) natural c) thermal d) other

3) Dryer reduces the _____ of the paint.

a) thickness b) elasticity c) spread d) workability

4) The dryer of an oil paint should not be more than _____

a) 5% b) 10% c) 15% d) 20%

5) For built up area calculations _____ is drawn on building permission drawing.

a) terrace plan b) site plan c) block plan d) location plan

6) Site plan in permission drawing is drawn to a scale of _____

a) 1 : 10 b) 1 : 100 c) 1 : 200 d) 1 : 50

7) Building bye laws are laid for _____

a) To prevent haphazard growth of city

b) To avoid Air and Noise pollution

c) To ensure proper light, ventilation and parking

d) All of the above

_____

SLR-EP – 24

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Wednesday, 23-11-2016 Marks : 56
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1) Use both sides of* ***full*** *imperial drawing sheet for Section –* ***I****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***All*** *the question in Section –* ***I*** *and Section –* ***II*** *are* ***compulsory****.*
4) Assume suitable data ***wherever*** *needed and mention it.*
5) ***Use*** *answerbook for Section –* ***II****.*

SECTION – I **28**

2. It is proposed to construct Semi detached houses.

   Provide for the following areas/rooms : Living room, Bed room, Kitchen, Standard size bathroom, Standard size Indian style W.C., and circulation as per requirement.

   Draw to scale 1 : 50 mention dimensions.

   1) Detailed plan with furniture layout for semidetached house. **18**
   2) Standard section cutting semidetached house. **10**

SECTION – II **28**

3. Attempt **any four** of the following. **(4×7=28)**
   1) Write a short note on “Principles of Building Planning”.
   2) Write the short note on “Paints and Varnishes”.
   3) Write a short note on “Rain water harvesting”.
   4) Write short note “Mechanical ventilation” and its types.
   5) Explain in brief “Summer Air Conditioning” and “Winter Air Conditioning” with diagram.
   6) Write a short note on “Septic Tank” with neat sketch.

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Set P

Set P

SLR-EP – 24

Seat No.	

Set Q

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Wednesday, 23-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 7.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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

1. A) State whether following statements are correct or wrong. (Mention answer in words as correct or wrong only). **(1×7=7)**

   1) The height of a store room shall be not less than 2.2 m.

   2) For the detached building the minimum plot size should be above 250 sqm.

   3) For the proper lighting and ventilation of rooms for dry hot climate the opening should be one tenth of floor area.

   4) The Semi detached building is building which is detached on two sides.

   5) The built up area for residential building of plot size more the 1000 sqm should be 33.33 percent or 1/3rd for ground coverage.

   6) The front open spaces for street width 7.5 m to 18 m should have minimum 3 m.

   7) No sunshade shall be permitted on road less than 9 m in width or on road having no foot paths.

B) Select correct option from the given options and fill in the gap (Mention answer in words **only**). **(1×7=7)**

1) For built up area calculations _____ is drawn on building permission drawing.

a) terrace plan b) site plan c) block plan d) location plan

2) Site plan in permission drawing is drawn to a scale of _____

a) 1 : 10 b) 1 : 100 c) 1 : 200 d) 1 : 50

3) Building bye laws are laid for _____

a) To prevent haphazard growth of city

b) To avoid Air and Noise pollution

c) To ensure proper light, ventilation and parking

d) All of the above

4) Wind effect is a _____ type of ventilation.

a) mechanical b) natural c) combined d) other

5) Exhaust fan system is used in _____ type of ventilation.

a) mechanical b) natural c) thermal d) other

6) Dryer reduces the _____ of the paint.

a) thickness b) elasticity c) spread d) workability

7) The dryer of an oil paint should not be more than _____

a) 5% b) 10% c) 15% d) 20%

_____

SLR-EP – 24

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Wednesday, 23-11-2016 Marks : 56
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1) Use both sides of* ***full*** *imperial drawing sheet for Section –* ***I****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***All*** *the question in Section –* ***I*** *and Section –* ***II*** *are* ***compulsory****.*
4) Assume suitable data ***wherever*** *needed and mention it.*
5) ***Use*** *answerbook for Section –* ***II****.*

SECTION – I **28**

2. It is proposed to construct Semi detached houses.

   Provide for the following areas/rooms : Living room, Bed room, Kitchen, Standard size bathroom, Standard size Indian style W.C., and circulation as per requirement.

   Draw to scale 1 : 50 mention dimensions.

   1) Detailed plan with furniture layout for semidetached house. **18**
   2) Standard section cutting semidetached house. **10**

SECTION – II **28**

3. Attempt **any four** of the following. **(4×7=28)**
   1) Write a short note on “Principles of Building Planning”.
   2) Write the short note on “Paints and Varnishes”.
   3) Write a short note on “Rain water harvesting”.
   4) Write short note “Mechanical ventilation” and its types.
   5) Explain in brief “Summer Air Conditioning” and “Winter Air Conditioning” with diagram.
   6) Write a short note on “Septic Tank” with neat sketch.

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Set Q

Set Q

SLR-EP – 24

Seat No.	

Set R

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Wednesday, 23-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 7.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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

1. A) State whether following statements are correct or wrong. (Mention answer in words as correct or wrong only). **(1×7=7)**

   1) The front open spaces for street width 7.5 m to 18 m should have minimum 3 m.

   2) No sunshade shall be permitted on road less than 9 m in width or on road having no foot paths.

   3) The height of a store room shall be not less than 2.2 m.

   4) For the detached building the minimum plot size should be above 250 sqm.

   5) For the proper lighting and ventilation of rooms for dry hot climate the opening should be one tenth of floor area.

   6) The Semi detached building is building which is detached on two sides.

   7) The built up area for residential building of plot size more the 1000 sqm should be 33.33 percent or 1/3rd for ground coverage.

B) Select correct option from the given options and fill in the gap (Mention answer in words **only**). **(1×7=7)**

1) Dryer reduces the _____ of the paint.

a) thickness b) elasticity c) spread d) workability

2) The dryer of an oil paint should not be more than _____

a) 5% b) 10% c) 15% d) 20%

3) For built up area calculations _____ is drawn on building permission drawing.

a) terrace plan b) site plan c) block plan d) location plan

4) Site plan in permission drawing is drawn to a scale of _____

a) 1 : 10 b) 1 : 100 c) 1 : 200 d) 1 : 50

5) Building bye laws are laid for _____

a) To prevent haphazard growth of city

b) To avoid Air and Noise pollution

c) To ensure proper light, ventilation and parking

d) All of the above

6) Wind effect is a _____ type of ventilation.

a) mechanical b) natural c) combined d) other

7) Exhaust fan system is used in ____ type of ventilation.

a) mechanical b) natural c) thermal d) other

_____

SLR-EP – 24

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Wednesday, 23-11-2016 Marks : 56
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1) Use both sides of* ***full*** *imperial drawing sheet for Section –* ***I****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***All*** *the question in Section –* ***I*** *and Section –* ***II*** *are* ***compulsory****.*
4) Assume suitable data ***wherever*** *needed and mention it.*
5) ***Use*** *answerbook for Section –* ***II****.*

SECTION – I **28**

2. It is proposed to construct Semi detached houses.

   Provide for the following areas/rooms : Living room, Bed room, Kitchen, Standard size bathroom, Standard size Indian style W.C., and circulation as per requirement.

   Draw to scale 1 : 50 mention dimensions.

   1) Detailed plan with furniture layout for semidetached house. **18**
   2) Standard section cutting semidetached house. **10**

SECTION – II **28**

3. Attempt **any four** of the following. **(4×7=28)**
   1) Write a short note on “Principles of Building Planning”.
   2) Write the short note on “Paints and Varnishes”.
   3) Write a short note on “Rain water harvesting”.
   4) Write short note “Mechanical ventilation” and its types.
   5) Explain in brief “Summer Air Conditioning” and “Winter Air Conditioning” with diagram.
   6) Write a short note on “Septic Tank” with neat sketch.

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Set R

Set R

SLR-EP – 24

Seat No.	

Set S

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Wednesday, 23-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 7.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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

1. A) State whether following statements are correct or wrong. (Mention answer in words as correct or wrong only). **(1×7=7)**

   1) For the detached building the minimum plot size should be above 250 sqm.

   2) For the proper lighting and ventilation of rooms for dry hot climate the opening should be one tenth of floor area.

   3) The Semi detached building is building which is detached on two sides.

   4) The built up area for residential building of plot size more the 1000 sqm should be 33.33 percent or 1/3rd for ground coverage.

   5) The front open spaces for street width 7.5 m to 18 m should have minimum 3 m.

   6) No sunshade shall be permitted on road less than 9 m in width or on road having no foot paths.

   7) The height of a store room shall be not less than 2.2 m.

P.T.O.

B) Select correct option from the given options and fill in the gap (Mention answer in words **only**). **(1×7=7)**

1) Site plan in permission drawing is drawn to a scale of _____

a) 1 : 10 b) 1 : 100 c) 1 : 200 d) 1 : 50

2) Building bye laws are laid for _____

a) To prevent haphazard growth of city

b) To avoid Air and Noise pollution

c) To ensure proper light, ventilation and parking

d) All of the above

3) Wind effect is a _____ type of ventilation.

a) mechanical b) natural c) combined d) other

4) Exhaust fan system is used in ____ type of ventilation.

a) mechanical b) natural c) thermal d) other

5) Dryer reduces the _____ of the paint.

a) thickness b) elasticity c) spread d) workability

6) The dryer of an oil paint should not be more than _____

a) 5% b) 10% c) 15% d) 20%

7) For built up area calculations _____ is drawn on building permission drawing.

a) terrace plan b) site plan c) block plan d) location plan

_____

SLR-EP – 24

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2016
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Wednesday, 23-11-2016 Marks : 56
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1) Use both sides of* ***full*** *imperial drawing sheet for Section –* ***I****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***All*** *the question in Section –* ***I*** *and Section –* ***II*** *are* ***compulsory****.*
4) Assume suitable data ***wherever*** *needed and mention it.*
5) ***Use*** *answerbook for Section –* ***II****.*

SECTION – I **28**

2. It is proposed to construct Semi detached houses.

   Provide for the following areas/rooms : Living room, Bed room, Kitchen, Standard size bathroom, Standard size Indian style W.C., and circulation as per requirement.

   Draw to scale 1 : 50 mention dimensions.

   1) Detailed plan with furniture layout for semidetached house. **18**
   2) Standard section cutting semidetached house. **10**

SECTION – II **28**

3. Attempt **any four** of the following. **(4×7=28)**
   1) Write a short note on “Principles of Building Planning”.
   2) Write the short note on “Paints and Varnishes”.
   3) Write a short note on “Rain water harvesting”.
   4) Write short note “Mechanical ventilation” and its types.
   5) Explain in brief “Summer Air Conditioning” and “Winter Air Conditioning” with diagram.
   6) Write a short note on “Septic Tank” with neat sketch.

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Set S

Set S

SLR-EP – 25

Seat No.	

Set P

S.E. (Civil) Part – II (CGPA) Examination, 2016
FLUID MECHANICS – II

Day and Date : Thursday, 24-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions from Section –* ***I*** *are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) Question No. ***5*** *from Section –* ***II*** *is* ***compulsory*** *and solve* ***any one*** *question from question no.* ***6*** *and* ***7****.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.*
5) ***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

1. Choose correct answer :

1) Froude's number is the ratios of inertia force to
   a) Viscou's force b) Pressure force
   c) Elastic force d) Gravity force

2) An error of 1% in measuring head will produce error in discharge over a triangular notch **2**
   a) 2.5% b) 1.5% c) 2% d) 1%

3) If side slope is 2H : 1V then the Froude's number in triangular channel is
   a) $v/\sqrt{g}\,y$ b) $2v/\sqrt{g}\,y$ c) $v/\sqrt{2g}\,y$ d) v/gy

4) Reynold's number is defined as ratio of inertia force to
   a) Gravity force b) Viscous force c) Pressure force d) None

5) Head due to velocity of approach is
   a) $v^2a/2g$ b) $va^3/2g$ c) $va/2g$ d) None

6) The condition for maximum discharge over a broad crested Weir is h =
   a) $2/5H$ b) $2/3H$ c) $2H^3/3$ d) None

P.T.O.

7) The force exerted by a jet of water on a stationary vertical plate in the direction of motion of plate is given by
   a) ρaV b) ρaV^2 c) ρa^2V d) ρaV^3

8) When a steady jet impinges on a fixed inclined surface
   a) The flow is divided into parts proportional to the angle of inclination of the surface
   b) No force is exerted on the jet on the vane
   c) The momentum component is unchanged parallel to the surface
   d) None of he above

9) The effective (or net) head at the turbine is
   a) The sum of gross head plus head loss in penstock and the velocity head at the turbine is exit
   b) The difference between gross head minus the head loss in penstock
   c) The difference between the gross head minus head loss in penstock and velocity head at the turbine exit
   d) The sum of gross head plus the head loss in pen stock

10) Which of the following statements is a definition of the hydraulic efficiency of the turbine ?
   a) The ratio of power available at the shaft to that supplied to it by runner
   b) The ratio of the power supplied by the runner to the power available at the shaft
   c) The ratio of power utilized by runner to that supplied by the water at entry to the turbine
   d) The ratio of power supplied by water at entry to the power utilized by runner

11) The power which appears in the expression for the specific speed is the
   a) Shaft power b) Water power
   c) Power in to the turbine d) None of the above

12) With reference to a centrifugal pump which of the following statements is incorrect ?
   a) The discharge control valve is fitted in the delivery pipe
   b) The suction pipe is provided with a foot valve and a strainer
   c) The suction pipe has larger diameter as compared to the discharge pipe
   d) The discharge control valve is fitted in the suction pipe

13) Distorted models are required to be prepared for which of the following ?
   a) Rivers b) Dams across very wide rivers
   c) Harbours d) All of above

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SLR-EP – 25

Seat No.	

S.E. (Civil) Part – II (CGPA) Examination, 2016
FLUID MECHANICS – II

Day and Date : Thursday, 24-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions from Section –* ***I*** *are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) Question No. ***5*** *from Section –* ***II*** *is* ***compulsory*** *and solve* ***any one*** *question from question no.* ***6*** *and* ***7****.*

SECTION – I

2. a) Show that for non uniform flow, $\frac{dy}{dx} = \frac{so - sf}{1 - Fr^2}$ also states assumptions in deriving it. **5**

   b) A rectangular channel of width 10 m and normal depth 1.75 m has bed slope 1 in 1500. A obstruction in the form of a overflow dam at the raises the level by 1.0 m. Calculate the slope of water surface with respect to horizontal line, at the section. Assume n = 0.025. **5**

   c) Classify hydraulic jump on the basis of froudes number. **2**

3. Attempt **any two** :

   a) Derive the expression for theoretical discharge through triangular notch. Draw neat figure. **5**

   b) Find the time required to lower the water level from 3 m to 2 m in a tank of dimension 80 m × 80 m by
      a) right angled 'v' notch
      b) rectangular notch of length 1.2 m. Take cd as 0.62. **5**

   c) Show that for a hydraulic jump in rectangular channel $y_2 = \frac{y_1}{2}\left[\sqrt{1 + 8Fr_1^2} - 1\right]$. **5**

4. Attempt **any two** :

   a) Sketch M_1, S_1 and S_3 water surface profile. **3**

   b) What are the different methods of computing GVF profiles ? Explain any one of them. **3**

   c) A 40 meters long weir is divided in to 10 equal bays by vertical posts each 0.6 m wide. Using Francis formula. Calculate the discharge over the weir under an effective head of 1 metre. **3**

Set P

SECTION – II

5. a) Derive the expression for force exerted by a jet on a stationary curved plate. **6**

   b) State Buckingham π method. Explain procedure for determining functional relationship. **8**

6. a) Define the terms : **6**
      i) Suction head
      ii) Delivery head
      iii) Static head
      iv) Manometric head.

   b) The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20° and 30° respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. **8**

7. a) Differentiate between impulse turbine and reaction turbine. Description and function of draft tube. **6**

   b) The resistance force F is a function of its length L, velocity V, acceleration due to gravity g, and fluid properties like ρ and viscosity μ. Write the relationship in a dimensionless form. Use Buckingham π method. **8**

SLR-EP – 25

Seat No.	

Set Q

S.E. (Civil) Part – II (CGPA) Examination, 2016
FLUID MECHANICS – II

Day and Date : Thursday, 24-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **All** questions from Section – **I** are **compulsory**.*
*2) Draw **neat** sketches **wherever** necessary.*
*3) Question No. **5** from Section – **II** is **compulsory** and solve **any one** question from question no. **6** and **7**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*5) **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

1. Choose correct answer :

1) The force exerted by a jet of water on a stationary vertical plate in the direction of motion of plate is given by
   a) ρaV b) ρaV^2 c) ρa^2V d) ρaV^3

2) When a steady jet impinges on a fixed inclined surface
   a) The flow is divided into parts proportional to the angle of inclination of the surface
   b) No force is exerted on the jet on the vane
   c) The momentum component is unchanged parallel to the surface
   d) None of he above

3) The effective (or net) head at the turbine is
   a) The sum of gross head plus head loss in penstock and the velocity head at the turbine is exit
   b) The difference between gross head minus the head loss in penstock
   c) The difference between the gross head minus head loss in penstock and velocity head at the turbine exit
   d) The sum of gross head plus the head loss in pen stock

4) Which of the following statements is a definition of the hydraulic efficiency of the turbine ?
   a) The ratio of power available at the shaft to that supplied to it by runner
   b) The ratio of the power supplied by the runner to the power available at the shaft
   c) The ratio of power utilized by runner to that supplied by the water at entry to the turbine
   d) The ratio of power supplied by water at entry to the power utilized by runner

5) The power which appears in the expression for the specific speed is the
   a) Shaft power b) Water power
   c) Power in to the turbine d) None of the above

6) With reference to a centrifugal pump which of the following statements is incorrect ?
   a) The discharge control valve is fitted in the delivery pipe
   b) The suction pipe is provided with a foot valve and a strainer
   c) The suction pipe has larger diameter as compared to the discharge pipe
   d) The discharge control valve is fitted in the suction pipe

7) Distorted models are required to be prepared for which of the following ?
   a) Rivers b) Dams across very wide rivers
   c) Harbours d) All of above

8) Froude's number is the ratios of inertia force to
   a) Viscou's force b) Pressure force
   c) Elastic force d) Gravity force

9) An error of 1% in measuring head will produce error in discharge over a triangular notch **2**
   a) 2.5% b) 1.5% c) 2% d) 1%

10) If side slope is 2H : 1V then the Froude's number in triangular channel is
   a) $v/\sqrt{g}\,y$ b) $2v/\sqrt{g}\,y$ c) $v/\sqrt{2g}\,y$ d) v/gy

11) Reynold's number is defined as ratio of inertia force to
   a) Gravity force b) Viscous force c) Pressure force d) None

12) Head due to velocity of approach is
   a) $v^2a/2g$ b) $va^3/2g$ c) $va/2g$ d) None

13) The condition for maximum discharge over a broad crested Weir is h =
   a) $2/5H$ b) $2/3H$ c) $2H^3/3$ d) None

SLR-EP – 25

Seat No.	

S.E. (Civil) Part – II (CGPA) Examination, 2016
FLUID MECHANICS – II

Day and Date : Thursday, 24-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions from Section –* ***I*** *are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) Question No. ***5*** *from Section –* ***II*** *is* ***compulsory*** *and solve* ***any one*** *question from question no.* ***6*** *and* ***7****.*

SECTION – I

2. a) Show that for non uniform flow, $\frac{dy}{dx} = \frac{so - sf}{1 - Fr^2}$ also states assumptions in deriving it. **5**

   b) A rectangular channel of width 10 m and normal depth 1.75 m has bed slope 1 in 1500. A obstruction in the form of a overflow dam at the raises the level by 1.0 m. Calculate the slope of water surface with respect to horizontal line, at the section. Assume n = 0.025. **5**

   c) Classify hydraulic jump on the basis of froudes number. **2**

3. Attempt **any two** :

   a) Derive the expression for theoretical discharge through triangular notch. Draw neat figure. **5**

   b) Find the time required to lower the water level from 3 m to 2 m in a tank of dimension 80 m × 80 m by
      a) right angled 'v' notch
      b) rectangular notch of length 1.2 m. Take cd as 0.62. **5**

   c) Show that for a hydraulic jump in rectangular channel $y_2 = \frac{y_1}{2}\left[\sqrt{1 + 8Fr_1^2} - 1\right]$. **5**

4. Attempt **any two** :

   a) Sketch M_1, S_1 and S_3 water surface profile. **3**

   b) What are the different methods of computing GVF profiles ? Explain any one of them. **3**

   c) A 40 meters long weir is divided in to 10 equal bays by vertical posts each 0.6 m wide. Using Francis formula. Calculate the discharge over the weir under an effective head of 1 metre. **3**

SECTION – II

5. a) Derive the expression for force exerted by a jet on a stationary curved plate. **6**

   b) State Buckingham π method. Explain procedure for determining functional relationship. **8**

6. a) Define the terms : **6**
      i) Suction head
      ii) Delivery head
      iii) Static head
      iv) Manometric head.

   b) The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20° and 30° respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. **8**

7. a) Differentiate between impulse turbine and reaction turbine. Description and function of draft tube. **6**

   b) The resistance force F is a function of its length L, velocity V, acceleration due to gravity g, and fluid properties like ρ and viscosity μ. Write the relationship in a dimensionless form. Use Buckingham π method. **8**

SLR-EP – 25

Seat No.	

Set R

S.E. (Civil) Part – II (CGPA) Examination, 2016
FLUID MECHANICS – II

Day and Date : Thursday, 24-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions from Section –* ***I*** *are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) Question No. ***5*** *from Section –* ***II*** *is* ***compulsory*** *and solve* ***any one*** *question from question no.* ***6*** *and* ***7****.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.*
5) ***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

1. Choose correct answer :

1) Reynold's number is defined as ratio of inertia force to
   a) Gravity force b) Viscous force c) Pressure force d) None

2) Head due to velocity of approach is
   a) $v^2a/2g$ b) $va^3/2g$ c) $va/2g$ d) None

3) The condition for maximum discharge over a broad crested Weir is h =
   a) $^{2}/_{5H}$ b) $^{2}/_{3H}$ c) $^{2H^3}/_{3}$ d) None

4) The force exerted by a jet of water on a stationary vertical plate in the direction of motion of plate is given by
   a) ρaV b) ρaV^2 c) ρa^2V d) ρaV^3

5) When a steady jet impinges on a fixed inclined surface
   a) The flow is divided into parts proportional to the angle of inclination of the surface
   b) No force is exerted on the jet on the vane
   c) The momentum component is unchanged parallel to the surface
   d) None of he above

6) The effective (or net) head at the turbine is
   a) The sum of gross head plus head loss in penstock and the velocity head at the turbine is exit
   b) The difference between gross head minus the head loss in penstock
   c) The difference between the gross head minus head loss in penstock and velocity head at the turbine exit
   d) The sum of gross head plus the head loss in pen stock

7) Which of the following statements is a definition of the hydraulic efficiency of the turbine ?
   a) The ratio of power available at the shaft to that supplied to it by runner
   b) The ratio of the power supplied by the runner to the power available at the shaft
   c) The ratio of power utilized by runner to that supplied by the water at entry to the turbine
   d) The ratio of power supplied by water at entry to the power utilized by runner

8) The power which appears in the expression for the specific speed is the
   a) Shaft power b) Water power
   c) Power in to the turbine d) None of the above

9) With reference to a centrifugal pump which of the following statements is incorrect ?
   a) The discharge control valve is fitted in the delivery pipe
   b) The suction pipe is provided with a foot valve and a strainer
   c) The suction pipe has larger diameter as compared to the discharge pipe
   d) The discharge control valve is fitted in the suction pipe

10) Distorted models are required to be prepared for which of the following ?
   a) Rivers b) Dams across very wide rivers
   c) Harbours d) All of above

11) Froude's number is the ratios of inertia force to
   a) Viscou's force b) Pressure force
   c) Elastic force d) Gravity force

12) An error of 1% in measuring head will produce error in discharge over a triangular notch
   a) 2.5% b) 1.5% c) 2% d) 1%

13) If side slope is 2H : 1V then the Froude's number in triangular channel is
   a) $v/\sqrt{g}\,y$ b) $2v/\sqrt{g}\,y$ c) $v/\sqrt{2g}\,y$ d) v/gy

2

SLR-EP – 25

Seat No.	

S.E. (Civil) Part – II (CGPA) Examination, 2016
FLUID MECHANICS – II

Day and Date : Thursday, 24-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions from Section –* ***I*** *are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) Question No. ***5*** *from Section –* ***II*** *is* ***compulsory*** *and solve* ***any one*** *question from question no.* ***6*** *and* ***7****.*

SECTION – I

2. a) Show that for non uniform flow, $\frac{dy}{dx} = \frac{so - sf}{1 - Fr^2}$ also states assumptions in deriving it. **5**

   b) A rectangular channel of width 10 m and normal depth 1.75 m has bed slope 1 in 1500. A obstruction in the form of a overflow dam at the raises the level by 1.0 m. Calculate the slope of water surface with respect to horizontal line, at the section. Assume n = 0.025. **5**

   c) Classify hydraulic jump on the basis of froudes number. **2**

3. Attempt **any two** :

   a) Derive the expression for theoretical discharge through triangular notch. Draw neat figure. **5**

   b) Find the time required to lower the water level from 3 m to 2 m in a tank of dimension 80 m × 80 m by
      a) right angled 'v' notch
      b) rectangular notch of length 1.2 m. Take cd as 0.62. **5**

   c) Show that for a hydraulic jump in rectangular channel $y_2 = \frac{y_1}{2}\left[\sqrt{1 + 8Fr_1^2} - 1\right]$. **5**

4. Attempt **any two** :

   a) Sketch M_1, S_1 and S_3 water surface profile. **3**

   b) What are the different methods of computing GVF profiles ? Explain any one of them. **3**

   c) A 40 meters long weir is divided in to 10 equal bays by vertical posts each 0.6 m wide. Using Francis formula. Calculate the discharge over the weir under an effective head of 1 metre. **3**

SECTION – II

5. a) Derive the expression for force exerted by a jet on a stationary curved plate. **6**

   b) State Buckingham π method. Explain procedure for determining functional relationship. **8**

6. a) Define the terms : **6**
      i) Suction head
      ii) Delivery head
      iii) Static head
      iv) Manometric head.

   b) The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20° and 30° respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. **8**

7. a) Differentiate between impulse turbine and reaction turbine. Description and function of draft tube. **6**

   b) The resistance force F is a function of its length L, velocity V, acceleration due to gravity g, and fluid properties like ρ and viscosity μ. Write the relationship in a dimensionless form. Use Buckingham π method. **8**

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SLR-EP – 25

Seat No.	

Set S

S.E. (Civil) Part – II (CGPA) Examination, 2016
FLUID MECHANICS – II

Day and Date : Thursday, 24-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions from Section –* ***I*** *are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) Question No. ***5*** *from Section –* ***II*** *is* ***compulsory*** *and solve* ***any one*** *question from question no.* ***6*** *and* ***7****.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.*
5) ***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

1. Choose correct answer :

1) The effective (or net) head at the turbine is
   a) The sum of gross head plus head loss in penstock and the velocity head at the turbine is exit
   b) The difference between gross head minus the head loss in penstock
   c) The difference between the gross head minus head loss in penstock and velocity head at the turbine exit
   d) The sum of gross head plus the head loss in pen stock

2) Which of the following statements is a definition of the hydraulic efficiency of the turbine ?
   a) The ratio of power available at the shaft to that supplied to it by runner
   b) The ratio of the power supplied by the runner to the power available at the shaft
   c) The ratio of power utilized by runner to that supplied by the water at entry to the turbine
   d) The ratio of power supplied by water at entry to the power utilized by runner

3) The power which appears in the expression for the specific speed is the
   a) Shaft power b) Water power
   c) Power in to the turbine d) None of the above

P.T.O.

4) With reference to a centrifugal pump which of the following statements is incorrect ?
   a) The discharge control valve is fitted in the delivery pipe
   b) The suction pipe is provided with a foot valve and a strainer
   c) The suction pipe has larger diameter as compared to the discharge pipe
   d) The discharge control valve is fitted in the suction pipe

5) Distorted models are required to be prepared for which of the following ?
   a) Rivers b) Dams across very wide rivers
   c) Harbours d) All of above

6) Froude's number is the ratios of inertia force to
   a) Viscou's force b) Pressure force
   c) Elastic force d) Gravity force

7) An error of 1% in measuring head will produce error in discharge over a triangular notch **2**
   a) 2.5% b) 1.5% c) 2% d) 1%

8) If side slope is 2H : 1V then the Froude's number in triangular channel is
   a) $v/\sqrt{g}\,y$ b) $2v/\sqrt{g}\,y$ c) $v/\sqrt{2g}\,\bar{y}$ d) v/gy

9) Reynold's number is defined as ratio of inertia force to
   a) Gravity force b) Viscous force c) Pressure force d) None

10) Head due to velocity of approach is
   a) $v^2a/2g$ b) $va^3/2g$ c) $va/2g$ d) None

11) The condition for maximum discharge over a broad crested Weir is h =
   a) $2/5H$ b) $2/3H$ c) $2H^3/3$ d) None

12) The force exerted by a jet of water on a stationary vertical plate in the direction of motion of plate is given by
   a) ρaV b) ρaV^2 c) ρa^2V d) ρaV^3

13) When a steady jet impinges on a fixed inclined surface
   a) The flow is divided into parts proportional to the angle of inclination of the surface
   b) No force is exerted on the jet on the vane
   c) The momentum component is unchanged parallel to the surface
   d) None of he above

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SLR-EP – 25

Seat No.	

S.E. (Civil) Part – II (CGPA) Examination, 2016
FLUID MECHANICS – II

Day and Date : Thursday, 24-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions from Section –* ***I*** *are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) Question No. ***5*** *from Section –* ***II*** *is* ***compulsory*** *and solve* ***any one*** *question from question no.* ***6*** *and* ***7****.*

SECTION – I

2. a) Show that for non uniform flow, $\frac{dy}{dx} = \frac{so - sf}{1 - Fr^2}$ also states assumptions in deriving it. **5**

   b) A rectangular channel of width 10 m and normal depth 1.75 m has bed slope 1 in 1500. A obstruction in the form of a overflow dam at the raises the level by 1.0 m. Calculate the slope of water surface with respect to horizontal line, at the section. Assume n = 0.025. **5**

   c) Classify hydraulic jump on the basis of froudes number. **2**

3. Attempt **any two** :

   a) Derive the expression for theoretical discharge through triangular notch. Draw neat figure. **5**

   b) Find the time required to lower the water level from 3 m to 2 m in a tank of dimension 80 m × 80 m by
      a) right angled 'v' notch
      b) rectangular notch of length 1.2 m. Take cd as 0.62. **5**

   c) Show that for a hydraulic jump in rectangular channel $y_2 = \frac{y_1}{2}\left[\sqrt{1 + 8Fr_1^2} - 1\right]$. **5**

4. Attempt **any two** :

   a) Sketch M_1, S_1 and S_3 water surface profile. **3**

   b) What are the different methods of computing GVF profiles ? Explain any one of them. **3**

   c) A 40 meters long weir is divided in to 10 equal bays by vertical posts each 0.6 m wide. Using Francis formula. Calculate the discharge over the weir under an effective head of 1 metre. **3**

SECTION – II

5. a) Derive the expression for force exerted by a jet on a stationary curved plate. **6**

   b) State Buckingham π method. Explain procedure for determining functional relationship. **8**

6. a) Define the terms : **6**
      i) Suction head
      ii) Delivery head
      iii) Static head
      iv) Manometric head.

   b) The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20° and 30° respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. **8**

7. a) Differentiate between impulse turbine and reaction turbine. Description and function of draft tube. **6**

   b) The resistance force F is a function of its length L, velocity V, acceleration due to gravity g, and fluid properties like ρ and viscosity μ. Write the relationship in a dimensionless form. Use Buckingham π method. **8**

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SLR-EP – 26

Seat No.	

Set **P**

S.E. (Civil) (CGPA) (Part – II) Examination, 2016
WATER RESOURCES ENGINEERING – I

Day and Date : Friday, 25-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Answer **any three** questions from **each** Section.*
*2) Assume **suitable** data if necessary and state it **clearly**.*
*3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **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

1. Choose the correct alternative: **(14×1=14)**

1) The standard Symson's rain gauge has a collecting area of diameter
a) 12.7 cm b) 10 cm c) 5.08 cm d) 25.4 cm

2) Direct runoff is made up of
a) Overland flow and infiltration
b) Rainfall and evaporation
c) Surface runoff, infiltration and evapotranspiration
d) Surface runoff, prompt interflow and channel precipitation

3) Infiltration capacity of soil depends upon
a) Shape and size of soil particles
b) Compaction of the soil particles
c) Arrangement of soil particles
d) All

4) Pick up the correct equation from the following
a) Run off = Surface run off + Ground water flow
b) Run off = Surface run off × Ground water flow
c) Run off = Surface run off – Ground water flow
d) Run off = Surface run off / Ground water flow

5) Flowing artesian wells are expected in areas where
a) The water table is very close to the land surface
b) The aquifer is confined
c) The elevation of piezometric head line is above the elevation of the ground surface
d) The rainfall is intense

6) The volume of water that can be extracted by force of gravity from a unit volume of aquifer material is called
a) Specific retention b) Specific yield
c) Specific storage d) Specific capacity

7) Precipitation caused by lifting of an air mass due to the pressure difference, is called
a) Orographic precipitation b) Convective precipitation
c) Cyclonic precipitation d) None of these

P.T.O.

8) 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

9) Addition of gypsum to the irrigation water is recommended to overcome difficulties posed by
   a) Highly saline irrigation supplies
   b) Irrigation supplies containing high quantities of sodium
   c) Irrigation supplies containing heavy sediment
   d) None of the above

10) The maximum irrigation requirement of Rice crop is exhibited by its
   a) Maximum delta value
   b) Maximum duty value
   c) Minimum duty value
   d) (a) and (c)

11) The duty of irrigation water for a given crop is maximum
   a) On the field
   b) At the head of the main canal
   c) At the head of the water-course
   d) None of them

12) The relationship between the duty D in ha/cumecs, the water depth in cm, and base period B in days, is given by

   a) $D = \frac{864B}{\Delta}$ b) $D = \frac{8.64B}{\Delta}$ c) $D = \frac{864\Delta}{B}$ d) $D = \frac{8.64\Delta}{B}$

13) The moisture held by a well drained soil against gravity drainage, by the force of surface tension between the soil grains and water drops, is called
   a) Field capacity water
   b) Hygroscopic water
   c) Capillary water
   d) Water of adhesion

14) An irrigation project is classified as a major project, when the culturable command involved in the project, is more than
   a) 2000 hectares
   b) 5000 hectares
   c) 10000 hectares
   d) None of the above

Seat No.	

S.E. (Civil) (CGPA) (Part – II) Examination, 2016
WATER RESOURCES ENGINEERING – I

Day and Date : Friday, 25-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Answer **any three** questions from **each** Section.*
*2) Assume **suitable** data if necessary and state it **clearly**.*

SECTION – I

2. a) What do you mean by infiltration ? Enlist different factors affecting infiltration process and explain any two of them. **4**

b) The isohyets drawn for a storm which occurred over a drainage basin of area 950 km^2 yielded the following information. **5**

Isohyet interval (mm)	85 – 75	75 – 65	65 – 55	55 – 45	45 – 35
Area between isohyets (km^2)	125	236	264	175	x

If the average rainfall over the basin is 60.11 mm, find missing value (x) of area.

3. a) Define S-curve hydrograph and explain the concept of S-curve hydrograph with a neat sketch. **4**

b) An engineer is required to design a drainage system for an airport with an area of 2.5 km^2 for a rainfall value of 50 year return period. The 50 year rainfall intensity in that region is given by :

$$I = \frac{35}{(t + 10)^{0.38}}$$

Where I is the intensity in cm/hr and t is the duration of rainfall in minutes. The 'time of concentration' for the area under consideration is estimated as 50 minutes. Calculate the design discharge for the drainage system. Take runoff coefficient equal to 1. **5**

4. a) What do you mean by stream gauging ? Enlist the factors considered for site selection for stream gauging. **4**

b) The current meter observations taken during the gauging of a storm are given below. The current meter rating may be taken as v = 0.05 + 0.3 N, where v is in m/s and N is in rev/s. Compute discharge in the stream. **6**

Distance from bank (m)	**Depth of flow (m)**	**Current meter depth (m)**	**Number of revolutions per minute**	**Time (sec.)**
0.8	0.5	0.3	12	48
1.6	1.0	0.8	23	52
–	–	0.2	36	51
2.4	1.6	1.28	27	54
–	–	0.32	41	60
3.0	2.0	1.6	33	58
–	–	0.40	45	62
3.6	2.0	1.6	32	58
–	–	0.44	44	60
4.2	1.8	1.44	28	53
–	–	0.36	42	58
5.0	1.2	0.96	24	50
–	–	0.24	35	50
5.8	0.6	0.36	14	45
6.6	0.0	–	–	–

5. a) Explain with neat sketches, Confined aquifer and Unconfined aquifer. **4**

   b) A 30 cm diameter well completely penetrates a confined aquifer of permeability 45 m/day. The length of strainer is 20 m. Under steady state of pumping, the drawdown at the well was found to be 3.0 m and the radius of influence was 300 m. Calculate the discharge of the well. **5**

SECTION – II

6. a) Write a detailed note on 'National Perspective Plan' of National Water Development Academy for Inter-basin transfer of water in India. **4**

   b) Sufficient irrigation water is to be applied to a crop. Calculate after how many days you will supply water to the crop, based on the following data.
   Field capacity of soil = 29%. Permanent wilting point = 14%, Dry unit weight of soil = 12.75 kN/m^3, Unit weight of water = 9.81 kN/m^3, Effective depth of root zone = 70 cm, Daily consumptive use of water for given crop = 12 mm. **5**

7. a) What do you mean by lift irrigation ? Draw a typical layout of a Lift Irrigation Scheme and discuss the different components of a scheme. **4**

   b) A reservoir is proposed to be constructed to command an area of 120000 hectares. It is anticipated that ultimately sugar and paddy would both be irrigated equal to 20% each, of the command and Rabi crops equal to 50% of command making a total annual irrigation equal to 90% of commanded area. Work out storage requirement of a reservoir, assuming total water requirement and average duty as following. Assume canal losses at 25% of the head discharge. Take reservoir evaporation and dead storage losses at 20% of gross capacity. **6**

Crop	**Total water depth required (cm)**	**Duty in hectare/cumec**
Sugarcane	90	600
Paddy (Kharif)	120	637
Rabi crops	40	1728

8. a) Discuss 'Bandhara irrigation system' with its advantages and disadvantages. **4**

   b) Define the following terms : **5**

      i) Gross Command area
      ii) Crop period
      iii) Base period
      iv) Capacity factor
      v) Kor-watering and Kor-depth.

9. a) Discuss the need of soil and water conservation in agricultural fields. What are the different structures constructed in watershed for soil conservation ? **4**

   b) Discuss the role of 'Water Users Organization' in irrigation management. **5**

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SLR-EP – 26

Seat No.	

Set **Q**

S.E. (Civil) (CGPA) (Part – II) Examination, 2016
WATER RESOURCES ENGINEERING – I

Day and Date : Friday, 25-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Answer* ***any three*** *questions from* ***each*** *Section.*
2) Assume ***suitable*** *data if necessary and state it* ***clearly****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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

1. Choose the correct alternative: **(14×1=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) Addition of gypsum to the irrigation water is recommended to overcome difficulties posed by
   a) Highly saline irrigation supplies
   b) Irrigation supplies containing high quantities of sodium
   c) Irrigation supplies containing heavy sediment
   d) None of the above

3) The maximum irrigation requirement of Rice crop is exhibited by its
   a) Maximum delta value b) Maximum duty value
   c) Minimum duty value d) (a) and (c)

4) The duty of irrigation water for a given crop is maximum
   a) On the field b) At the head of the main canal
   c) At the head of the water-course d) None of them

5) The relationship between the duty D in ha/cumecs, the water depth in cm, and base period B in days, is given by

   a) $D = \frac{864B}{\Delta}$ b) $D = \frac{8.64B}{\Delta}$ c) $D = \frac{864\Delta}{B}$ d) $D = \frac{8.64\Delta}{B}$

6) The moisture held by a well drained soil against gravity drainage, by the force of surface tension between the soil grains and water drops, is called
   a) Field capacity water b) Hygroscopic water
   c) Capillary water d) Water of adhesion

7) An irrigation project is classified as a major project, when the culturable command involved in the project, is more than
   a) 2000 hectares b) 5000 hectares
   c) 10000 hectares d) None of the above

8) The standard Symson's rain gauge has a collecting area of diameter
   a) 12.7 cm b) 10 cm c) 5.08 cm d) 25.4 cm

P.T.O.

9) Direct runoff is made up of
   a) Overland flow and infiltration
   b) Rainfall and evaporation
   c) Surface runoff, infiltration and evapotranspiration
   d) Surface runoff, prompt interflow and channel precipitation

10) Infiltration capacity of soil depends upon
   a) Shape and size of soil particles
   b) Compaction of the soil particles
   c) Arrangement of soil particles
   d) All

11) Pick up the correct equation from the following
   a) Run off = Surface run off + Ground water flow
   b) Run off = Surface run off × Ground water flow
   c) Run off = Surface run off – Ground water flow
   d) Run off = Surface run off / Ground water flow

12) Flowing artesian wells are expected in areas where
   a) The water table is very close to the land surface
   b) The aquifer is confined
   c) The elevation of piezometric head line is above the elevation of the ground surface
   d) The rainfall is intense

13) The volume of water that can be extracted by force of gravity from a unit volume of aquifer material is called
   a) Specific retention
   b) Specific yield
   c) Specific storage
   d) Specific capacity

14) Precipitation caused by lifting of an air mass due to the pressure difference, is called
   a) Orographic precipitation
   b) Convective precipitation
   c) Cyclonic precipitation
   d) None of these

Seat No.	

S.E. (Civil) (CGPA) (Part – II) Examination, 2016
WATER RESOURCES ENGINEERING – I

Day and Date : Friday, 25-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Answer* ***any three*** *questions from* ***each*** *Section.*
2) Assume ***suitable*** *data if necessary and state it* ***clearly****.*

SECTION – I

2. a) What do you mean by infiltration ? Enlist different factors affecting infiltration process and explain any two of them. **4**

b) The isohyets drawn for a storm which occurred over a drainage basin of area 950 km^2 yielded the following information. **5**

Isohyet interval (mm)	85 – 75	75 – 65	65 – 55	55 – 45	45 – 35
Area between isohyets (km^2)	125	236	264	175	x

If the average rainfall over the basin is 60.11 mm, find missing value (x) of area.

3. a) Define S-curve hydrograph and explain the concept of S-curve hydrograph with a neat sketch. **4**

b) An engineer is required to design a drainage system for an airport with an area of 2.5 km^2 for a rainfall value of 50 year return period. The 50 year rainfall intensity in that region is given by :

$$I = \frac{35}{(t + 10)^{0.38}}$$

Where I is the intensity in cm/hr and t is the duration of rainfall in minutes. The 'time of concentration' for the area under consideration is estimated as 50 minutes. Calculate the design discharge for the drainage system. Take runoff coefficient equal to 1. **5**

4. a) What do you mean by stream gauging ? Enlist the factors considered for site selection for stream gauging. **4**

b) The current meter observations taken during the gauging of a storm are given below. The current meter rating may be taken as v = 0.05 + 0.3 N, where v is in m/s and N is in rev/s. Compute discharge in the stream. **6**

Distance from bank (m)	**Depth of flow (m)**	**Current meter depth (m)**	**Number of revolutions per minute**	**Time (sec.)**
0.8	0.5	0.3	12	48
1.6	1.0	0.8	23	52
–	–	0.2	36	51
2.4	1.6	1.28	27	54
–	–	0.32	41	60
3.0	2.0	1.6	33	58
–	–	0.40	45	62
3.6	2.0	1.6	32	58
–	–	0.44	44	60
4.2	1.8	1.44	28	53
–	–	0.36	42	58
5.0	1.2	0.96	24	50
–	–	0.24	35	50
5.8	0.6	0.36	14	45
6.6	0.0	–	–	–

5. a) Explain with neat sketches, Confined aquifer and Unconfined aquifer. **4**

   b) A 30 cm diameter well completely penetrates a confined aquifer of permeability 45 m/day. The length of strainer is 20 m. Under steady state of pumping, the drawdown at the well was found to be 3.0 m and the radius of influence was 300 m. Calculate the discharge of the well. **5**

SECTION – II

6. a) Write a detailed note on 'National Perspective Plan' of National Water Development Academy for Inter-basin transfer of water in India. **4**

   b) Sufficient irrigation water is to be applied to a crop. Calculate after how many days you will supply water to the crop, based on the following data.
   Field capacity of soil = 29%. Permanent wilting point = 14%, Dry unit weight of soil = 12.75 kN/m^3, Unit weight of water = 9.81 kN/m^3, Effective depth of root zone = 70 cm, Daily consumptive use of water for given crop = 12 mm. **5**

7. a) What do you mean by lift irrigation ? Draw a typical layout of a Lift Irrigation Scheme and discuss the different components of a scheme. **4**

   b) A reservoir is proposed to be constructed to command an area of 120000 hectares. It is anticipated that ultimately sugar and paddy would both be irrigated equal to 20% each, of the command and Rabi crops equal to 50% of command making a total annual irrigation equal to 90% of commanded area. Work out storage requirement of a reservoir, assuming total water requirement and average duty as following. Assume canal losses at 25% of the head discharge. Take reservoir evaporation and dead storage losses at 20% of gross capacity. **6**

Crop	**Total water depth required (cm)**	**Duty in hectare/cumec**
Sugarcane	90	600
Paddy (Kharif)	120	637
Rabi crops	40	1728

8. a) Discuss 'Bandhara irrigation system' with its advantages and disadvantages. **4**

   b) Define the following terms : **5**

   i) Gross Command area
   ii) Crop period
   iii) Base period
   iv) Capacity factor
   v) Kor-watering and Kor-depth.

9. a) Discuss the need of soil and water conservation in agricultural fields. What are the different structures constructed in watershed for soil conservation ? **4**

   b) Discuss the role of 'Water Users Organization' in irrigation management. **5**

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SLR-EP – 26

Seat No.	

Set **R**

S.E. (Civil) (CGPA) (Part – II) Examination, 2016
WATER RESOURCES ENGINEERING – I

Day and Date : Friday, 25-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Answer* ***any three*** *questions from* ***each*** *Section.*
2) Assume ***suitable*** *data if necessary and state it* ***clearly****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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

1. Choose the correct alternative: **(14×1=14)**

1) Flowing artesian wells are expected in areas where
   a) The water table is very close to the land surface
   b) The aquifer is confined
   c) The elevation of piezometric head line is above the elevation of the ground surface
   d) The rainfall is intense

2) The volume of water that can be extracted by force of gravity from a unit volume of aquifer material is called
   a) Specific retention b) Specific yield
   c) Specific storage d) Specific capacity

3) Precipitation caused by lifting of an air mass due to the pressure difference, is called
   a) Orographic precipitation b) Convective precipitation
   c) Cyclonic precipitation d) None of these

4) 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

5) Addition of gypsum to the irrigation water is recommended to overcome difficulties posed by
   a) Highly saline irrigation supplies
   b) Irrigation supplies containing high quantities of sodium
   c) Irrigation supplies containing heavy sediment
   d) None of the above

6) The maximum irrigation requirement of Rice crop is exhibited by its
   a) Maximum delta value b) Maximum duty value
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7) The duty of irrigation water for a given crop is maximum
   a) On the field b) At the head of the main canal
   c) At the head of the water-course d) None of them

P.T.O.

8) The relationship between the duty D in ha/cumecs, the water depth in cm, and base period B in days, is given by

a) $D = \frac{864B}{\Delta}$ b) $D = \frac{8.64B}{\Delta}$ c) $D = \frac{864\Delta}{B}$ d) $D = \frac{8.64\Delta}{B}$

9) The moisture held by a well drained soil against gravity drainage, by the force of surface tension between the soil grains and water drops, is called
   a) Field capacity water
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10) An irrigation project is classified as a major project, when the culturable command involved in the project, is more than
   a) 2000 hectares
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11) The standard Symson's rain gauge has a collecting area of diameter
   a) 12.7 cm b) 10 cm c) 5.08 cm d) 25.4 cm

12) Direct runoff is made up of
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13) Infiltration capacity of soil depends upon
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14) Pick up the correct equation from the following
   a) Run off = Surface run off + Ground water flow
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Seat No.	

S.E. (Civil) (CGPA) (Part – II) Examination, 2016
WATER RESOURCES ENGINEERING – I

Day and Date : Friday, 25-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Answer **any three** questions from **each** Section.*
*2) Assume **suitable** data if necessary and state it **clearly**.*

SECTION – I

2. a) What do you mean by infiltration ? Enlist different factors affecting infiltration process and explain any two of them. **4**

b) The isohyets drawn for a storm which occurred over a drainage basin of area 950 km^2 yielded the following information. **5**

Isohyet interval (mm)	85 – 75	75 – 65	65 – 55	55 – 45	45 – 35
Area between isohyets (km^2)	125	236	264	175	x

If the average rainfall over the basin is 60.11 mm, find missing value (x) of area.

3. a) Define S-curve hydrograph and explain the concept of S-curve hydrograph with a neat sketch. **4**

b) An engineer is required to design a drainage system for an airport with an area of 2.5 km^2 for a rainfall value of 50 year return period. The 50 year rainfall intensity in that region is given by :

$$I = \frac{35}{(t + 10)^{0.38}}$$

Where I is the intensity in cm/hr and t is the duration of rainfall in minutes. The 'time of concentration' for the area under consideration is estimated as 50 minutes. Calculate the design discharge for the drainage system. Take runoff coefficient equal to 1. **5**

4. a) What do you mean by stream gauging ? Enlist the factors considered for site selection for stream gauging. **4**

b) The current meter observations taken during the gauging of a storm are given below. The current meter rating may be taken as v = 0.05 + 0.3 N, where v is in m/s and N is in rev/s. Compute discharge in the stream. **6**

Distance from bank (m)	**Depth of flow (m)**	**Current meter depth (m)**	**Number of revolutions per minute**	**Time (sec.)**
0.8	0.5	0.3	12	48
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–	–	0.36	42	58
5.0	1.2	0.96	24	50
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5.8	0.6	0.36	14	45
6.6	0.0	–	–	–

5. a) Explain with neat sketches, Confined aquifer and Unconfined aquifer. **4**

   b) A 30 cm diameter well completely penetrates a confined aquifer of permeability 45 m/day. The length of strainer is 20 m. Under steady state of pumping, the drawdown at the well was found to be 3.0 m and the radius of influence was 300 m. Calculate the discharge of the well. **5**

SECTION – II

6. a) Write a detailed note on 'National Perspective Plan' of National Water Development Academy for Inter-basin transfer of water in India. **4**

   b) Sufficient irrigation water is to be applied to a crop. Calculate after how many days you will supply water to the crop, based on the following data.
   Field capacity of soil = 29%. Permanent wilting point = 14%, Dry unit weight of soil = 12.75 kN/m^3, Unit weight of water = 9.81 kN/m^3, Effective depth of root zone = 70 cm, Daily consumptive use of water for given crop = 12 mm. **5**

7. a) What do you mean by lift irrigation ? Draw a typical layout of a Lift Irrigation Scheme and discuss the different components of a scheme. **4**

   b) A reservoir is proposed to be constructed to command an area of 120000 hectares. It is anticipated that ultimately sugar and paddy would both be irrigated equal to 20% each, of the command and Rabi crops equal to 50% of command making a total annual irrigation equal to 90% of commanded area. Work out storage requirement of a reservoir, assuming total water requirement and average duty as following. Assume canal losses at 25% of the head discharge. Take reservoir evaporation and dead storage losses at 20% of gross capacity. **6**

Crop	**Total water depth required (cm)**	**Duty in hectare/cumec**
Sugarcane	90	600
Paddy (Kharif)	120	637
Rabi crops	40	1728

8. a) Discuss 'Bandhara irrigation system' with its advantages and disadvantages. **4**

   b) Define the following terms : **5**

   i) Gross Command area
   ii) Crop period
   iii) Base period
   iv) Capacity factor
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9. a) Discuss the need of soil and water conservation in agricultural fields. What are the different structures constructed in watershed for soil conservation ? **4**

   b) Discuss the role of 'Water Users Organization' in irrigation management. **5**

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SLR-EP – 26

Seat No.	

Set **S**

S.E. (Civil) (CGPA) (Part – II) Examination, 2016
WATER RESOURCES ENGINEERING – I

Day and Date : Friday, 25-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Answer **any three** questions from **each** Section.*
*2) Assume **suitable** data if necessary and state it **clearly**.*
*3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **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

1. Choose the correct alternative: **(14×1=14)**

1) The maximum irrigation requirement of Rice crop is exhibited by its
   a) Maximum delta value b) Maximum duty value
   c) Minimum duty value d) (a) and (c)

2) The duty of irrigation water for a given crop is maximum
   a) On the field b) At the head of the main canal
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3) The relationship between the duty D in ha/cumecs, the water depth in cm, and base period B in days, is given by

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4) The moisture held by a well drained soil against gravity drainage, by the force of surface tension between the soil grains and water drops, is called
   a) Field capacity water b) Hygroscopic water
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5) An irrigation project is classified as a major project, when the culturable command involved in the project, is more than
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6) The standard Symson's rain gauge has a collecting area of diameter
   a) 12.7 cm b) 10 cm c) 5.08 cm d) 25.4 cm

7) Direct runoff is made up of
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P.T.O.

9) Pick up the correct equation from the following
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   a) Highly saline irrigation supplies
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   c) Irrigation supplies containing heavy sediment
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Seat No.	

S.E. (Civil) (CGPA) (Part – II) Examination, 2016
WATER RESOURCES ENGINEERING – I

Day and Date : Friday, 25-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Answer* ***any three*** *questions from* ***each*** *Section.*
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SECTION – I

2. a) What do you mean by infiltration ? Enlist different factors affecting infiltration process and explain any two of them. **4**

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–	–	0.36	42	58
5.0	1.2	0.96	24	50
–	–	0.24	35	50
5.8	0.6	0.36	14	45
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5. a) Explain with neat sketches, Confined aquifer and Unconfined aquifer. **4**

   b) A 30 cm diameter well completely penetrates a confined aquifer of permeability 45 m/day. The length of strainer is 20 m. Under steady state of pumping, the drawdown at the well was found to be 3.0 m and the radius of influence was 300 m. Calculate the discharge of the well. **5**

SECTION – II

6. a) Write a detailed note on 'National Perspective Plan' of National Water Development Academy for Inter-basin transfer of water in India. **4**

   b) Sufficient irrigation water is to be applied to a crop. Calculate after how many days you will supply water to the crop, based on the following data.
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7. a) What do you mean by lift irrigation ? Draw a typical layout of a Lift Irrigation Scheme and discuss the different components of a scheme. **4**

   b) A reservoir is proposed to be constructed to command an area of 120000 hectares. It is anticipated that ultimately sugar and paddy would both be irrigated equal to 20% each, of the command and Rabi crops equal to 50% of command making a total annual irrigation equal to 90% of commanded area. Work out storage requirement of a reservoir, assuming total water requirement and average duty as following. Assume canal losses at 25% of the head discharge. Take reservoir evaporation and dead storage losses at 20% of gross capacity. **6**

Crop	**Total water depth required (cm)**	**Duty in hectare/cumec**
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8. a) Discuss 'Bandhara irrigation system' with its advantages and disadvantages. **4**

   b) Define the following terms : **5**

   i) Gross Command area
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9. a) Discuss the need of soil and water conservation in agricultural fields. What are the different structures constructed in watershed for soil conservation ? **4**

   b) Discuss the role of 'Water Users Organization' in irrigation management. **5**

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SLR-EP – 27

Seat No.	

Set P

S.E.(Civil) (Part – II) (CGPA) Examination, 2016
ENGG. MATHEMATICS – III

Day and Date : Saturday, 26-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of calculator is **allowed**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **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

1. Choose the correct option : **(1×14=14)**

1) An Auxiliary equation of an ordinary differential equation gives
   a) Particular integral b) Particular solution
   c) Complementary function d) Singular solution

2) The particular integral of $(D^2+ 9)y = \cos 3x$ is
   a) $\frac{x}{3}\cos 3x$ b) $\frac{x}{3}\sin 3x$
   c) $\frac{-x}{6}\sin 3x$ d) $\frac{x}{6}\sin 3x$

3) The general solution of $(x^2D^2 - 4xD + 6)y = 0$, is
   a) $y = C_1x^2 + C_2x^3$ b) $y = C_1e^{2x} + C_2e^{3x}$
   c) $y = C_1e^{-2x} + C_2e^{-2x}$ d) $y = C_1x^{-4} + C_2x^6$

4) $L^{-1}\left\{\frac{1}{s^2+4s+13}\right\} =$
   a) $e^{-2t}\cos 3t$ b) $\frac{e^{-2t}\sin 3t}{3}$
   c) $\frac{e^{2t}\sin 3t}{3}$ d) $e^{2t}\cos 3t$

P.T.O.

5) $L\{f'(t)\} =$

a) $f(0) + s\bar{f}(s)$ b) $-f(0) + \bar{f}(s)$ c) $-f(0) + s\bar{f}(s)$ d) $s\bar{f}(s)$

6) The solution of $p + q = z$ is

a) $f(xy, y \log z) = 0$ b) $f(x + y, y + \log z) = 0$

c) $f(x - y, y - \log z) = 0$ d) none of these

7) The solution of $pq = p + q$ is

a) $z = ax + (a + 1)y + c$ b) $z = (a + 1)x + a(a - 1)y + c$

c) $z(a - 1) = a(a - 1)x + ay + c$ d) $z = (a - 1)x + ay + c$

8) If $f(x) = -k \quad -\pi < x < 0$

$= k \quad 0 < x < \pi$

then constant term a_0 in Fourier series of f(x) is

a) 0 b) $\frac{2k}{\pi}$ c) $\frac{\pi}{2k}$ d) $\frac{k}{\pi}$

9) If a Poisson distribution is such that $P(x = 2) = P(x = 3)$ then mean and variance of distribution are respectively

a) 2, 3 b) 3, 2 c) 3, 3 d) 2, 2

10) If $\bar{r} = xi + yj + zk$ then curl $\bar{r}$ =

a) 3 b) $\frac{1}{3}$ c) 0 d) Does not exists

11) If $y = x + 1$ and $x = 3y - 7$ are two lines of regression then r =

a) $\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$ c) $\sqrt{2}$ d) $\frac{1}{\sqrt{2}}$

12) The Fourier series expansion of $f(x) = x^2$ in the interval (–1, 1) has

a) Only cosine terms b) Only constant term

c) Only sine terms d) None of these

13) For a binomial distribution

a) Mean = variance b) Mean $\leq$ variance

c) Mean > variance d) Mean < variance

14) If ϕ is constant then grad ϕ =

a) i + j + k b) i – j – k c) i + j – k d) None of these

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SLR-EP – 27

Seat No.	

S.E.(Civil) (Part – II) (CGPA) Examination, 2016
ENGG. MATHEMATICS – III

Day and Date : Saturday, 26-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of calculator is **allowed**.*

SECTION – I

2. a) Solve $(D^2 - 4D + 13)y = 8\sin 3x$. **3**
   b) Solve $(D^2 - 2D + 1)y = x^2e^{3x}$. **3**
   c) Solve $(x^2D^2 + 3xD + 5)y = x\cos(\log x)$. **4**

   OR

   Solve $[(2 + 3x)^2D^2 + 3(2 + 3x)D - 36]y = 3x^2 + 4x + 1$.

3. a) Solve $(D^2 + 9)y = \sec 3x$. **4**
   b) A light horizontal strut AB is freely pinned at A and B. It is under the action of equal and opposite compressive forces P at its ends and it carries a load W at its centre.

   Then for $0 < x < l/2$, $EI\frac{d^2y}{dx^2} + Py + \frac{1}{2}Wx = 0$. Also $y = 0$ at $x = 0$ and $\frac{dy}{dx} = 0$ at $x = l/2$, Prove that $y = \frac{W}{2P}\left[\frac{\sin nx}{n\cos\left(\frac{nl}{2}\right)} - x\right]$, where $n^2 = \frac{P}{EI}$. **5**

4. Attempt **any three** : **9**
   a) Find $L\left\{e^{-t}\int_0^t \frac{\sin t}{t}dt\right\}$.
   b) Find $L^{-1}\left\{\frac{s+4}{s(s-1)(s^2+4)}\right\}$.
   c) Solve $\frac{d^2y}{dt^2} - 2\frac{dy}{dt} + y = e^t$, $y = 2$ and $\frac{dy}{dt} = -1$ at $t = 0$ by Laplace Transform.
   d) Find $L^{-1}\left\{\frac{1}{s^2\left(s^2+1\right)}\right\}$ by convolution theorem.

Set P

5. a) Solve $q = z^2p(1 - p^2)$ **3**
   b) Solve $yp - x^2q = x^2y$. **3**
   c) Solve $3\frac{\partial z}{\partial x} + 2\frac{\partial z}{\partial y} = 0$, given $z(x, 0) = 4e^{-x}$ by the method of separation of variables. **3**

SECTION – II

6. a) Find the Fourier series of $f(x) = \sqrt{1 - \cos x}$ in $(0, 2\pi)$. Hence deduce that $\frac{1}{2} = \sum_{n=1}^{\infty} \frac{1}{4n^2 - 1}$. **5**

OR

   a) Find Fourier series of $f(x) = \begin{cases} x & -1 < x < 0 \\ x + 2 & 0 < x < 1 \end{cases}$ with period 2. **5**
   b) In a factory a large number of workers have average income of Rs. 120. If 38.3% of them have income between Rs. 100 and Rs. 140 and 528 of them get more than Rs. 170, how many workers were interrogated ? **5**

7. a) Calculate correlation coefficient r for the following data : **5**

x :	63	50	55	65	55	70	64	70	58	68	52	60
y :	87	74	76	90	85	87	92	98	82	91	77	78

   b) Fit a binomial distribution for the following data : **4**

x	:	0	1	2	3	4	5	6
f	:	5	18	28	12	7	6	4

8. a) Find constants a and b so that the surface $ax^2 - byz = (a + 2)x$ will be orthogonal to surface $4x^2y + z^3 = 4$ at the point (1, –1, 2). **3**
   b) Prove that $\bar{F} = (x + 2y + az)i + (bx - 3y - z)j + (4x + cy + 2z)k$ is solenoidal and determine a, b, c if $\bar{F}$ is irrotational. **3**
   c) Show that in the interval (0, 1), $\cos \pi x = \frac{8}{\pi} \sum_{n=1}^{\infty} \frac{n}{4n^2 - 1} \sin 2n\pi x$. **3**

9. a) In what direction from point (2, 1, –1) is the directional derivative of $f = x^2yz^3$ a maximum ? What is magnitude of this maximum ? **3**
   b) Fit a straight line to the following data : **3**

x	:	0	1	2	3	4	5
y	:	1	2	3	4.5	6	7.5

   c) The equations of lines of regression are $x + 2y = 5$ and $2x + 3y = 8$, find $\bar{x}, \bar{y}$ and r. **3**

Set P

SLR-EP – 27

Seat No.	

Set Q

S.E.(Civil) (Part – II) (CGPA) Examination, 2016
ENGG. MATHEMATICS – III

Day and Date : Saturday, 26-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*
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*3) **Use** of calculator is **allowed**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **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

1. Choose the correct option : **(1×14=14)**

1) If $f(x) = -k \quad -\pi < x < 0$

$= k \quad 0 < x < \pi$

then constant term a_0 in Fourier series of f(x) is

a) 0 b) $\frac{2k}{\pi}$ c) $\frac{\pi}{2k}$ d) $\frac{k}{\pi}$

2) If a Poisson distribution is such that P(x = 2) = P(x = 3) then mean and variance of distribution are respectively

a) 2, 3 b) 3, 2 c) 3, 3 d) 2, 2

3) If $\bar{r} = xi + yj + zk$ then curl $\bar{r}$ =

a) 3 b) $\frac{1}{3}$ c) 0 d) Does not exists

4) If y =x +1 and x = 3y – 7 are two lines of regression then r =

a) $\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$ c) $\sqrt{2}$ d) $\frac{1}{\sqrt{2}}$

5) The Fourier series expansion of $f(x) = x^2$ in the interval (–1, 1) has

a) Only cosine terms b) Only constant term
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P.T.O.

6) For a binomial distribution
   a) Mean = variance
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7) If ϕ is constant then grad ϕ =
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8) An Auxiliary equation of an ordinary differential equation gives
   a) Particular integral
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9) The particular integral of $(D^2 + 9)y = \cos 3x$ is
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   a) $y = C_1x^2 + C_2x^3$
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   a) f(xy, y log z) = 0
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SLR-EP – 27

Seat No.	

S.E.(Civil) (Part – II) (CGPA) Examination, 2016
ENGG. MATHEMATICS – III

Day and Date : Saturday, 26-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*
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SECTION – I

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   a) Find $L\left\{e^{-t}\int_0^t \frac{\sin t}{t}dt\right\}$.
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Set Q

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SECTION – II

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   c) Show that in the interval (0, 1), $\cos \pi x = \frac{8}{\pi} \sum_{n=1}^{\infty} \frac{n}{4n^2 - 1} \sin 2n\pi x$. **3**

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   c) The equations of lines of regression are $x + 2y = 5$ and $2x + 3y = 8$, find $\bar{x}, \bar{y}$ and r. **3**

Set Q

SLR-EP – 27

Seat No.	

Set R

S.E.(Civil) (Part – II) (CGPA) Examination, 2016
ENGG. MATHEMATICS – III

Day and Date : Saturday, 26-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct option : **(1×14=14)**

1) $L\{f'(t)\} =$

a) $f(0) + s\bar{f}(s)$ b) $-f(0) + \bar{f}(s)$ c) $-f(0) + s\bar{f}(s)$ d) $s\bar{f}(s)$

2) The solution of p + q = z is
a) f(xy, y log z) = 0 b) f(x + y, y + log z) = 0
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then constant term a_0 in Fourier series of f(x) is

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5) If a Poisson distribution is such that P(x = 2) = P(x = 3) then mean and variance of distribution are respectively
a) 2, 3 b) 3, 2 c) 3, 3 d) 2, 2

P.T.O.

6) If $\bar{r} = xi + yj + zk$ then curl $\bar{r}$ =

a) 3 b) $\frac{1}{3}$ c) 0 d) Does not exists

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Set R

SLR-EP – 27

Seat No.	

S.E.(Civil) (Part – II) (CGPA) Examination, 2016
ENGG. MATHEMATICS – III

Day and Date : Saturday, 26-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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SECTION – I

2. a) Solve $(D^2 - 4D + 13)y = 8\sin 3x$. **3**
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Set R

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SECTION – II

6. a) Find the Fourier series of $f(x) = \sqrt{1 - \cos x}$ in $(0, 2\pi)$. Hence deduce that $\frac{1}{2} = \sum_{n=1}^{\infty} \frac{1}{4n^2 - 1}$. **5**

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Set R

SLR-EP – 27

Seat No.	

Set S

S.E.(Civil) (Part – II) (CGPA) Examination, 2016
ENGG. MATHEMATICS – III

Day and Date : Saturday, 26-11-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Attempt* ***any three*** *questions from* ***each*** *Section.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct option : **(1×14=14)**

1) If $\bar{r} = xi + yj + zk$ then curl $\bar{r}$ =

a) 3 b) $\frac{1}{3}$ c) 0 d) Does not exists

2) If y =x +1 and x = 3y – 7 are two lines of regression then r =

a) $\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$ c) $\sqrt{2}$ d) $\frac{1}{\sqrt{2}}$

3) The Fourier series expansion of $f(x) = x^2$ in the interval (–1, 1) has
a) Only cosine terms b) Only constant term
c) Only sine terms d) None of these

4) For a binomial distribution
a) Mean = variance b) Mean $\leq$ variance
c) Mean > variance d) Mean < variance

5) If ϕ is constant then grad ϕ =
a) i + j + k b) i – j – k c) i + j – k d) None of these

6) An Auxiliary equation of an ordinary differential equation gives
a) Particular integral b) Particular solution
c) Complementary function d) Singular solution

P.T.O.

7) The particular integral of $(D^2+ 9)y = \cos 3x$ is

a) $\frac{x}{3}\cos 3x$ b) $\frac{x}{3}\sin 3x$

c) $\frac{-x}{6}\sin 3x$ d) $\frac{x}{6}\sin 3x$

8) The general solution of $(x^2D^2 - 4xD + 6)y = 0$, is

a) $y = C_1x^2 + C_2x^3$ b) $y = C_1e^{2x} + C_2e^{3x}$

c) $y = C_1e^{-2x} + C_2e^{-2x}$ d) $y = C_1x^{-4} + C_2x^6$

9) $L^{-1}\left\{\frac{1}{s^2+4s+13}\right\} =$

a) $e^{-2t}\cos 3t$ b) $\frac{e^{-2t}\sin 3t}{3}$

c) $\frac{e^{2t}\sin 3t}{3}$ d) $e^{2t}\cos 3t$

10) $L\{f'(t)\} =$

a) $f(0) + s\bar{f}(s)$ b) $-f(0) + \bar{f}(s)$ c) $-f(0) + s\bar{f}(s)$ d) $s\bar{f}(s)$

11) The solution of $p + q = z$ is

a) $f(xy, y \log z) = 0$ b) $f(x + y, y + \log z) = 0$

c) $f(x – y, y – \log z) = 0$ d) none of these

12) The solution of $pq = p + q$ is

a) $z = ax + (a + 1)y + c$ b) $z = (a + 1)x + a(a – 1)y + c$

c) $z(a – 1) = a(a – 1)x + ay + c$ d) $z = (a – 1)x + ay + c$

13) If $f(x) = -k \quad -\pi < x < 0$

$= k \quad 0 < x < \pi$

then constant term a_0 in Fourier series of f(x) is

a) 0 b) $\frac{2k}{\pi}$ c) $\frac{\pi}{2k}$ d) $\frac{k}{\pi}$

14) If a Poisson distribution is such that $P(x = 2) = P(x = 3)$ then mean and variance of distribution are respectively

a) 2, 3 b) 3, 2 c) 3, 3 d) 2, 2

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Seat No.	

S.E.(Civil) (Part – II) (CGPA) Examination, 2016
ENGG. MATHEMATICS – III

Day and Date : Saturday, 26-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of calculator is **allowed**.*

SECTION – I

2. a) Solve $(D^2 - 4D + 13)y = 8\sin 3x$. **3**
   b) Solve $(D^2 - 2D + 1)y = x^2e^{3x}$. **3**
   c) Solve $(x^2D^2 + 3xD + 5)y = x\cos(\log x)$. **4**

   OR

   Solve $[(2 + 3x)^2D^2 + 3(2 + 3x)D - 36]y = 3x^2 + 4x + 1$.

3. a) Solve $(D^2 + 9)y = \sec 3x$. **4**
   b) A light horizontal strut AB is freely pinned at A and B. It is under the action of equal and opposite compressive forces P at its ends and it carries a load W at its centre.

   Then for $0 < x < l/2$, $EI\frac{d^2y}{dx^2} + Py + \frac{1}{2}Wx = 0$. Also $y = 0$ at $x = 0$ and $\frac{dy}{dx} = 0$ at

   $x = l/2$, Prove that $y = \frac{W}{2P}\left[\frac{\sin nx}{n\cos\left(\frac{nl}{2}\right)} - x\right]$, where $n^2 = \frac{P}{EI}$. **5**

4. Attempt **any three** : **9**

   a) Find $L\left\{e^{-t}\int_0^t \frac{\sin t}{t}dt\right\}$.

   b) Find $L^{-1}\left\{\frac{s+4}{s(s-1)(s^2+4)}\right\}$.

   c) Solve $\frac{d^2y}{dt^2} - 2\frac{dy}{dt} + y = e^t$, $y = 2$ and $\frac{dy}{dt} = -1$ at $t = 0$ by Laplace Transform.

   d) Find $L^{-1}\left\{\frac{1}{s^2\left(s^2+1\right)}\right\}$ by convolution theorem.

Set S

5. a) Solve $q = z^2p(1 - p^2)$ **3**
   b) Solve $yp - x^2q = x^2y$. **3**
   c) Solve $3\frac{\partial z}{\partial x} + 2\frac{\partial z}{\partial y} = 0$, given $z(x, 0) = 4e^{-x}$ by the method of separation of variables. **3**

SECTION – II

6. a) Find the Fourier series of $f(x) = \sqrt{1 - \cos x}$ in $(0, 2\pi)$. Hence deduce that $\frac{1}{2} = \sum_{n=1}^{\infty} \frac{1}{4n^2 - 1}$. **5**

OR

   a) Find Fourier series of $f(x) = \begin{cases} x & -1 < x < 0 \\ x + 2 & 0 < x < 1 \end{cases}$ with period 2. **5**
   b) In a factory a large number of workers have average income of Rs. 120. If 38.3% of them have income between Rs. 100 and Rs. 140 and 528 of them get more than Rs. 170, how many workers were interrogated ? **5**

7. a) Calculate correlation coefficient r for the following data : **5**

x :	63	50	55	65	55	70	64	70	58	68	52	60
y :	87	74	76	90	85	87	92	98	82	91	77	78

   b) Fit a binomial distribution for the following data : **4**

x	:	0	1	2	3	4	5	6
f	:	5	18	28	12	7	6	4

8. a) Find constants a and b so that the surface $ax^2 - byz = (a + 2)x$ will be orthogonal to surface $4x^2y + z^3 = 4$ at the point (1, –1, 2). **3**
   b) Prove that $\bar{F} = (x + 2y + az)i + (bx - 3y - z)j + (4x + cy + 2z)k$ is solenoidal and determine a, b, c if $\bar{F}$ is irrotational. **3**
   c) Show that in the interval (0, 1), $\cos \pi x = \frac{8}{\pi} \sum_{n=1}^{\infty} \frac{n}{4n^2 - 1} \sin 2n\pi x$. **3**

9. a) In what direction from point (2, 1, –1) is the directional derivative of $f = x^2yz^3$ a maximum ? What is magnitude of this maximum ? **3**
   b) Fit a straight line to the following data : **3**

x	:	0	1	2	3	4	5
y	:	1	2	3	4.5	6	7.5

   c) The equations of lines of regression are $x + 2y = 5$ and $2x + 3y = 8$, find $\bar{x}, \bar{y}$ and r. **3**

Set S

SLR-EP – 28

Seat No.	

Set P

T.E. Civil Engineering (Part – I) Examination, 2016
(New CGPA)
DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 28-11-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
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 i****ndicates the* ***full*** *marks.*
6) Assume suitable data ***if*** *necessary and mention it* ***clearly*** *before the solution.*
7) Draw the appropriate sketches ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

i) For a welded plate girder, the b/t_f and d/t_w ratios are respectively 6.7 and 91. The section of the plate girder will be classified as
a) plastic b) compact c) semi-compact d) slender

ii) The design wind speed is V. The design wind pressure will be given as
a) $0.4\ V^2$ b) $0.5\ V^2$ c) $0.6\ V^2$ d) $0.8\ V^2$

iii) The collapse load for a propped cantilever of span l subjected to uniformly distributed load is
a) 0.414 Mp/l b) 0.586 Mp/l c) 7.67 Mp/l d) 11.656 Mp/l

iv) Which of the following sections has minimum value of shape factor ?
a) Tube section b) I – section
c) Rectangular section d) Circular section

v) For a point on a simply supported rectangular section beam, the hinge length is span divided by
a) $\sqrt{3}$ b) $\sqrt{3/2}$ c) 3 d) 3/2

P.T.O.

vi) If the same number of bolts has been used in the joints, then which of the following patterns will yield highest efficiency ?
a) Chain b) Staggered
c) Diamond d) Staggered diamond

vii) A single angle tension member welded to the gusset plate is preferred over a bolted one because
a) Welded tension members are easy to fabricate
b) Bolts are weak in tension
c) Eccentricity of the connection can be eliminated by adjusting the weld length
d) Welding is cheaper and economical

viii) A column that can support same load in compression that it can in tension is classified as
a) Short column b) Intermediate column
c) Long column d) Can not be ascertained

ix) The slenderness ratio of lacing flat is limited to
a) 350 b) 145 c) 180 d) 250

x) The best double angle compression member section is
a) Equal angle on same side of gusset
b) Unequal angles with long legs back to back
c) Unequal angles with short legs back to back
d) Equal angles on opposite side of gusset

xi) For same load, unsupported length and end conditions a laced column as compared to battened column
a) Is stronger b) Is weaker
c) Is equally strong d) Can not be compared

xii) Which of the following is a correct match ?
a) purlin – ISLC b) girder – ISHB
c) joist – ISF d) castelled girder – ISA

xiii) In case of an axially loaded column machined for full bearing, the fastenings connecting the column to the base plate in gusseted base are designed for
a) 100% of column load b) 50% of column load
c) 25% of column load d) errection loads only

xiv) 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

SLR-EP – 28

Seat No.	

T.E. Civil Engineering (Part – I) Examination, 2016
(New CGPA)
DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 28-11-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Use of **scientific** non programmable calculator is **allowed**.*
*2) Figures to the **right i**ndicates the **full** marks.*
*3) Assume suitable data **if** necessary and mention it **clearly** before the solution.*
*4) Draw the appropriate sketches **whenever** necessary.*
*5) Solve any **three** questions from **each** Section.*
*6) Use of **IS 800-2007** and **IS 875** are allowed, but not allowed for MCQ (Q. No. **1**).*

SECTION – I

2. A portal frame ABCD hinged at A and fixed at D and subjected to two point loads 2W and 3W acting at midpoint of BC and at B respectively. Take AB = L, BC = 2L and CD = L. Also take the plastic moment capacity of AB = Mp, BC = 2Mp and CD = Mp. Find the collapse load W and draw the bending moment diagram. Also check the value of the bending moment where plastic hinge is not developed. **10**

3. An ISLB 200 is used as a diagonal in a foot bridge truss. Factored axial tensile load is 500 KN. Both flanges are connected to two gusset plates by 16 bolts of 16 mm diameter symmetrically arranged. i.e. 8 bolts per flange. Thus there are four bolts on each side of web per flange. Determine the maximum tension it can carry. f_y= 250 MPa. **9**

4. Design double angle section back to back on each side of gusset 8 mm thick for continuous principal rafter of a truss to carry factored load of 250 KN. Centre to centre length of member between centroids of connection is 2.5 m. **9**

5. Attempt **any three** : **9**

   a) What are the advantages and disadvantages of steel structures ?

   b) Explain complete, partial and over complete collapse.

c) A 18 mm thick plate is joined to 16 mm plate by 200 mm long (effective) butt weld. Determine the strength of the joint.

d) Classify the following sections, where f_y = 250 MPa
   i) ISLB 300 @ 37.7Kg/m
   ii) ISHB 400 @ 77.4 Kg/m
   iii) ISA 100 × 100 × 6 @ 9.2Kg/m.

SECTION – II

6. Design a simply supported beam of span 10 m effective span carrying a total factored load of 60KN/m. The depth of beam should not exceed 500 mm. The compression flange of the beam is laterally supported by floor construction. Assume stiff end bearing is 75 mm. **9**

7. Design the purlin for the following applicable data :
   1) location : Hydrabad
   2) life span : 50
   3) permeability : Normal
   4) spacing = 3.5 m
   5) span of truss = 15 m
   6) central rise = 3 m
   7) height of truss at evas level = 10 m
   8) f_y = 250 MPa
   9) corrugated GI sheets of self weight = 131N/m^2
   10) spaing of purlins limited to 1.4 m **9**

8. Design a built up column comprising two rolled steel I sections to resist factored axial compressive load of 4000 KN. Length of column is 5 m restrained in direction at both ends, restrained in position at base but not in position in z-z direction.

   Use fy250 MPa.

   Also design a suitable single lacing system. **10**

9. A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1700 KN. Design a suitable bolted gusset base. The base rests on M15 grade concrete pedestal. Use 24 mm diameter bolts of grade 4.6 for making the connection. **9**

Set P

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SLR-EP – 28

Seat No.	

Set Q

T.E. Civil Engineering (Part – I) Examination, 2016
(New CGPA)
DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 28-11-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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6) Assume suitable data ***if*** *necessary and mention it* ***clearly*** *before the solution.*
7) Draw the appropriate sketches ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

i) A column that can support same load in compression that it can in tension is classified as
   a) Short column b) Intermediate column
   c) Long column d) Can not be ascertained

ii) The slenderness ratio of lacing flat is limited to
   a) 350 b) 145 c) 180 d) 250

iii) The best double angle compression member section is
   a) Equal angle on same side of gusset
   b) Unequal angles with long legs back to back
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   d) Equal angles on opposite side of gusset

iv) For same load, unsupported length and end conditions a laced column as compared to battened column
   a) Is stronger b) Is weaker
   c) Is equally strong d) Can not be compared

P.T.O.

v) Which of the following is a correct match ?
   a) purlin – ISLC b) girder – ISHB
   c) joist – ISF d) castelled girder – ISA

vi) In case of an axially loaded column machined for full bearing, the fastenings connecting the column to the base plate in gusseted base are designed for
   a) 100% of column load b) 50% of column load
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   a) 0.414 Mp/l b) 0.586 Mp/l c) 7.67 Mp/l d) 11.656 Mp/l

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xii) For a point on a simply supported rectangular section beam, the hinge length is span divided by
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Set Q

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Seat No.	

T.E. Civil Engineering (Part – I) Examination, 2016
(New CGPA)
DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 28-11-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Use of **scientific** non programmable calculator is **allowed**.*
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*4) Draw the appropriate sketches **whenever** necessary.*
*5) Solve any **three** questions from **each** Section.*
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SECTION – I

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3. An ISLB 200 is used as a diagonal in a foot bridge truss. Factored axial tensile load is 500 KN. Both flanges are connected to two gusset plates by 16 bolts of 16 mm diameter symmetrically arranged. i.e. 8 bolts per flange. Thus there are four bolts on each side of web per flange. Determine the maximum tension it can carry. f_y= 250 MPa. **9**

4. Design double angle section back to back on each side of gusset 8 mm thick for continuous principal rafter of a truss to carry factored load of 250 KN. Centre to centre length of member between centroids of connection is 2.5 m. **9**

5. Attempt **any three** : **9**

   a) What are the advantages and disadvantages of steel structures ?

   b) Explain complete, partial and over complete collapse.

c) A 18 mm thick plate is joined to 16 mm plate by 200 mm long (effective) butt weld. Determine the strength of the joint.

d) Classify the following sections, where f_y = 250 MPa
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   5) span of truss = 15 m
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   Use fy250 MPa.

   Also design a suitable single lacing system. **10**

9. A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1700 KN. Design a suitable bolted gusset base. The base rests on M15 grade concrete pedestal. Use 24 mm diameter bolts of grade 4.6 for making the connection. **9**

Set Q

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SLR-EP – 28

Seat No.	

Set R

T.E. Civil Engineering (Part – I) Examination, 2016
(New CGPA)
DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 28-11-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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6) Assume suitable data ***if*** *necessary and mention it* ***clearly*** *before the solution.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

i) For a point on a simply supported rectangular section beam, the hinge length is span divided by

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c) Eccentricity of the connection can be eliminated by adjusting the weld length
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P.T.O.

iv) A column that can support same load in compression that it can in tension is classified as
a) Short column b) Intermediate column
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v) The slenderness ratio of lacing flat is limited to
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xiii) The collapse load for a propped cantilever of span l subjected to uniformly distributed load is
a) 0.414 Mp/l b) 0.586 Mp/l c) 7.67 Mp/l d) 11.656 Mp/l

xiv) Which of the following sections has minimum value of shape factor ?
a) Tube section b) I – section
c) Rectangular section d) Circular section

SLR-EP – 28

Seat No.	

T.E. Civil Engineering (Part – I) Examination, 2016
(New CGPA)
DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 28-11-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Use of **scientific** non programmable calculator is **allowed**.*
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SECTION – I

2. A portal frame ABCD hinged at A and fixed at D and subjected to two point loads 2W and 3W acting at midpoint of BC and at B respectively. Take AB = L, BC = 2L and CD = L. Also take the plastic moment capacity of AB = Mp, BC = 2Mp and CD = Mp. Find the collapse load W and draw the bending moment diagram. Also check the value of the bending moment where plastic hinge is not developed. **10**

3. An ISLB 200 is used as a diagonal in a foot bridge truss. Factored axial tensile load is 500 KN. Both flanges are connected to two gusset plates by 16 bolts of 16 mm diameter symmetrically arranged. i.e. 8 bolts per flange. Thus there are four bolts on each side of web per flange. Determine the maximum tension it can carry. f_y= 250 MPa. **9**

4. Design double angle section back to back on each side of gusset 8 mm thick for continuous principal rafter of a truss to carry factored load of 250 KN. Centre to centre length of member between centroids of connection is 2.5 m. **9**

5. Attempt **any three** : **9**

   a) What are the advantages and disadvantages of steel structures ?

   b) Explain complete, partial and over complete collapse.

c) A 18 mm thick plate is joined to 16 mm plate by 200 mm long (effective) butt weld. Determine the strength of the joint.

d) Classify the following sections, where f_y = 250 MPa
   i) ISLB 300 @ 37.7Kg/m
   ii) ISHB 400 @ 77.4 Kg/m
   iii) ISA 100 × 100 × 6 @ 9.2Kg/m.

SECTION – II

6. Design a simply supported beam of span 10 m effective span carrying a total factored load of 60KN/m. The depth of beam should not exceed 500 mm. The compression flange of the beam is laterally supported by floor construction. Assume stiff end bearing is 75 mm. **9**

7. Design the purlin for the following applicable data :
   1) location : Hydrabad
   2) life span : 50
   3) permeability : Normal
   4) spacing = 3.5 m
   5) span of truss = 15 m
   6) central rise = 3 m
   7) height of truss at evas level = 10 m
   8) f_y = 250 MPa
   9) corrugated GI sheets of self weight = 131N/m^2
   10) spaing of purlins limited to 1.4 m **9**

8. Design a built up column comprising two rolled steel I sections to resist factored axial compressive load of 4000 KN. Length of column is 5 m restrained in direction at both ends, restrained in position at base but not in position in z-z direction.

   Use fy250 MPa.

   Also design a suitable single lacing system. **10**

9. A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1700 KN. Design a suitable bolted gusset base. The base rests on M15 grade concrete pedestal. Use 24 mm diameter bolts of grade 4.6 for making the connection. **9**

Set R

SLR-EP – 28

Seat No.	

Set S

T.E. Civil Engineering (Part – I) Examination, 2016
(New CGPA)
DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 28-11-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
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 i****ndicates the* ***full*** *marks.*
6) Assume suitable data ***if*** *necessary and mention it* ***clearly*** *before the solution.*
7) Draw the appropriate sketches ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

i) The best double angle compression member section is
   a) Equal angle on same side of gusset
   b) Unequal angles with long legs back to back
   c) Unequal angles with short legs back to back
   d) Equal angles on opposite side of gusset

ii) For same load, unsupported length and end conditions a laced column as compared to battened column
   a) Is stronger b) Is weaker
   c) Is equally strong d) Can not be compared

iii) Which of the following is a correct match ?
   a) purlin – ISLC b) girder – ISHB
   c) joist – ISF d) castelled girder – ISA

iv) In case of an axially loaded column machined for full bearing, the fastenings connecting the column to the base plate in gusseted base are designed for
   a) 100% of column load b) 50% of column load
   c) 25% of column load d) errection loads only

P.T.O.

v) 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

vi) For a welded plate girder, the b/t_f and d/t_w ratios are respectively 6.7 and 91. The section of the plate girder will be classified as
   a) plastic b) compact c) semi-compact d) slender

vii) The design wind speed is V. The design wind pressure will be given as
   a) $0.4\ V^2$ b) $0.5\ V^2$ c) $0.6\ V^2$ d) $0.8\ V^2$

viii) The collapse load for a propped cantilever of span l subjected to uniformly distributed load is
   a) 0.414 Mp/l b) 0.586 Mp/l c) 7.67 Mp/l d) 11.656 Mp/l

ix) Which of the following sections has minimum value of shape factor ?
   a) Tube section b) I – section
   c) Rectangular section d) Circular section

x) For a point on a simply supported rectangular section beam, the hinge length is span divided by
   a) $\sqrt{3}$ b) $\sqrt{3/2}$ c) 3 d) 3/2

xi) If the same number of bolts has been used in the joints, then which of the following patterns will yield highest efficiency ?
   a) Chain b) Staggered
   c) Diamond d) Staggered diamond

xii) A single angle tension member welded to the gusset plate is preferred over a bolted one because
   a) Welded tension members are easy to fabricate
   b) Bolts are weak in tension
   c) Eccentricity of the connection can be eliminated by adjusting the weld length
   d) Welding is cheaper and economical

xiii) A column that can support same load in compression that it can in tension is classified as
   a) Short column b) Intermediate column
   c) Long column d) Can not be ascertained

xiv) The slenderness ratio of lacing flat is limited to
   a) 350 b) 145 c) 180 d) 250

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Seat No.	

T.E. Civil Engineering (Part – I) Examination, 2016
(New CGPA)
DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 28-11-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Use of **scientific** non programmable calculator is **allowed**.*
*2) Figures to the **right i**ndicates the **full** marks.*
*3) Assume suitable data **if** necessary and mention it **clearly** before the solution.*
*4) Draw the appropriate sketches **whenever** necessary.*
*5) Solve any **three** questions from **each** Section.*
*6) Use of **IS 800-2007** and **IS 875** are allowed, but not allowed for MCQ (Q. No. **1**).*

SECTION – I

2. A portal frame ABCD hinged at A and fixed at D and subjected to two point loads 2W and 3W acting at midpoint of BC and at B respectively. Take AB = L, BC = 2L and CD = L. Also take the plastic moment capacity of AB = Mp, BC = 2Mp and CD = Mp. Find the collapse load W and draw the bending moment diagram. Also check the value of the bending moment where plastic hinge is not developed. **10**

3. An ISLB 200 is used as a diagonal in a foot bridge truss. Factored axial tensile load is 500 KN. Both flanges are connected to two gusset plates by 16 bolts of 16 mm diameter symmetrically arranged. i.e. 8 bolts per flange. Thus there are four bolts on each side of web per flange. Determine the maximum tension it can carry. f_y= 250 MPa. **9**

4. Design double angle section back to back on each side of gusset 8 mm thick for continuous principal rafter of a truss to carry factored load of 250 KN. Centre to centre length of member between centroids of connection is 2.5 m. **9**

5. Attempt **any three** : **9**

   a) What are the advantages and disadvantages of steel structures ?

   b) Explain complete, partial and over complete collapse.

c) A 18 mm thick plate is joined to 16 mm plate by 200 mm long (effective) butt weld. Determine the strength of the joint.

d) Classify the following sections, where f_y = 250 MPa
   i) ISLB 300 @ 37.7Kg/m
   ii) ISHB 400 @ 77.4 Kg/m
   iii) ISA 100 × 100 × 6 @ 9.2Kg/m.

SECTION – II

6. Design a simply supported beam of span 10 m effective span carrying a total factored load of 60KN/m. The depth of beam should not exceed 500 mm. The compression flange of the beam is laterally supported by floor construction. Assume stiff end bearing is 75 mm. **9**

7. Design the purlin for the following applicable data :
   1) location : Hydrabad
   2) life span : 50
   3) permeability : Normal
   4) spacing = 3.5 m
   5) span of truss = 15 m
   6) central rise = 3 m
   7) height of truss at evas level = 10 m
   8) f_y = 250 MPa
   9) corrugated GI sheets of self weight = 131N/m^2
   10) spaing of purlins limited to 1.4 m **9**

8. Design a built up column comprising two rolled steel I sections to resist factored axial compressive load of 4000 KN. Length of column is 5 m restrained in direction at both ends, restrained in position at base but not in position in z-z direction.

   Use fy250 MPa.

   Also design a suitable single lacing system. **10**

9. A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1700 KN. Design a suitable bolted gusset base. The base rests on M15 grade concrete pedestal. Use 24 mm diameter bolts of grade 4.6 for making the connection. **9**

Set S

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SLR-EP– 29

Seat No.	

Set **P**

T.E. (Civil) (Part – I) Examination, 2016
GEOTECHNICAL ENGINEERING – I (New - CGPA)

Day and Date : Wednesday, 30-11-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Assume additional data, **if** required and state it **clearly**.*
*3) Figures to the **right** indicate **full** marks.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **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

1. Choose the correct alterntives : **(14×1=14)**

1) The soil having particles of variety of sizes is said to be
   a) Well graded b) Uniformly graded
   c) Poorly graded d) Gap graded

2) The critical exit gradient for the seepage of water out of a soil is
   a) $\frac{G-1}{1-e'}$ b) $\frac{G-1}{1+e'}$ c) $\frac{G+1}{1-e'}$ d) $\frac{G+1}{1+e'}$

3) The toughness index of clayee soil is given by
   a) Plasticity index/flow index b) Liquid limit/plastic limit
   c) Liquidity index/plastic limit d) Plastic limit/ liquidity index

4) An unconfined compression test is good for
   a) Granular soils b) Saturated cohesive soils
   c) Both granular and cohesive soils d) None of these

5) In a given soil sample, degree of saturation is 90%, G = 2.7, Voids ratio is 0.3. The water content of sample is
   a) 10 % b) 13.5 % c) 22.5 % d) 35 %

6) Vane tester is normally used for determining in-situ shear strength of
   a) Soft clays b) Sand c) Stiff clays d) Gravel

P.T.O.

7) The shear test in which soil samples are allowed to soften under applied pressure and then sheared under conditions of no drainage is known as
   a) a CD test
   b) a CU test
   c) a UU test
   d) none of these

8) Sheep foot rollers are preferred for
   a) Cohesionless soils
   b) Cohesive soils
   c) All types of soils
   d) None of the above

9) Measurement of water content in the field during compaction can be calculated by
   a) Calcium Carbide method
   b) Alcohol method
   c) Proctor Needle method
   d) Any/all of the methods

10) Which of the coefficient of earth pressure is more in magnitude ?
   a) Active
   b) Passive
   c) At rest
   d) None

11) If the coefficient of volume change and coefficient of permeability of a soil mass are 2.91×10^{-4} m^2/kN and 3.5×10^{-5} m/s respectively, then the coefficient of consolidation will be
   a) $9.82 \times 10^{-4}\ m^2/s$
   b) $12.26 \times 10^{-3}\ m^2/s$
   c) $11.91 \times 10^{-3}\ m^2/s$
   d) $3.62 \times 10^{-3}\ m^2/s$

12) The depth of the unsupported cut in cohesive soil $(\varphi = 0)$ is with unit weight of 20 kN/m^3 and cohesion of 20 kN/m^2 is
   a) 2 m
   b) 3 m
   c) 4 m
   d) 0 m

13) A rigid retaining wall 5 m high supports a backfill of cohesionless soil with $\phi = 30°$, what will be the coefficient of active earth pressure ?
   a) 1/3
   b) 3
   c) 1/2
   d) 2

14) When a retaining wall moves away from the backfill, the pressure exerted on the wall is termed as
   a) Passive earth pressure
   b) Swelling pressure
   c) Pore pressure
   d) Active earth pressure

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SLR-EP– 29

Seat No.	

T.E. (Civil) (Part – I) Examination, 2016
GEOTECHNICAL ENGINEERING – I (New - CGPA)

Day and Date : Wednesday, 30-11-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) Assume additional data, ***if*** *required and state it* ***clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. A) The following are the test results of soil sample, passing 4.75 mm sieve – 64%, passing 75 micron sieve – 6%, coefficient of uniformity – 7, coefficient of curvature – 3, Plasticity Index – 3, Classify the soil. **5**
   B) List the various methods of determination of water content. Explain the oven drying method in detail. **4**

3. A) With a neat labeled sketch, explain characteristics of flownet. **4**
   B) For a homogeneous Earth dam 25 m high and 2 m free board, a flow net was constructed with four flow channels. The no. of potential drops are 20. The dam has a horizontal filter at the base near the toe. The coefficient of permeability of the soil is 7×10^{-2} mm/sec. Determine the anticipated seepage, if the length of the dam is 200 metres. **5**

4. A) With the help of neat sketch derive the equation of 'K' for constant head permeability test. **4**
   B) Write a detail note on Boussinesq's equation for stress under the concentrated load. **5**

5. A) Derive the equation for the inclination of failure plane. **5**
   B) The following results were obtained from a direct shear test on a sandy clay sample.

Normal load (N)	Shear load proving ring reading (Division)
360	13
720	19
1080	26
1440	26

If the box is 60 mm × 60 mm square and the proving ring constant is 25 N per division. Estimate the shear strength parameters of the soil. **5**

SECTION – II

6. Write short notes on : **(2½×4=10)**
   a) Field compaction methods.
   b) e – p curve.
   c) Assumptions in Rankine's earth pressure theory.
   d) Factor affecting compaction.

7. A) A clay layer whose settlement under a given loading is expected to be 10 cm, settles by 2.4 cm at the end of one month after the application of the load increment. How many months will be required to reach a settlement of 5.2 cm ? Assume the layer to have double drainage. **6**
   B) What is meant by normally consolidated and over consolidated soils ? **3**

8. A) A rigid retaining wall 7 m high has a saturated backfill of soft clay soil.
   The properties are $\gamma_{sat} = 17.8\ kN/m^3$ and cohesion of $C_u = 18\ kN/m^2$. Determine
   a) Depth of tension crack in the soil,
   b) Total active earth force and its point of application. **6**
   B) State coefficient of active earth pressure. Derive the expression. **3**

9. A) A standard proctor compaction test was conducted on a soil whose G = 2.85 and the following results were obtained :

Bulk unit wt., kN/m^3	18	19	19.6	20.45	21	20.5	20.1
Water content, %	9.6	11	12.5	14	16	18	19.5

   i) Draw the compaction curve and obtain the values of MDD and OMC.
   ii) Draw the zero air voids line
   Show the specimen calculations for the above **6**
   B) State the assumptions in Terzaghi's 1D consolidation theory. **3**

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SLR-EP– 29

Seat No.	

Set Q

T.E. (Civil) (Part – I) Examination, 2016
GEOTECHNICAL ENGINEERING – I (New - CGPA)

Day and Date : Wednesday, 30-11-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Assume additional data, **if** required and state it **clearly**.*
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*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **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

1. Choose the correct alterntives : **(14×1=14)**

1) Sheep foot rollers are preferred for
   a) Cohesionless soils b) Cohesive soils
   c) All types of soils d) None of the above

2) Measurement of water content in the field during compaction can be calculated by
   a) Calcium Carbide method b) Alcohol method
   c) Proctor Needle method d) Any/all of the methods

3) Which of the coefficient of earth pressure is more in magnitude ?
   a) Active b) Passive
   c) At rest d) None

4) If the coefficient of volume change and coefficient of permeability of a soil mass are 2.91×10^{-4} m^2/kN and 3.5×10^{-5} m/s respectively, then the coefficient of consolidation will be
   a) $9.82 \times 10^{-4}\ m^2/s$ b) $12.26 \times 10^{-3}\ m^2/s$
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5) The depth of the unsupported cut in cohesive soil $(\varphi = 0)$ is with unit weight of 20 kN/m^3 and cohesion of 20 kN/m^2 is
   a) 2 m b) 3 m
   c) 4 m d) 0 m

P.T.O.

6) A rigid retaining wall 5 m high supports a backfill of cohesionless soil with $\phi = 30°$, what will be the coefficient of active earth pressure ?
   a) 1/3 b) 3
   c) 1/2 d) 2

7) When a retaining wall moves away from the backfill, the pressure exerted on the wall is termed as
   a) Passive earth pressure b) Swelling pressure
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8) The soil having particles of variety of sizes is said to be
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9) The critical exit gradient for the seepage of water out of a soil is
   a) $\frac{G-1}{1-e'}$ b) $\frac{G-1}{1+e'}$ c) $\frac{G+1}{1-e'}$ d) $\frac{G+1}{1+e'}$

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12) In a given soil sample, degree of saturation is 90%, G = 2.7, Voids ratio is 0.3. The water content of sample is
   a) 10 % b) 13.5 % c) 22.5 % d) 35 %

13) Vane tester is normally used for determining in-situ shear strength of
   a) Soft clays b) Sand c) Stiff clays d) Gravel

14) The shear test in which soil samples are allowed to soften under applied pressure and then sheared under conditions of no drainage is known as
   a) a CD test b) a CU test
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SLR-EP– 29

Seat No.	

T.E. (Civil) (Part – I) Examination, 2016
GEOTECHNICAL ENGINEERING – I (New - CGPA)

Day and Date : Wednesday, 30-11-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) Assume additional data, ***if*** *required and state it* ***clearly****.*
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SECTION – I

2. A) The following are the test results of soil sample, passing 4.75 mm sieve – 64%, passing 75 micron sieve – 6%, coefficient of uniformity – 7, coefficient of curvature – 3, Plasticity Index – 3, Classify the soil. **5**
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4. A) With the help of neat sketch derive the equation of 'K' for constant head permeability test. **4**
   B) Write a detail note on Boussinesq's equation for stress under the concentrated load. **5**

5. A) Derive the equation for the inclination of failure plane. **5**
   B) The following results were obtained from a direct shear test on a sandy clay sample.

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SECTION – II

6. Write short notes on : **(2½×4=10)**
   a) Field compaction methods.
   b) e – p curve.
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   B) What is meant by normally consolidated and over consolidated soils ? **3**

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9. A) A standard proctor compaction test was conducted on a soil whose G = 2.85 and the following results were obtained :

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Water content, %	9.6	11	12.5	14	16	18	19.5

   i) Draw the compaction curve and obtain the values of MDD and OMC.
   ii) Draw the zero air voids line
   Show the specimen calculations for the above **6**
   B) State the assumptions in Terzaghi's 1D consolidation theory. **3**

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Seat No.	

Set **R**

T.E. (Civil) (Part – I) Examination, 2016
GEOTECHNICAL ENGINEERING – I (New - CGPA)

Day and Date : Wednesday, 30-11-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
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*3) Figures to the **right** indicate **full** marks.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alterntives : **(14×1=14)**

1) In a given soil sample, degree of saturation is 90%, G = 2.7, Voids ratio is 0.3. The water content of sample is
   a) 10 % b) 13.5 % c) 22.5 % d) 35 %

2) Vane tester is normally used for determining in-situ shear strength of
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3) The shear test in which soil samples are allowed to soften under applied pressure and then sheared under conditions of no drainage is known as
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4) Sheep foot rollers are preferred for
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5) Measurement of water content in the field during compaction can be calculated by
   a) Calcium Carbide method b) Alcohol method
   c) Proctor Needle method d) Any/all of the methods

6) Which of the coefficient of earth pressure is more in magnitude ?
   a) Active b) Passive
   c) At rest d) None

P.T.O.

7) If the coefficient of volume change and coefficient of permeability of a soil mass are 2.91×10^{-4} m^2/kN and 3.5×10^{-5} m/s respectively, then the coefficient of consolidation will be

a) $9.82 \times 10^{-4}\ m^2/s$ b) $12.26 \times 10^{-3}\ m^2/s$

c) $11.91 \times 10^{-3}\ m^2/s$ d) $3.62 \times 10^{-3}\ m^2/s$

8) The depth of the unsupported cut in cohesive soil $(\varphi = 0)$ is with unit weight of 20 kN/m^3 and cohesion of 20 kN/m^2 is

a) 2 m b) 3 m

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9) A rigid retaining wall 5 m high supports a backfill of cohesionless soil with $\phi = 30°$, what will be the coefficient of active earth pressure ?

a) 1/3 b) 3

c) 1/2 d) 2

10) When a retaining wall moves away from the backfill, the pressure exerted on the wall is termed as

a) Passive earth pressure b) Swelling pressure

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11) The soil having particles of variety of sizes is said to be

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c) Poorly graded d) Gap graded

12) The critical exit gradient for the seepage of water out of a soil is

a) $\frac{G-1}{1-e'}$ b) $\frac{G-1}{1+e'}$ c) $\frac{G+1}{1-e'}$ d) $\frac{G+1}{1+e'}$

13) The toughness index of clayee soil is given by

a) Plasticity index/flow index b) Liquid limit/plastic limit

c) Liquidity index/plastic limit d) Plastic limit/ liquidity index

14) An unconfined compression test is good for

a) Granular soils b) Saturated cohesive soils

c) Both granular and cohesive soils d) None of these

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SLR-EP– 29

Seat No.	

T.E. (Civil) (Part – I) Examination, 2016
GEOTECHNICAL ENGINEERING – I (New - CGPA)

Day and Date : Wednesday, 30-11-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) Assume additional data, ***if*** *required and state it* ***clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. A) The following are the test results of soil sample, passing 4.75 mm sieve – 64%, passing 75 micron sieve – 6%, coefficient of uniformity – 7, coefficient of curvature – 3, Plasticity Index – 3, Classify the soil. **5**
   B) List the various methods of determination of water content. Explain the oven drying method in detail. **4**

3. A) With a neat labeled sketch, explain characteristics of flownet. **4**
   B) For a homogeneous Earth dam 25 m high and 2 m free board, a flow net was constructed with four flow channels. The no. of potential drops are 20. The dam has a horizontal filter at the base near the toe. The coefficient of permeability of the soil is 7×10^{-2} mm/sec. Determine the anticipated seepage, if the length of the dam is 200 metres. **5**

4. A) With the help of neat sketch derive the equation of 'K' for constant head permeability test. **4**
   B) Write a detail note on Boussinesq's equation for stress under the concentrated load. **5**

5. A) Derive the equation for the inclination of failure plane. **5**
   B) The following results were obtained from a direct shear test on a sandy clay sample.

Normal load (N)	Shear load proving ring reading (Division)
360	13
720	19
1080	26
1440	26

If the box is 60 mm × 60 mm square and the proving ring constant is 25 N per division. Estimate the shear strength parameters of the soil. **5**

SECTION – II

6. Write short notes on : **(2½×4=10)**
   a) Field compaction methods.
   b) e – p curve.
   c) Assumptions in Rankine's earth pressure theory.
   d) Factor affecting compaction.

7. A) A clay layer whose settlement under a given loading is expected to be 10 cm, settles by 2.4 cm at the end of one month after the application of the load increment. How many months will be required to reach a settlement of 5.2 cm ? Assume the layer to have double drainage. **6**
   B) What is meant by normally consolidated and over consolidated soils ? **3**

8. A) A rigid retaining wall 7 m high has a saturated backfill of soft clay soil.
   The properties are $\gamma_{sat} = 17.8\ kN/m^3$ and cohesion of $C_u = 18\ kN/m^2$. Determine
   a) Depth of tension crack in the soil,
   b) Total active earth force and its point of application. **6**
   B) State coefficient of active earth pressure. Derive the expression. **3**

9. A) A standard proctor compaction test was conducted on a soil whose G = 2.85 and the following results were obtained :

Bulk unit wt., kN/m^3	18	19	19.6	20.45	21	20.5	20.1
Water content, %	9.6	11	12.5	14	16	18	19.5

   i) Draw the compaction curve and obtain the values of MDD and OMC.
   ii) Draw the zero air voids line
   Show the specimen calculations for the above **6**
   B) State the assumptions in Terzaghi's 1D consolidation theory. **3**

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SLR-EP– 29

Seat No.	

Set S

T.E. (Civil) (Part – I) Examination, 2016
GEOTECHNICAL ENGINEERING – I (New - CGPA)

Day and Date : Wednesday, 30-11-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Assume additional data, **if** required and state it **clearly**.*
*3) Figures to the **right** indicate **full** marks.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **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

1. Choose the correct alterntives : **(14×1=14)**

1) Which of the coefficient of earth pressure is more in magnitude ?
   a) Active b) Passive
   c) At rest d) None

2) If the coefficient of volume change and coefficient of permeability of a soil mass are 2.91×10^{-4} m^2/kN and 3.5×10^{-5} m/s respectively, then the coefficient of consolidation will be
   a) $9.82 \times 10^{-4}\ m^2/s$ b) $12.26 \times 10^{-3}\ m^2/s$
   c) $11.91 \times 10^{-3}\ m^2/s$ d) $3.62 \times 10^{-3}\ m^2/s$

3) The depth of the unsupported cut in cohesive soil $(\varphi = 0)$ is with unit weight of 20 kN/m^3 and cohesion of 20 kN/m^2 is
   a) 2 m b) 3 m
   c) 4 m d) 0 m

4) A rigid retaining wall 5 m high supports a backfill of cohesionless soil with $\phi = 30°$, what will be the coefficient of active earth pressure ?
   a) 1/3 b) 3
   c) 1/2 d) 2

P.T.O.

5) When a retaining wall moves away from the backfill, the pressure exerted on the wall is termed as
   a) Passive earth pressure b) Swelling pressure
   c) Pore pressure d) Active earth pressure

6) The soil having particles of variety of sizes is said to be
   a) Well graded b) Uniformly graded
   c) Poorly graded d) Gap graded

7) The critical exit gradient for the seepage of water out of a soil is
   a) $\frac{G-1}{1-e'}$ b) $\frac{G-1}{1+e'}$ c) $\frac{G+1}{1-e'}$ d) $\frac{G+1}{1+e'}$

8) The toughness index of clayee soil is given by
   a) Plasticity index/flow index b) Liquid limit/plastic limit
   c) Liquidity index/plastic limit d) Plastic limit/ liquidity index

9) An unconfined compression test is good for
   a) Granular soils b) Saturated cohesive soils
   c) Both granular and cohesive soils d) None of these

10) In a given soil sample, degree of saturation is 90%, G = 2.7, Voids ratio is 0.3. The water content of sample is
   a) 10 % b) 13.5 % c) 22.5 % d) 35 %

11) Vane tester is normally used for determining in-situ shear strength of
   a) Soft clays b) Sand c) Stiff clays d) Gravel

12) The shear test in which soil samples are allowed to soften under applied pressure and then sheared under conditions of no drainage is known as
   a) a CD test b) a CU test
   c) a UU test d) none of these

13) Sheep foot rollers are preferred for
   a) Cohesionless soils b) Cohesive soils
   c) All types of soils d) None of the above

14) Measurement of water content in the field during compaction can be calculated by
   a) Calcium Carbide method b) Alcohol method
   c) Proctor Needle method d) Any/all of the methods

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SLR-EP– 29

Seat No.	

T.E. (Civil) (Part – I) Examination, 2016
GEOTECHNICAL ENGINEERING – I (New - CGPA)

Day and Date : Wednesday, 30-11-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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SECTION – I

2. A) The following are the test results of soil sample, passing 4.75 mm sieve – 64%, passing 75 micron sieve – 6%, coefficient of uniformity – 7, coefficient of curvature – 3, Plasticity Index – 3, Classify the soil. **5**
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3. A) With a neat labeled sketch, explain characteristics of flownet. **4**
   B) For a homogeneous Earth dam 25 m high and 2 m free board, a flow net was constructed with four flow channels. The no. of potential drops are 20. The dam has a horizontal filter at the base near the toe. The coefficient of permeability of the soil is 7×10^{-2} mm/sec. Determine the anticipated seepage, if the length of the dam is 200 metres. **5**

4. A) With the help of neat sketch derive the equation of 'K' for constant head permeability test. **4**
   B) Write a detail note on Boussinesq's equation for stress under the concentrated load. **5**

5. A) Derive the equation for the inclination of failure plane. **5**
   B) The following results were obtained from a direct shear test on a sandy clay sample.

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360	13
720	19
1080	26
1440	26

If the box is 60 mm × 60 mm square and the proving ring constant is 25 N per division. Estimate the shear strength parameters of the soil. **5**

Set S

SECTION – II

6. Write short notes on : **(2½×4=10)**
   a) Field compaction methods.
   b) e – p curve.
   c) Assumptions in Rankine's earth pressure theory.
   d) Factor affecting compaction.

7. A) A clay layer whose settlement under a given loading is expected to be 10 cm, settles by 2.4 cm at the end of one month after the application of the load increment. How many months will be required to reach a settlement of 5.2 cm ? Assume the layer to have double drainage. **6**
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9. A) A standard proctor compaction test was conducted on a soil whose G = 2.85 and the following results were obtained :

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Water content, %	9.6	11	12.5	14	16	18	19.5

   i) Draw the compaction curve and obtain the values of MDD and OMC.
   ii) Draw the zero air voids line
   Show the specimen calculations for the above **6**
   B) State the assumptions in Terzaghi's 1D consolidation theory. **3**

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SLR-EP – 30

Seat No.	

Set P

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
BUILDING PLANNING AND DESIGN

Day and Date : Friday, 2-12-2016 Total Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **Use** both sides of **full** imperial drawing sheet for Section – **I**.*
*4) Figures on **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever needed** and **mention it.***
*6) **Use** answer book for Section – **II**.*
*7) Retain **all** projection/construction lines on drawing sheet.*
*8) **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

1. Choose the correct alternative : **14**

A) State whether following statement are **true** or **false (One mark each)** : **7**

1) Gross area in sq. m. per student of primary school with furniture is 1.11 sq. m.
2) Ramp with a slope not more than 1 in 10 or 1 in 12 should be provided for school building.
3) The general size of black board is 2.4 m × 1.2 m.
4) The minimum width of stair flight in public building should be 1.5 m.
5) In post office number of WC according to rule and regulation should be 1 per 25 for male 1 per 15 for female.
6) In two point's perspective, only one side of object is true dimension in perspective view.
7) The slope for floor of auditorium/cinema theatre may be with an inclination of 8° 10 15° from front side.

P.T.O.

B) Fill in the blanks **(One mark each)** : **7**

1) The flight width for a stair in school building should not be less than _____ m.
2) The length of the classroom should not be more than _____ m, for effective teaching.
3) The desirable aspect of the classroom is _____
4) Max. no. of classroom to be provided in a row is _____
5) The desirable no. of storey's for a school building is _____
6) The minimum clearance between two adjoining desks arranged side by side is _____ mm.
7) The distance between the first row of benches and the black board should not be less than _____ m.

_____

SLR-EP – 30

Seat No.	

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
BUILDING PLANNING AND DESIGN

Day and Date : Friday, 2-12-2016 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Use** both sides of **full** imperial drawing sheet for Section – **I**.*
*3) Figures on **right** indicate **full** marks.*
*4) **Assume** suitable data **wherever needed** and **mention it.***
*5**) Use** answer book for Section – **II**.*
*6) Retain **all** projection/construction lines on drawing sheet.*

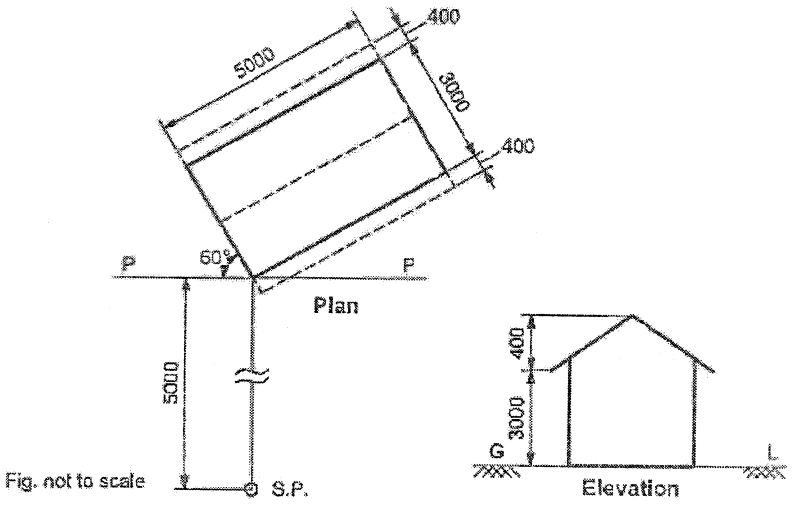
SECTION – I

2. It is proposed to construct a PWD Executive Engineers office with the following data :

1) Entrance and waiting
2) Head clerk cabin
3) Administrative office
4) Executive Engineers office (with attached toilet of suitable size)
5) Cabin for personal assistant of Executive Engineers
6) Technical assistant cabin
7) Drawing, printing and xeroxing room
8) Record keeping room
9) Common ladies room (with attached toilet of suitable size)
10) All passages of 1.5 m. wide
11) Provide suitable sanitary units for gents.

The building is R.C.C. framed structure. Assume additional data if required and mention it clearly. Draw a detailed plan indicating furniture layout also (scale 1 : 50). **20**

3. Following sketch shows a plan elevation of a structure. Draw to scale 1 : 50 two point perspective of the same. Retain all construction lines. (All dimensions are in mm.) : **8**



SECTION – II

4. Attempt **any four** of the following : **(4×7=28)**

   1) Enlist the general principles and factors in acoustical design and describe any three of them.

   2) Write a note on : Rain Water Harvesting and Landscaping for Public buildings.

   3) Explain important signification of a Green Building and its scope with respect to public buildings.

   4) Explain the architectural compositions for public building planning.

   5) Explain the importance of AUTOCAD work and describe any four commands of CAD.

   6) Enlist different types of fire extinguishing equipments used in public building and explain in brief any three types of it.

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SLR-EP – 30

Seat No.	

Set Q

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
BUILDING PLANNING AND DESIGN

Day and Date : Friday, 2-12-2016 Total Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **Use** both sides of **full** imperial drawing sheet for Section – **I**.*
*4) Figures on **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever needed** and **mention it.***
*6) **Use** answer book for Section – **II**.*
*7) Retain **all** projection/construction lines on drawing sheet.*
*8) **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

1. Choose the correct alternative : **14**

A) State whether following statement are **true** or **false (One mark each)** : **7**

1) The general size of black board is 2.4 m × 1.2 m.
2) The minimum width of stair flight in public building should be 1.5 m.
3) In post office number of WC according to rule and regulation should be 1 per 25 for male 1 per 15 for female.
4) In two point's perspective, only one side of object is true dimension in perspective view.
5) The slope for floor of auditorium/cinema theatre may be with an inclination of 8° 10 15° from front side.
6) Gross area in sq. m. per student of primary school with furniture is 1.11 sq. m.
7) Ramp with a slope not more than 1 in 10 or 1 in 12 should be provided for school building.

B) Fill in the blanks **(One mark each)** : **7**

1) The desirable aspect of the classroom is _____
2) Max. no. of classroom to be provided in a row is _____
3) The desirable no. of storey's for a school building is _____
4) The minimum clearance between two adjoining desks arranged side by side is _____ mm.
5) The distance between the first row of benches and the black board should not be less than _____ m.
6) The flight width for a stair in school building should not be less than _____ m.
7) The length of the classroom should not be more than _____ m, for effective teaching.

_____

SLR-EP – 30

Seat No.	

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
BUILDING PLANNING AND DESIGN

Day and Date : Friday, 2-12-2016 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Use** both sides of **full** imperial drawing sheet for Section – **I**.*
*3) Figures on **right** indicate **full** marks.*
*4) **Assume** suitable data **wherever needed** and **mention it.***
*5**) Use** answer book for Section – **II**.*
*6) Retain **all** projection/construction lines on drawing sheet.*

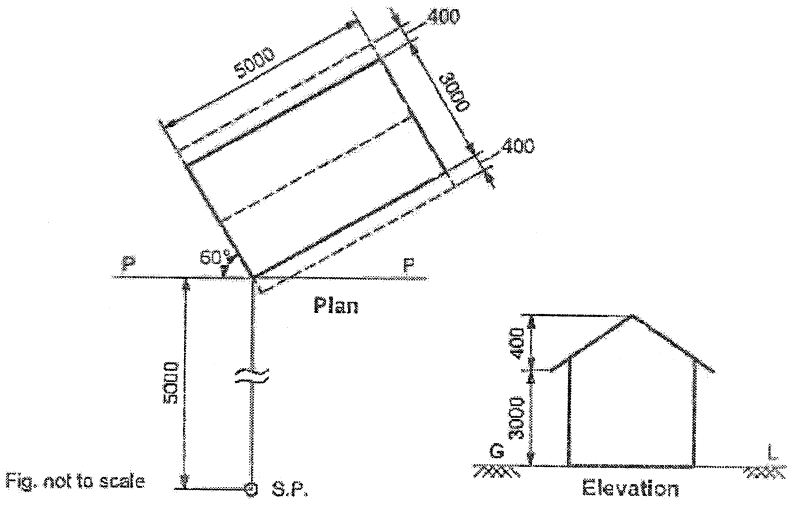
SECTION – I

2. It is proposed to construct a PWD Executive Engineers office with the following data :

1) Entrance and waiting
2) Head clerk cabin
3) Administrative office
4) Executive Engineers office (with attached toilet of suitable size)
5) Cabin for personal assistant of Executive Engineers
6) Technical assistant cabin
7) Drawing, printing and xeroxing room
8) Record keeping room
9) Common ladies room (with attached toilet of suitable size)
10) All passages of 1.5 m. wide
11) Provide suitable sanitary units for gents.

The building is R.C.C. framed structure. Assume additional data if required and mention it clearly. Draw a detailed plan indicating furniture layout also (scale 1 : 50). **20**

3. Following sketch shows a plan elevation of a structure. Draw to scale 1 : 50 two point perspective of the same. Retain all construction lines. (All dimensions are in mm.) : **8**



SECTION – II

4. Attempt **any four** of the following : **(4×7=28)**
   1) Enlist the general principles and factors in acoustical design and describe any three of them.
   2) Write a note on : Rain Water Harvesting and Landscaping for Public buildings.
   3) Explain important signification of a Green Building and its scope with respect to public buildings.
   4) Explain the architectural compositions for public building planning.
   5) Explain the importance of AUTOCAD work and describe any four commands of CAD.
   6) Enlist different types of fire extinguishing equipments used in public building and explain in brief any three types of it.

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SLR-EP – 30

Seat No.	

Set R

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
BUILDING PLANNING AND DESIGN

Day and Date : Friday, 2-12-2016 Total Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **Use** both sides of **full** imperial drawing sheet for Section – **I**.*
*4) Figures on **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever needed** and **mention it.***
*6) **Use** answer book for Section – **II**.*
*7) Retain **all** projection/construction lines on drawing sheet.*
*8) **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

1. Choose the correct alternative : **14**

A) State whether following statement are **true** or **false (One mark each)** : **7**

1) In post office number of WC according to rule and regulation should be 1 per 25 for male 1 per 15 for female.
2) In two point's perspective, only one side of object is true dimension in perspective view.
3) The slope for floor of auditorium/cinema theatre may be with an inclination of 8° 10 15° from front side.
4) Gross area in sq. m. per student of primary school with furniture is 1.11 sq. m.
5) Ramp with a slope not more than 1 in 10 or 1 in 12 should be provided for school building.
6) The general size of black board is 2.4 m × 1.2 m.
7) The minimum width of stair flight in public building should be 1.5 m.

B) Fill in the blanks **(One mark each)** : **7**

1) The desirable no. of storey's for a school building is _____
2) The minimum clearance between two adjoining desks arranged side by side is _____ mm.
3) The distance between the first row of benches and the black board should not be less than _____ m.
4) The flight width for a stair in school building should not be less than _____ m.
5) The length of the classroom should not be more than _____ m, for effective teaching.
6) The desirable aspect of the classroom is _____
7) Max. no. of classroom to be provided in a row is _____

_____

SLR-EP – 30

Seat No.	

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
BUILDING PLANNING AND DESIGN

Day and Date : Friday, 2-12-2016 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

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SECTION – I

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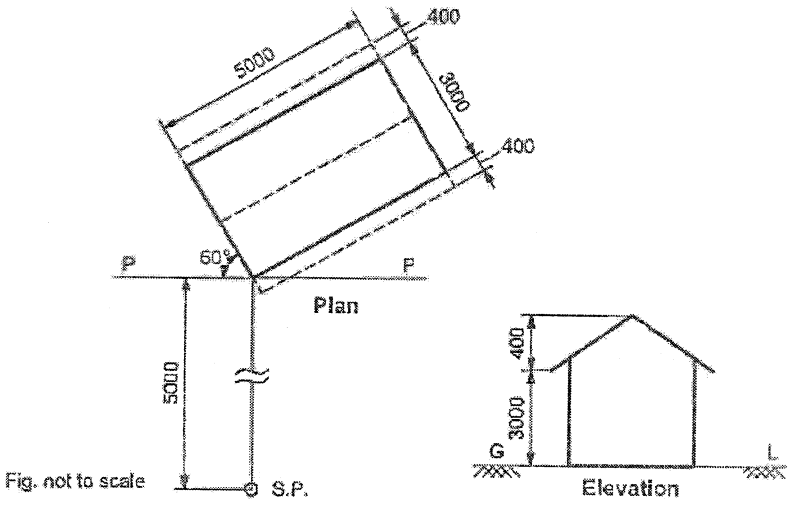

SECTION – II

4. Attempt **any four** of the following : **(4×7=28)**

   1) Enlist the general principles and factors in acoustical design and describe any three of them.

   2) Write a note on : Rain Water Harvesting and Landscaping for Public buildings.

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SLR-EP – 30

Seat No.	

Set S

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
BUILDING PLANNING AND DESIGN

Day and Date : Friday, 2-12-2016 Total Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **14**

A) State whether following statement are **true** or **false (One mark each)** : **7**

1) The minimum width of stair flight in public building should be 1.5 m.
2) In post office number of WC according to rule and regulation should be 1 per 25 for male 1 per 15 for female.
3) In two point's perspective, only one side of object is true dimension in perspective view.
4) The slope for floor of auditorium/cinema theatre may be with an inclination of 8° 10 15° from front side.
5) Gross area in sq. m. per student of primary school with furniture is 1.11 sq. m.
6) Ramp with a slope not more than 1 in 10 or 1 in 12 should be provided for school building.
7) The general size of black board is 2.4 m × 1.2 m.

B) Fill in the blanks **(One mark each)** : **7**

1) Max. no. of classroom to be provided in a row is _____
2) The desirable no. of storey's for a school building is _____
3) The minimum clearance between two adjoining desks arranged side by side is _____ mm.
4) The distance between the first row of benches and the black board should not be less than _____ m.
5) The flight width for a stair in school building should not be less than _____ m.
6) The length of the classroom should not be more than _____ m, for effective teaching.
7) The desirable aspect of the classroom is _____

_____

SLR-EP – 30

Seat No.	

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
BUILDING PLANNING AND DESIGN

Day and Date : Friday, 2-12-2016 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

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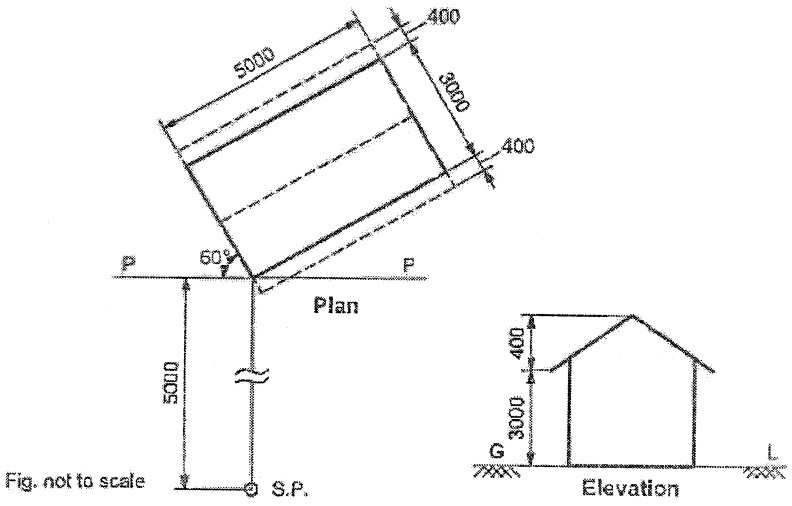
SECTION – I

2. It is proposed to construct a PWD Executive Engineers office with the following data :

1) Entrance and waiting
2) Head clerk cabin
3) Administrative office
4) Executive Engineers office (with attached toilet of suitable size)
5) Cabin for personal assistant of Executive Engineers
6) Technical assistant cabin
7) Drawing, printing and xeroxing room
8) Record keeping room
9) Common ladies room (with attached toilet of suitable size)
10) All passages of 1.5 m. wide
11) Provide suitable sanitary units for gents.

The building is R.C.C. framed structure. Assume additional data if required and mention it clearly. Draw a detailed plan indicating furniture layout also (scale 1 : 50). **20**

3. Following sketch shows a plan elevation of a structure. Draw to scale 1 : 50 two point perspective of the same. Retain all construction lines. (All dimensions are in mm.) : **8**



SECTION – II

4. Attempt **any four** of the following : **(4×7=28)**
   1) Enlist the general principles and factors in acoustical design and describe any three of them.
   2) Write a note on : Rain Water Harvesting and Landscaping for Public buildings.
   3) Explain important signification of a Green Building and its scope with respect to public buildings.
   4) Explain the architectural compositions for public building planning.
   5) Explain the importance of AUTOCAD work and describe any four commands of CAD.
   6) Enlist different types of fire extinguishing equipments used in public building and explain in brief any three types of it.

———————

SLR-EP – 31

Seat No.	

Set P

T.E. (Civil) Part – I Examination, 2016
ENVIRONMENTAL ENGINEERING – I
(New CGPA)

Day and Date : Monday, 5-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Use of non-programmable calculator is **allowed**.*
*2) Figures to the **right** indicate full marks.*
*3) Assume suitable data **wherever** necessary and mention it **clearly**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **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

1. Choose the correct alternatives : **14**

1) _____ water is fit for drinking.
a) Pure b) Potable c) Palatable d) Wholesome

2) Standard EDTA is used to determine _____ of water.
a) Alkalinity b) Hardness
c) Turbidity d) Residual chlorine

3) The process of desalination of water, which makes use of micro-porous membrane, is
a) Freezing b) Solar distillation
c) Electrodialysis d) None of above

4) Air binding phenomena in rapid sand filter may occur due to
a) Excessive negative pressure b) Mud ball formation
c) Higher turbidity in the effluent d) Low temperature

5) Strokes law is applied in design of _____ treatment unit.
a) Coagulation b) Filtration c) Sedimentation d) Aeration

6) The process in which the chlorination is done beyond the break point is known as
a) Prechlorination b) Post chlorination
c) Super chlorination d) Break point chlorination

P.T.O.

7) _____ is the actual average time taken by water to pass through a sedimentation tank.
   a) Flow through period b) Overflow rate
   c) Organic loading d) None of above

8) Velocity of sound in water is _____ m/sec.
   a) 1436 b) 1432 c) 1431 d) 1433

9) Hoop stress in the water pipe is caused by
   a) Internal water pressure b) Water hammer pressure
   c) Traffic load d) All of above

10) Corrosion of a pipe
   a) Reduces its life span b) Reduces its carrying capacity
   c) Adds colour to water d) All the above

11) Air relief valves are provided at the _____ along water pipe.
   a) Sag b) Summits
   c) Mid-point d) None of the above

12) The suitable layout for a water supply distribution system for irregularly grown city is
   a) Dead end system b) Grid iron system
   c) Ring system d) Radial system

13) The valves which are used to remove the sediments in the pipe line are called
   a) Butterfly valve b) Scour valve c) Air valve d) Check valve

14) The storage capacity of reservoir can be found out by
   a) Heytograph b) Flow frequency curve
   c) Mass curve d) All of above

_____

SLR-EP – 31

Seat No.	

T.E. (Civil) Part – I Examination, 2016
ENVIRONMENTAL ENGINEERING – I
(New CGPA)

Day and Date : Monday, 5-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *and* ***any three*** *questions from Section –* ***II****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary and mention it* ***clearly****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. a) Draw a general flowsheet for water treatment plant having river as a source. Also explain functions of each treatment unit. **5**

   b) Following figure represents census data for a town. Calculate the future population for the year 2020 by geometrical increase method. **5**

Year	1940	1950	1960	1970	1980	1990
Population in thousands	1,50,000	1,80,000	2,34,000	3,27,000	4,58,000	6,87,960

3. a) Derive equation for settling velocity by using Stoke's law. **5**

   b) Discuss objectives of aeration. Explain 'cascade aerator' with neat sketch. **4**

4. a) Explain chemistry of chlorination. **5**

   b) Design a slow sand filter to treat a flow of 5 mld. **4**

5. Write short notes on following (**any three**) : **9**

   1) Electro-dialysis.
   2) Lime soda process.
   3) Back washing of filter.
   4) Design of flocculator.

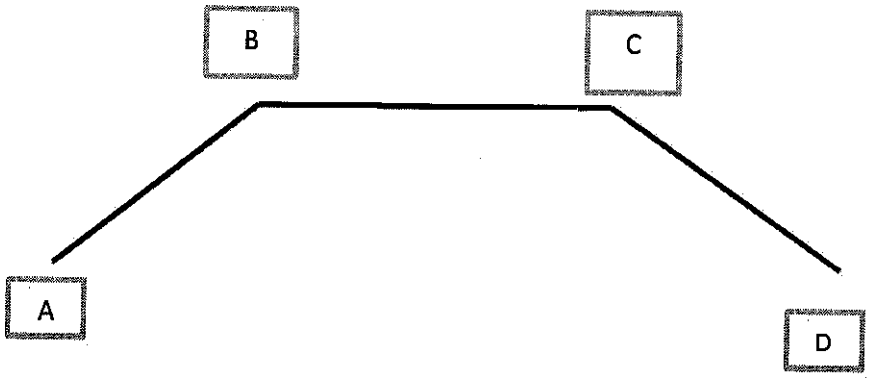
SECTION – II

6. a) What is economical diameter of pipe ? **5**

   b) Explain the mass curve method of finding balancing storage capacity of reservoir. **5**

7. a) Enlist various types of stresses to be considered in design of water pipes. Explain any one in detail. **5**

   b) **4**



Find equivalent length of pipe system shown in above figure if equivalent diameter is 300 mm. Use

i) Darcy's formula.

ii) Hazen William's formula.

Pipe	Length (m)	Diameter (mm)
AB	300	400
BC	400	300
CD	500	200

8. a) Explain dead end system with its advantages and disadvantages. **5**

   b) A pipe network consist of four pipes AB, BC, CD and DA with inflow at junction A 100 units and discharge values at B, C and D are 20, 30 and 50 units respectively. Find the corrected flow in each pipe with its direction of flow. Take value of k in $h_f = k. Q^2$, 2, 3, 4 and 5 for pipes AB, BC, CD and DA respectively. Carry two iterations only. **4**

9. Write short note on the following (**any three**) : **9**

   1) Leak detection techniques.
   2) Corrosion control in water pipes.
   3) Air relief valve.
   4) Equivalent pipe.

SLR-EP – 31

Seat No.	

Set Q

T.E. (Civil) Part – I Examination, 2016
ENVIRONMENTAL ENGINEERING – I
(New CGPA)

Day and Date : Monday, 5-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Use of non-programmable calculator is* ***allowed****.*
2) Figures to the ***right*** *indicate full marks.*
3) Assume suitable data ***wherever*** *necessary and mention it* ***clearly****.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct alternatives : **14**

1) Velocity of sound in water is _____ m/sec.
a) 1436 b) 1432 c) 1431 d) 1433

2) Hoop stress in the water pipe is caused by
a) Internal water pressure b) Water hammer pressure
c) Traffic load d) All of above

3) Corrosion of a pipe
a) Reduces its life span b) Reduces its carrying capacity
c) Adds colour to water d) All the above

4) Air relief valves are provided at the _____ along water pipe.
a) Sag b) Summits
c) Mid-point d) None of the above

5) The suitable layout for a water supply distribution system for irregularly grown city is
a) Dead end system b) Grid iron system
c) Ring system d) Radial system

6) The valves which are used to remove the sediments in the pipe line are called
a) Butterfly valve b) Scour valve c) Air valve d) Check valve

7) The storage capacity of reservoir can be found out by
   a) Heytograph b) Flow frequency curve
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8) _____ water is fit for drinking.
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9) Standard EDTA is used to determine _____ of water.
   a) Alkalinity b) Hardness
   c) Turbidity d) Residual chlorine

10) The process of desalination of water, which makes use of micro-porous membrane, is
   a) Freezing b) Solar distillation
   c) Electrodialysis d) None of above

11) Air binding phenomena in rapid sand filter may occur due to
   a) Excessive negative pressure b) Mud ball formation
   c) Higher turbidity in the effluent d) Low temperature

12) Strokes law is applied in design of _____ treatment unit.
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13) The process in which the chlorination is done beyond the break point is known as
   a) Prechlorination b) Post chlorination
   c) Super chlorination d) Break point chlorination

14) _____ is the actual average time taken by water to pass through a sedimentation tank.
   a) Flow through period b) Overflow rate
   c) Organic loading d) None of above

_____

SLR-EP – 31

Seat No.	

T.E. (Civil) Part – I Examination, 2016
ENVIRONMENTAL ENGINEERING – I
(New CGPA)

Day and Date : Monday, 5-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *and* ***any three*** *questions from Section –* ***II****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary and mention it* ***clearly****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. a) Draw a general flowsheet for water treatment plant having river as a source. Also explain functions of each treatment unit. **5**

   b) Following figure represents census data for a town. Calculate the future population for the year 2020 by geometrical increase method. **5**

Year	1940	1950	1960	1970	1980	1990
Population in thousands	1,50,000	1,80,000	2,34,000	3,27,000	4,58,000	6,87,960

3. a) Derive equation for settling velocity by using Stoke's law. **5**

   b) Discuss objectives of aeration. Explain 'cascade aerator' with neat sketch. **4**

4. a) Explain chemistry of chlorination. **5**

   b) Design a slow sand filter to treat a flow of 5 mld. **4**

5. Write short notes on following (**any three**) : **9**

   1) Electro-dialysis.
   2) Lime soda process.
   3) Back washing of filter.
   4) Design of flocculator.

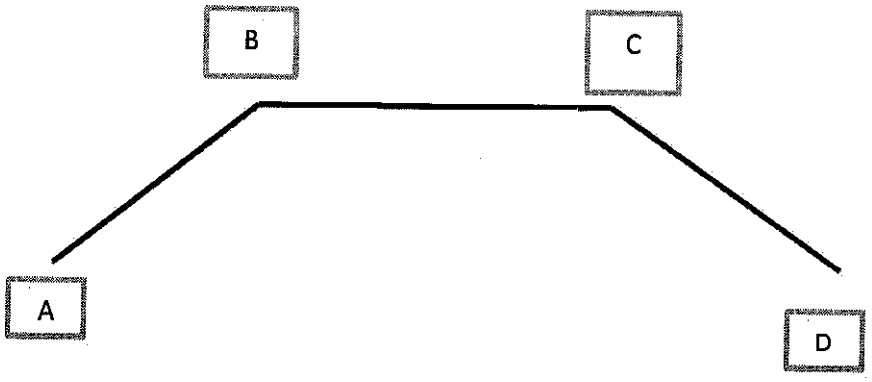
SECTION – II

6. a) What is economical diameter of pipe ? **5**

   b) Explain the mass curve method of finding balancing storage capacity of reservoir. **5**

7. a) Enlist various types of stresses to be considered in design of water pipes. Explain any one in detail. **5**

   b) **4**



Find equivalent length of pipe system shown in above figure if equivalent diameter is 300 mm. Use

i) Darcy's formula.

ii) Hazen William's formula.

Pipe	Length (m)	Diameter (mm)
AB	300	400
BC	400	300
CD	500	200

8. a) Explain dead end system with its advantages and disadvantages. **5**

   b) A pipe network consist of four pipes AB, BC, CD and DA with inflow at junction A 100 units and discharge values at B, C and D are 20, 30 and 50 units respectively. Find the corrected flow in each pipe with its direction of flow. Take value of k in $h_f = k. Q^2$, 2, 3, 4 and 5 for pipes AB, BC, CD and DA respectively. Carry two iterations only. **4**

9. Write short note on the following (**any three**) : **9**

   1) Leak detection techniques.
   2) Corrosion control in water pipes.
   3) Air relief valve.
   4) Equivalent pipe.

SLR-EP – 31

Seat No.	

Set R

T.E. (Civil) Part – I Examination, 2016
ENVIRONMENTAL ENGINEERING – I
(New CGPA)

Day and Date : Monday, 5-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Use of non-programmable calculator is* ***allowed****.*
2) Figures to the ***right*** *indicate full marks.*
3) Assume suitable data ***wherever*** *necessary and mention it* ***clearly****.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct alternatives : **14**

1) Strokes law is applied in design of _____ treatment unit.
a) Coagulation b) Filtration c) Sedimentation d) Aeration

2) The process in which the chlorination is done beyond the break point is known as
a) Prechlorination b) Post chlorination
c) Super chlorination d) Break point chlorination

3) _____ is the actual average time taken by water to pass through a sedimentation tank.
a) Flow through period b) Overflow rate
c) Organic loading d) None of above

4) Velocity of sound in water is _____ m/sec.
a) 1436 b) 1432 c) 1431 d) 1433

5) Hoop stress in the water pipe is caused by
a) Internal water pressure b) Water hammer pressure
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6) Corrosion of a pipe
a) Reduces its life span b) Reduces its carrying capacity
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P.T.O.

7) Air relief valves are provided at the _____ along water pipe.
   a) Sag b) Summits
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8) The suitable layout for a water supply distribution system for irregularly grown city is
   a) Dead end system b) Grid iron system
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9) The valves which are used to remove the sediments in the pipe line are called
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_____

SLR-EP – 31

Seat No.	

T.E. (Civil) Part – I Examination, 2016
ENVIRONMENTAL ENGINEERING – I
(New CGPA)

Day and Date : Monday, 5-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *and* ***any three*** *questions from Section –* ***II****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary and mention it* ***clearly****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. a) Draw a general flowsheet for water treatment plant having river as a source. Also explain functions of each treatment unit. **5**

   b) Following figure represents census data for a town. Calculate the future population for the year 2020 by geometrical increase method. **5**

Year	1940	1950	1960	1970	1980	1990
Population in thousands	1,50,000	1,80,000	2,34,000	3,27,000	4,58,000	6,87,960

3. a) Derive equation for settling velocity by using Stoke's law. **5**

   b) Discuss objectives of aeration. Explain 'cascade aerator' with neat sketch. **4**

4. a) Explain chemistry of chlorination. **5**

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5. Write short notes on following (**any three**) : **9**

   1) Electro-dialysis.
   2) Lime soda process.
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   4) Design of flocculator.

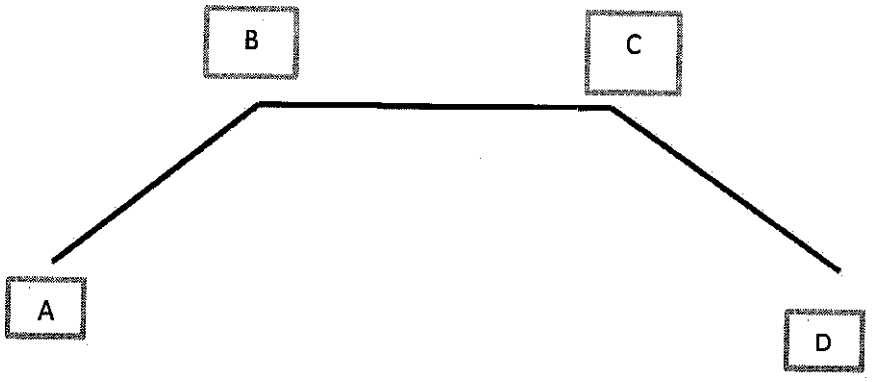
SECTION – II

6. a) What is economical diameter of pipe ? **5**

   b) Explain the mass curve method of finding balancing storage capacity of reservoir. **5**

7. a) Enlist various types of stresses to be considered in design of water pipes. Explain any one in detail. **5**

   b) **4**



Find equivalent length of pipe system shown in above figure if equivalent diameter is 300 mm. Use

i) Darcy's formula.

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Pipe	Length (m)	Diameter (mm)
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8. a) Explain dead end system with its advantages and disadvantages. **5**

   b) A pipe network consist of four pipes AB, BC, CD and DA with inflow at junction A 100 units and discharge values at B, C and D are 20, 30 and 50 units respectively. Find the corrected flow in each pipe with its direction of flow. Take value of k in $h_f = k. Q^2$, 2, 3, 4 and 5 for pipes AB, BC, CD and DA respectively. Carry two iterations only. **4**

9. Write short note on the following (**any three**) : **9**

   1) Leak detection techniques.
   2) Corrosion control in water pipes.
   3) Air relief valve.
   4) Equivalent pipe.

SLR-EP – 31

Seat No.	

Set S

T.E. (Civil) Part – I Examination, 2016
ENVIRONMENTAL ENGINEERING – I
(New CGPA)

Day and Date : Monday, 5-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Use of non-programmable calculator is* ***allowed****.*
2) Figures to the ***right*** *indicate full marks.*
3) Assume suitable data ***wherever*** *necessary and mention it* ***clearly****.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct alternatives : **14**

1) Corrosion of a pipe
   a) Reduces its life span b) Reduces its carrying capacity
   c) Adds colour to water d) All the above

2) Air relief valves are provided at the _____ along water pipe.
   a) Sag b) Summits
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3) The suitable layout for a water supply distribution system for irregularly grown city is
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_____

SLR-EP – 31

Seat No.	

T.E. (Civil) Part – I Examination, 2016
ENVIRONMENTAL ENGINEERING – I
(New CGPA)

Day and Date : Monday, 5-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *and* ***any three*** *questions from Section –* ***II****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary and mention it* ***clearly****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. a) Draw a general flowsheet for water treatment plant having river as a source. Also explain functions of each treatment unit. **5**

   b) Following figure represents census data for a town. Calculate the future population for the year 2020 by geometrical increase method. **5**

Year	1940	1950	1960	1970	1980	1990
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3. a) Derive equation for settling velocity by using Stoke's law. **5**

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4. a) Explain chemistry of chlorination. **5**

   b) Design a slow sand filter to treat a flow of 5 mld. **4**

5. Write short notes on following (**any three**) : **9**

   1) Electro-dialysis.
   2) Lime soda process.
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SECTION – II

6. a) What is economical diameter of pipe ? **5**

   b) Explain the mass curve method of finding balancing storage capacity of reservoir. **5**

7. a) Enlist various types of stresses to be considered in design of water pipes. Explain any one in detail. **5**

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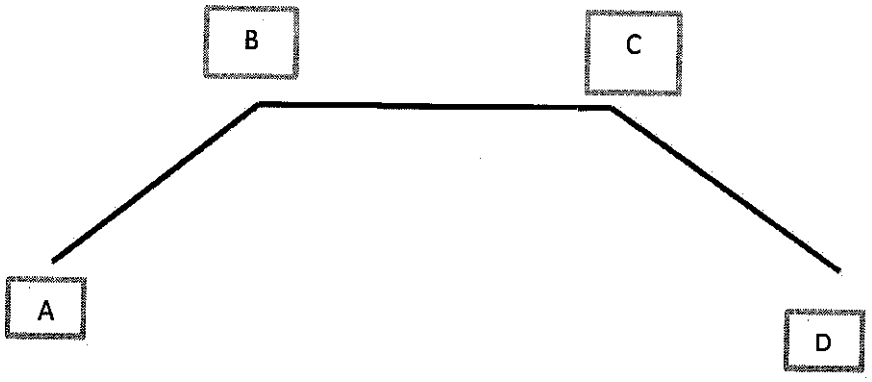

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9. Write short note on the following (**any three**) : **9**

   1) Leak detection techniques.
   2) Corrosion control in water pipes.
   3) Air relief valve.
   4) Equivalent pipe.

SLR-EP – 32

Seat No.	

Set P

T.E. (Civil) (Part – I) (CGPA Pattern) (New) Examination, 2016
ENGINEERING MANAGEMENT – I

Day and Date : Wednesday, 7-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***wherever*** *necessary.*
3) Use ***graph*** *paper* ***if needed****.*
4) Use of nonprogrammable computers is ***permitted****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
6) ***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

1. Choose the correct answer (**1** mark **each**) :

1) An LPP is said to be _____ if has no solution that satisfies all the constraints.
a) Feasible b) Infeasible c) Bounded d) None of these

2) Transportation problem can be solved if _____
a) No. of rows = no. of columns b) No. of rows $\leq$ no. of columns
c) No. of rows $\geq$ no. of columns d) All of these

3) EOQ model helps to find
a) Optimum size of order b) Time interval between order
c) Both a) and b) d) None of these

4) Moderate inventory control is sufficient for _____
a) A class items b) B class items c) C class items d) All of these

5) Motile Carlo simulation method is suitable for
a) Transportation problem b) Queuing problem
c) Assignment problem d) None of these

6) Biological process of mutation has inspired
a) ANN b) Fuzzy Logic
c) Genetic Algorithm d) None of these

7) Planning is _____
   a) Setting goal
   b) SWOT Analysis
   c) Selection of best alternative
   d) All of these

8) If 'λ' is arrival rate, ω is waiting time then expected no. of customer 'L' will be
   a) $L = \lambda\omega$
   b) $L = \lambda/\omega$
   c) $L = \omega/\lambda$
   d) $L = \omega + \lambda$

9) 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

10) In dynamic programming state is defined as
   a) Point where decision is made
   b) Information describing problem at each stage
   c) Decision making rule
   d) Optimal policy

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) Queuing theory means
   a) Optimization process
   b) Descriptive process
   c) Maximization process
   d) Minimization process

13) Games without a saddle point require player to play
   a) Mixed strategies
   b) Pure strategies
   c) Dominated strategies
   d) None of these

14) Motion study is recommended for
   a) Developing motion picture
   b) Preventing indiscipline
   c) Eliminating wasteful motions
   d) None of these

_____

SLR-EP – 32

Seat No.	

T.E. (Civil) (Part – I) (CGPA Pattern) (New) Examination, 2016
ENGINEERING MANAGEMENT – I

Day and Date : Wednesday, 7-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***wherever*** *neccessary.*
3) Use ***graph*** *paper* ***if needed****.*
4) Use of nonprogrammable computers is ***permitted****.*

SECTION – I

2. Solve **any three** (**8** marks **each**) : **(3×8=24)**

a) Solve the following LPP using simplex method.

Max $Z = 10x_1 + 15x_2 + 20x_3$

S/t $2x_1 + 4x_2 + 6x_3 \leq 24$

$-3x_1 - 9x_2 - 6x_3 \geq -30$

$x_1, x_2, x_3 \geq 0.$

b) Solve the problem using :

1) Laplace 2) Maximax criterion.

Customer Category	Supplier level			
	A_1	A_2	A_3	A_4
E_1	7	12	20	27
E_2	10	9	10	25
E_3	23	20	14	23
E_4	32	24	21	17

c) 1) Explain with example "Dominance Rule".

2) Find the value of game :

15	2	3
6	5	7
–7	4	0

d) Explain with example "Line and staff" organisation.

e) Write notes on :

1) Simulation 2) ANN.

3. Discuss in short **any one** function of management from following : **(1×4=4)**

a) Co-ordination b) Direction.

SECTION – II

4. Solve **any three** (**8** marks **each**) : **(3×8=24)**

a) A company uses a special product in the manufacture of products which it orders from suppliers. The appropriate data are

1) Demand = 2000 per annum.

2) Ordering cost = Rs. 20 per order

3) Carrying cost = 20% of item price.

4) Basic item price ₹ 10 per bracket.

Calculate EOQ and discuss why to calculate EOQ ?

b) Discuss objectives and importance of material management.

c) Explain with example "Pre-Disaster Stage".

d) What is BEA ? Explain with example how it is carried out ?

e) Write notes on :

1) TQM 2) Quality circle.

5. State the importance of **(any one)** : **(1×4=4)**

a) Quality control charts.

b) Disaster management.

SLR-EP – 32

Seat No.	

Set Q

T.E. (Civil) (Part – I) (CGPA Pattern) (New) Examination, 2016
ENGINEERING MANAGEMENT – I

Day and Date : Wednesday, 7-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***wherever*** *necessary.*
3) Use ***graph*** *paper* ***if needed****.*
4) Use of nonprogrammable computers is ***permitted****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
6) ***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

1. Choose the correct answer (**1** mark **each**) :

1) If 'λ' is arrival rate, ω is waiting time then expected no. of customer 'L' will be
   a) $L = \lambda\omega$ b) $L = \lambda/\omega$ c) $L = \omega/\lambda$ d) $L = \omega + \lambda$
2) 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
3) In dynamic programming state is defined as
   a) Point where decision is made
   b) Information describing problem at each stage
   c) Decision making rule
   d) Optimal policy
4) 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
5) Queuing theory means
   a) Optimization process b) Descriptive process
   c) Maximization process d) Minimization process

P.T.O.

6) Games without a saddle point require player to play
   a) Mixed strategies b) Pure strategies
   c) Dominated strategies d) None of these

7) Motion study is recommended for
   a) Developing motion picture b) Preventing indiscipline
   c) Eliminating wasteful motions d) None of these

8) An LPP is said to be _____ if has no solution that satisfies all the constraints.
   a) Feasible b) Infeasible c) Bounded d) None of these

9) Transportation problem can be solved if _____
   a) No. of rows = no. of columns b) No. of rows $\leq$ no. of columns
   c) No. of rows $\geq$ no. of columns d) All of these

10) EOQ model helps to find
   a) Optimum size of order b) Time interval between order
   c) Both a) and b) d) None of these

11) Moderate inventory control is sufficient for _____
   a) A class items b) B class items c) C class items d) All of these

12) Motile Carlo simulation method is suitable for
   a) Transportation problem b) Queuing problem
   c) Assignment problem d) None of these

13) Biological process of mutation has inspired
   a) ANN b) Fuzzy Logic
   c) Genetic Algorithm d) None of these

14) Planning is _____
   a) Setting goal b) SWOT Analysis
   c) Selection of best alternative d) All of these

_____

SLR-EP – 32

Seat No.	

T.E. (Civil) (Part – I) (CGPA Pattern) (New) Examination, 2016
ENGINEERING MANAGEMENT – I

Day and Date : Wednesday, 7-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***wherever*** *neccessary.*
3) Use ***graph*** *paper* ***if needed****.*
4) Use of nonprogrammable computers is ***permitted****.*

SECTION – I

2. Solve **any three** (**8** marks **each**) : **(3×8=24)**

a) Solve the following LPP using simplex method.

$$\text{Max } Z = 10x_1 + 15x_2 + 20x_3$$

$$\text{S/t} \quad 2x_1 + 4x_2 + 6x_3 \leq 24$$

$$-3x_1 - 9x_2 - 6x_3 \geq -30$$

$$x_1, x_2, x_3 \geq 0.$$

b) Solve the problem using :
1) Laplace 2) Maximax criterion.

Customer Category	Supplier level			
	A_1	A_2	A_3	A_4
E_1	7	12	20	27
E_2	10	9	10	25
E_3	23	20	14	23
E_4	32	24	21	17

c) 1) Explain with example "Dominance Rule".

2) Find the value of game :

15	2	3
6	5	7
–7	4	0

d) Explain with example "Line and staff" organisation.

e) Write notes on :

1) Simulation 2) ANN.

3. Discuss in short **any one** function of management from following : **(1×4=4)**

a) Co-ordination b) Direction.

SECTION – II

4. Solve **any three** (**8** marks **each**) : **(3×8=24)**

a) A company uses a special product in the manufacture of products which it orders from suppliers. The appropriate data are

1) Demand = 2000 per annum.

2) Ordering cost = Rs. 20 per order

3) Carrying cost = 20% of item price.

4) Basic item price ₹ 10 per bracket.

Calculate EOQ and discuss why to calculate EOQ ?

b) Discuss objectives and importance of material management.

c) Explain with example "Pre-Disaster Stage".

d) What is BEA ? Explain with example how it is carried out ?

e) Write notes on :

1) TQM 2) Quality circle.

5. State the importance of **(any one)** : **(1×4=4)**

a) Quality control charts.

b) Disaster management.

SLR-EP – 32

Seat No.	

Set R

T.E. (Civil) (Part – I) (CGPA Pattern) (New) Examination, 2016
ENGINEERING MANAGEMENT – I

Day and Date : Wednesday, 7-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***wherever*** *necessary.*
3) Use ***graph*** *paper* ***if needed****.*
4) Use of nonprogrammable computers is ***permitted****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
6) ***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

1. Choose the correct answer (**1** mark **each**) :

1) Motile Carlo simulation method is suitable for
   a) Transportation problem b) Queuing problem
   c) Assignment problem d) None of these

2) Biological process of mutation has inspired
   a) ANN b) Fuzzy Logic
   c) Genetic Algorithm d) None of these

3) Planning is _____
   a) Setting goal b) SWOT Analysis
   c) Selection of best alternative d) All of these

4) If 'λ' is arrival rate, ω is waiting time then expected no. of customer 'L' will be
   a) $L = \lambda\omega$ b) $L = \lambda/\omega$ c) $L = \omega/\lambda$ d) $L = \omega + \lambda$

5) 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

P.T.O.

6) In dynamic programming state is defined as
   a) Point where decision is made
   b) Information describing problem at each stage
   c) Decision making rule
   d) Optimal policy

7) 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

8) Queuing theory means
   a) Optimization process b) Descriptive process
   c) Maximization process d) Minimization process

9) Games without a saddle point require player to play
   a) Mixed strategies b) Pure strategies
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   a) Developing motion picture b) Preventing indiscipline
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11) An LPP is said to be _____ if has no solution that satisfies all the constraints.
   a) Feasible b) Infeasible c) Bounded d) None of these

12) Transportation problem can be solved if _____
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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) Moderate inventory control is sufficient for _____
   a) A class items b) B class items c) C class items d) All of these

_____

SLR-EP – 32

Seat No.	

T.E. (Civil) (Part – I) (CGPA Pattern) (New) Examination, 2016
ENGINEERING MANAGEMENT – I

Day and Date : Wednesday, 7-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***wherever*** *neccessary.*
3) Use ***graph*** *paper* ***if needed****.*
4) Use of nonprogrammable computers is ***permitted****.*

SECTION – I

2. Solve **any three** (**8** marks **each**) : **(3×8=24)**

a) Solve the following LPP using simplex method.

Max $Z = 10x_1 + 15x_2 + 20x_3$

S/t $2x_1 + 4x_2 + 6x_3 \leq 24$

$-3x_1 - 9x_2 - 6x_3 \geq -30$

$x_1, x_2, x_3 \geq 0.$

b) Solve the problem using :

1) Laplace 2) Maximax criterion.

Customer Category	Supplier level			
	A_1	A_2	A_3	A_4
E_1	7	12	20	27
E_2	10	9	10	25
E_3	23	20	14	23
E_4	32	24	21	17

c) 1) Explain with example "Dominance Rule".

2) Find the value of game :

15	2	3
6	5	7
–7	4	0

d) Explain with example "Line and staff" organisation.

e) Write notes on :

1) Simulation 2) ANN.

3. Discuss in short **any one** function of management from following : **(1×4=4)**

a) Co-ordination b) Direction.

SECTION – II

4. Solve **any three** (**8** marks **each**) : **(3×8=24)**

a) A company uses a special product in the manufacture of products which it orders from suppliers. The appropriate data are

1) Demand = 2000 per annum.

2) Ordering cost = Rs. 20 per order

3) Carrying cost = 20% of item price.

4) Basic item price ₹ 10 per bracket.

Calculate EOQ and discuss why to calculate EOQ ?

b) Discuss objectives and importance of material management.

c) Explain with example "Pre-Disaster Stage".

d) What is BEA ? Explain with example how it is carried out ?

e) Write notes on :

1) TQM 2) Quality circle.

5. State the importance of **(any one)** : **(1×4=4)**

a) Quality control charts.

b) Disaster management.

SLR-EP – 32

Seat No.	

Set S

T.E. (Civil) (Part – I) (CGPA Pattern) (New) Examination, 2016
ENGINEERING MANAGEMENT – I

Day and Date : Wednesday, 7-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***wherever*** *necessary.*
3) Use ***graph*** *paper* ***if needed****.*
4) Use of nonprogrammable computers is ***permitted****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
6) ***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

1. Choose the correct answer (**1** mark **each**) :

1) In dynamic programming state is defined as
   a) Point where decision is made
   b) Information describing problem at each stage
   c) Decision making rule
   d) Optimal policy

2) 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

3) Queuing theory means
   a) Optimization process b) Descriptive process
   c) Maximization process d) Minimization process

4) Games without a saddle point require player to play
   a) Mixed strategies b) Pure strategies
   c) Dominated strategies d) None of these

5) Motion study is recommended for
   a) Developing motion picture b) Preventing indiscipline
   c) Eliminating wasteful motions d) None of these

P.T.O.

6) An LPP is said to be _____ if has no solution that satisfies all the constraints.
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7) Transportation problem can be solved if _____
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   c) No. of rows $\geq$ no. of columns d) All of these

8) EOQ model helps to find
   a) Optimum size of order b) Time interval between order
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13) If 'λ' is arrival rate, ω is waiting time then expected no. of customer 'L' will be
   a) $L = \lambda\omega$ b) $L = \lambda/\omega$ c) $L = \omega/\lambda$ d) $L = \omega + \lambda$

14) 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

_____

SLR-EP – 32

Seat No.	

T.E. (Civil) (Part – I) (CGPA Pattern) (New) Examination, 2016
ENGINEERING MANAGEMENT – I

Day and Date : Wednesday, 7-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***wherever*** *neccessary.*
3) Use ***graph*** *paper* ***if needed****.*
4) Use of nonprogrammable computers is ***permitted****.*

SECTION – I

2. Solve **any three** (**8** marks **each**) : **(3×8=24)**

a) Solve the following LPP using simplex method.

Max $Z = 10x_1 + 15x_2 + 20x_3$

S/t $2x_1 + 4x_2 + 6x_3 \leq 24$

$-3x_1 - 9x_2 - 6x_3 \geq -30$

$x_1, x_2, x_3 \geq 0.$

b) Solve the problem using :

1) Laplace 2) Maximax criterion.

Customer Category	Supplier level			
	A_1	A_2	A_3	A_4
E_1	7	12	20	27
E_2	10	9	10	25
E_3	23	20	14	23
E_4	32	24	21	17

c) 1) Explain with example "Dominance Rule".

2) Find the value of game :

15	2	3
6	5	7
–7	4	0

d) Explain with example "Line and staff" organisation.

e) Write notes on :

1) Simulation 2) ANN.

3. Discuss in short **any one** function of management from following : **(1×4=4)**

a) Co-ordination b) Direction.

SECTION – II

4. Solve **any three** (**8** marks **each**) : **(3×8=24)**

a) A company uses a special product in the manufacture of products which it orders from suppliers. The appropriate data are

1) Demand = 2000 per annum.

2) Ordering cost = Rs. 20 per order

3) Carrying cost = 20% of item price.

4) Basic item price ₹ 10 per bracket.

Calculate EOQ and discuss why to calculate EOQ ?

b) Discuss objectives and importance of material management.

c) Explain with example "Pre-Disaster Stage".

d) What is BEA ? Explain with example how it is carried out ?

e) Write notes on :

1) TQM 2) Quality circle.

5. State the importance of **(any one)** : **(1×4=4)**

a) Quality control charts.

b) Disaster management.

SLR-EP – 33

Seat No.	

Set P

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 9-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figure on ***right*** *indicates* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *needed and mention it.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct alternative (**1** Mark **each**) : **(14×1=14)**

1) What is the sign for stopping sight distance on a highway at descending gradient in its formula ?
   a) Positive b) Negative
   c) Both a) and b) d) None

2) For highway developments, which of the following plans were used ?
   a) Bombay plan b) Nagpur plan
   c) Lucknow plan d) All the above

3) For highway alignment, which of the following factor is not considered ?
   a) Religious space b) Grave yard
   c) Safety factor d) None

4) Which of the following part is just adjustcent to the carriage way ?
   a) Kerb b) Drainline
   c) Building line d) None

5) The background colour of informatory sign is
   a) Red b) White
   c) Green d) Yellow

P.T.O.

6) Aggregate impact test is carried out to determine _____ of aggregate.
   a) Hardness b) Toughness c) Crushing d) None

7) Application of Geosynthetics in road construction will _____ road strength.
   a) Decrease b) Increase c) Both a) and b) d) None

8) Modulus of subgrade reaction (K) is given by
   a) $K = p/\Delta$ b) $K = \Delta/p$ c) $K = \Delta.p$ d) $K = p.\Delta.0.125$

9) In rigid pavement, area of the pavement is effective in resisting the bending moment is called,
   a) Modulus of subgrade reaction
   b) Equivalent radius of resisting section
   c) Modulus of rigidity
   d) Modulus of elasticity

10) The materials used in construction of WBM roads are
   a) Coarse aggregates, screenings and binding material
   b) Coarse aggregates, screenings, binding material and bitumen
   c) Coarse aggregates, screenings, binding material and cement
   d) Coarse aggregates, screenings, binding material and lime

11) _____ bars are used across the longitudinal joints of cement concrete pavements.
   a) Tie bars b) Dowel bars
   c) Tie bars and dowel bars d) None of these

12) Free board is the level difference between the crown of the road at its lowest point and
   a) Rail level b) Bed level c) HFL d) Danger level

13) Heading and bench method of tunneling is used in
   a) Soft soil b) Hard rock c) Both a) and b) d) All the above

14) In tunneling mucking means
   a) Blasting b) Drilling
   c) Removal of debris d) All the above

_____

SLR-EP – 33

Seat No.	

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 9-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figure on ***right*** *indicates* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

SECTION – I

2. Solve **any four** (**7** marks **each**) :

a) The load penetration values of CBR test conducted on a specimen of soil is given below :

Sr. No.	Load dial readings in division	Penetration mm
	5	0.8
	15	1
	25	1.3
	30	1.5
	40	1.85
	50	2.4
	60	3
	69	4
	80	5.5
	90	7.1
	100	10
	107	12.5

b) In a district where rainfall is heavy, two types of road pavements are to be constructed.

a) Two lane state highway with bitu. conc.surface.

b) MDR of WBM pavement with 3.8 m wide. What should be the height of crown with respect to edges in these two cases assuming straight line camber.

c) Explain with example importance of highway transportation and development.

d) What is super elevation ? Why it is to be provided ? Derive the formula to find super elevation and write the limiting values of 'e' and 'f'.

e) Write a detail note on "volume and speed studies".

f) Enlist with sketch different types of traffic signs and signals.

g) With a neat sketch, derive the formula for O.S.D.

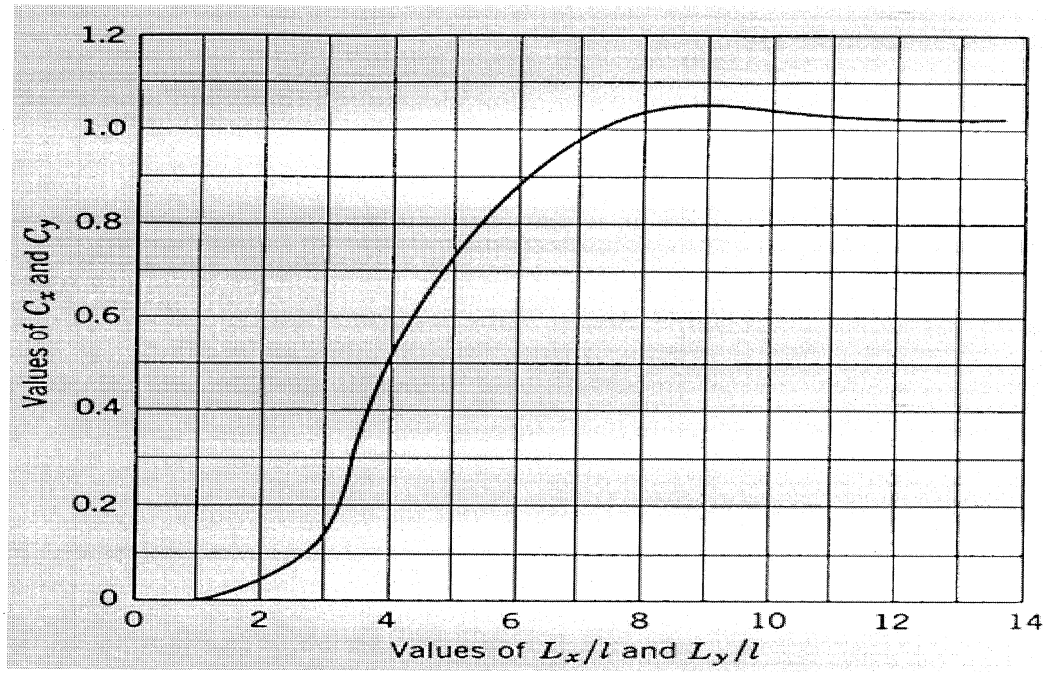
SECTION – II

3. Answer **any four** questions (**7** marks **each**) : **(7×4)**

a) Differentiate between flexible and rigid pavement.

b) Mention the specifications of materials and construction steps for Water Bound Macadam (WBM) road.

c) Determine the warping stresses at interior, edge and corner of a 25 cm thick cement concrete pavement with transverse joints at 5.0 m interval and longitudinal joints at 3.6 m intervals. The modulus of subgrade reaction K is 6.9 kg/cm^3 and radius of loaded area is 15 cm. Assume temperature differential during day to be 0.6°C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4°C per cm slab thickness during the night (for warping stress at the corner). Assume e = 10×10^{-6} per °C, E = 3×10^5 kg/cm^2, μ = 0.15. Use Bradbury chart given in Figure – 1.



(Q. 3) c) Figure – 1

d) Find the economical span of a T-Beam bridge from the following data :

Span (m)	4m	8m	12m	15m
Approx cost of one span of superstructure (Rs.)	1,700	7,000	16,000	24,500
Approx cost of one pier with foundation (Rs.)	22,200	23,200	23,000	23,600

e) What is the importance of Afflux, Scour depth and waterway in bridge hydrology ?

f) List the different methods tunnel construction in hard rock and explain any one method with neat sketch.

g) Explain different types of tunnel lining.

———————

Set P

SLR-EP – 33

Seat No.	

Set Q

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 9-12-2016 Max. Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

2) Figure on ***right*** *indicates* ***full*** *marks.*

3) ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

5) ***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

1. Choose the correct alternative (**1** Mark **each**) : **(14×1=14)**

1) Modulus of subgrade reaction (K) is given by

a) $K = p/\Delta$ b) $K = \Delta/p$ c) $K = \Delta.p$ d) $K = p.\Delta.0.125$

2) In rigid pavement, area of the pavement is effective in resisting the bending moment is called,

a) Modulus of subgrade reaction

b) Equivalent radius of resisting section

c) Modulus of rigidity

d) Modulus of elasticity

3) The materials used in construction of WBM roads are

a) Coarse aggregates, screenings and binding material

b) Coarse aggregates, screenings, binding material and bitumen

c) Coarse aggregates, screenings, binding material and cement

d) Coarse aggregates, screenings, binding material and lime

P.T.O.

4) _____ bars are used across the longitudinal joints of cement concrete pavements.
   a) Tie bars b) Dowel bars
   c) Tie bars and dowel bars d) None of these

5) Free board is the level difference between the crown of the road at its lowest point and
   a) Rail level b) Bed level c) HFL d) Danger level

6) Heading and bench method of tunneling is used in
   a) Soft soil b) Hard rock c) Both a) and b) d) All the above

7) In tunneling mucking means
   a) Blasting b) Drilling
   c) Removal of debris d) All the above

8) What is the sign for stopping sight distance on a highway at descending gradient in its formula ?
   a) Positive b) Negative
   c) Both a) and b) d) None

9) For highway developments, which of the following plans were used ?
   a) Bombay plan b) Nagpur plan
   c) Lucknow plan d) All the above

10) For highway alignment, which of the following factor is not considered ?
   a) Religious space b) Grave yard
   c) Safety factor d) None

11) Which of the following part is just adjustcent to the carriage way ?
   a) Kerb b) Drainline
   c) Building line d) None

12) The background colour of informatory sign is
   a) Red b) White
   c) Green d) Yellow

13) Aggregate impact test is carried out to determine _____ of aggregate.
   a) Hardness b) Toughness c) Crushing d) None

14) Application of Geosynthetics in road construction will _____ road strength.
   a) Decrease b) Increase c) Both a) and b) d) None

_____

SLR-EP – 33

Seat No.	

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 9-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figure on ***right*** *indicates* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

SECTION – I

2. Solve **any four** (**7** marks **each**) :

a) The load penetration values of CBR test conducted on a specimen of soil is given below :

Sr. No.	Load dial readings in division	Penetration mm
	5	0.8
	15	1
	25	1.3
	30	1.5
	40	1.85
	50	2.4
	60	3
	69	4
	80	5.5
	90	7.1
	100	10
	107	12.5

b) In a district where rainfall is heavy, two types of road pavements are to be constructed.

a) Two lane state highway with bitu. conc.surface.

b) MDR of WBM pavement with 3.8 m wide. What should be the height of crown with respect to edges in these two cases assuming straight line camber.

c) Explain with example importance of highway transportation and development.

d) What is super elevation ? Why it is to be provided ? Derive the formula to find super elevation and write the limiting values of 'e' and 'f'.

e) Write a detail note on "volume and speed studies".

f) Enlist with sketch different types of traffic signs and signals.

g) With a neat sketch, derive the formula for O.S.D.

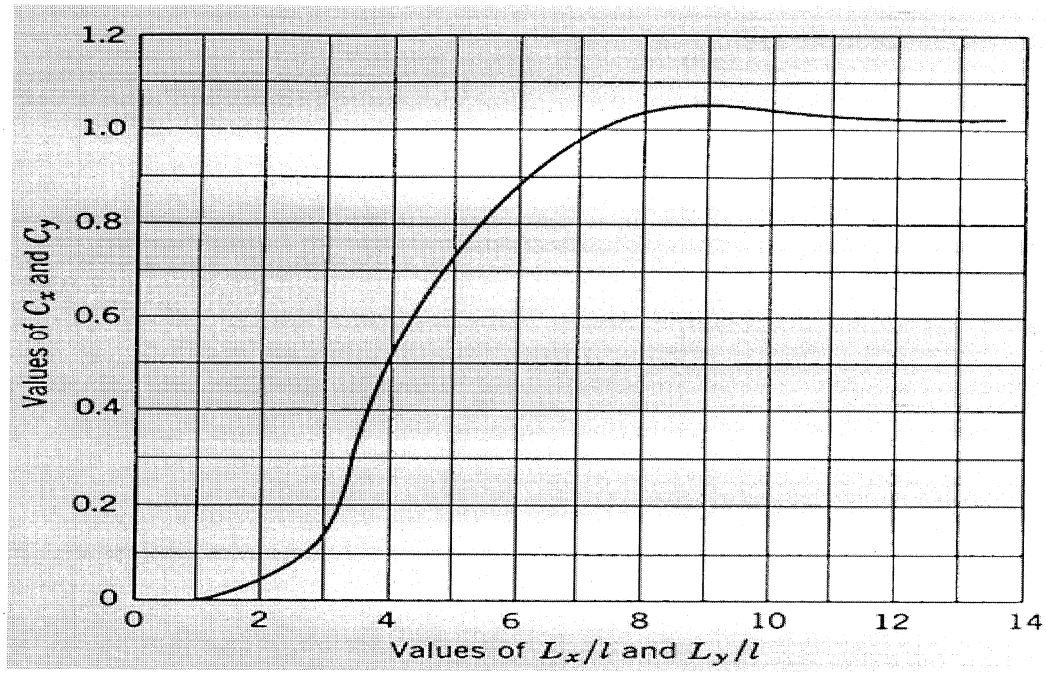
SECTION – II

3. Answer **any four** questions (**7** marks **each**) : **(7×4)**

a) Differentiate between flexible and rigid pavement.

b) Mention the specifications of materials and construction steps for Water Bound Macadam (WBM) road.

c) Determine the warping stresses at interior, edge and corner of a 25 cm thick cement concrete pavement with transverse joints at 5.0 m interval and longitudinal joints at 3.6 m intervals. The modulus of subgrade reaction K is 6.9 kg/cm^3 and radius of loaded area is 15 cm. Assume temperature differential during day to be 0.6°C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4°C per cm slab thickness during the night (for warping stress at the corner). Assume e = 10×10^{-6} per °C, E = 3×10^5 kg/cm^2, μ = 0.15. Use Bradbury chart given in Figure – 1.



(Q. 3) c) Figure – 1

d) Find the economical span of a T-Beam bridge from the following data :

Span (m)	4m	8m	12m	15m
Approx cost of one span of superstructure (Rs.)	1,700	7,000	16,000	24,500
Approx cost of one pier with foundation (Rs.)	22,200	23,200	23,000	23,600

e) What is the importance of Afflux, Scour depth and waterway in bridge hydrology ?

f) List the different methods tunnel construction in hard rock and explain any one method with neat sketch.

g) Explain different types of tunnel lining.

———————

Set Q

SLR-EP – 33

Seat No.	

Set R

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 9-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figure on ***right*** *indicates* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *needed and mention it.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct alternative (**1** Mark **each**) : **(14×1=14)**

1) The background colour of informatory sign is
   a) Red b) White
   c) Green d) Yellow

2) Aggregate impact test is carried out to determine _____ of aggregate.
   a) Hardness b) Toughness c) Crushing d) None

3) Application of Geosynthetics in road construction will _____ road strength.
   a) Decrease b) Increase c) Both a) and b) d) None

4) Modulus of subgrade reaction (K) is given by
   a) $K = p/\Delta$ b) $K = \Delta/p$ c) $K = \Delta.p$ d) $K = p.\Delta.0.125$

5) In rigid pavement, area of the pavement is effective in resisting the bending moment is called,
   a) Modulus of subgrade reaction
   b) Equivalent radius of resisting section
   c) Modulus of rigidity
   d) Modulus of elasticity

P.T.O.

6) The materials used in construction of WBM roads are
   a) Coarse aggregates, screenings and binding material
   b) Coarse aggregates, screenings, binding material and bitumen
   c) Coarse aggregates, screenings, binding material and cement
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7) _____ bars are used across the longitudinal joints of cement concrete pavements.
   a) Tie bars b) Dowel bars
   c) Tie bars and dowel bars d) None of these

8) Free board is the level difference between the crown of the road at its lowest point and
   a) Rail level b) Bed level c) HFL d) Danger level

9) Heading and bench method of tunneling is used in
   a) Soft soil b) Hard rock c) Both a) and b) d) All the above

10) In tunneling mucking means
   a) Blasting b) Drilling
   c) Removal of debris d) All the above

11) What is the sign for stopping sight distance on a highway at descending gradient in its formula ?
   a) Positive b) Negative
   c) Both a) and b) d) None

12) For highway developments, which of the following plans were used ?
   a) Bombay plan b) Nagpur plan
   c) Lucknow plan d) All the above

13) For highway alignment, which of the following factor is not considered ?
   a) Religious space b) Grave yard
   c) Safety factor d) None

14) Which of the following part is just adjustcent to the carriage way ?
   a) Kerb b) Drainline
   c) Building line d) None

_____

SLR-EP – 33

Seat No.	

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 9-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figure on ***right*** *indicates* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

SECTION – I

2. Solve **any four** (**7** marks **each**) :

a) The load penetration values of CBR test conducted on a specimen of soil is given below :

Sr. No.	Load dial readings in division	Penetration mm
	5	0.8
	15	1
	25	1.3
	30	1.5
	40	1.85
	50	2.4
	60	3
	69	4
	80	5.5
	90	7.1
	100	10
	107	12.5

b) In a district where rainfall is heavy, two types of road pavements are to be constructed.

a) Two lane state highway with bitu. conc.surface.

b) MDR of WBM pavement with 3.8 m wide. What should be the height of crown with respect to edges in these two cases assuming straight line camber.

c) Explain with example importance of highway transportation and development.

d) What is super elevation ? Why it is to be provided ? Derive the formula to find super elevation and write the limiting values of 'e' and 'f'.

e) Write a detail note on "volume and speed studies".

f) Enlist with sketch different types of traffic signs and signals.

g) With a neat sketch, derive the formula for O.S.D.

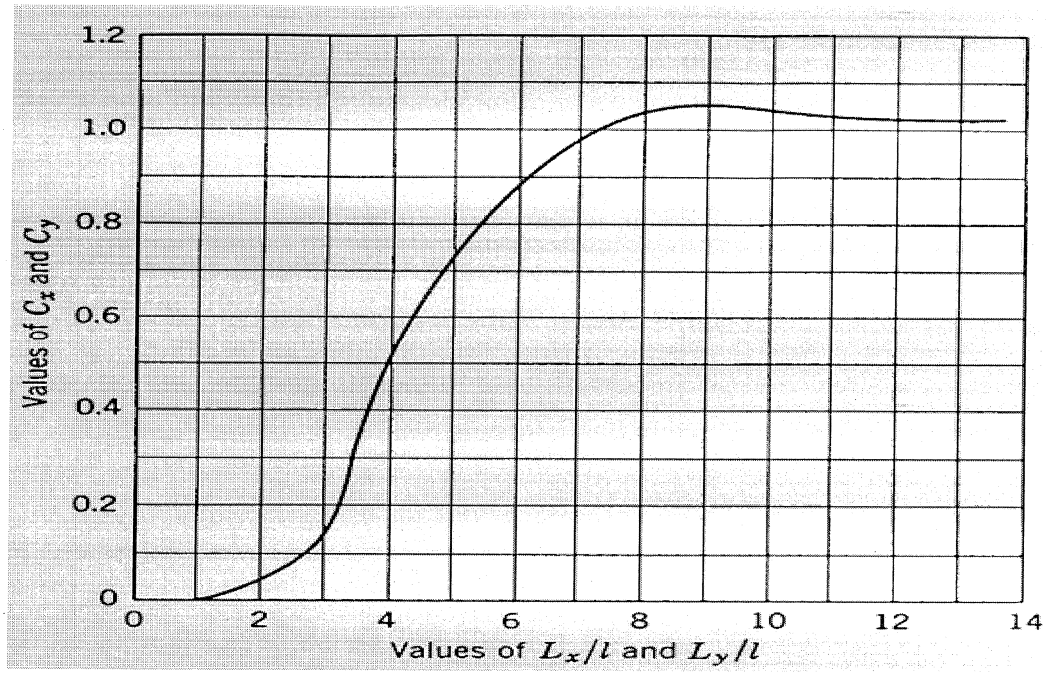
SECTION – II

3. Answer **any four** questions (**7** marks **each**) : **(7×4)**

a) Differentiate between flexible and rigid pavement.

b) Mention the specifications of materials and construction steps for Water Bound Macadam (WBM) road.

c) Determine the warping stresses at interior, edge and corner of a 25 cm thick cement concrete pavement with transverse joints at 5.0 m interval and longitudinal joints at 3.6 m intervals. The modulus of subgrade reaction K is 6.9 kg/cm^3 and radius of loaded area is 15 cm. Assume temperature differential during day to be 0.6°C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4°C per cm slab thickness during the night (for warping stress at the corner). Assume e = 10×10^{-6} per °C, E = 3×10^5 kg/cm^2, μ = 0.15. Use Bradbury chart given in Figure – 1.



(Q. 3) c) Figure – 1

Set R

d) Find the economical span of a T-Beam bridge from the following data :

Span (m)	4m	8m	12m	15m
Approx cost of one span of superstructure (Rs.)	1,700	7,000	16,000	24,500
Approx cost of one pier with foundation (Rs.)	22,200	23,200	23,000	23,600

e) What is the importance of Afflux, Scour depth and waterway in bridge hydrology ?

f) List the different methods tunnel construction in hard rock and explain any one method with neat sketch.

g) Explain different types of tunnel lining.

———————

Set R

SLR-EP – 33

Seat No.	

Set S

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 9-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figure on ***right*** *indicates* ***full*** *marks.*
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4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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

1. Choose the correct alternative (**1** Mark **each**) : **(14×1=14)**

1) The materials used in construction of WBM roads are
   a) Coarse aggregates, screenings and binding material
   b) Coarse aggregates, screenings, binding material and bitumen
   c) Coarse aggregates, screenings, binding material and cement
   d) Coarse aggregates, screenings, binding material and lime

2) _____ bars are used across the longitudinal joints of cement concrete pavements.
   a) Tie bars b) Dowel bars
   c) Tie bars and dowel bars d) None of these

3) Free board is the level difference between the crown of the road at its lowest point and
   a) Rail level b) Bed level c) HFL d) Danger level

4) Heading and bench method of tunneling is used in
   a) Soft soil b) Hard rock c) Both a) and b) d) All the above

P.T.O.

5) In tunneling mucking means
   a) Blasting b) Drilling
   c) Removal of debris d) All the above

6) What is the sign for stopping sight distance on a highway at descending gradient in its formula ?
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7) For highway developments, which of the following plans were used ?
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8) For highway alignment, which of the following factor is not considered ?
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   c) Safety factor d) None

9) Which of the following part is just adjustcent to the carriage way ?
   a) Kerb b) Drainline
   c) Building line d) None

10) The background colour of informatory sign is
   a) Red b) White
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11) Aggregate impact test is carried out to determine _____ of aggregate.
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12) Application of Geosynthetics in road construction will _____ road strength.
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13) Modulus of subgrade reaction (K) is given by
   a) $K = p/\Delta$ b) $K = \Delta/p$ c) $K = \Delta.p$ d) $K = p.\Delta.0.125$

14) In rigid pavement, area of the pavement is effective in resisting the bending moment is called,
   a) Modulus of subgrade reaction
   b) Equivalent radius of resisting section
   c) Modulus of rigidity
   d) Modulus of elasticity

_____

SLR-EP – 33

Seat No.	

T.E. Civil (Part – I) (New) (CGPA) Examination, 2016
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 9-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figure on ***right*** *indicates* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

SECTION – I

2. Solve **any four** (**7** marks **each**) :

a) The load penetration values of CBR test conducted on a specimen of soil is given below :

Sr. No.	Load dial readings in division	Penetration mm
	5	0.8
	15	1
	25	1.3
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	50	2.4
	60	3
	69	4
	80	5.5
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	100	10
	107	12.5

b) In a district where rainfall is heavy, two types of road pavements are to be constructed.

a) Two lane state highway with bitu. conc.surface.

b) MDR of WBM pavement with 3.8 m wide. What should be the height of crown with respect to edges in these two cases assuming straight line camber.

c) Explain with example importance of highway transportation and development.

d) What is super elevation ? Why it is to be provided ? Derive the formula to find super elevation and write the limiting values of 'e' and 'f'.

e) Write a detail note on "volume and speed studies".

f) Enlist with sketch different types of traffic signs and signals.

g) With a neat sketch, derive the formula for O.S.D.

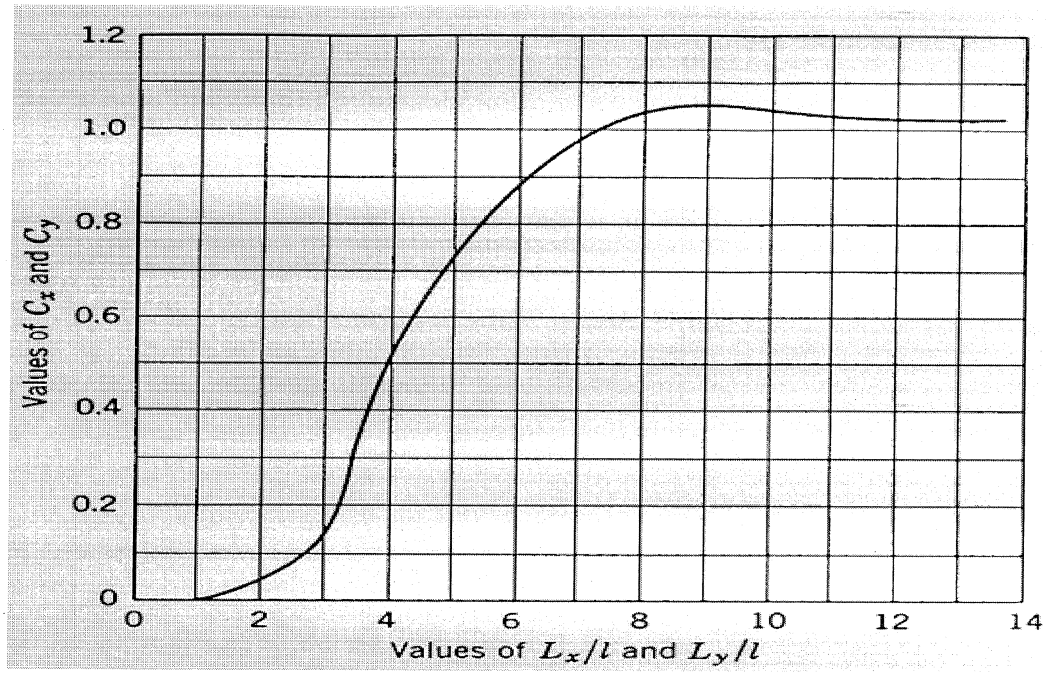
SECTION – II

3. Answer **any four** questions (**7** marks **each**) : **(7×4)**

a) Differentiate between flexible and rigid pavement.

b) Mention the specifications of materials and construction steps for Water Bound Macadam (WBM) road.

c) Determine the warping stresses at interior, edge and corner of a 25 cm thick cement concrete pavement with transverse joints at 5.0 m interval and longitudinal joints at 3.6 m intervals. The modulus of subgrade reaction K is 6.9 kg/cm^3 and radius of loaded area is 15 cm. Assume temperature differential during day to be 0.6°C per cm slab thickness (for warping stress at interior and edge) and maximum temperature differential of 0.4°C per cm slab thickness during the night (for warping stress at the corner). Assume e = 10×10^{-6} per °C, E = 3×10^5 kg/cm^2, μ = 0.15. Use Bradbury chart given in Figure – 1.



(Q. 3) c) Figure – 1

Set S

d) Find the economical span of a T-Beam bridge from the following data :

Span (m)	4m	8m	12m	15m
Approx cost of one span of superstructure (Rs.)	1,700	7,000	16,000	24,500
Approx cost of one pier with foundation (Rs.)	22,200	23,200	23,000	23,600

e) What is the importance of Afflux, Scour depth and waterway in bridge hydrology ?

f) List the different methods tunnel construction in hard rock and explain any one method with neat sketch.

g) Explain different types of tunnel lining.

———————

Set S

SLR-EP – 35

Seat No.	

Set P

T.E. (Civil) (Part – II) Examination, 2016
STRUCTURAL MECHANICS – III

Day and Date : Monday, 21-11-2016 Max. Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) Q. No. **2** in Section **I** is **compulsory**. Solve **any two** from remaining questions in Section **I**.*

*3) Solve **any three** questions from Section **II**.*

*4) **Assume** suitable data if **required**.*

*5) Figures to the **right** indicates **full** marks.*

*6) **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

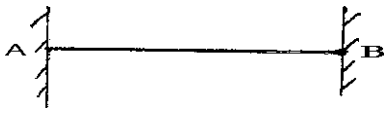
Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The degree of kinematic indeterminacy of following beam is

a) 3 b) 1 c) 4 d) 0

2) The degree of static indeterminacy of beam shown in figure is



a) 2 b) 3 c) 2 and 4 d) 4

3) Following is one of the force method
   a) Energy Method b) Stiffness Method
   c) Moment-Distribution Method d) None

4) In a linearly elastic structural element
   a) Stiffness is equal to flexibility
   b) Stiffness is inversely proportional to flexibility
   c) Stiffness is directly proportional to flexibility
   d) Stiffness is not related to flexibility

5) Strain energy due to bending of a structure is given by

a) $\int \frac{M^2}{EI} dx$ b) $\int \frac{M^2}{2EI} dx$ c) $\int \frac{M}{EI} dx$ d) $\int \frac{2M^2}{EI} dx$

P.T.O.

6) Maxwell reciprocal theorem is valid for all
   a) Statically determinant structure
   b) Structures
   c) Elastic structures
   d) Structures with linear force displacement relations

7) The degree of freedom for pin jointed plane frame is
   a) 3 b) 4 c) 6 d) 2

8) Castiglon's second theorem is used to calculate
   a) Deflection b) Unknown rotation
   c) Redundant force d) None of the above

9) Stiffness matrix is
   a) Rectangular matrix
   b) Unsymmetrical about major diagonal axis
   c) Symmetrical about major diagonal axis
   d) None of the above

10) Method of consistent deformation is
   a) Displacement method b) Equilibrium method
   c) Force method d) All of the above

11) Number of unknowns to be determined in the Stiffness method is equal to
   a) Static indeterminacy
   b) Kinematic indeterminacy
   c) Sum of static indeterminacy and kinematic indeterminacy
   d) None of these

12) Moment Distribution Method is best suited for
   a) In determinant Pin-Jointed truss b) Rigid Frame
   c) Space Frame d) Trussed Beam

13) Shape of ILD for indeterminate structure is
   a) Linear b) Nonlinear
   c) Triangular d) All of the above

14) In the Stiffness method first we obtain
   a) Force b) Displacement
   c) Torsion d) Bending Moment

15) Size of Stiffness matrix for simply supported beam is
   a) 2×2 b) 3×3 c) 4×4 d) None of these

16) MullarBreslae principle for influence line is applicable for
   a) Simple beam b) Continuous beam
   c) Redundant truss d) All of these

17) If a moment is applied to the hinged end of a prismatic propped cantilever, then moment at fixed end will be
   a) M b) M/2 c) M/3 d) M/4

18) Moment Distribution Method is developed by
   a) Hardy Cross b) Castiglones c) Betti d) Maxwell

19) Stiffness method is
   a) Displacement method b) Force method
   c) Dynamic method d) None of these

20) The carry over factor
   a) Less than 1 b) Equal to 1 c) Greater than 1 d) All of the above

SLR-EP – 35

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
STRUCTURAL MECHANICS – III

Day and Date : Monday, 21-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***2*** *in Section* ***I*** *is* ***compulsory****. Solve* ***any two*** *from remaining questions in Section* ***I****.*
2) Solve ***any three*** *questions from Section* ***II****.*
3) ***Assume*** *suitable data if* ***required****.*
4) Figures to the ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain strain energy approach to solve the beam problem.
   b) State properties of flexibility matrix.
   c) Explain difference between flexibility and stiffness matrix.
   d) Distinguish between force and displacement method.

3. Draw Bending Moment Diagram using Energy method. Refer fig. no. 1. **14**

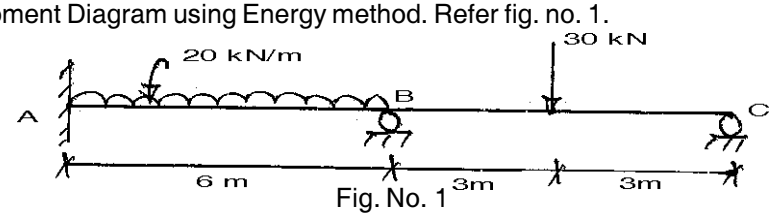


Fig. No. 1

   1) If support 'B' sinks by 10 mm 2) Take EI = 5×10^4 kN.m^2.

4. Draw Bending Moment Diagram using Consistent deformation method. Refer fig. no. 2. **14**

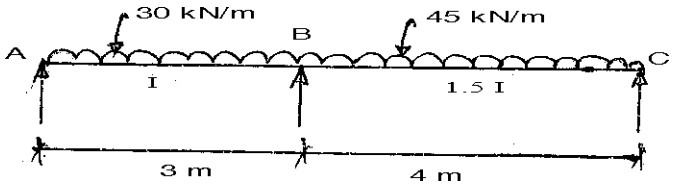


Fig. No. 2

   1) If support 'B' sinks by 5 mm 2) Take EI = 40,000 kN.m^2.

5. Analyse frame using flexibility method and draw Bending moment diagram. Refer fig. no. 3. **14**

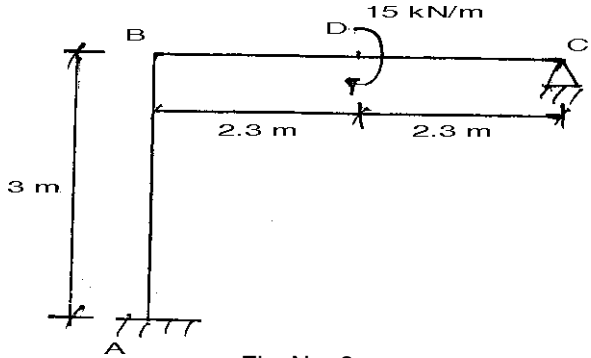


Fig. No. 3

Set P

SECTION – II

6. Draw SF and BM diagram for continuous beam with overhang as shown in figure no. 4 using Moment Distribution Method. **13**

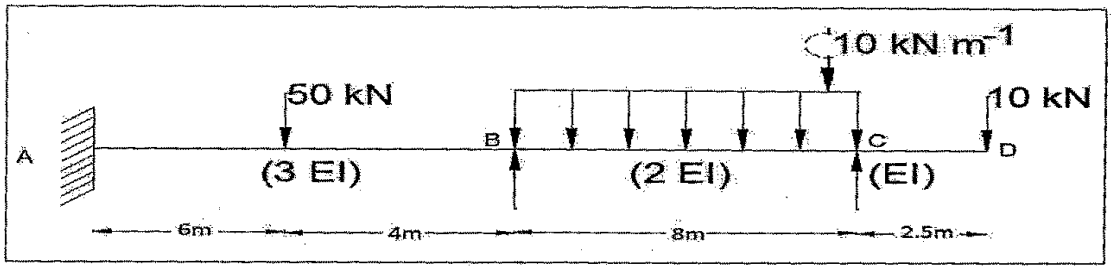


Fig. No. 4

7. Using Stiffness Method of analysis obtain the moments at the ends of member for frame as shown in figure no. 5. **14**

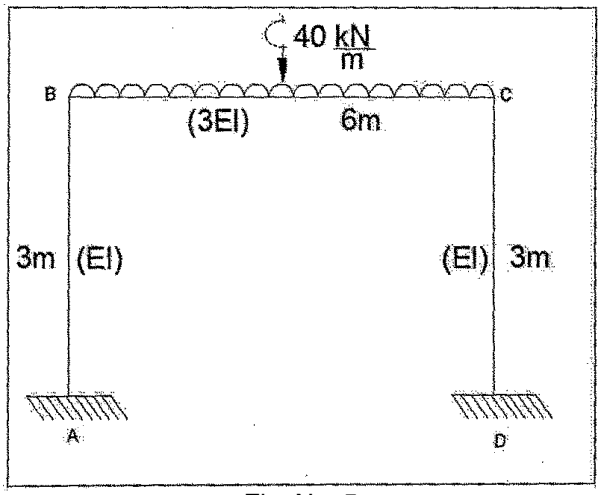


Fig. No. 5

8. Draw ILD for continuous beam as shown in figure no. 6 **13**
   a) Ra b) SF at Section D c) BM at Section D.

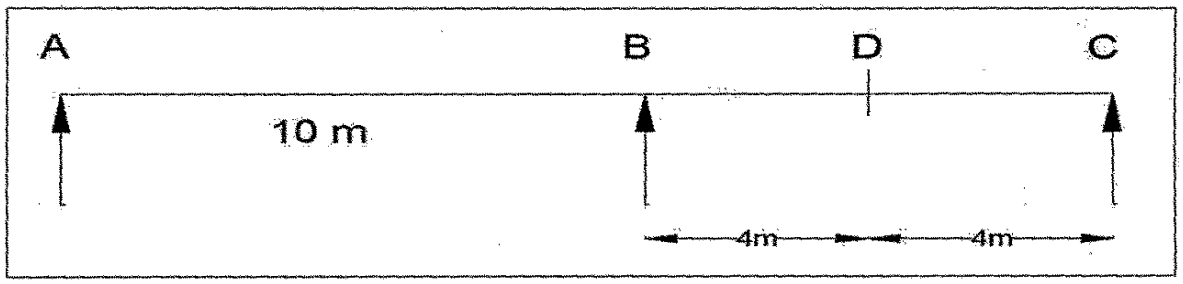


Fig. No. 6

9. Develop Stiffness Matrix for beam as shown in figure no. 7 in the direction of given ordinates. **13**

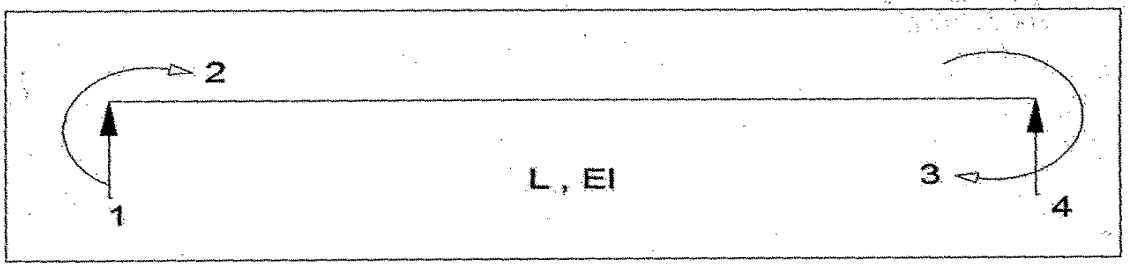


Fig. No. 7

Set P

SLR-EP – 35

Seat No.	

Set **Q**

T.E. (Civil) (Part – II) Examination, 2016
STRUCTURAL MECHANICS – III

Day and Date : Monday, 21-11-2016 Max. Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) Q. No. **2** in Section **I** is **compulsory**. Solve **any two** from remaining questions in Section **I**.*

*3) Solve **any three** questions from Section **II**.*

*4) **Assume** suitable data if **required**.*

*5) Figures to the **right** indicates **full** marks.*

*6) **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 : 20

1. Choose the correct answer : **(20×1=20)**

1) MullarBreslae principle for influence line is applicable for
   a) Simple beam b) Continuous beam
   c) Redundant truss d) All of these

2) If a moment is applied to the hinged end of a prismatic propped cantilever, then moment at fixed end will be
   a) M b) M/2 c) M/3 d) M/4

3) Moment Distribution Method is developed by
   a) Hardy Cross b) Castiglones c) Betti d) Maxwell

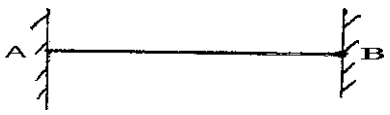
4) Stiffness method is
   a) Displacement method b) Force method
   c) Dynamic method d) None of these

5) The carry over factor
   a) Less than 1 b) Equal to 1 c) Greater than 1 d) All of the above

6) The degree of kinematic indeterminacy of following beam is

   a) 3 b) 1 c) 4 d) 0

7) The degree of static indeterminacy of beam shown in figure is



   a) 2 b) 3 c) 2 and 4 d) 4

P.T.O.

8) Following is one of the force method
   a) Energy Method
   b) Stiffness Method
   c) Moment-Distribution Method
   d) None

9) In a linearly elastic structural element
   a) Stiffness is equal to flexibility
   b) Stiffness is inversely proportional to flexibility
   c) Stiffness is directly proportional to flexibility
   d) Stiffness is not related to flexibility

10) Strain energy due to bending of a structure is given by
   a) $\int \frac{M^2}{EI} dx$
   b) $\int \frac{M^2}{2EI} dx$
   c) $\int \frac{M}{EI} dx$
   d) $\int \frac{2M^2}{EI} dx$

11) Maxwell reciprocal theorem is valid for all
   a) Statically determinant structure
   b) Structures
   c) Elastic structures
   d) Structures with linear force displacement relations

12) The degree of freedom for pin jointed plane frame is
   a) 3
   b) 4
   c) 6
   d) 2

13) Castiglon's second theorem is used to calculate
   a) Deflection
   b) Unknown rotation
   c) Redundant force
   d) None of the above

14) Stiffness matrix is
   a) Rectangular matrix
   b) Unsymmetrical about major diagonal axis
   c) Symmetrical about major diagonal axis
   d) None of the above

15) Method of consistent deformation is
   a) Displacement method
   b) Equilibrium method
   c) Force method
   d) All of the above

16) Number of unknowns to be determined in the Stiffness method is equal to
   a) Static indeterminacy
   b) Kinematic indeterminacy
   c) Sum of static indeterminacy and kinematic indeterminacy
   d) None of these

17) Moment Distribution Method is best suited for
   a) In determinant Pin-Jointed truss
   b) Rigid Frame
   c) Space Frame
   d) Trussed Beam

18) Shape of ILD for indeterminate structure is
   a) Linear
   b) Nonlinear
   c) Triangular
   d) All of the above

19) In the Stiffness method first we obtain
   a) Force
   b) Displacement
   c) Torsion
   d) Bending Moment

20) Size of Stiffness matrix for simply supported beam is
   a) 2×2
   b) 3×3
   c) 4×4
   d) None of these

SLR-EP – 35

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
STRUCTURAL MECHANICS – III

Day and Date : Monday, 21-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***2*** *in Section* ***I*** *is* ***compulsory****. Solve* ***any two*** *from remaining questions in Section* ***I****.*
2) Solve ***any three*** *questions from Section* ***II****.*
3) ***Assume*** *suitable data if* ***required****.*
4) Figures to the ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain strain energy approach to solve the beam problem.
   b) State properties of flexibility matrix.
   c) Explain difference between flexibility and stiffness matrix.
   d) Distinguish between force and displacement method.

3. Draw Bending Moment Diagram using Energy method. Refer fig. no. 1. **14**

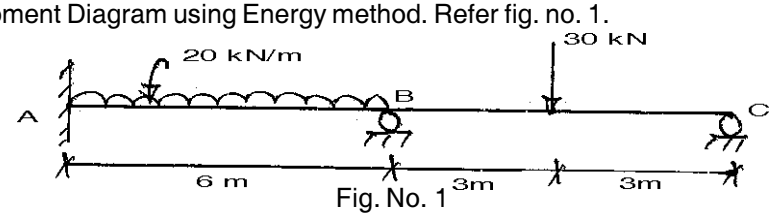


Fig. No. 1

   1) If support 'B' sinks by 10 mm 2) Take EI = 5×10^4 kN.m^2.

4. Draw Bending Moment Diagram using Consistent deformation method. Refer fig. no. 2. **14**

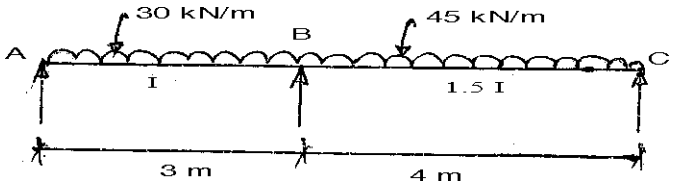


Fig. No. 2

   1) If support 'B' sinks by 5 mm 2) Take EI = 40,000 kN.m^2.

5. Analyse frame using flexibility method and draw Bending moment diagram. Refer fig. no. 3. **14**

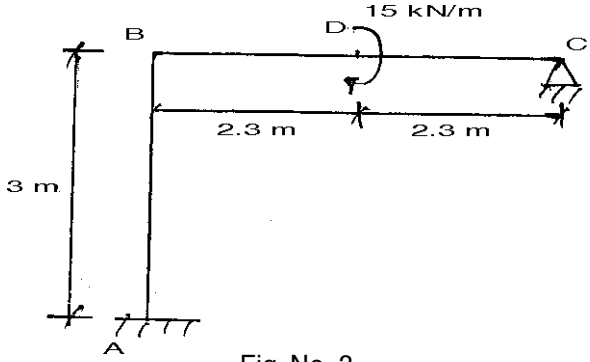


Fig. No. 3

Set Q

SECTION – II

6. Draw SF and BM diagram for continuous beam with overhang as shown in figure no. 4 using Moment Distribution Method. **13**

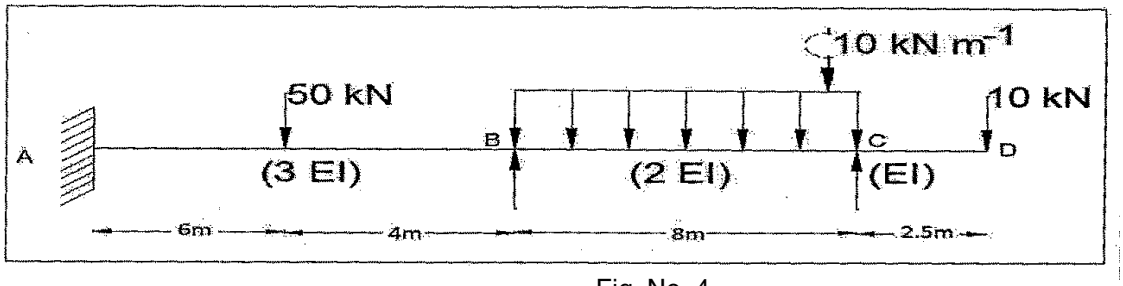


Fig. No. 4

7. Using Stiffness Method of analysis obtain the moments at the ends of member for frame as shown in figure no. 5. **14**

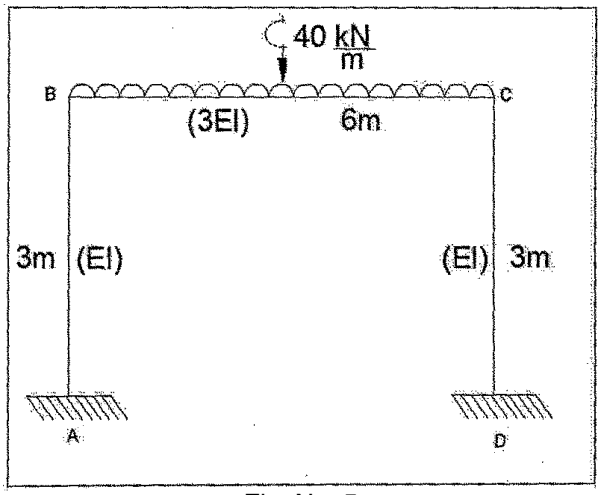


Fig. No. 5

8. Draw ILD for continuous beam as shown in figure no. 6 **13**
   a) Ra b) SF at Section D c) BM at Section D.

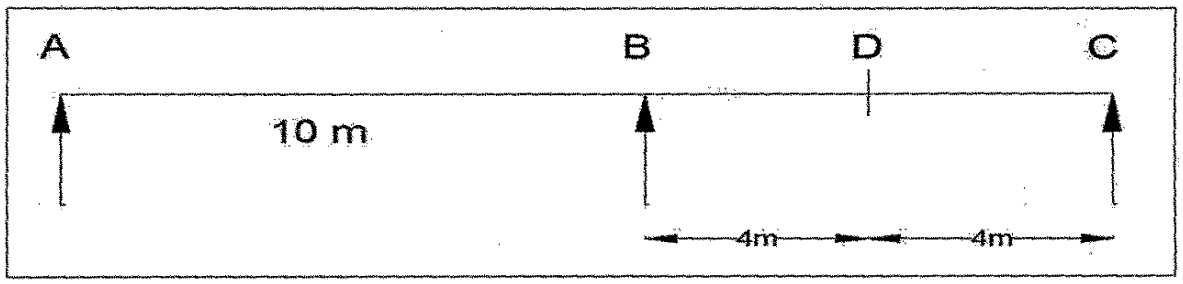


Fig. No. 6

9. Develop Stiffness Matrix for beam as shown in figure no. 7 in the direction of given ordinates. **13**

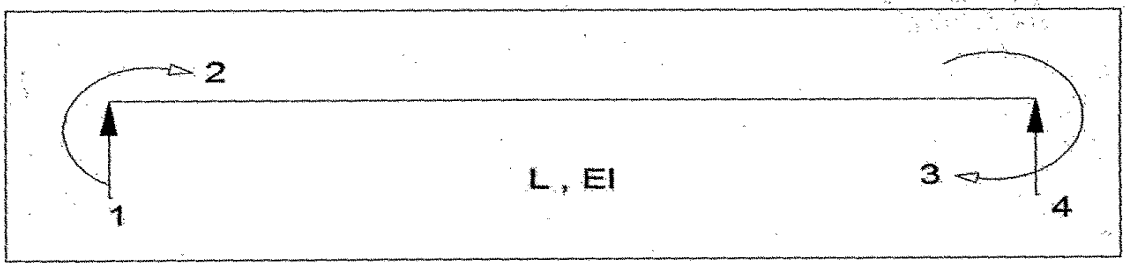


Fig. No. 7

Set Q

SLR-EP – 35

Seat No.	

Set R

T.E. (Civil) (Part – II) Examination, 2016
STRUCTURAL MECHANICS – III

Day and Date : Monday, 21-11-2016 Max. Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) Q. No. **2** in Section **I** is **compulsory**. Solve **any two** from remaining questions in Section **I**.*

*3) Solve **any three** questions from Section **II**.*

*4) **Assume** suitable data if **required**.*

*5) Figures to the **right** indicates **full** marks.*

*6) **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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Number of unknowns to be determined in the Stiffness method is equal to
   a) Static indeterminacy
   b) Kinematic indeterminacy
   c) Sum of static indeterminacy and kinematic indeterminacy
   d) None of these

2) Moment Distribution Method is best suited for
   a) In determinant Pin-Jointed truss b) Rigid Frame
   c) Space Frame d) Trussed Beam

3) Shape of ILD for indeterminate structure is
   a) Linear b) Nonlinear
   c) Triangular d) All of the above

4) In the Stiffness method first we obtain
   a) Force b) Displacement
   c) Torsion d) Bending Moment

5) Size of Stiffness matrix for simply supported beam is
   a) 2 × 2 b) 3 × 3 c) 4 × 4 d) None of these

6) MullarBreslae principle for influence line is applicable for
   a) Simple beam b) Continuous beam
   c) Redundant truss d) All of these

7) If a moment is applied to the hinged end of a prismatic propped cantilever, then moment at fixed end will be
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8) Moment Distribution Method is developed by
   a) Hardy Cross b) Castiglones c) Betti d) Maxwell

P.T.O.

9) Stiffness method is
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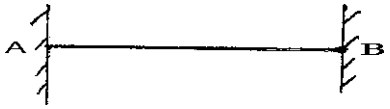
   b) Force method
   c) Dynamic method
   d) None of these

10) The carry over factor
   a) Less than 1
   b) Equal to 1
   c) Greater than 1
   d) All of the above

11) The degree of kinematic indeterminacy of following beam is

   a) 3
   b) 1
   c) 4
   d) 0

12) The degree of static indeterminacy of beam shown in figure is



   a) 2
   b) 3
   c) 2 and 4
   d) 4

13) Following is one of the force method
   a) Energy Method
   b) Stiffness Method
   c) Moment-Distribution Method
   d) None

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   d) Structures with linear force displacement relations

17) The degree of freedom for pin jointed plane frame is
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   b) 4
   c) 6
   d) 2

18) Castiglon's second theorem is used to calculate
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   b) Unknown rotation
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19) Stiffness matrix is
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   b) Unsymmetrical about major diagonal axis
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   d) None of the above

20) Method of consistent deformation is
   a) Displacement method
   b) Equilibrium method
   c) Force method
   d) All of the above

SLR-EP – 35

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
STRUCTURAL MECHANICS – III

Day and Date : Monday, 21-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***2*** *in Section* ***I*** *is* ***compulsory****. Solve* ***any two*** *from remaining questions in Section* ***I****.*
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SECTION – I

2. Solve **any three** : **(4×3=12)**
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   d) Distinguish between force and displacement method.

3. Draw Bending Moment Diagram using Energy method. Refer fig. no. 1. **14**

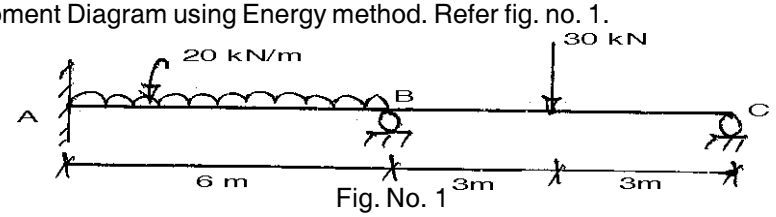

Fig. No. 1

   1) If support 'B' sinks by 10 mm 2) Take EI = 5×10^4 kN.m^2.

4. Draw Bending Moment Diagram using Consistent deformation method. Refer fig. no. 2. **14**

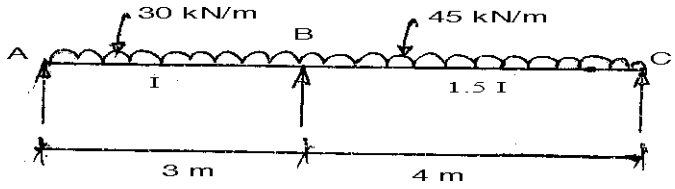

Fig. No. 2

   1) If support 'B' sinks by 5 mm 2) Take EI = 40,000 kN.m^2.

5. Analyse frame using flexibility method and draw Bending moment diagram. Refer fig. no. 3. **14**

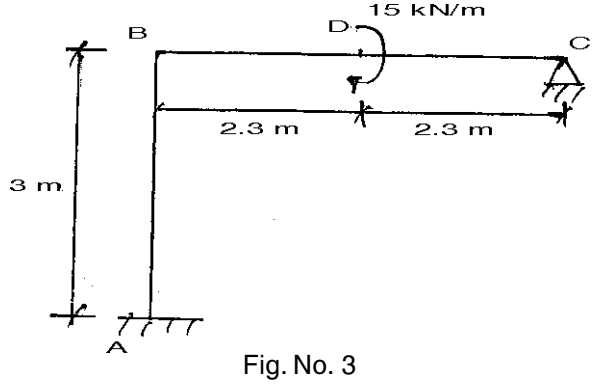

Fig. No. 3

Set R

SECTION – II

6. Draw SF and BM diagram for continuous beam with overhang as shown in figure no. 4 using Moment Distribution Method. **13**

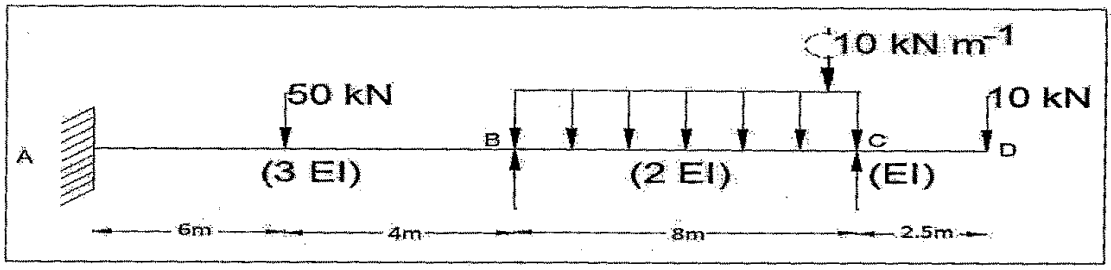

Fig. No. 4

7. Using Stiffness Method of analysis obtain the moments at the ends of member for frame as shown in figure no. 5. **14**

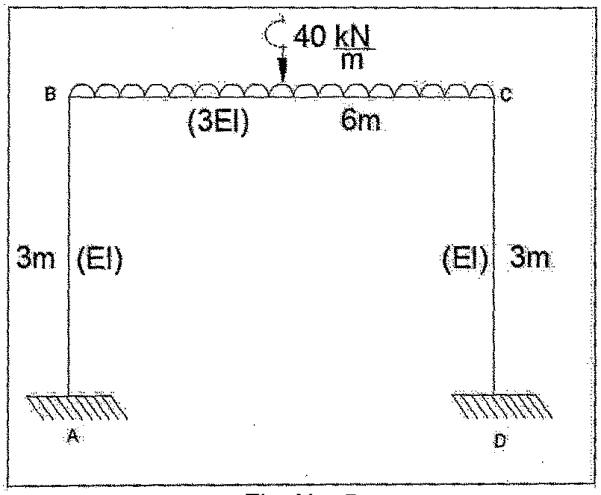

Fig. No. 5

8. Draw ILD for continuous beam as shown in figure no. 6 **13**
   a) Ra b) SF at Section D c) BM at Section D.

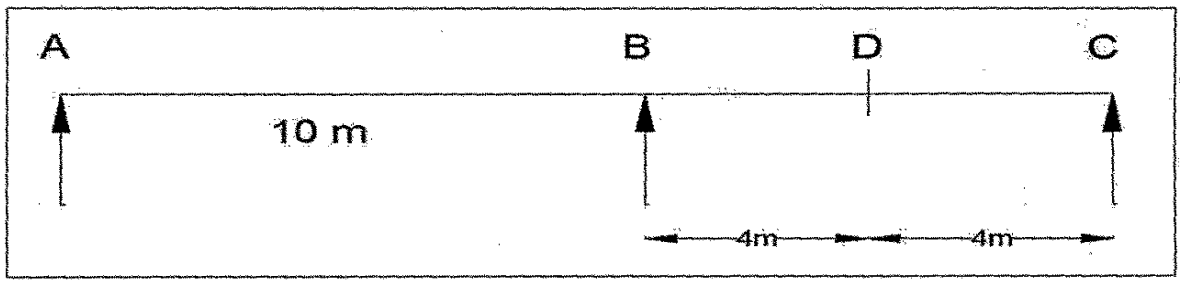

Fig. No. 6

9. Develop Stiffness Matrix for beam as shown in figure no. 7 in the direction of given ordinates. **13**

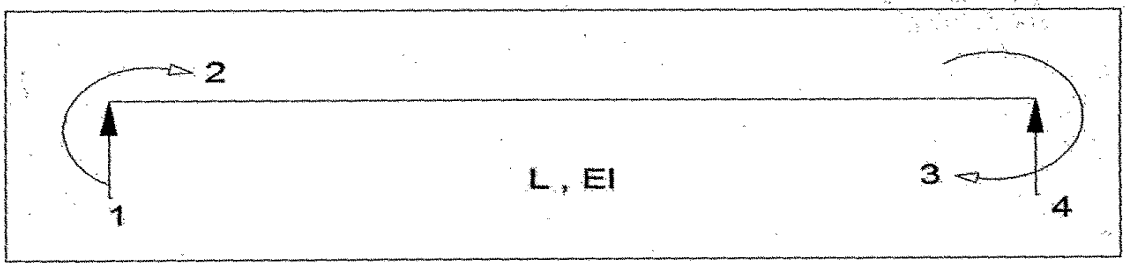

Fig. No. 7

———————

Set R

SLR-EP – 35

Seat No.	

Set **S**

T.E. (Civil) (Part – II) Examination, 2016
STRUCTURAL MECHANICS – III

Day and Date : Monday, 21-11-2016 Max. Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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4) ***Assume*** *suitable data if* ***required****.*

5) Figures to the ***right*** *indicates* ***full*** *marks.*

6) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Maxwell reciprocal theorem is valid for all
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   b) Structures
   c) Elastic structures
   d) Structures with linear force displacement relations

2) The degree of freedom for pin jointed plane frame is
   a) 3 b) 4 c) 6 d) 2

3) Castiglon's second theorem is used to calculate
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   c) Sum of static indeterminacy and kinematic indeterminacy
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7) Moment Distribution Method is best suited for
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P.T.O.

8) Shape of ILD for indeterminate structure is
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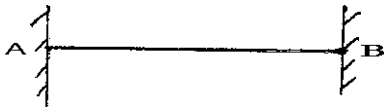

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SLR-EP – 35

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
STRUCTURAL MECHANICS – III

Day and Date : Monday, 21-11-2016 Marks : 80

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SECTION – I

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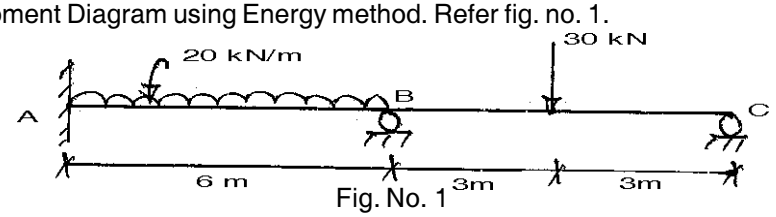

Fig. No. 1

   1) If support 'B' sinks by 10 mm 2) Take EI = 5×10^4 kN.m^2.

4. Draw Bending Moment Diagram using Consistent deformation method. Refer fig. no. 2. **14**

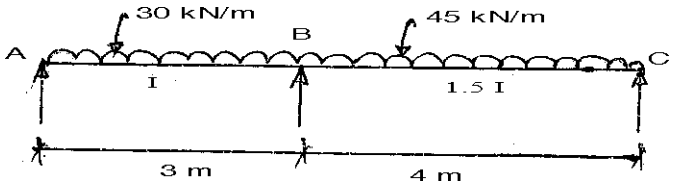

Fig. No. 2

   1) If support 'B' sinks by 5 mm 2) Take EI = 40,000 kN.m^2.

5. Analyse frame using flexibility method and draw Bending moment diagram. Refer fig. no. 3. **14**

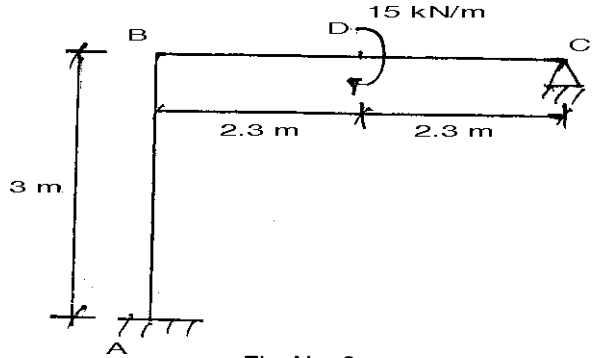

Fig. No. 3

Set S

SECTION – II

6. Draw SF and BM diagram for continuous beam with overhang as shown in figure no. 4 using Moment Distribution Method. **13**

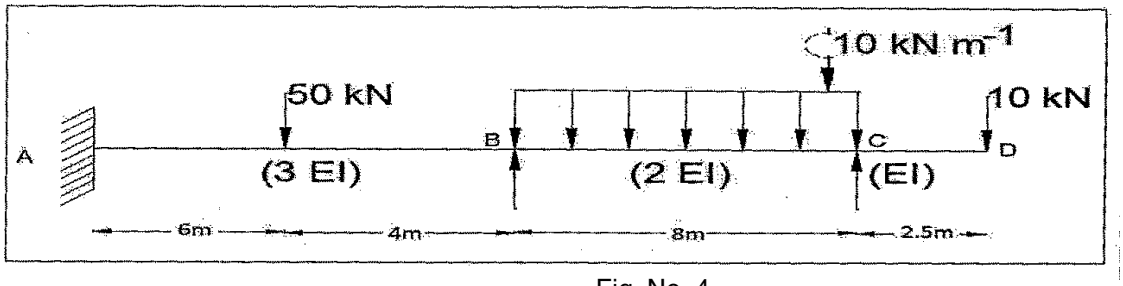

Fig. No. 4

7. Using Stiffness Method of analysis obtain the moments at the ends of member for frame as shown in figure no. 5. **14**

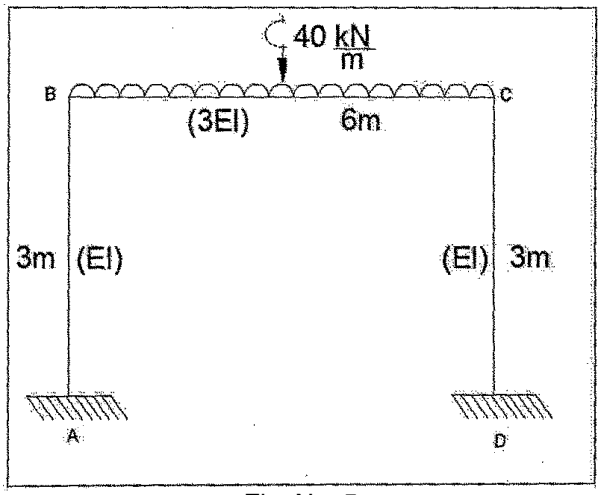

Fig. No. 5

8. Draw ILD for continuous beam as shown in figure no. 6 **13**
   a) Ra b) SF at Section D c) BM at Section D.

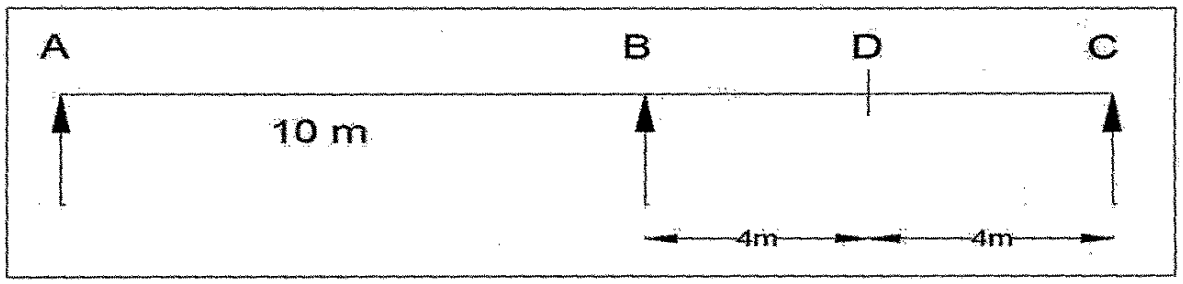

Fig. No. 6

9. Develop Stiffness Matrix for beam as shown in figure no. 7 in the direction of given ordinates. **13**

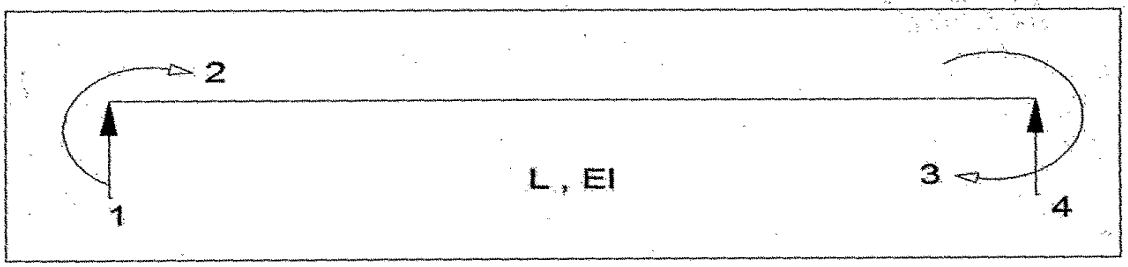

Fig. No. 7

Set S

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Seat No.	

Set P

T.E. (Civil) (Part – II) Examination, 2016
GEOTECHNICAL ENGINEERING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) *Figures to the **right** indicate **full** marks.*
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4) *Assume additional data if **required** and mention it **clearly**.*
5) *Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
6) ***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 : 20

I. Choose the correct option :

1) Mineral present in expansive soil is **1**
   a) Illite b) Montmorillonite c) Kaolonite d) None

2) For undisturbed samples the area ratio of sampler should be **1**
   a) 0% b) <10% c) >10% d) 10 % to 20%

3) If RQD of the sample is 47% then quality of this sample is **1**
   a) Poor b) Good c) Very good d) Fair

4) Dilatancy correction is applied to SPT test results when **1**
   a) Soil is silty sand
   b) Water table is present above test level
   c) Value of SPT corrected for overburden is more than 15
   d) All

5) Shape factor for weight term (Sr) in case of Terzaghi's equation for square footing is **1**
   a) 1.0 b) 1.3 c) 0.6 d) 0.8

6) Effect of uniform settlement on the structure is **1**
   a) No effect b) Effect on utility services
   c) Develop cracks in the structures d) Leads to failure of structure

7) Terzaghi's local shear parameter, N'_c, N'_q and N'_r values for $\varphi = 0$ **1**
   a) 0, 0, 0 b) 5.14, 0, 0 c) 5.7, 0, 0 d) 5.7, 1.0, 0.0

P.T.O.

8) Second zone of failure under the footing is **1**
   a) Elastic zone b) Plastic zone
   c) Rankine's passive zone d) None

9) In case of plate load test seating load to be applied is **1**
   a) 5 kPa b) 10 kPa c) 7 kPa d) none

10) Mass of rammer used in SPT test is **1**
   a) 25 kg b) 65 kg c) 75 kg d) 45 kg

11) When the two column loads are unequal, with the outer column carrying heavier load and there is a space limitation beyond the outer column, which of the following combined footing is adopted ? **1**
   a) Rectangular footing b) Trapezoidal footing
   c) Mat foundation d) Strip footing

12) Three piles are arranged in a triangular form, efficiency of pile group by Feld's rule **2**
   a) 33.33% b) 50% c) 75% d) 87.5%

13) Arrange the order of various stages of construction of under reamed pile foundation **2**
   1. Concreting pile cap
   2. Boring by Auger
   3. Placing reinforcement cage in position
   4. Under reaming by under reamer
   5. Concreting pile
   a) 4, 5, 2, 3, 1 b) 2, 4, 3, 5, 1 c) 2, 3, 4, 5, 1 d) 2, 3, 5, 4, 1

14) The bottom plug in well foundation is usually made up of **1**
   a) Brick Masonry b) RCC
   c) Cement concrete d) None

15) The critical force system to be considered for stability of well foundation is **1**
   a) Vertical direction
   b) Direction perpendicular to water flow
   c) Direction parallel to water flow
   d) Horizontal direction

16) Identify the incorrect statement. A sheet pile may fail in any one of the following ways **1**
   a) Forward movement of the base b) Failure by bending
   c) Failure by shear d) Failure by anchors

17) Any slope of great extent with uniform soil condition at any given depth below the surface is termed as **1**
   a) Flexible slope b) Rigid slope c) Finite slope d) Infinite slope

18) In slope stability analysis by friction circle method, the radius of friction circle is given by **1**
   a) K r cos φ b) K r sin φ c) K r sec φ d) K r tan φ

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SLR-EP – 36

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
GEOTECHNICAL ENGINEERING – II

Day and Date : Tuesday, 22-11-2016 Marks : 80
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*3) Answer **any three** questions out of Q. **VI**, Q. **VII**, Q. **VIII** and Q. **IX**.*
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SECTION – I

II. a) Explain wash boring with the help of neat labelled sketch. **5**

b) A strip footing of width 2.5 m is placed at a depth of 2 m below ground level in a soil having following properties $\gamma = 18$ kN/m^3, C = 24 kPa and $\varphi = 30^\circ$ how much load this footing can carry safely with a factor of safety of 2.5. Use IS code method, assume local shear failure, water table is at large depth and for $\varphi = 30^\circ$ IS code Bearing capacity factors are $N'_c = 16$, $N'_q = 8.4$ and $N'_r = 7.3$. **7**

III. a) List the assumptions made by Terzaghi's in derivation of bearing capacity equation. **5**

b) Determine factor of safety for a square footing of size 1.5 m carrying a load of 900 kN which is located at a depth of 1.3 m below the ground in a soil having following properties e = 0.55, G = 2.67, S_r = 50%, c = 8 kPa, $\varphi = 30^\circ$. Use Terzaghi's analysis assuming general shear failure for $\varphi = 30^\circ$ Terzaghi's Bearing capacity factors are $N_c = 37.2$, $N_q = 22.5$ and $N_r = 19.7$. **7**

IV. a) What is collapsible soil, what are the precautions to be taken when collapsible soil is encountered during foundation construction ? **6**

b) Explain with a neat sketch function of geotextiles in road construction. **6**

V. Write short notes on following : **16**

a) Rock quality designation.

b) Depth of boring for soil exploration.

c) General shear failure.

d) Plate load test.

SECTION – II

VI. a) Explain different types of shallow foundations with neat sketches. **7**

b) A trapezoidal footing is to be provided to support two square columns of 30 cm and 50 cm sides respectively, columns are 6.4 m apart centre to centre. Safe bearing capacity of soil is 400 kN/m^2. The bigger column carries 5000 kN and the smaller 3000 kN. Design a suitable size of footing so that it does not extend beyond the faces of column. **7**

VII. a) A Group of 9 piles arranged in a square pattern with diameter and length of each pile as 25 cm and 10 m respectively is used as a foundation in soft clay deposit. Taking unconfined compressive strength of clay as 120 kN/m^2 and the pile spacing as 100 cm centre to centre, find the load capacity of pile group. Assume bearing capacity factor Nc = 9 and adhesive factor = 0.75. Factor of safety = 2.5. **7**

b) Explain design and construction of under reamed pile with neat sketch. **6**

VIII. a) Determine the depth of embedment of cantilever sheet pile which has to retain clay of unit weight 17 kN/m^3 and unconfined compressive strength 70 kN/m^2. The height of backfill soil is 6 m. The soil below dredge line also clay of same properties. **7**

b) With the help of neat sketch explain cellular type cofferdam and diaphragm type cofferdam. **6**

IX. a) Write a note on Taylor's stability number. **6**

b) Calculate the factor of safety with respect to cohesion of a clay slope, laid at 1 in 2 to a height of 10 m. If the angle of internal friction = 10°, cohesion = 25 kN/m^2, unit weight = 19 kN/m^3. What will be the critical height of the slope in this soil ? Take Sn = 0.064. **7**

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Seat No.	

Set Q

T.E. (Civil) (Part – II) Examination, 2016
GEOTECHNICAL ENGINEERING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

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*6) **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 : 20

I. Choose the correct option :

1) Second zone of failure under the footing is **1**
   a) Elastic zone b) Plastic zone
   c) Rankine's passive zone d) None

2) In case of plate load test seating load to be applied is **1**
   a) 5 kPa b) 10 kPa c) 7 kPa d) none

3) Mass of rammer used in SPT test is **1**
   a) 25 kg b) 65 kg c) 75 kg d) 45 kg

4) When the two column loads are unequal, with the outer column carrying heavier load and there is a space limitation beyond the outer column, which of the following combined footing is adopted ? **1**
   a) Rectangular footing b) Trapezoidal footing
   c) Mat foundation d) Strip footing

5) Three piles are arranged in a triangular form, efficiency of pile group by Feld's rule **2**
   a) 33.33% b) 50% c) 75% d) 87.5%

6) Arrange the order of various stages of construction of under reamed pile foundation **2**
   1. Concreting pile cap
   2. Boring by Auger
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   4. Under reaming by under reamer
   5. Concreting pile
   a) 4, 5, 2, 3, 1 b) 2, 4, 3, 5, 1 c) 2, 3, 4, 5, 1 d) 2, 3, 5, 4, 1

P.T.O.

7) The bottom plug in well foundation is usually made up of **1**
   a) Brick Masonry b) RCC
   c) Cement concrete d) None

8) The critical force system to be considered for stability of well foundation is **1**
   a) Vertical direction
   b) Direction perpendicular to water flow
   c) Direction parallel to water flow
   d) Horizontal direction

9) Identify the incorrect statement. A sheet pile may fail in any one of the following ways **1**
   a) Forward movement of the base b) Failure by bending
   c) Failure by shear d) Failure by anchors

10) Any slope of great extent with uniform soil condition at any given depth below the surface is termed as **1**
   a) Flexible slope b) Rigid slope c) Finite slope d) Infinite slope

11) In slope stability analysis by friction circle method, the radius of friction circle is given by **1**
   a) K r cos φ b) K r sin φ c) K r sec φ d) K r tan φ

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13) For undisturbed samples the area ratio of sampler should be **1**
   a) 0% b) <10% c) >10% d) 10 % to 20%

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   b) Water table is present above test level
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16) Shape factor for weight term (Sr) in case of Terzaghi's equation for square footing is **1**
   a) 1.0 b) 1.3 c) 0.6 d) 0.8

17) Effect of uniform settlement on the structure is **1**
   a) No effect b) Effect on utility services
   c) Develop cracks in the structures d) Leads to failure of structure

18) Terzaghi's local shear parameter, N'_c, N'_q and N'_r values for $\varphi = 0$ **1**
   a) 0, 0, 0 b) 5.14, 0, 0 c) 5.7, 0, 0 d) 5.7, 1.0, 0.0

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Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
GEOTECHNICAL ENGINEERING – II

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

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4) Assume additional data if ***required*** *and mention it* ***clearly****.*

SECTION – I

II. a) Explain wash boring with the help of neat labelled sketch. **5**

b) A strip footing of width 2.5 m is placed at a depth of 2 m below ground level in a soil having following properties $\gamma = 18$ kN/m^3, C = 24 kPa and $\varphi = 30^\circ$ how much load this footing can carry safely with a factor of safety of 2.5. Use IS code method, assume local shear failure, water table is at large depth and for $\varphi = 30^\circ$ IS code Bearing capacity factors are $N'_c = 16$, $N'_q = 8.4$ and $N'_r = 7.3$. **7**

III. a) List the assumptions made by Terzaghi's in derivation of bearing capacity equation. **5**

b) Determine factor of safety for a square footing of size 1.5 m carrying a load of 900 kN which is located at a depth of 1.3 m below the ground in a soil having following properties e = 0.55, G = 2.67, S_r = 50%, c = 8 kPa, $\varphi = 30^\circ$. Use Terzaghi's analysis assuming general shear failure for $\varphi = 30^\circ$ Terzaghi's Bearing capacity factors are $N_c = 37.2$, $N_q = 22.5$ and $N_r = 19.7$. **7**

IV. a) What is collapsible soil, what are the precautions to be taken when collapsible soil is encountered during foundation construction ? **6**

b) Explain with a neat sketch function of geotextiles in road construction. **6**

V. Write short notes on following : **16**

a) Rock quality designation.

b) Depth of boring for soil exploration.

c) General shear failure.

d) Plate load test.

Set Q

SECTION – II

VI. a) Explain different types of shallow foundations with neat sketches. **7**

b) A trapezoidal footing is to be provided to support two square columns of 30 cm and 50 cm sides respectively, columns are 6.4 m apart centre to centre. Safe bearing capacity of soil is 400 kN/m^2. The bigger column carries 5000 kN and the smaller 3000 kN. Design a suitable size of footing so that it does not extend beyond the faces of column. **7**

VII. a) A Group of 9 piles arranged in a square pattern with diameter and length of each pile as 25 cm and 10 m respectively is used as a foundation in soft clay deposit. Taking unconfined compressive strength of clay as 120 kN/m^2 and the pile spacing as 100 cm centre to centre, find the load capacity of pile group. Assume bearing capacity factor Nc = 9 and adhesive factor = 0.75. Factor of safety = 2.5. **7**

b) Explain design and construction of under reamed pile with neat sketch. **6**

VIII. a) Determine the depth of embedment of cantilever sheet pile which has to retain clay of unit weight 17 kN/m^3 and unconfined compressive strength 70 kN/m^2. The height of backfill soil is 6 m. The soil below dredge line also clay of same properties. **7**

b) With the help of neat sketch explain cellular type cofferdam and diaphragm type cofferdam. **6**

IX. a) Write a note on Taylor's stability number. **6**

b) Calculate the factor of safety with respect to cohesion of a clay slope, laid at 1 in 2 to a height of 10 m. If the angle of internal friction = 10°, cohesion = 25 kN/m^2, unit weight = 19 kN/m^3. What will be the critical height of the slope in this soil ? Take Sn = 0.064. **7**

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Seat No.	

Set R

T.E. (Civil) (Part – II) Examination, 2016
GEOTECHNICAL ENGINEERING – II

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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1) Three piles are arranged in a triangular form, efficiency of pile group by Feld's rule **2**
   a) 33.33% b) 50% c) 75% d) 87.5%

2) Arrange the order of various stages of construction of under reamed pile foundation **2**
   1. Concreting pile cap
   2. Boring by Auger
   3. Placing reinforcement cage in position
   4. Under reaming by under reamer
   5. Concreting pile
   a) 4, 5, 2, 3, 1 b) 2, 4, 3, 5, 1 c) 2, 3, 4, 5, 1 d) 2, 3, 5, 4, 1

3) The bottom plug in well foundation is usually made up of **1**
   a) Brick Masonry b) RCC
   c) Cement concrete d) None

4) The critical force system to be considered for stability of well foundation is **1**
   a) Vertical direction
   b) Direction perpendicular to water flow
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5) Identify the incorrect statement. A sheet pile may fail in any one of the following ways **1**
   a) Forward movement of the base b) Failure by bending
   c) Failure by shear d) Failure by anchors

P.T.O.

6) Any slope of great extent with uniform soil condition at any given depth below the surface is termed as **1**
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7) In slope stability analysis by friction circle method, the radius of friction circle is given by **1**
   a) K r cos φ b) K r sin φ c) K r sec φ d) K r tan φ

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14) Terzaghi's local shear parameter, N'_c, N'_q and N'_r values for $\varphi = 0$ **1**
   a) 0, 0, 0 b) 5.14, 0, 0 c) 5.7, 0, 0 d) 5.7, 1.0, 0.0

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   a) 25 kg b) 65 kg c) 75 kg d) 45 kg

18) When the two column loads are unequal, with the outer column carrying heavier load and there is a space limitation beyond the outer column, which of the following combined footing is adopted ? **1**
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Seat No.	

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SECTION – I

II. a) Explain wash boring with the help of neat labelled sketch. **5**

b) A strip footing of width 2.5 m is placed at a depth of 2 m below ground level in a soil having following properties $\gamma = 18$ kN/m^3, C = 24 kPa and $\varphi = 30^\circ$ how much load this footing can carry safely with a factor of safety of 2.5. Use IS code method, assume local shear failure, water table is at large depth and for $\varphi = 30^\circ$ IS code Bearing capacity factors are $N'_c = 16$, $N'_q = 8.4$ and $N'_r = 7.3$. **7**

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IV. a) What is collapsible soil, what are the precautions to be taken when collapsible soil is encountered during foundation construction ? **6**

b) Explain with a neat sketch function of geotextiles in road construction. **6**

V. Write short notes on following : **16**

a) Rock quality designation.

b) Depth of boring for soil exploration.

c) General shear failure.

d) Plate load test.

Set R

SECTION – II

VI. a) Explain different types of shallow foundations with neat sketches. **7**

b) A trapezoidal footing is to be provided to support two square columns of 30 cm and 50 cm sides respectively, columns are 6.4 m apart centre to centre. Safe bearing capacity of soil is 400 kN/m^2. The bigger column carries 5000 kN and the smaller 3000 kN. Design a suitable size of footing so that it does not extend beyond the faces of column. **7**

VII. a) A Group of 9 piles arranged in a square pattern with diameter and length of each pile as 25 cm and 10 m respectively is used as a foundation in soft clay deposit. Taking unconfined compressive strength of clay as 120 kN/m^2 and the pile spacing as 100 cm centre to centre, find the load capacity of pile group. Assume bearing capacity factor Nc = 9 and adhesive factor = 0.75. Factor of safety = 2.5. **7**

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VIII. a) Determine the depth of embedment of cantilever sheet pile which has to retain clay of unit weight 17 kN/m^3 and unconfined compressive strength 70 kN/m^2. The height of backfill soil is 6 m. The soil below dredge line also clay of same properties. **7**

b) With the help of neat sketch explain cellular type cofferdam and diaphragm type cofferdam. **6**

IX. a) Write a note on Taylor's stability number. **6**

b) Calculate the factor of safety with respect to cohesion of a clay slope, laid at 1 in 2 to a height of 10 m. If the angle of internal friction = 10°, cohesion = 25 kN/m^2, unit weight = 19 kN/m^3. What will be the critical height of the slope in this soil ? Take Sn = 0.064. **7**

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Seat No.	

Set S

T.E. (Civil) (Part – II) Examination, 2016
GEOTECHNICAL ENGINEERING – II

Day and Date : Tuesday, 22-11-2016 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Q. V is **compulsory**; Answer **any two** questions out of Q. **II**, Q. **III** and Q. **IV**.*
*3) Answer **any three** questions out of Q. **VI**, Q. **VII**, Q. **VIII** and Q. **IX**.*
*4) Assume additional data if **required** and mention it **clearly**.*
*5) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*6) **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 : 20

I. Choose the correct option :

1) Identify the incorrect statement. A sheet pile may fail in any one of the following ways **1**
   a) Forward movement of the base b) Failure by bending
   c) Failure by shear d) Failure by anchors

2) Any slope of great extent with uniform soil condition at any given depth below the surface is termed as **1**
   a) Flexible slope b) Rigid slope c) Finite slope d) Infinite slope

3) In slope stability analysis by friction circle method, the radius of friction circle is given by **1**
   a) K r cos φ b) K r sin φ c) K r sec φ d) K r tan φ

4) Mineral present in expansive soil is **1**
   a) Illite b) Montmorillonite c) Kaolonite d) None

5) For undisturbed samples the area ratio of sampler should be **1**
   a) 0% b) <10% c) >10% d) 10 % to 20%

6) If RQD of the sample is 47% then quality of this sample is **1**
   a) Poor b) Good c) Very good d) Fair

7) Dilatancy correction is applied to SPT test results when **1**
   a) Soil is silty sand
   b) Water table is present above test level
   c) Value of SPT corrected for overburden is more than 15
   d) All

P.T.O.

8) Shape factor for weight term (Sr) in case of Terzaghi's equation for square footing is **1**
   a) 1.0 b) 1.3 c) 0.6 d) 0.8

9) Effect of uniform settlement on the structure is **1**
   a) No effect b) Effect on utility services
   c) Develop cracks in the structures d) Leads to failure of structure

10) Terzaghi's local shear parameter, N'_c, N'_q and N'_r values for $\varphi = 0$ **1**
   a) 0, 0, 0 b) 5.14, 0, 0 c) 5.7, 0, 0 d) 5.7, 1.0, 0.0

11) Second zone of failure under the footing is **1**
   a) Elastic zone b) Plastic zone
   c) Rankine's passive zone d) None

12) In case of plate load test seating load to be applied is **1**
   a) 5 kPa b) 10 kPa c) 7 kPa d) none

13) Mass of rammer used in SPT test is **1**
   a) 25 kg b) 65 kg c) 75 kg d) 45 kg

14) When the two column loads are unequal, with the outer column carrying heavier load and there is a space limitation beyond the outer column, which of the following combined footing is adopted ? **1**
   a) Rectangular footing b) Trapezoidal footing
   c) Mat foundation d) Strip footing

15) Three piles are arranged in a triangular form, efficiency of pile group by Feld's rule **2**
   a) 33.33% b) 50% c) 75% d) 87.5%

16) Arrange the order of various stages of construction of under reamed pile foundation **2**
   1. Concreting pile cap
   2. Boring by Auger
   3. Placing reinforcement cage in position
   4. Under reaming by under reamer
   5. Concreting pile
   a) 4, 5, 2, 3, 1 b) 2, 4, 3, 5, 1 c) 2, 3, 4, 5, 1 d) 2, 3, 5, 4, 1

17) The bottom plug in well foundation is usually made up of **1**
   a) Brick Masonry b) RCC
   c) Cement concrete d) None

18) The critical force system to be considered for stability of well foundation is **1**
   a) Vertical direction
   b) Direction perpendicular to water flow
   c) Direction parallel to water flow
   d) Horizontal direction

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Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
GEOTECHNICAL ENGINEERING – II

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3) Answer ***any three*** *questions out of Q.* ***VI****, Q.* ***VII****, Q.* ***VIII*** *and Q.* ***IX****.*
4) Assume additional data if ***required*** *and mention it* ***clearly****.*

SECTION – I

II. a) Explain wash boring with the help of neat labelled sketch. **5**

b) A strip footing of width 2.5 m is placed at a depth of 2 m below ground level in a soil having following properties $\gamma = 18$ kN/m^3, C = 24 kPa and $\varphi = 30^\circ$ how much load this footing can carry safely with a factor of safety of 2.5. Use IS code method, assume local shear failure, water table is at large depth and for $\varphi = 30^\circ$ IS code Bearing capacity factors are $N'_c = 16$, $N'_q = 8.4$ and $N'_r = 7.3$. **7**

III. a) List the assumptions made by Terzaghi's in derivation of bearing capacity equation. **5**

b) Determine factor of safety for a square footing of size 1.5 m carrying a load of 900 kN which is located at a depth of 1.3 m below the ground in a soil having following properties e = 0.55, G = 2.67, S_r = 50%, c = 8 kPa, $\varphi = 30^\circ$. Use Terzaghi's analysis assuming general shear failure for $\varphi = 30^\circ$ Terzaghi's Bearing capacity factors are $N_c = 37.2$, $N_q = 22.5$ and $N_r = 19.7$. **7**

IV. a) What is collapsible soil, what are the precautions to be taken when collapsible soil is encountered during foundation construction ? **6**

b) Explain with a neat sketch function of geotextiles in road construction. **6**

V. Write short notes on following : **16**

a) Rock quality designation.

b) Depth of boring for soil exploration.

c) General shear failure.

d) Plate load test.

Set S

SECTION – II

VI. a) Explain different types of shallow foundations with neat sketches. **7**

b) A trapezoidal footing is to be provided to support two square columns of 30 cm and 50 cm sides respectively, columns are 6.4 m apart centre to centre. Safe bearing capacity of soil is 400 kN/m^2. The bigger column carries 5000 kN and the smaller 3000 kN. Design a suitable size of footing so that it does not extend beyond the faces of column. **7**

VII. a) A Group of 9 piles arranged in a square pattern with diameter and length of each pile as 25 cm and 10 m respectively is used as a foundation in soft clay deposit. Taking unconfined compressive strength of clay as 120 kN/m^2 and the pile spacing as 100 cm centre to centre, find the load capacity of pile group. Assume bearing capacity factor Nc = 9 and adhesive factor = 0.75. Factor of safety = 2.5. **7**

b) Explain design and construction of under reamed pile with neat sketch. **6**

VIII. a) Determine the depth of embedment of cantilever sheet pile which has to retain clay of unit weight 17 kN/m^3 and unconfined compressive strength 70 kN/m^2. The height of backfill soil is 6 m. The soil below dredge line also clay of same properties. **7**

b) With the help of neat sketch explain cellular type cofferdam and diaphragm type cofferdam. **6**

IX. a) Write a note on Taylor's stability number. **6**

b) Calculate the factor of safety with respect to cohesion of a clay slope, laid at 1 in 2 to a height of 10 m. If the angle of internal friction = 10°, cohesion = 25 kN/m^2, unit weight = 19 kN/m^3. What will be the critical height of the slope in this soil ? Take Sn = 0.064. **7**

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Seat No.	

Set P

T.E. (Civil) (Part – II) Examination, 2016
ENVIRONMENTAL ENGINEERING – II

Day and Date : Wednesday, 23-11-2016 Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

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6) *Use of non programmable calculator is allowed.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) The lower portion of manhole is known as _____
   a) Benching b) Branch sewer c) Inspection arm d) Working chamber

2) _____ of sewage depends upon scouring action of flowing sewage.
   a) Self cleansing velocity b) Surface loading rate
   c) Flocculation d) Coagulation

3) _____ test involves an acidic oxidation with potassium dicromate.
   a) BOD b) COD
   c) Chlorides d) Total Kjeldahl nitrogen

4) If sewer line dips below the hydraulic grade line it is called _____
   a) Manhole b) Clean outs c) Inverted siphon d) Catch basins

5) The objective of _____ is to coagulate and remove the non settleable colloidal solids and to stabilize organic matter.
   a) Chemical precipitation b) Adsorption
   c) Flow equalization d) Biological treatment

6) _____ is a measure of light emitting properties of waste water.
   a) Colour b) Turbidity
   c) Suspended solids d) Colloidal solids

P.T.O.

7) The optimum range of depth for facultative pond is _____
   a) 1.0 – 1.5 m b) 3.0 – 3.5 m c) 2.0 – 2.5 m d) 2.5 – 3.0 m

8) A velocity control device is necessary to be provided in a _____
   a) Trickling filter b) Rapid sand filter
   c) Aeration tank d) Grit chamber

9) The standard B.O.D. of water is taken for _____
   a) 2 days b) 5 days c) 1 day d) 3 days

10) For the survival of fish in a river stream, the minimum dissolved oxygen is prescribed
   a) 1 ppm b) 2 ppm c) 4 ppm d) 3 ppm

11) In general oxides of nitrogen can be written as _____
   a) O_xN b) NiO_x c) NO_x d) All of above

12) Global warming can be controlled by _____
   a) Tree plantation b) Use of renewable energy sources
   c) Reduction in use of fossil fuels d) All of above

13) Main cause of acid rain is/are _____
   a) SO_x b) NO_x c) Both a) and b) d) None of these

14) Which of the following is a bulky waste ?
   a) Paper b) Glass bottles
   c) Tree leaves d) Abandoned furniture

15) Skin cancer may because by _____ global effect of air pollution.
   a) Acid rain b) Global warming c) Ozone depletion d) Heat island

16) Which of the following is not a combustible waste ?
   a) Wood b) Cardboard c) Bagasse d) Glass

17) The first zone in the purification process is _____ zone.
   a) Zone of Degradation b) Active decomposition
   c) Clear water d) Recovery

18) Leftover Food items require _____ time to disintegrate.
   a) 1 to 2 weeks b) 1 month c) 1 year d) 24 hrs.

19) Pick out the odd one.
   a) SO_2 b) NO c) PAN d) CO

20) Gravity settling chamber is used to remove _____ pollutants.
   a) Gaseous b) Particulate c) Both a) and b) d) None of these

_____

SLR-EP – 37

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
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Day and Date : Wednesday, 23-11-2016 Marks : 80
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SECTION – I

2. a) Explain with neat sketch working of Sewage Pumping Station. **7**
   b) What is dry weather flow ? Explain any four factors affecting dry weather flow. **6**

3. a) The 5-day BOD at 20°C of waste water is found to be 200 mg/l. taking K_1 as 0.15/day, estimate the ultimate BOD. Also determine the 8 day BOD value at 15°C. **7**
   b) Determine the size of a circular sewer for discharge of 1000 liters per second running half full. Assume S = 0.0001 and N = 0.013. **6**

4. a) Write advantages and disadvantages of stabilization pond. **6**
   b) Calculate the size of single stage high rate trickling filter for following data : **8**

   Flow = 4.5 MLD

   Recirculation ratio = 1 : 4

   BOD of raw sewage = 280 mg/l

   BOD removal in primary settling tank = 35%

   BOD final effluent = 50 mg/l.

5. Write short note on (**any three**) :
   i) Grit Chamber. **4**
   ii) Anaerobic pond. **5**
   iii) Sludge digestion. **4**
   iv) Trickling filter. **5**

SECTION – II

6. a) What are zones of pollution in purification process ? Explain with the help of figure. **6**

   b) Define air pollution. Give NAAQS for PM_{10}, $PM_{2.5}$, SO_2 and CO. **6**

7. a) Define : **7**

      i) Positive lapse rate

      ii) Strato pause

      iii) Inversion

      iv) Self-purification process.

   b) What is hazardous waste ? How it is defined with the help of four characteristics ? Explain. **7**

8. a) Classify solid waste based on sources. **6**

   b) A town discharges 80 m^3/sec of sewage into a stream having a rate of flow 1200 m^3/sec. 5-day BOD of sewage is 250 mg/Lit. Find t_c, D_c and x_c, if DOs_{at} at 20°C is 9.2 mg/Lit for river water. Take k_1 = 0.1/day and k_2 = 0.35/day (Both values are to the base 10). Assume velocity of river water = 0.12m/sec. **8**

9. Write short notes on the following (**any three**) : **14**

   1) Acid rain

   2) ESP

   3) Bangalore method of composting

   4) Decentralized treatment systems.

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SLR-EP – 37

Seat No.	

Set **Q**

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Set Q

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SLR-EP – 37

Seat No.	

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P.T.O.

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SECTION – I

2. a) Explain with neat sketch working of Sewage Pumping Station. **7**
   b) What is dry weather flow ? Explain any four factors affecting dry weather flow. **6**

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Set R

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   b) What is hazardous waste ? How it is defined with the help of four characteristics ? Explain. **7**

8. a) Classify solid waste based on sources. **6**

   b) A town discharges 80 m^3/sec of sewage into a stream having a rate of flow 1200 m^3/sec. 5-day BOD of sewage is 250 mg/Lit. Find t_c, D_c and x_c, if DOs_{at} at 20°C is 9.2 mg/Lit for river water. Take k_1 = 0.1/day and k_2 = 0.35/day (Both values are to the base 10). Assume velocity of river water = 0.12m/sec. **8**

9. Write short notes on the following (**any three**) : **14**

   1) Acid rain

   2) ESP

   3) Bangalore method of composting

   4) Decentralized treatment systems.

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SLR-EP – 37

Seat No.	

Set S

T.E. (Civil) (Part – II) Examination, 2016
ENVIRONMENTAL ENGINEERING – II

Day and Date : Wednesday, 23-11-2016 Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

Instructions :

1) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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.***
3) *Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
4) *Figures to the **right** indicate **full** marks.*
5) *Assume suitable data **wherever** necessary and mention it clearly.*
6) *Use of non programmable calculator is allowed.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) _____ is a measure of light emitting properties of waste water.
   a) Colour b) Turbidity
   c) Suspended solids d) Colloidal solids

2) The optimum range of depth for facultative pond is _____
   a) 1.0 – 1.5 m b) 3.0 – 3.5 m c) 2.0 – 2.5 m d) 2.5 – 3.0 m

3) A velocity control device is necessary to be provided in a _____
   a) Trickling filter b) Rapid sand filter
   c) Aeration tank d) Grit chamber

4) The standard B.O.D. of water is taken for _____
   a) 2 days b) 5 days c) 1 day d) 3 days

5) For the survival of fish in a river stream, the minimum dissolved oxygen is prescribed
   a) 1 ppm b) 2 ppm c) 4 ppm d) 3 ppm

6) In general oxides of nitrogen can be written as _____
   a) O_xN b) NiO_x c) NO_x d) All of above

P.T.O.

7) Global warming can be controlled by _____
   a) Tree plantation
   b) Use of renewable energy sources
   c) Reduction in use of fossil fuels
   d) All of above

8) Main cause of acid rain is/are _____
   a) SO_x
   b) NO_x
   c) Both a) and b)
   d) None of these

9) Which of the following is a bulky waste ?
   a) Paper
   b) Glass bottles
   c) Tree leaves
   d) Abandoned furniture

10) Skin cancer may because by _____ global effect of air pollution.
   a) Acid rain
   b) Global warming
   c) Ozone depletion
   d) Heat island

11) Which of the following is not a combustible waste ?
   a) Wood
   b) Cardboard
   c) Bagasse
   d) Glass

12) The first zone in the purification process is _____ zone.
   a) Zone of Degradation
   b) Active decomposition
   c) Clear water
   d) Recovery

13) Leftover Food items require _____ time to disintegrate.
   a) 1 to 2 weeks
   b) 1 month
   c) 1 year
   d) 24 hrs.

14) Pick out the odd one.
   a) SO_2
   b) NO
   c) PAN
   d) CO

15) Gravity settling chamber is used to remove _____ pollutants.
   a) Gaseous
   b) Particulate
   c) Both a) and b)
   d) None of these

16) The lower portion of manhole is known as _____
   a) Benching
   b) Branch sewer
   c) Inspection arm
   d) Working chamber

17) _____ of sewage depends upon scouring action of flowing sewage.
   a) Self cleansing velocity
   b) Surface loading rate
   c) Flocculation
   d) Coagulation

18) _____ test involves an acidic oxidation with potassium dicromate.
   a) BOD
   b) COD
   c) Chlorides
   d) Total Kjeldahl nitrogen

19) If sewer line dips below the hydraulic grade line it is called _____
   a) Manhole
   b) Clean outs
   c) Inverted siphon
   d) Catch basins

20) The objective of _____ is to coagulate and remove the non settleable colloidal solids and to stabilize organic matter.
   a) Chemical precipitation
   b) Adsorption
   c) Flow equalization
   d) Biological treatment

_____

SLR-EP – 37

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
ENVIRONMENTAL ENGINEERING – II

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. a) Explain with neat sketch working of Sewage Pumping Station. **7**
   b) What is dry weather flow ? Explain any four factors affecting dry weather flow. **6**

3. a) The 5-day BOD at 20°C of waste water is found to be 200 mg/l. taking K_1 as 0.15/day, estimate the ultimate BOD. Also determine the 8 day BOD value at 15°C. **7**
   b) Determine the size of a circular sewer for discharge of 1000 liters per second running half full. Assume S = 0.0001 and N = 0.013. **6**

4. a) Write advantages and disadvantages of stabilization pond. **6**
   b) Calculate the size of single stage high rate trickling filter for following data : **8**

   Flow = 4.5 MLD

   Recirculation ratio = 1 : 4

   BOD of raw sewage = 280 mg/l

   BOD removal in primary settling tank = 35%

   BOD final effluent = 50 mg/l.

5. Write short note on (**any three**) :
   i) Grit Chamber. **4**
   ii) Anaerobic pond. **5**
   iii) Sludge digestion. **4**
   iv) Trickling filter. **5**

Set S

SECTION – II

6. a) What are zones of pollution in purification process ? Explain with the help of figure. **6**

   b) Define air pollution. Give NAAQS for PM_{10}, $PM_{2.5}$, SO_2 and CO. **6**

7. a) Define : **7**

      i) Positive lapse rate

      ii) Strato pause

      iii) Inversion

      iv) Self-purification process.

   b) What is hazardous waste ? How it is defined with the help of four characteristics ? Explain. **7**

8. a) Classify solid waste based on sources. **6**

   b) A town discharges 80 m^3/sec of sewage into a stream having a rate of flow 1200 m^3/sec. 5-day BOD of sewage is 250 mg/Lit. Find t_c, D_c and x_c, if DOs_{at} at 20°C is 9.2 mg/Lit for river water. Take k_1 = 0.1/day and k_2 = 0.35/day (Both values are to the base 10). Assume velocity of river water = 0.12m/sec. **8**

9. Write short notes on the following (**any three**) : **14**

   1) Acid rain

   2) ESP

   3) Bangalore method of composting

   4) Decentralized treatment systems.

———————

SLR-EP – 38

Seat No.	

Set **P**

T.E. (Civil) (Part – II) Examination, 2016

ENGINEERING MANAGEMENT – II

Day and Date : Thursday, 24-11-2016 Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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.***

3) Assume suitable data ***wherever*** *needed but mention it* ***clearly****.*

4) Use of nonprogrammable calculators is ***allowed****.*

5) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions out of Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *from Section* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section* ***II****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) A PERT activity has an optimistic time of three days, pessimistic time of 15 days and the expected time is 7 days. The most likely time of the activity is
   a) 8 days b) 9 days c) 6 days d) None

2) In a CPM network, the critical path is the _____ Path.
   a) Shortest b) Longest
   c) Average of longest and shortest d) None

3) A delay in the activity which is on the non-critical path
   a) Would not increase the project completion time
   b) Would increase the project completion time if the amount of delay is greater than free slack
   c) Would increase the project completion time if the amount of delay exceeds total slack
   d) Would increase the project completion time

4) In a PERT network sometimes dummy activities are introduced to
   a) Prevent cycling in the network
   b) Maintain network logic of precedence
   c) Avoid crossing of activities in the network
   d) Have an activity with zero duration of time

5) In the PERT network, the distribution of the project completion time is assumed to follow
   a) Beta distribution b) Poisson distribution
   c) Normal distribution d) Binomial distribution

6) The estimated duration of time for an activity in the PERT network under the worst and best environment are as 9 and 3 days. The variance of this activity is
   a) 6 days b) 1 day
   c) 2 days d) None of these as data is insufficient

7) While crashing an activity in the critical path, the project direct cost would
   a) Increase and the indirect cost would decrease
   b) Decrease and the indirect cost would increase
   c) Increase and the indirect cost would increase
   d) Decrease and the indirect cost would decrease

P.T.O.

8) Which of the following statement is correct ?
   a) CPM technique is useful to minimize direct and indirect expenses
   b) When slack of an activity is zero, it falls only on critical path
   c) Critical path of a network represents minimum time required for completion of the project
   d) All the above

9) When slack of an activity is negative ?
   a) It represents that a programme falls behind schedule and additional resources are required to complete the project in time
   b) The activity is critical and any delay in its performance will delay the completion of the project
   c) It represents a situation where extra resources are available and the completion of the project is not delayed
   d) None of the above

10) If the total float is negative, the activity is called
   a) Subcritical b) Critical
   c) Supercritical d) None of the above

11) If D is duration, ES and EF are the earliest start time and earliest finish times. LS and LF are the latest start time and finish times, then the following relation holds good
   a) EF = ES + D b) LS = LF – D c) LF = LS + D d) All the above

12) In the network diagram
   a) An activity and an event are represented by an arrow
   b) An activity and an event are represented by a circle
   c) An activity is represented by a circle and an event by an arrow
   d) An activity is represented by an arrow and an event by a circle

13) For Beta distribution, the standard deviation is given by
   a) $(t_p - t_o)/2$ b) $(t_p - t_o)/6$ c) $((t_p - t_o)/6)^2$ d) $(t_p + t_o)/2$

14) The time span in which the starting or finishing of an activity can be delayed without delaying the completion of the project is known as
   a) Free float b) Independent float c) Interfering float d) Total float

15) The expected time (t_e) in terms of optimistic time (t_o), pessimistic time (t_p) and most likely time (t_m) is given by
   a) $t_e = (t_o + t_p + t_m)/3$ b) $t_e = (4t_o + t_p + t_m)/3$
   c) $t_e = (t_o + t_p + 4t_m)/6$ d) $t_e = (t_o + t_p + 4t_m)/3$

16) The objective of network analysis is to
   a) Minimize total project duration
   b) Minimize total project cost
   c) Minimize production delays, interruption and conflicts
   d) All of the above

17) Network models have advantage in terms of project
   a) Planning b) Scheduling c) Controlling d) All of the above

18) The slack for an activity is equal to
   a) LF – LS b) EF – ES c) LS – ES d) None of the above

19) The another term commonly used for the activity slack is
   a) Total float b) Free float c) Independent float d) All of the above

20) Generally PERT technique deals with the project of
   a) Repetitive nature b) None repetitive nature
   c) Deterministic nature d) None of the above

SLR-EP – 38

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
ENGINEERING MANAGEMENT – II

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *needed but mention it* ***clearly****.*
2) Use of nonprogrammable calculators is ***allowed****.*
3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions out of Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *from Section* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section* ***II****.*

SECTION – I

2. a) Write in detail with example about the work breakdown structure. **6**

b) Using the following information, create an AON network activity diagram, calculate each activity TE (rounding to the nearest integer), the total duration of the project, its early start, early finish, late start and late finish times. Finally, show the project's critical path. **8**

Activity	Preceding activities	Best	Likely	Worst
A	–	4	5	6
B	A	10	12	14
C	A	7	9	16
D	B	14	17	22
E	B, C	10	15	30
F	C	4	7	13
G	D	12	20	40
H	D, E	10	12	15
I	F, H	8	9	10

3. In a CPM network the critical path includes five activities. Their duration in days are tabulated as follows.

Activity	Optimistic Time	Most Likely Time	Pessimistic Time
A	2	4	7
B	5	8	14
C	4	6	8
D	2	2	2
E	7	10	21

a) Determine the expected time for each activity. **3**
b) Determine the variance for each activity. **3**
c) Determine expected duration for the entire path. **2**
d) Determine expected variance for the entire path. **2**
e) How to compute the probability that project will finish by the end of a particular day ? **3**

4. a) 'PERT is rarely used in the construction industry'. State and explain any four reasons to justify the statement. **7**

   b) Explain use of Project Management Software in scheduling the activities in a project. **6**

5. Calculate the normal cost and normal duration for the data in the following table. Calculate cost duration associated to two cycles of crashing. Indirect costs are Rs. 120/day.

Activity	Preceding activity	Duration		Cost	
		Normal	Crash	Normal	Crash
A	–	5	4	500	600
B	A	7	5	350	500
C	A	8	5	800	920
D	A	11	7	1200	1400
E	B, C	6	4	600	700
F	C	4	4	500	500
G	D, F	7	5	700	1000
H	E, F	6	5	300	420

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SECTION – II

6. Write short notes on : **(4 Marks each)**

   a) Life cycle costing

   b) Value Engineering

   c) Break even analysis

   d) Total Quality Management.

7. a) What are various discounting methods of Economic comparison ? Explain any one using suitable example. **9**

   b) Explain 'Variable and attribute method of sampling'. **3**

8. a) Explain statistical quality control. **6**

   b) What is time value of money ? Explain its significance. **3**

   c) Write note on 'Demand and Supply'. **3**

9. a) Derive the formula for sinking fund factor and capital recovery factor. **6**

   b) Write note on 'Cash Flow Diagram'. **3**

   c) Write note on 'Build, operate and transfer'. **3**

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SLR-EP – 38

Seat No.	

Set **Q**

T.E. (Civil) (Part – II) Examination, 2016

ENGINEERING MANAGEMENT – II

Day and Date : Thursday, 24-11-2016 Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The objective of network analysis is to
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P.T.O.

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SLR-EP – 38

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
ENGINEERING MANAGEMENT – II

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data **wherever** needed but mention it **clearly**.*
*2) Use of nonprogrammable calculators is **allowed**.*
*3) Q. **2** and Q. **6** are **compulsory**. Answer **any two** questions out of Q. **3**, Q. **4** and Q. **5** from Section **I** and Q. **7**, Q. **8** and Q. **9** from Section **II**.*

SECTION – I

2. a) Write in detail with example about the work breakdown structure. **6**

b) Using the following information, create an AON network activity diagram, calculate each activity TE (rounding to the nearest integer), the total duration of the project, its early start, early finish, late start and late finish times. Finally, show the project's critical path. **8**

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G	D	12	20	40
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I	F, H	8	9	10

3. In a CPM network the critical path includes five activities. Their duration in days are tabulated as follows.

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C	4	6	8
D	2	2	2
E	7	10	21

a) Determine the expected time for each activity. **3**

b) Determine the variance for each activity. **3**

c) Determine expected duration for the entire path. **2**

d) Determine expected variance for the entire path. **2**

e) How to compute the probability that project will finish by the end of a particular day ? **3**

Set Q

4. a) 'PERT is rarely used in the construction industry'. State and explain any four reasons to justify the statement. **7**

   b) Explain use of Project Management Software in scheduling the activities in a project. **6**

5. Calculate the normal cost and normal duration for the data in the following table. Calculate cost duration associated to two cycles of crashing. Indirect costs are Rs. 120/day.

Activity	Preceding activity	Duration		Cost	
		Normal	Crash	Normal	Crash
A	–	5	4	500	600
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C	A	8	5	800	920
D	A	11	7	1200	1400
E	B, C	6	4	600	700
F	C	4	4	500	500
G	D, F	7	5	700	1000
H	E, F	6	5	300	420

13

SECTION – II

6. Write short notes on : **(4 Marks each)**

   a) Life cycle costing

   b) Value Engineering

   c) Break even analysis

   d) Total Quality Management.

7. a) What are various discounting methods of Economic comparison ? Explain any one using suitable example. **9**

   b) Explain 'Variable and attribute method of sampling'. **3**

8. a) Explain statistical quality control. **6**

   b) What is time value of money ? Explain its significance. **3**

   c) Write note on 'Demand and Supply'. **3**

9. a) Derive the formula for sinking fund factor and capital recovery factor. **6**

   b) Write note on 'Cash Flow Diagram'. **3**

   c) Write note on 'Build, operate and transfer'. **3**

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SLR-EP – 38

Seat No.	

Set R

T.E. (Civil) (Part – II) Examination, 2016

ENGINEERING MANAGEMENT – II

Day and Date : Thursday, 24-11-2016 Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Assume suitable data **wherever** needed but mention it **clearly**.*

*4) Use of nonprogrammable calculators is **allowed**.*

*5) Q. **2** and Q. **6** are **compulsory**. Answer **any two** questions out of Q. **3**, Q. **4** and Q. **5** from Section **I** and Q. **7**, Q. **8** and Q. **9** from Section **II**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) If D is duration, ES and EF are the earliest start time and earliest finish times. LS and LF are the latest start time and finish times, then the following relation holds good
   a) EF = ES + D b) LS = LF – D c) LF = LS + D d) All the above

2) In the network diagram
   a) An activity and an event are represented by an arrow
   b) An activity and an event are represented by a circle
   c) An activity is represented by a circle and an event by an arrow
   d) An activity is represented by an arrow and an event by a circle

3) For Beta distribution, the standard deviation is given by
   a) $(t_p - t_o)/2$ b) $(t_p - t_o)/6$ c) $((t_p - t_o)/6)^2$ d) $(t_p + t_o)/2$

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   a) Free float b) Independent float c) Interfering float d) Total float

5) The expected time (t_e) in terms of optimistic time (t_o), pessimistic time (t_p) and most likely time (t_m) is given by
   a) $t_e = (t_o + t_p + t_m)/3$ b) $t_e = (4t_o + t_p + t_m)/3$
   c) $t_e = (t_o + t_p + 4t_m)/6$ d) $t_e = (t_o + t_p + 4t_m)/3$

6) The objective of network analysis is to
   a) Minimize total project duration
   b) Minimize total project cost
   c) Minimize production delays, interruption and conflicts
   d) All of the above

7) Network models have advantage in terms of project
   a) Planning b) Scheduling c) Controlling d) All of the above

8) The slack for an activity is equal to
   a) LF – LS b) EF – ES c) LS – ES d) None of the above

P.T.O.

9) The another term commonly used for the activity slack is
   a) Total float b) Free float c) Independent float d) All of the above

10) Generally PERT technique deals with the project of
   a) Repetitive nature b) None repetitive nature
   c) Deterministic nature d) None of the above

11) A PERT activity has an optimistic time of three days, pessimistic time of 15 days and the expected time is 7 days. The most likely time of the activity is
   a) 8 days b) 9 days c) 6 days d) None

12) In a CPM network, the critical path is the _____ Path.
   a) Shortest b) Longest
   c) Average of longest and shortest d) None

13) A delay in the activity which is on the non-critical path
   a) Would not increase the project completion time
   b) Would increase the project completion time if the amount of delay is greater than free slack
   c) Would increase the project completion time if the amount of delay exceeds total slack
   d) Would increase the project completion time

14) In a PERT network sometimes dummy activities are introduced to
   a) Prevent cycling in the network
   b) Maintain network logic of precedence
   c) Avoid crossing of activities in the network
   d) Have an activity with zero duration of time

15) In the PERT network, the distribution of the project completion time is assumed to follow
   a) Beta distribution b) Poisson distribution
   c) Normal distribution d) Binomial distribution

16) The estimated duration of time for an activity in the PERT network under the worst and best environment are as 9 and 3 days. The variance of this activity is
   a) 6 days b) 1 day
   c) 2 days d) None of these as data is insufficient

17) While crashing an activity in the critical path, the project direct cost would
   a) Increase and the indirect cost would decrease
   b) Decrease and the indirect cost would increase
   c) Increase and the indirect cost would increase
   d) Decrease and the indirect cost would decrease

18) Which of the following statement is correct ?
   a) CPM technique is useful to minimize direct and indirect expenses
   b) When slack of an activity is zero, it falls only on critical path
   c) Critical path of a network represents minimum time required for completion of the project
   d) All the above

19) When slack of an activity is negative ?
   a) It represents that a programme falls behind schedule and additional resources are required to complete the project in time
   b) The activity is critical and any delay in its performance will delay the completion of the project
   c) It represents a situation where extra resources are available and the completion of the project is not delayed
   d) None of the above

20) If the total float is negative, the activity is called
   a) Subcritical b) Critical
   c) Supercritical d) None of the above

_____

SLR-EP – 38

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
ENGINEERING MANAGEMENT – II

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data **wherever** needed but mention it **clearly**.*
*2) Use of nonprogrammable calculators is **allowed**.*
*3) Q. **2** and Q. **6** are **compulsory**. Answer **any two** questions out of Q. **3**, Q. **4** and Q. **5** from Section **I** and Q. **7**, Q. **8** and Q. **9** from Section **II**.*

SECTION – I

2. a) Write in detail with example about the work breakdown structure. **6**

b) Using the following information, create an AON network activity diagram, calculate each activity TE (rounding to the nearest integer), the total duration of the project, its early start, early finish, late start and late finish times. Finally, show the project's critical path. **8**

Activity	Preceding activities	Best	Likely	Worst
A	–	4	5	6
B	A	10	12	14
C	A	7	9	16
D	B	14	17	22
E	B, C	10	15	30
F	C	4	7	13
G	D	12	20	40
H	D, E	10	12	15
I	F, H	8	9	10

3. In a CPM network the critical path includes five activities. Their duration in days are tabulated as follows.

Activity	Optimistic Time	Most Likely Time	Pessimistic Time
A	2	4	7
B	5	8	14
C	4	6	8
D	2	2	2
E	7	10	21

a) Determine the expected time for each activity. **3**

b) Determine the variance for each activity. **3**

c) Determine expected duration for the entire path. **2**

d) Determine expected variance for the entire path. **2**

e) How to compute the probability that project will finish by the end of a particular day ? **3**

Set R

4. a) 'PERT is rarely used in the construction industry'. State and explain any four reasons to justify the statement. **7**

   b) Explain use of Project Management Software in scheduling the activities in a project. **6**

5. Calculate the normal cost and normal duration for the data in the following table. Calculate cost duration associated to two cycles of crashing. Indirect costs are Rs. 120/day.

Activity	Preceding activity	Duration		Cost	
		Normal	Crash	Normal	Crash
A	–	5	4	500	600
B	A	7	5	350	500
C	A	8	5	800	920
D	A	11	7	1200	1400
E	B, C	6	4	600	700
F	C	4	4	500	500
G	D, F	7	5	700	1000
H	E, F	6	5	300	420

13

SECTION – II

6. Write short notes on : **(4 Marks each)**

   a) Life cycle costing

   b) Value Engineering

   c) Break even analysis

   d) Total Quality Management.

7. a) What are various discounting methods of Economic comparison ? Explain any one using suitable example. **9**

   b) Explain 'Variable and attribute method of sampling'. **3**

8. a) Explain statistical quality control. **6**

   b) What is time value of money ? Explain its significance. **3**

   c) Write note on 'Demand and Supply'. **3**

9. a) Derive the formula for sinking fund factor and capital recovery factor. **6**

   b) Write note on 'Cash Flow Diagram'. **3**

   c) Write note on 'Build, operate and transfer'. **3**

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SLR-EP – 38

Seat No.	

Set **S**

T.E. (Civil) (Part – II) Examination, 2016

ENGINEERING MANAGEMENT – II

Day and Date : Thursday, 24-11-2016 Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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.***

3) Assume suitable data ***wherever*** *needed but mention it* ***clearly****.*

4) Use of nonprogrammable calculators is ***allowed****.*

5) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions out of Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *from Section* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section* ***II****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The estimated duration of time for an activity in the PERT network under the worst and best environment are as 9 and 3 days. The variance of this activity is
   a) 6 days b) 1 day
   c) 2 days d) None of these as data is insufficient

2) While crashing an activity in the critical path, the project direct cost would
   a) Increase and the indirect cost would decrease
   b) Decrease and the indirect cost would increase
   c) Increase and the indirect cost would increase
   d) Decrease and the indirect cost would decrease

3) Which of the following statement is correct ?
   a) CPM technique is useful to minimize direct and indirect expenses
   b) When slack of an activity is zero, it falls only on critical path
   c) Critical path of a network represents minimum time required for completion of the project
   d) All the above

4) When slack of an activity is negative ?
   a) It represents that a programme falls behind schedule and additional resources are required to complete the project in time
   b) The activity is critical and any delay in its performance will delay the completion of the project
   c) It represents a situation where extra resources are available and the completion of the project is not delayed
   d) None of the above

5) If the total float is negative, the activity is called
   a) Subcritical b) Critical
   c) Supercritical d) None of the above

6) If D is duration, ES and EF are the earliest start time and earliest finish times. LS and LF are the latest start time and finish times, then the following relation holds good
   a) EF = ES + D b) LS = LF – D c) LF = LS + D d) All the above

P.T.O.

7) In the network diagram
   a) An activity and an event are represented by an arrow
   b) An activity and an event are represented by a circle
   c) An activity is represented by a circle and an event by an arrow
   d) An activity is represented by an arrow and an event by a circle

8) For Beta distribution, the standard deviation is given by
   a) $(t_p - t_o)/2$ b) $(t_p - t_o)/6$ c) $((t_p - t_o)/6)^2$ d) $(t_p + t_o)/2$

9) The time span in which the starting or finishing of an activity can be delayed without delaying the completion of the project is known as
   a) Free float b) Independent float c) Interfering float d) Total float

10) The expected time (t_e) in terms of optimistic time (t_o), pessimistic time (t_p) and most likely time (t_m) is given by
   a) $t_e = (t_o + t_p + t_m)/3$ b) $t_e = (4t_o + t_p + t_m)/3$
   c) $t_e = (t_o + t_p + 4t_m)/6$ d) $t_e = (t_o + t_p + 4t_m)/3$

11) The objective of network analysis is to
   a) Minimize total project duration
   b) Minimize total project cost
   c) Minimize production delays, interruption and conflicts
   d) All of the above

12) Network models have advantage in terms of project
   a) Planning b) Scheduling c) Controlling d) All of the above

13) The slack for an activity is equal to
   a) LF – LS b) EF – ES c) LS – ES d) None of the above

14) The another term commonly used for the activity slack is
   a) Total float b) Free float c) Independent float d) All of the above

15) Generally PERT technique deals with the project of
   a) Repetitive nature b) None repetitive nature
   c) Deterministic nature d) None of the above

16) A PERT activity has an optimistic time of three days, pessimistic time of 15 days and the expected time is 7 days. The most likely time of the activity is
   a) 8 days b) 9 days c) 6 days d) None

17) In a CPM network, the critical path is the _____ Path.
   a) Shortest b) Longest
   c) Average of longest and shortest d) None

18) A delay in the activity which is on the non-critical path
   a) Would not increase the project completion time
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   c) Would increase the project completion time if the amount of delay exceeds total slack
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19) In a PERT network sometimes dummy activities are introduced to
   a) Prevent cycling in the network
   b) Maintain network logic of precedence
   c) Avoid crossing of activities in the network
   d) Have an activity with zero duration of time

20) In the PERT network, the distribution of the project completion time is assumed to follow
   a) Beta distribution b) Poisson distribution
   c) Normal distribution d) Binomial distribution

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SLR-EP – 38

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
ENGINEERING MANAGEMENT – II

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data **wherever** needed but mention it **clearly**.*
*2) Use of nonprogrammable calculators is **allowed**.*
*3) Q. **2** and Q. **6** are **compulsory**. Answer **any two** questions out of Q. **3**, Q. **4** and Q. **5** from Section **I** and Q. **7**, Q. **8** and Q. **9** from Section **II**.*

SECTION – I

2. a) Write in detail with example about the work breakdown structure. **6**

b) Using the following information, create an AON network activity diagram, calculate each activity TE (rounding to the nearest integer), the total duration of the project, its early start, early finish, late start and late finish times. Finally, show the project's critical path. **8**

Activity	Preceding activities	Best	Likely	Worst
A	–	4	5	6
B	A	10	12	14
C	A	7	9	16
D	B	14	17	22
E	B, C	10	15	30
F	C	4	7	13
G	D	12	20	40
H	D, E	10	12	15
I	F, H	8	9	10

3. In a CPM network the critical path includes five activities. Their duration in days are tabulated as follows.

Activity	Optimistic Time	Most Likely Time	Pessimistic Time
A	2	4	7
B	5	8	14
C	4	6	8
D	2	2	2
E	7	10	21

a) Determine the expected time for each activity. **3**

b) Determine the variance for each activity. **3**

c) Determine expected duration for the entire path. **2**

d) Determine expected variance for the entire path. **2**

e) How to compute the probability that project will finish by the end of a particular day ? **3**

Set S

4. a) 'PERT is rarely used in the construction industry'. State and explain any four reasons to justify the statement. **7**

   b) Explain use of Project Management Software in scheduling the activities in a project. **6**

5. Calculate the normal cost and normal duration for the data in the following table. Calculate cost duration associated to two cycles of crashing. Indirect costs are Rs. 120/day.

Activity	Preceding activity	Duration		Cost	
		Normal	Crash	Normal	Crash
A	–	5	4	500	600
B	A	7	5	350	500
C	A	8	5	800	920
D	A	11	7	1200	1400
E	B, C	6	4	600	700
F	C	4	4	500	500
G	D, F	7	5	700	1000
H	E, F	6	5	300	420

13

SECTION – II

6. Write short notes on : **(4 Marks each)**

   a) Life cycle costing

   b) Value Engineering

   c) Break even analysis

   d) Total Quality Management.

7. a) What are various discounting methods of Economic comparison ? Explain any one using suitable example. **9**

   b) Explain 'Variable and attribute method of sampling'. **3**

8. a) Explain statistical quality control. **6**

   b) What is time value of money ? Explain its significance. **3**

   c) Write note on 'Demand and Supply'. **3**

9. a) Derive the formula for sinking fund factor and capital recovery factor. **6**

   b) Write note on 'Cash Flow Diagram'. **3**

   c) Write note on 'Build, operate and transfer'. **3**

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SLR-EP – 39

Seat No.	

Set **P**

T.E. (Civil Engineering) (Part – II) Examination, 2016
TRANSPORTATION ENGINEERING – II

Day and Date : Friday, 25-11-2016 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed and mention it.*
2) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
3) ***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 : 20

1. Choose the correct answer : **20**

1) For sleeper density of (n + 4) on straight length, the sleeper density on the curves will be
a) (n + 5) b) (n + 4) c) (n – 3) d) All the above

2) The loose ballast between the two adjacent sleepers is known as
a) Ballast crib b) Boxing c) Packing d) None of the above

3) Sub-grade (formation) is prepared to *receive*
a) Ballast, sleepers and rails b) Ballast, sleepers and engine
c) Ballast, rails and wagons d) All the above

4) One of the following is not the 'Gauge' used by Indian railways.
a) Broad Gauge 1676 mm b) Meter Gauge 1000 mm
c) Standard Gauge 1451 mm d) Narrow Gauge 762 mm

5) For broad gauge curve resistance = _____ × degree of curve × weight of train.
a) 0.0004 b) 0.00045 c) 0.0005 d) 0.00054

6) The wheels are coned at a slope of
a) 1 in 20 i.e. 1 vertical to 20 horizontal b) 1 in 20 i.e. 1 horizontal to 20 vertical
c) 1 in 32 i.e. 1 vertical to 32 horizontal d) 1 in 32 i.e. 1 horizontal to 32 vertical

7) Cant is provided on curved rail track to
a) Introduce centripetal force
b) Ensure slower and safe movements of the trains
c) Provide equal distribution of wheel loads on both rails
d) All a), b) and c)

8) Recommended ruling gradients in plains are
a) 1 : 150 b) 1 : 200 c) 1 : 100 d) a) and b)

9) Speed of the train depends upon
   a) Power of locomotive b) Gradient
   c) Radius or curve d) All a), b) and c)

10) Check rails are provided at 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

11) The minimum width of clearway is
   a) 50 m b) 100 m c) 150 m d) 250 m

12) The total length of runway is 1000 m the elevation at distance 0 m, 200 m, 400 m, 600 m, 800 m and 1000 m are 100 m, 99.2 m, 101.0 m, 101.8 m, 101.4 m and 101.0 m resp. the effective gradient of runway will be
   a) 0.10% b) 0.26% c) 0.43% d) 0.65%

13) Zero fuel weight of an aircraft is
   a) Equal to empty operating weight
   b) Equal to maximum landing weight
   c) Less than empty operating weight
   d) Equal to sum of empty operating weight and the maximum pay load

14) As per ICAO, for airports serving big aircrafts, the crosswind component should not exceed
   a) 15 kmph b) 25 kmph c) 35 kmph d) 45 kmph

15) For supersonic transport aircraft, the minimum turning radius of taxiway is
   a) 60 m b) 120 m c) 180 m d) 240 m

16) As compared to wall type breakwater, mound type breakwater
   a) Requires skilled labour
   b) Requires low maintenance cost
   c) Requires less material
   d) Results in less damage due to gradual failure

17) If the maximum spring rise is 2 m and height of the waves expected is 4 m, then breakwater height above datum will be
   a) 2.5 m b) 4 m c) 5 m d) 7 m

18) Which of the following structures protects the shore by trapping of littoral drift ?
   a) Groynes b) Sea walls c) Revetments d) Moles

19) A ship is berthed in a chamber and lifted by principles of buoyancy, such a chamber is called
   a) Dry dock b) Wet dock c) Floating dock d) Refuge dock

20) In a calendar year the spring tide occurs
   a) 12 times b) 24 times c) 6 times d) 1 time

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SLR-EP – 39

Seat No.	

T.E. (Civil Engineering) (Part – II) Examination, 2016
TRANSPORTATION ENGINEERING – II

Day and Date : Friday, 25-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instruction *:* ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

SECTION – I

2. Answer **any three** questions (**Each** carry **8** marks) :

   a) Explain creep in rails. State effects of creep. Give remedial measures for the same. **8**

   b) With neat diagram explain "coning of wheels" on a level track and list the disadvantages. **8**

   c) A curve of 5° is situated on a section of BG. If maximum permissible speed on the section is 60 kmph, determine amount of equilibrium cant. If, for meeting the demand of slow moving trains, cant deficiency amounting 7.6 cm is provided. Determine super elevation needs to be provided. **8**

   d) What will be the allowable ruling gradient for a B.G. track on 4° curve, where ruling gradient is 1 : 150 ? **8**

3. Answer **any two** questions (**Each** carry **8** marks) :

   a) Draw a neat sketch of a Right hand turnout and show various parts on it. **8**

   b) Explain the following with neat sketches : **8**

      1) Heel divergence

      2) Switch angle

      3) Actual nose of crossing

      4) Throw of switch.

   c) Why are signals required ? Discuss different types of signals. **8**

SECTION – II

4. Answer **any three** questions (**Each** carry **8** marks) :

   a) Explain the site selection criteria for airport. **8**

   b) Show a figure showing components of aircraft and label its components. **8**

   c) For the hottest month of the year at the proposed airport site, the mean of the average daily temperature is 38°C and the mean of the maximum daily temperature is 47°C. Calculate the airport reference temperature. If the site is at 150 m above mean sea-level with a level ground, calculate the actual runway length to be provided. Basic runway length is 1200 m. **8**

   d) The longitudinal profile of a runway is comprised of a rising gradient of 1.4 percent followed by a falling gradient of 0.5 percent which is followed by a rising gradient of 0.5 percent. Determine the lengths of vertical curves and the distance between them. **8**

5. Answer **any two** questions (**Each** carry **8** marks) :

   a) Enlist different types of breakwaters and explain any two with neat sketches. **8**

   b) Draw a neat sketch of dry dock (plan and section) and label all components and explain the working of dry dock. **8**

   c) The biggest vessel to be slipped is a tug of 30 m length and 3 m drought. If the height of cradle block from the slipway deck is 0.75 m and inclination of the slipway to the horizontal is $3°30'$. Workout the total length of the slipway. Use,

   $L = 2l + (d + h)\ \text{cosec}\ \theta + k$

   k ranges 2 to 5. **8**

SLR-EP – 39

Seat No.	

Set **Q**

T.E. (Civil Engineering) (Part – II) Examination, 2016
TRANSPORTATION ENGINEERING – II

Day and Date : Friday, 25-11-2016 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed and mention it.*
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3) ***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 : 20

1. Choose the correct answer : **20**

1) As compared to wall type breakwater, mound type breakwater
   a) Requires skilled labour
   b) Requires low maintenance cost
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2) If the maximum spring rise is 2 m and height of the waves expected is 4 m, then breakwater height above datum will be
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   a) Dry dock b) Wet dock c) Floating dock d) Refuge dock

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   a) 12 times b) 24 times c) 6 times d) 1 time

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   a) (n + 5) b) (n + 4) c) (n – 3) d) All the above

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   a) Ballast crib b) Boxing c) Packing d) None of the above

8) Sub-grade (formation) is prepared to *receive*
   a) Ballast, sleepers and rails b) Ballast, sleepers and engine
   c) Ballast, rails and wagons d) All the above

9) One of the following is not the 'Gauge' used by Indian railways.
   a) Broad Gauge 1676 mm
   b) Meter Gauge 1000 mm
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   a) 1 in 20 i.e. 1 vertical to 20 horizontal
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12) Cant is provided on curved rail track to
   a) Introduce centripetal force
   b) Ensure slower and safe movements of the trains
   c) Provide equal distribution of wheel loads on both rails
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13) Recommended ruling gradients in plains are
   a) 1 : 150 b) 1 : 200 c) 1 : 100 d) a) and b)

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   a) Power of locomotive
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15) Check rails are provided at the curves to
   a) Reduce the lateral wear on outer rail
   b) Prevent the outer wheel flange from mounting the outer rail
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16) The minimum width of clearway is
   a) 50 m b) 100 m c) 150 m d) 250 m

17) The total length of runway is 1000 m the elevation at distance 0 m, 200 m, 400 m, 600 m, 800 m and 1000 m are 100 m, 99.2 m, 101.0 m, 101.8 m, 101.4 m and 101.0 m resp. the effective gradient of runway will be
   a) 0.10% b) 0.26% c) 0.43% d) 0.65%

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   a) Equal to empty operating weight
   b) Equal to maximum landing weight
   c) Less than empty operating weight
   d) Equal to sum of empty operating weight and the maximum pay load

19) As per ICAO, for airports serving big aircrafts, the crosswind component should not exceed
   a) 15 kmph b) 25 kmph c) 35 kmph d) 45 kmph

20) For supersonic transport aircraft, the minimum turning radius of taxiway is
   a) 60 m b) 120 m c) 180 m d) 240 m

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SLR-EP – 39

Seat No.	

T.E. (Civil Engineering) (Part – II) Examination, 2016
TRANSPORTATION ENGINEERING – II

Day and Date : Friday, 25-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instruction *:* ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

SECTION – I

2. Answer **any three** questions (**Each** carry **8** marks) :

   a) Explain creep in rails. State effects of creep. Give remedial measures for the same. **8**

   b) With neat diagram explain "coning of wheels" on a level track and list the disadvantages. **8**

   c) A curve of 5° is situated on a section of BG. If maximum permissible speed on the section is 60 kmph, determine amount of equilibrium cant. If, for meeting the demand of slow moving trains, cant deficiency amounting 7.6 cm is provided. Determine super elevation needs to be provided. **8**

   d) What will be the allowable ruling gradient for a B.G. track on 4° curve, where ruling gradient is 1 : 150 ? **8**

3. Answer **any two** questions (**Each** carry **8** marks) :

   a) Draw a neat sketch of a Right hand turnout and show various parts on it. **8**

   b) Explain the following with neat sketches : **8**

      1) Heel divergence

      2) Switch angle

      3) Actual nose of crossing

      4) Throw of switch.

   c) Why are signals required ? Discuss different types of signals. **8**

SECTION – II

4. Answer **any three** questions (**Each** carry **8** marks) :

   a) Explain the site selection criteria for airport. **8**

   b) Show a figure showing components of aircraft and label its components. **8**

   c) For the hottest month of the year at the proposed airport site, the mean of the average daily temperature is 38°C and the mean of the maximum daily temperature is 47°C. Calculate the airport reference temperature. If the site is at 150 m above mean sea-level with a level ground, calculate the actual runway length to be provided. Basic runway length is 1200 m. **8**

   d) The longitudinal profile of a runway is comprised of a rising gradient of 1.4 percent followed by a falling gradient of 0.5 percent which is followed by a rising gradient of 0.5 percent. Determine the lengths of vertical curves and the distance between them. **8**

5. Answer **any two** questions (**Each** carry **8** marks) :

   a) Enlist different types of breakwaters and explain any two with neat sketches. **8**

   b) Draw a neat sketch of dry dock (plan and section) and label all components and explain the working of dry dock. **8**

   c) The biggest vessel to be slipped is a tug of 30 m length and 3 m drought. If the height of cradle block from the slipway deck is 0.75 m and inclination of the slipway to the horizontal is $3°30'$. Workout the total length of the slipway. Use,

   $L = 2l + (d + h)\ \text{cosec}\ \theta + k$

   k ranges 2 to 5. **8**

SLR-EP – 39

Seat No.	

Set **R**

T.E. (Civil Engineering) (Part – II) Examination, 2016
TRANSPORTATION ENGINEERING – II

Day and Date : Friday, 25-11-2016 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed and mention it.*
2) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
3) ***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 : 20

1. Choose the correct answer : **20**

1) The minimum width of clearway is
   a) 50 m b) 100 m c) 150 m d) 250 m

2) The total length of runway is 1000 m the elevation at distance 0 m, 200 m, 400 m, 600 m, 800 m and 1000 m are 100 m, 99.2 m, 101.0 m, 101.8 m, 101.4 m and 101.0 m resp. the effective gradient of runway will be
   a) 0.10% b) 0.26% c) 0.43% d) 0.65%

3) Zero fuel weight of an aircraft is
   a) Equal to empty operating weight
   b) Equal to maximum landing weight
   c) Less than empty operating weight
   d) Equal to sum of empty operating weight and the maximum pay load

4) As per ICAO, for airports serving big aircrafts, the crosswind component should not exceed
   a) 15 kmph b) 25 kmph c) 35 kmph d) 45 kmph

5) For supersonic transport aircraft, the minimum turning radius of taxiway is
   a) 60 m b) 120 m c) 180 m d) 240 m

6) As compared to wall type breakwater, mound type breakwater
   a) Requires skilled labour
   b) Requires low maintenance cost
   c) Requires less material
   d) Results in less damage due to gradual failure

7) If the maximum spring rise is 2 m and height of the waves expected is 4 m, then breakwater height above datum will be
   a) 2.5 m b) 4 m c) 5 m d) 7 m

8) Which of the following structures protects the shore by trapping of littoral drift ?
   a) Groynes b) Sea walls c) Revetments d) Moles

9) A ship is berthed in a chamber and lifted by principles of buoyancy, such a chamber is called
   a) Dry dock b) Wet dock c) Floating dock d) Refuge dock

10) In a calendar year the spring tide occurs
   a) 12 times b) 24 times c) 6 times d) 1 time

11) For sleeper density of (n + 4) on straight length, the sleeper density on the curves will be
   a) (n + 5) b) (n + 4) c) (n – 3) d) All the above

12) The loose ballast between the two adjacent sleepers is known as
   a) Ballast crib b) Boxing c) Packing d) None of the above

13) Sub-grade (formation) is prepared to *receive*
   a) Ballast, sleepers and rails b) Ballast, sleepers and engine
   c) Ballast, rails and wagons d) All the above

14) One of the following is not the 'Gauge' used by Indian railways.
   a) Broad Gauge 1676 mm b) Meter Gauge 1000 mm
   c) Standard Gauge 1451 mm d) Narrow Gauge 762 mm

15) For broad gauge curve resistance = _____ × degree of curve × weight of train.
   a) 0.0004 b) 0.00045 c) 0.0005 d) 0.00054

16) The wheels are coned at a slope of
   a) 1 in 20 i.e. 1 vertical to 20 horizontal b) 1 in 20 i.e. 1 horizontal to 20 vertical
   c) 1 in 32 i.e. 1 vertical to 32 horizontal d) 1 in 32 i.e. 1 horizontal to 32 vertical

17) Cant is provided on curved rail track to
   a) Introduce centripetal force
   b) Ensure slower and safe movements of the trains
   c) Provide equal distribution of wheel loads on both rails
   d) All a), b) and c)

18) Recommended ruling gradients in plains are
   a) 1 : 150 b) 1 : 200 c) 1 : 100 d) a) and b)

19) Speed of the train depends upon
   a) Power of locomotive b) Gradient
   c) Radius or curve d) All a), b) and c)

20) Check rails are provided at 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

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SLR-EP – 39

Seat No.	

T.E. (Civil Engineering) (Part – II) Examination, 2016
TRANSPORTATION ENGINEERING – II

Day and Date : Friday, 25-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instruction *:* ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

SECTION – I

2. Answer **any three** questions (**Each** carry **8** marks) :

   a) Explain creep in rails. State effects of creep. Give remedial measures for the same. **8**

   b) With neat diagram explain "coning of wheels" on a level track and list the disadvantages. **8**

   c) A curve of 5° is situated on a section of BG. If maximum permissible speed on the section is 60 kmph, determine amount of equilibrium cant. If, for meeting the demand of slow moving trains, cant deficiency amounting 7.6 cm is provided. Determine super elevation needs to be provided. **8**

   d) What will be the allowable ruling gradient for a B.G. track on 4° curve, where ruling gradient is 1 : 150 ? **8**

3. Answer **any two** questions (**Each** carry **8** marks) :

   a) Draw a neat sketch of a Right hand turnout and show various parts on it. **8**

   b) Explain the following with neat sketches : **8**

      1) Heel divergence

      2) Switch angle

      3) Actual nose of crossing

      4) Throw of switch.

   c) Why are signals required ? Discuss different types of signals. **8**

SECTION – II

4. Answer **any three** questions (**Each** carry **8** marks) :

   a) Explain the site selection criteria for airport. **8**

   b) Show a figure showing components of aircraft and label its components. **8**

   c) For the hottest month of the year at the proposed airport site, the mean of the average daily temperature is 38°C and the mean of the maximum daily temperature is 47°C. Calculate the airport reference temperature. If the site is at 150 m above mean sea-level with a level ground, calculate the actual runway length to be provided. Basic runway length is 1200 m. **8**

   d) The longitudinal profile of a runway is comprised of a rising gradient of 1.4 percent followed by a falling gradient of 0.5 percent which is followed by a rising gradient of 0.5 percent. Determine the lengths of vertical curves and the distance between them. **8**

5. Answer **any two** questions (**Each** carry **8** marks) :

   a) Enlist different types of breakwaters and explain any two with neat sketches. **8**

   b) Draw a neat sketch of dry dock (plan and section) and label all components and explain the working of dry dock. **8**

   c) The biggest vessel to be slipped is a tug of 30 m length and 3 m drought. If the height of cradle block from the slipway deck is 0.75 m and inclination of the slipway to the horizontal is $3°30'$. Workout the total length of the slipway. Use,

   $L = 2l + (d + h)\ \text{cosec}\ \theta + k$

   k ranges 2 to 5. **8**

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SLR-EP – 39

Seat No.	

Set **S**

T.E. (Civil Engineering) (Part – II) Examination, 2016
TRANSPORTATION ENGINEERING – II

Day and Date : Friday, 25-11-2016 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed and mention it.*
2) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
3) ***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 : 20

1. Choose the correct answer : **20**

1) The wheels are coned at a slope of
   a) 1 in 20 i.e. 1 vertical to 20 horizontal b) 1 in 20 i.e. 1 horizontal to 20 vertical
   c) 1 in 32 i.e. 1 vertical to 32 horizontal d) 1 in 32 i.e. 1 horizontal to 32 vertical

2) Cant is provided on curved rail track to
   a) Introduce centripetal force
   b) Ensure slower and safe movements of the trains
   c) Provide equal distribution of wheel loads on both rails
   d) All a), b) and c)

3) Recommended ruling gradients in plains are
   a) 1 : 150 b) 1 : 200 c) 1 : 100 d) a) and b)

4) Speed of the train depends upon
   a) Power of locomotive b) Gradient
   c) Radius or curve d) All a), b) and c)

5) Check rails are provided at 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

6) The minimum width of clearway is
   a) 50 m b) 100 m c) 150 m d) 250 m

7) The total length of runway is 1000 m the elevation at distance 0 m, 200 m, 400 m, 600 m, 800 m and 1000 m are 100 m, 99.2 m, 101.0 m, 101.8 m, 101.4 m and 101.0 m resp. the effective gradient of runway will be
   a) 0.10% b) 0.26% c) 0.43% d) 0.65%

8) Zero fuel weight of an aircraft is
   a) Equal to empty operating weight
   b) Equal to maximum landing weight
   c) Less than empty operating weight
   d) Equal to sum of empty operating weight and the maximum pay load

9) As per ICAO, for airports serving big aircrafts, the crosswind component should not exceed
   a) 15 kmph b) 25 kmph c) 35 kmph d) 45 kmph

10) For supersonic transport aircraft, the minimum turning radius of taxiway is
   a) 60 m b) 120 m c) 180 m d) 240 m

11) As compared to wall type breakwater, mound type breakwater
   a) Requires skilled labour
   b) Requires low maintenance cost
   c) Requires less material
   d) Results in less damage due to gradual failure

12) If the maximum spring rise is 2 m and height of the waves expected is 4 m, then breakwater height above datum will be
   a) 2.5 m b) 4 m c) 5 m d) 7 m

13) Which of the following structures protects the shore by trapping of littoral drift ?
   a) Groynes b) Sea walls c) Revetments d) Moles

14) A ship is berthed in a chamber and lifted by principles of buoyancy, such a chamber is called
   a) Dry dock b) Wet dock c) Floating dock d) Refuge dock

15) In a calendar year the spring tide occurs
   a) 12 times b) 24 times c) 6 times d) 1 time

16) For sleeper density of (n + 4) on straight length, the sleeper density on the curves will be
   a) (n + 5) b) (n + 4) c) (n – 3) d) All the above

17) The loose ballast between the two adjacent sleepers is known as
   a) Ballast crib b) Boxing c) Packing d) None of the above

18) Sub-grade (formation) is prepared to *receive*
   a) Ballast, sleepers and rails b) Ballast, sleepers and engine
   c) Ballast, rails and wagons d) All the above

19) One of the following is not the 'Gauge' used by Indian railways.
   a) Broad Gauge 1676 mm b) Meter Gauge 1000 mm
   c) Standard Gauge 1451 mm d) Narrow Gauge 762 mm

20) For broad gauge curve resistance = _____ × degree of curve × weight of train.
   a) 0.0004 b) 0.00045 c) 0.0005 d) 0.00054

_____

SLR-EP – 39

Seat No.	

T.E. (Civil Engineering) (Part – II) Examination, 2016
TRANSPORTATION ENGINEERING – II

Day and Date : Friday, 25-11-2016 Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

Instruction *:* ***Assume*** *suitable data* ***wherever*** *needed and mention it.*

SECTION – I

2. Answer **any three** questions (**Each** carry **8** marks) :

   a) Explain creep in rails. State effects of creep. Give remedial measures for the same. **8**

   b) With neat diagram explain "coning of wheels" on a level track and list the disadvantages. **8**

   c) A curve of 5° is situated on a section of BG. If maximum permissible speed on the section is 60 kmph, determine amount of equilibrium cant. If, for meeting the demand of slow moving trains, cant deficiency amounting 7.6 cm is provided. Determine super elevation needs to be provided. **8**

   d) What will be the allowable ruling gradient for a B.G. track on 4° curve, where ruling gradient is 1 : 150 ? **8**

3. Answer **any two** questions (**Each** carry **8** marks) :

   a) Draw a neat sketch of a Right hand turnout and show various parts on it. **8**

   b) Explain the following with neat sketches : **8**

      1) Heel divergence

      2) Switch angle

      3) Actual nose of crossing

      4) Throw of switch.

   c) Why are signals required ? Discuss different types of signals. **8**

SECTION – II

4. Answer **any three** questions (**Each** carry **8** marks) :

   a) Explain the site selection criteria for airport. **8**

   b) Show a figure showing components of aircraft and label its components. **8**

   c) For the hottest month of the year at the proposed airport site, the mean of the average daily temperature is 38°C and the mean of the maximum daily temperature is 47°C. Calculate the airport reference temperature. If the site is at 150 m above mean sea-level with a level ground, calculate the actual runway length to be provided. Basic runway length is 1200 m. **8**

   d) The longitudinal profile of a runway is comprised of a rising gradient of 1.4 percent followed by a falling gradient of 0.5 percent which is followed by a rising gradient of 0.5 percent. Determine the lengths of vertical curves and the distance between them. **8**

5. Answer **any two** questions (**Each** carry **8** marks) :

   a) Enlist different types of breakwaters and explain any two with neat sketches. **8**

   b) Draw a neat sketch of dry dock (plan and section) and label all components and explain the working of dry dock. **8**

   c) The biggest vessel to be slipped is a tug of 30 m length and 3 m drought. If the height of cradle block from the slipway deck is 0.75 m and inclination of the slipway to the horizontal is $3°30'$. Workout the total length of the slipway. Use,

   $L = 2l + (d + h)\ \text{cosec}\ \theta + k$

   k ranges 2 to 5. **8**

SLR-EP – 40 (d)

Seat No.	

Set **P**

T.E. (Civil) (Part – II) Examination, 2016
Self Learning (Technical) : TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Attempt **any four** from remaining questions.*

*4) Figures at **right** indicate **full** marks.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) Total Quality control done through
   a) Quality Development
   b) Quality Assurance
   c) Quality Planning
   d) TQM

2) _____ is needed to ensure quality before material is send to store or use.
   a) Analysis b) Inspection
   c) Both a) and b) d) Measurement

3) For better management of supply chain, the organizations are linking the _____ aspect to the various level of chain.
   a) Strategic b) Material
   c) Quality d) Process

P.T.O.

4) In Six Sigma Approach, the Sigma stand for
   a) Standard Deviation
   b) Standard Value of Six
   c) Variance
   d) None of these

5) ISO : 9001 is
   a) Technical System of TQM
   b) Managerial System of TQM
   c) TQM
   d) None

6) _____ is result of processing data.
   a) Action
   b) Planning
   c) Information
   d) Decision

7) The ISO : 9001 audit system includes the first party audit and
   a) Second party Audit
   b) Government Audit
   c) Third Party Audit
   d) Private Audit

8) ISO stands for
   a) International Organization for Standardization
   b) Indian Organization for Standardization
   c) Indian Standard Organization
   d) None

9) MIS structure is based on
   a) Management Activity
   b) Population
   c) Both a) and b)
   d) None

10) The programmed decision is nothing but
   a) Unstructured Decision
   b) Structured Decision
   c) Good Decision
   d) Systematic Decision

_____

SLR-EP – 40 (d)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
Self Learning (Technical) : TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Instructions *: 1) Attempt* ***any four*** *in Question No.* ***2*** *to Question No.* ***7****.*
2) Figures at ***right*** *indicate* ***full*** *marks.*

2. Discuss the role of MIS in the organizational structure.
3. Write a note on Six Sigma.
4. Explain in detail importance of checklist in TQM.
5. Write a note on Kaizen in TQM.
6. Discuss the various categories of MIS and their role in decision making.
7. Explain the checklist for Electrification Activity.

_____

Set P

SLR-EP – 40 (d)

Seat No.	

Set **Q**

T.E. (Civil) (Part – II) Examination, 2016
Self Learning (Technical) : TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Attempt **any four** from remaining questions.*

*4) Figures at **right** indicate **full** marks.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) MIS structure is based on
   a) Management Activity
   b) Population
   c) Both a) and b)
   d) None

2) The programmed decision is nothing but
   a) Unstructured Decision
   b) Structured Decision
   c) Good Decision
   d) Systematic Decision

3) The ISO : 9001 audit system includes the first party audit and
   a) Second party Audit
   b) Government Audit
   c) Third Party Audit
   d) Private Audit

P.T.O.

4) ISO stands for
   a) International Organization for Standardization
   b) Indian Organization for Standardization
   c) Indian Standard Organization
   d) None

5) Total Quality control done through
   a) Quality Development
   b) Quality Assurance
   c) Quality Planning
   d) TQM

6) _____ is needed to ensure quality before material is send to store or use.
   a) Analysis
   b) Inspection
   c) Both a) and b)
   d) Measurement

7) For better management of supply chain, the organizations are linking the _____ aspect to the various level of chain.
   a) Strategic
   b) Material
   c) Quality
   d) Process

8) In Six Sigma Approach, the Sigma stand for
   a) Standard Deviation
   b) Standard Value of Six
   c) Variance
   d) None of these

9) ISO : 9001 is
   a) Technical System of TQM
   b) Managerial System of TQM
   c) TQM
   d) None

10) _____ is result of processing data.
   a) Action
   b) Planning
   c) Information
   d) Decision

_____

SLR-EP – 40 (d)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
Self Learning (Technical) : TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Instructions *: 1) Attempt* ***any four*** *in Question No.* ***2*** *to Question No.* ***7****.*
2) Figures at ***right*** *indicate* ***full*** *marks.*

2. Discuss the role of MIS in the organizational structure.
3. Write a note on Six Sigma.
4. Explain in detail importance of checklist in TQM.
5. Write a note on Kaizen in TQM.
6. Discuss the various categories of MIS and their role in decision making.
7. Explain the checklist for Electrification Activity.

_____

Set Q

Set Q

SLR-EP – 40 (d)

Seat No.	

Set **R**

T.E. (Civil) (Part – II) Examination, 2016
Self Learning (Technical) : TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Attempt **any four** from remaining questions.*

*4) Figures at **right** indicate **full** marks.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) ISO : 9001 is

a) Technical System of TQM

b) Managerial System of TQM

c) TQM

d) None

2) _____ is result of processing data.

a) Action b) Planning

c) Information d) Decision

3) MIS structure is based on

a) Management Activity b) Population

c) Both a) and b) d) None

P.T.O.

4) The programmed decision is nothing but
   a) Unstructured Decision
   b) Structured Decision
   c) Good Decision
   d) Systematic Decision

5) For better management of supply chain, the organizations are linking the _____ aspect to the various level of chain.
   a) Strategic
   b) Material
   c) Quality
   d) Process

6) In Six Sigma Approach, the Sigma stand for
   a) Standard Deviation
   b) Standard Value of Six
   c) Variance
   d) None of these

7) Total Quality control done through
   a) Quality Development
   b) Quality Assurance
   c) Quality Planning
   d) TQM

8) _____ is needed to ensure quality before material is send to store or use.
   a) Analysis
   b) Inspection
   c) Both a) and b)
   d) Measurement

9) The ISO : 9001 audit system includes the first party audit and
   a) Second party Audit
   b) Government Audit
   c) Third Party Audit
   d) Private Audit

10) ISO stands for
   a) International Organization for Standardization
   b) Indian Organization for Standardization
   c) Indian Standard Organization
   d) None

_____

SLR-EP – 40 (d)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
Self Learning (Technical) : TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Instructions *: 1) Attempt* ***any four*** *in Question No.* ***2*** *to Question No.* ***7****.*
2) Figures at ***right*** *indicate* ***full*** *marks.*

2. Discuss the role of MIS in the organizational structure.
3. Write a note on Six Sigma.
4. Explain in detail importance of checklist in TQM.
5. Write a note on Kaizen in TQM.
6. Discuss the various categories of MIS and their role in decision making.
7. Explain the checklist for Electrification Activity.

_____

Set R

SLR-EP – 40 (d)

Seat No.	

Set **S**

T.E. (Civil) (Part – II) Examination, 2016
Self Learning (Technical) : TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Attempt **any four** from remaining questions.*

*4) Figures at **right** indicate **full** marks.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) For better management of supply chain, the organizations are linking the _____ aspect to the various level of chain.

a) Strategic b) Material

c) Quality d) Process

2) In Six Sigma Approach, the Sigma stand for

a) Standard Deviation b) Standard Value of Six

c) Variance d) None of these

3) ISO : 9001 is

a) Technical System of TQM

b) Managerial System of TQM

c) TQM

d) None

P.T.O.

4) _____ is result of processing data.
   a) Action
   b) Planning
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   d) Decision

5) The ISO : 9001 audit system includes the first party audit and
   a) Second party Audit
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7) MIS structure is based on
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   b) Population
   c) Both a) and b)
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8) The programmed decision is nothing but
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9) Total Quality control done through
   a) Quality Development
   b) Quality Assurance
   c) Quality Planning
   d) TQM

10) _____ is needed to ensure quality before material is send to store or use.
   a) Analysis
   b) Inspection
   c) Both a) and b)
   d) Measurement

_____

SLR-EP – 40 (d)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
Self Learning (Technical) : TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Instructions *: 1) Attempt* ***any four*** *in Question No.* ***2*** *to Question No.* ***7****.*
2) Figures at ***right*** *indicate* ***full*** *marks.*

2. Discuss the role of MIS in the organizational structure.
3. Write a note on Six Sigma.
4. Explain in detail importance of checklist in TQM.
5. Write a note on Kaizen in TQM.
6. Discuss the various categories of MIS and their role in decision making.
7. Explain the checklist for Electrification Activity.

_____

Set S

SLR-EP – 40a

Seat No.	

Set **P**

T.E. (Civil Engineering) (Part – II) Examination, 2016
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume **suitable** data **wherever** needed and mention it clearly.*
*3) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **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

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) The bitumen of grade 80/100 means
   a) Its penetration value 80 mm
   b) Its penetration value 10 mm
   c) Its penetration value is 8 mm to 10 mm
   d) Its penetration value is 8 cm to 10 cm

2) The stability of the subgrade soil decreases due to
   a) Variation in moisture content
   b) Soil with high plasticity
   c) Swelling and shrinkage
   d) All the above

3) The pavement thickness for soil with CBR
   a) Increases with increase in CBR
   b) Decreases with increase in CBR
   c) First increases and then decreases
   d) No change in the pavement thickness

4) The aggregate abrasion value should not exceed _____ percent for aggregate to be used in Bituminous concrete surface course.
   a) 40 b) 30 c) 20 d) 10

5) Generally the specific gravity of bitumen is in the range of
   a) 0.97 to 1.02 b) 1.02 to 2.02 c) 1.5 to 2.5 d) 2.5 to 3.0
6) Which of the following represents hardest grade of bitumen ?
   a) 30/40 b) 60/70 c) 80/100 d) 100/120
7) The dowel bar in rigid pavement
   a) Helps to prevent buckling of the slab
   b) Acts as load transfer media
   c) Strengthens the expansion joint
   d) All the above
8) The maximum width of expansion joint in rigid pavement is
   a) 5 mm b) 25 mm c) 50 mm d) 100 mm
9) The materials used in construction of WBM roads are
   a) Coarse aggregates, Screenings and binding material
   b) Coarse aggregates, Screenings, binding material and bitumen
   c) Coarse aggregates, Screenings, binding material and cement
   d) Coarse aggregates, Screenings, binding material and lime
10) _____ bars are used across the longitudinal joints of cement concrete pavements.
   a) Tie bars b) Dowel bars
   c) Tie bars and dowel bars d) None of these

_____

SLR-EP – 40a

Seat No.	

T.E. (Civil Engineering) (Part – II) Examination, 2016
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Figures on **right** indicates **full** marks.*
*2) Assume **suitable** data **wherever** needed and mention it clearly.*

2. Answer **any five** questions (**8** marks **each**) : **(8×5=40)**

a) Briefly outline the advantages and limitations of flexible pavement.

b) Discuss briefly factors to be considered for the design of flexible pavements.

c) Discuss the advantages and limitations of CBR method of flexible pavement design.

d) The traffic studies and axle load distribution studies carried out during project preparation indicated that there are (i) 5600 commercial vehicles per day with rear axle loads in the range of 2500 to 3500 kg and growth rate of 6.5% p.a. and (ii) 1900 heavy commercial vehicles with rear axle loads in the range of 11,000 to 13,000 kg and growth rate of 4.5% p.a. The road pavement is expected to be constructed in a period of 3.0 years after this study and the flexible pavement structure is to be designed for a design life of 15 years. Determine the CSA for design. Assume standard axle load as 8160 kg.

e) Design a new flexible pavement by CBR method using the following data :

1) Subgarde soil (soaked) CBR = 3%

2) Moorum sub-base (soaked) CBR = 20%

3) WBM base CBR = 90%

4) Number of heavy vehicles per day in May 2016 = 200

5) Design life = 10 years

6) Annual rate of increase in the heavy vehicles = 7.5%

7) The road proposed to be completed in May 2020.

Draw the sketch showing thickness of surface course, base and sub-base layers. (Use Figure -1)

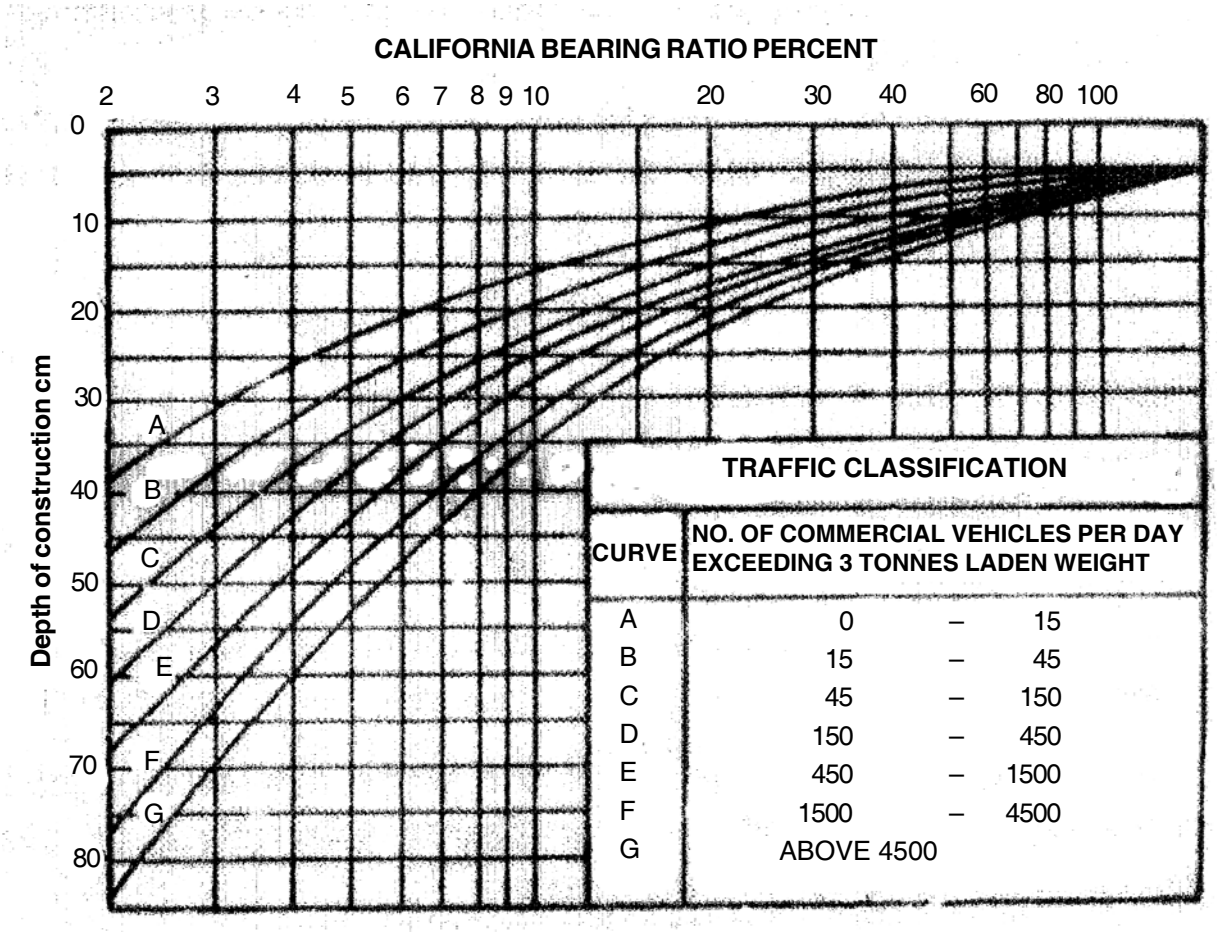

Fig. 1 : C.B.R. Design Chart (Recommended by IRC)

f) Mention the specifications of materials and construction steps for Water Bound Macadam (WBM) road.

g) With sketches illustrate typical failures in flexible pavements starting from the (a) Subgrade (b) Sub-base or base course (c) Surface course.

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SLR-EP – 40a

Seat No.	

Set **Q**

T.E. (Civil Engineering) (Part – II) Examination, 2016
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume **suitable** data **wherever** needed and mention it clearly.*
*3) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **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

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) The materials used in construction of WBM roads are
   a) Coarse aggregates, Screenings and binding material
   b) Coarse aggregates, Screenings, binding material and bitumen
   c) Coarse aggregates, Screenings, binding material and cement
   d) Coarse aggregates, Screenings, binding material and lime

2) _____ bars are used across the longitudinal joints of cement concrete pavements.
   a) Tie bars b) Dowel bars
   c) Tie bars and dowel bars d) None of these

3) The dowel bar in rigid pavement
   a) Helps to prevent buckling of the slab
   b) Acts as load transfer media
   c) Strengthens the expansion joint
   d) All the above

4) The maximum width of expansion joint in rigid pavement is
   a) 5 mm b) 25 mm c) 50 mm d) 100 mm

5) The bitumen of grade 80/100 means
   a) Its penetration value 80 mm
   b) Its penetration value 10 mm
   c) Its penetration value is 8 mm to 10 mm
   d) Its penetration value is 8 cm to 10 cm

6) The stability of the subgrade soil decreases due to
   a) Variation in moisture content
   b) Soil with high plasticity
   c) Swelling and shrinkage
   d) All the above

7) The pavement thickness for soil with CBR
   a) Increases with increase in CBR
   b) Decreases with increase in CBR
   c) First increases and then decreases
   d) No change in the pavement thickness

8) The aggregate abrasion value should not exceed _____ percent for aggregate to be used in Bituminous concrete surface course.
   a) 40 b) 30 c) 20 d) 10

9) Generally the specific gravity of bitumen is in the range of
   a) 0.97 to 1.02 b) 1.02 to 2.02 c) 1.5 to 2.5 d) 2.5 to 3.0

10) Which of the following represents hardest grade of bitumen ?
   a) 30/40 b) 60/70 c) 80/100 d) 100/120

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SLR-EP – 40a

Seat No.	

T.E. (Civil Engineering) (Part – II) Examination, 2016
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Figures on **right** indicates **full** marks.*
*2) Assume **suitable** data **wherever** needed and mention it clearly.*

2. Answer **any five** questions (**8** marks **each**) : **(8×5=40)**

a) Briefly outline the advantages and limitations of flexible pavement.

b) Discuss briefly factors to be considered for the design of flexible pavements.

c) Discuss the advantages and limitations of CBR method of flexible pavement design.

d) The traffic studies and axle load distribution studies carried out during project preparation indicated that there are (i) 5600 commercial vehicles per day with rear axle loads in the range of 2500 to 3500 kg and growth rate of 6.5% p.a. and (ii) 1900 heavy commercial vehicles with rear axle loads in the range of 11,000 to 13,000 kg and growth rate of 4.5% p.a. The road pavement is expected to be constructed in a period of 3.0 years after this study and the flexible pavement structure is to be designed for a design life of 15 years. Determine the CSA for design. Assume standard axle load as 8160 kg.

e) Design a new flexible pavement by CBR method using the following data :

1) Subgarde soil (soaked) CBR = 3%

2) Moorum sub-base (soaked) CBR = 20%

3) WBM base CBR = 90%

4) Number of heavy vehicles per day in May 2016 = 200

5) Design life = 10 years

6) Annual rate of increase in the heavy vehicles = 7.5%

7) The road proposed to be completed in May 2020.

Draw the sketch showing thickness of surface course, base and sub-base layers. (Use Figure -1)

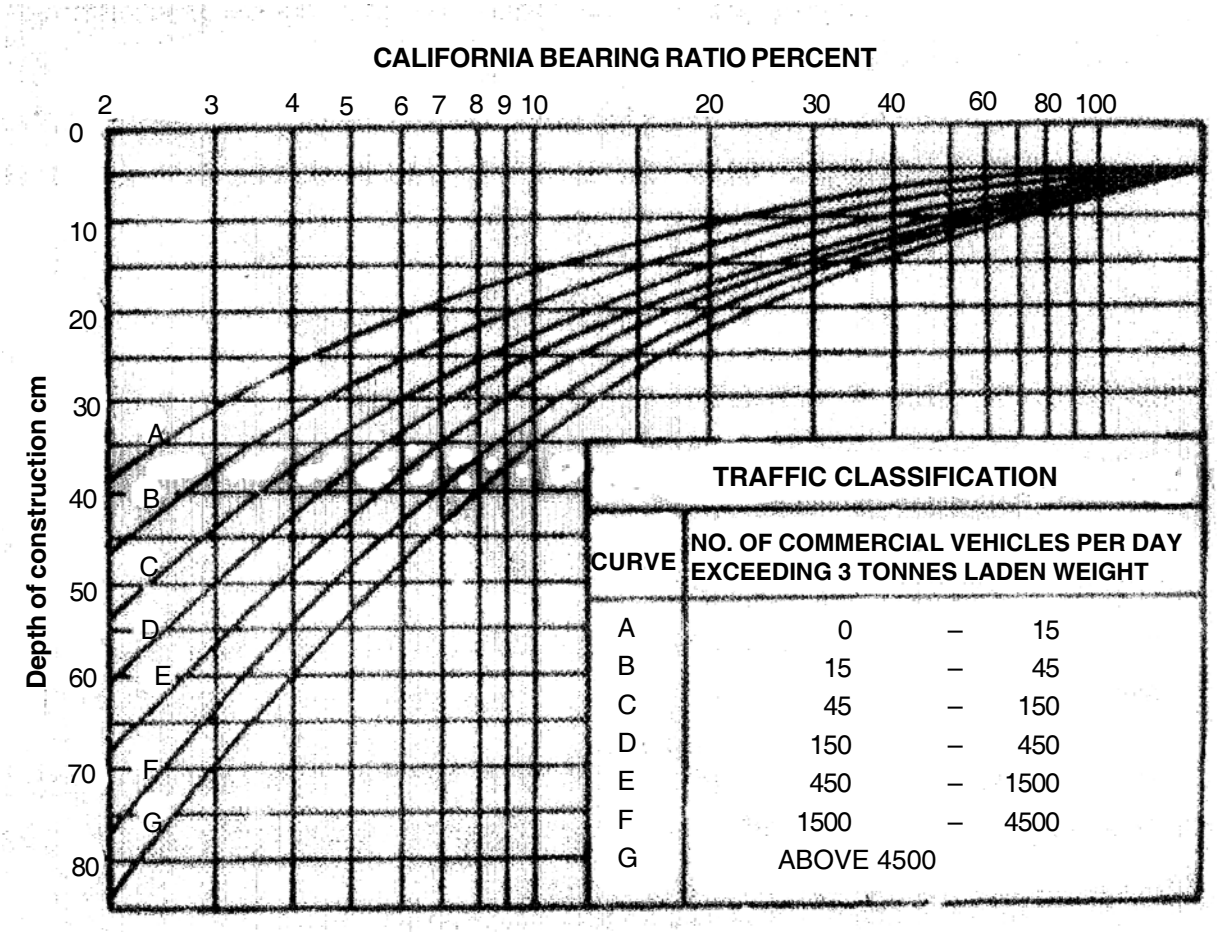

Fig. 1 : C.B.R. Design Chart (Recommended by IRC)

f) Mention the specifications of materials and construction steps for Water Bound Macadam (WBM) road.

g) With sketches illustrate typical failures in flexible pavements starting from the (a) Subgrade (b) Sub-base or base course (c) Surface course.

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SLR-EP – 40a

Seat No.	

Set **R**

T.E. (Civil Engineering) (Part – II) Examination, 2016
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume **suitable** data **wherever** needed and mention it clearly.*
*3) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **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

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) Generally the specific gravity of bitumen is in the range of
a) 0.97 to 1.02 b) 1.02 to 2.02 c) 1.5 to 2.5 d) 2.5 to 3.0

2) Which of the following represents hardest grade of bitumen ?
a) 30/40 b) 60/70 c) 80/100 d) 100/120

3) The materials used in construction of WBM roads are
a) Coarse aggregates, Screenings and binding material
b) Coarse aggregates, Screenings, binding material and bitumen
c) Coarse aggregates, Screenings, binding material and cement
d) Coarse aggregates, Screenings, binding material and lime

4) _____ bars are used across the longitudinal joints of cement concrete pavements.
a) Tie bars b) Dowel bars
c) Tie bars and dowel bars d) None of these

5) The pavement thickness for soil with CBR
a) Increases with increase in CBR
b) Decreases with increase in CBR
c) First increases and then decreases
d) No change in the pavement thickness

6) The aggregate abrasion value should not exceed _____ percent for aggregate to be used in Bituminous concrete surface course.
   a) 40 b) 30 c) 20 d) 10

7) The bitumen of grade 80/100 means
   a) Its penetration value 80 mm
   b) Its penetration value 10 mm
   c) Its penetration value is 8 mm to 10 mm
   d) Its penetration value is 8 cm to 10 cm

8) The stability of the subgrade soil decreases due to
   a) Variation in moisture content
   b) Soil with high plasticity
   c) Swelling and shrinkage
   d) All the above

9) The dowel bar in rigid pavement
   a) Helps to prevent buckling of the slab
   b) Acts as load transfer media
   c) Strengthens the expansion joint
   d) All the above

10) The maximum width of expansion joint in rigid pavement is
   a) 5 mm b) 25 mm c) 50 mm d) 100 mm

_____

SLR-EP – 40a

Seat No.	

T.E. (Civil Engineering) (Part – II) Examination, 2016
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Figures on **right** indicates **full** marks.*
*2) Assume **suitable** data **wherever** needed and mention it clearly.*

2. Answer **any five** questions (**8** marks **each**) : **(8×5=40)**

a) Briefly outline the advantages and limitations of flexible pavement.

b) Discuss briefly factors to be considered for the design of flexible pavements.

c) Discuss the advantages and limitations of CBR method of flexible pavement design.

d) The traffic studies and axle load distribution studies carried out during project preparation indicated that there are (i) 5600 commercial vehicles per day with rear axle loads in the range of 2500 to 3500 kg and growth rate of 6.5% p.a. and (ii) 1900 heavy commercial vehicles with rear axle loads in the range of 11,000 to 13,000 kg and growth rate of 4.5% p.a. The road pavement is expected to be constructed in a period of 3.0 years after this study and the flexible pavement structure is to be designed for a design life of 15 years. Determine the CSA for design. Assume standard axle load as 8160 kg.

e) Design a new flexible pavement by CBR method using the following data :

1) Subgarde soil (soaked) CBR = 3%

2) Moorum sub-base (soaked) CBR = 20%

3) WBM base CBR = 90%

4) Number of heavy vehicles per day in May 2016 = 200

5) Design life = 10 years

6) Annual rate of increase in the heavy vehicles = 7.5%

7) The road proposed to be completed in May 2020.

Draw the sketch showing thickness of surface course, base and sub-base layers. (Use Figure -1)

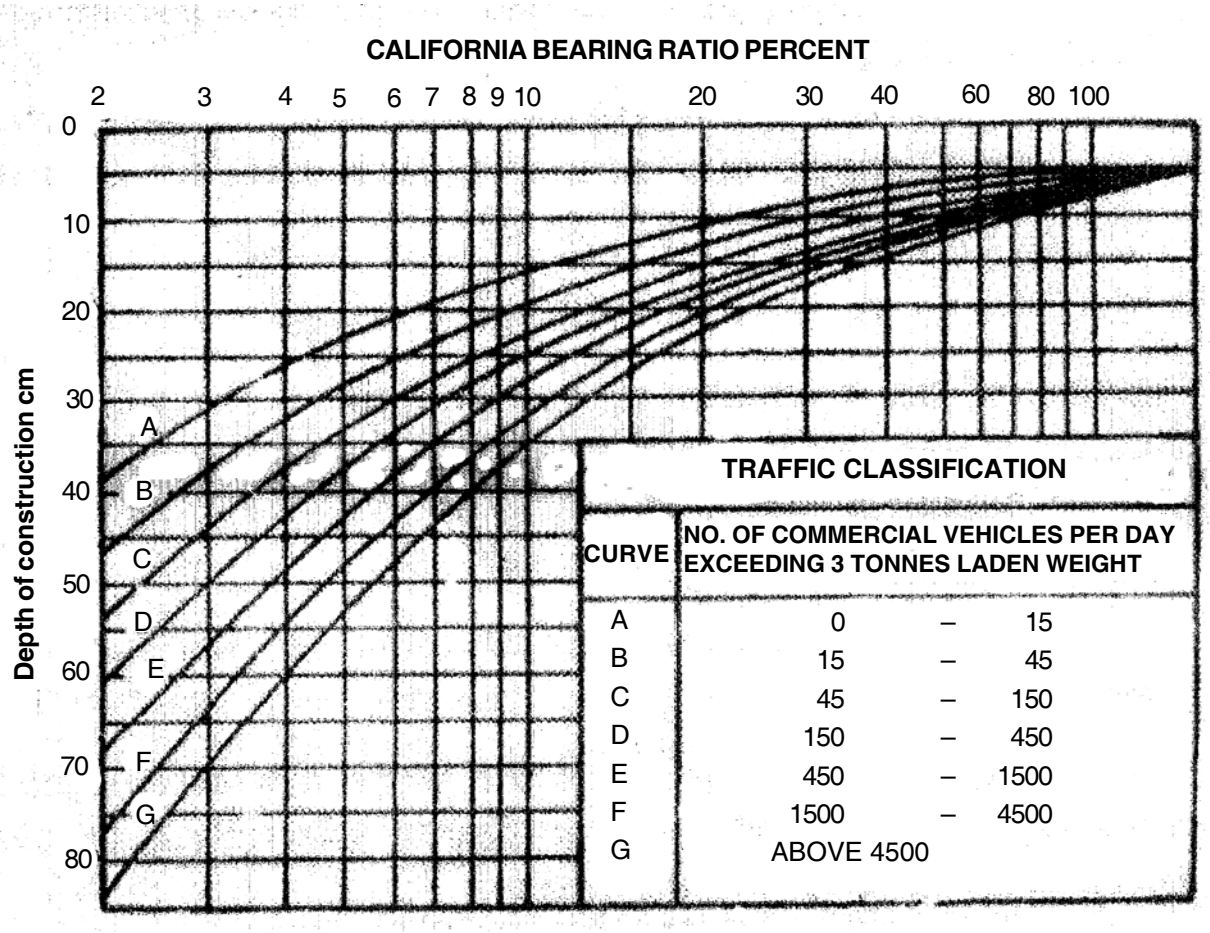

Fig. 1 : C.B.R. Design Chart (Recommended by IRC)

f) Mention the specifications of materials and construction steps for Water Bound Macadam (WBM) road.

g) With sketches illustrate typical failures in flexible pavements starting from the (a) Subgrade (b) Sub-base or base course (c) Surface course.

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SLR-EP – 40a

Seat No.	

Set **S**

T.E. (Civil Engineering) (Part – II) Examination, 2016
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume **suitable** data **wherever** needed and mention it clearly.*
*3) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **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

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) The pavement thickness for soil with CBR
   a) Increases with increase in CBR
   b) Decreases with increase in CBR
   c) First increases and then decreases
   d) No change in the pavement thickness

2) The aggregate abrasion value should not exceed _____ percent for aggregate to be used in Bituminous concrete surface course.
   a) 40 b) 30 c) 20 d) 10

3) Generally the specific gravity of bitumen is in the range of
   a) 0.97 to 1.02 b) 1.02 to 2.02 c) 1.5 to 2.5 d) 2.5 to 3.0

4) Which of the following represents hardest grade of bitumen ?
   a) 30/40 b) 60/70 c) 80/100 d) 100/120

5) The dowel bar in rigid pavement
   a) Helps to prevent buckling of the slab
   b) Acts as load transfer media
   c) Strengthens the expansion joint
   d) All the above

6) The maximum width of expansion joint in rigid pavement is
   a) 5 mm b) 25 mm c) 50 mm d) 100 mm

P.T.O.

7) The materials used in construction of WBM roads are
   a) Coarse aggregates, Screenings and binding material
   b) Coarse aggregates, Screenings, binding material and bitumen
   c) Coarse aggregates, Screenings, binding material and cement
   d) Coarse aggregates, Screenings, binding material and lime

8) _____ bars are used across the longitudinal joints of cement concrete pavements.
   a) Tie bars
   b) Dowel bars
   c) Tie bars and dowel bars
   d) None of these

9) The bitumen of grade 80/100 means
   a) Its penetration value 80 mm
   b) Its penetration value 10 mm
   c) Its penetration value is 8 mm to 10 mm
   d) Its penetration value is 8 cm to 10 cm

10) The stability of the subgrade soil decreases due to
   a) Variation in moisture content
   b) Soil with high plasticity
   c) Swelling and shrinkage
   d) All the above

_____

SLR-EP – 40a

Seat No.	

T.E. (Civil Engineering) (Part – II) Examination, 2016
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Figures on* ***right*** *indicates* ***full*** *marks.*
2) Assume ***suitable*** *data* ***wherever*** *needed and mention it clearly.*

2. Answer **any five** questions (**8** marks **each**) : **(8×5=40)**

a) Briefly outline the advantages and limitations of flexible pavement.

b) Discuss briefly factors to be considered for the design of flexible pavements.

c) Discuss the advantages and limitations of CBR method of flexible pavement design.

d) The traffic studies and axle load distribution studies carried out during project preparation indicated that there are (i) 5600 commercial vehicles per day with rear axle loads in the range of 2500 to 3500 kg and growth rate of 6.5% p.a. and (ii) 1900 heavy commercial vehicles with rear axle loads in the range of 11,000 to 13,000 kg and growth rate of 4.5% p.a. The road pavement is expected to be constructed in a period of 3.0 years after this study and the flexible pavement structure is to be designed for a design life of 15 years. Determine the CSA for design. Assume standard axle load as 8160 kg.

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2) Moorum sub-base (soaked) CBR = 20%

3) WBM base CBR = 90%

4) Number of heavy vehicles per day in May 2016 = 200

5) Design life = 10 years

6) Annual rate of increase in the heavy vehicles = 7.5%

7) The road proposed to be completed in May 2020.

Draw the sketch showing thickness of surface course, base and sub-base layers. (Use Figure -1)

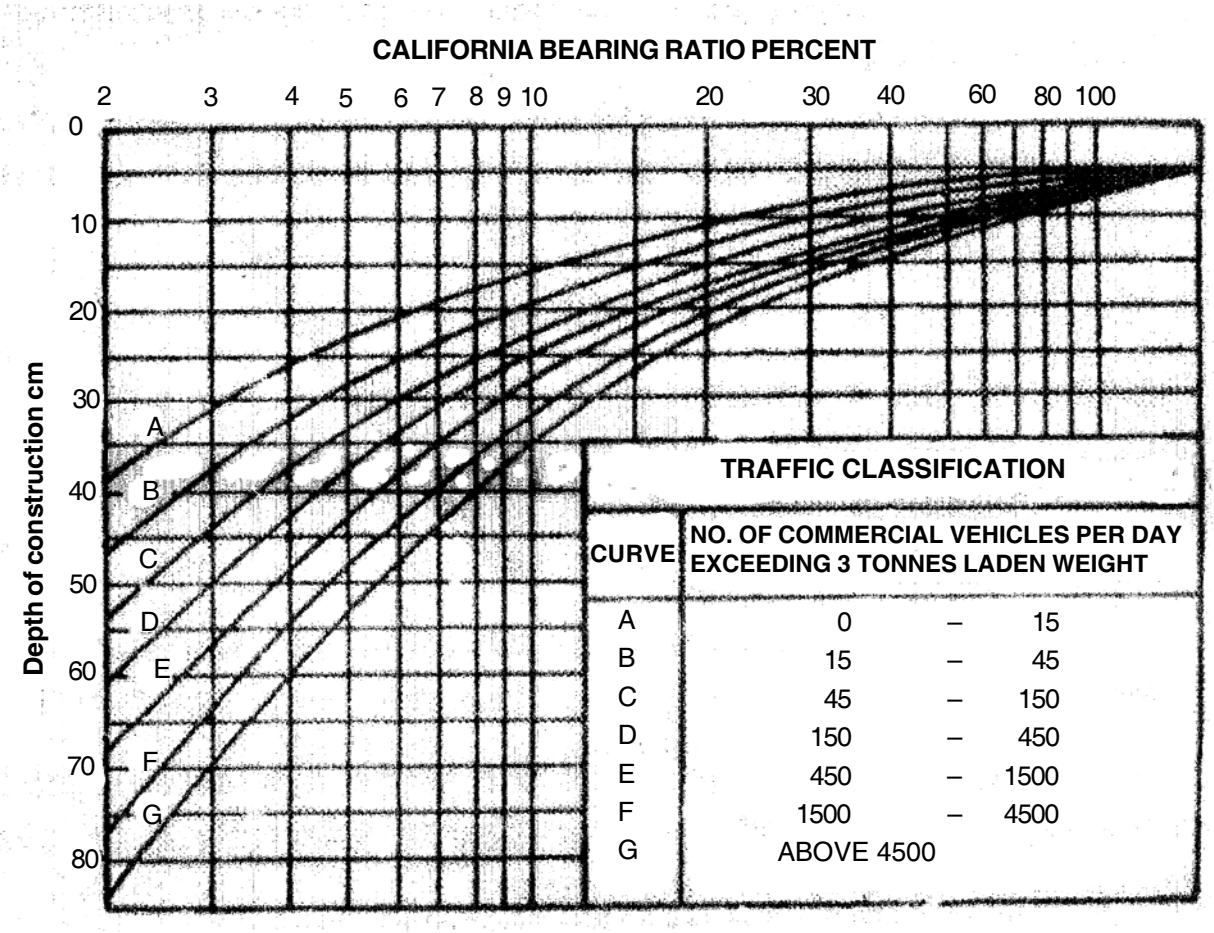

Fig. 1 : C.B.R. Design Chart (Recommended by IRC)

f) Mention the specifications of materials and construction steps for Water Bound Macadam (WBM) road.

g) With sketches illustrate typical failures in flexible pavements starting from the (a) Subgrade (b) Sub-base or base course (c) Surface course.

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SLR-EP – 40(b)

Seat No.	

Set P

T.E. (Civil) (Part – II) Examination, 2016
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) **Assume** additional data, if required and state **it clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(1 mark each)**

1) Reinforced earth wall need to be checked for its
   a) Internal stability only
   b) External stability only
   c) Both internal and external
   d) None

2) For external stability of RE wall it should be safe against
   a) Sliding b) Overturning
   c) Bearing d) All

3) Minimum FOS against pullout of reinforcing element of wall is
   a) 1.2 b) 1.5
   c) 2.0 d) 2.5

4) 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

P.T.O.

5) The materials used in the manufacture of geosynthetics are primarily synthetic polymers generally derived from
   a) Rubber
   b) Fiberglass
   c) Crude petroleum oils
   d) Jute

6) Which one of the following geosynthetics is a geocomposite ?
   a) Geogrid
   b) Geonet
   c) Geosynthetic clay liner
   d) None of the above

7) If a geosynthetic allows for adequate fluid flow with limited migration of soil particles across its plane over a projected service lifetime of the application under consideration, this function of geosynthetic is called
   a) Separation
   b) Filtration
   c) Drainage
   d) Protection

8) The most useful geosynthetic physical property which is closely related to engineering performance is
   a) Thickness
   b) Mass per unit area
   c) Strength
   d) Stiffness

9) The thickness of a geotextile is measured at a specified normal compressive stress, generally equal to
   a) 2.0 kPa for 5 s
   b) 2.0 kPa for 10 s
   c) 20.0 kPa for 5 s
   d) None of the above

10) The compressibility is relatively high for
   a) Woven geotextiles
   b) Needle-punched nonwoven geotextiles
   c) Thermally bonded geotextiles
   d) Knitted geotextiles

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SLR-EP – 40(b)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Out of Q. **2** to Q. **6**, solve **any four** question.*
*2) **Assume** additional data, if required and state **it clearly**.*
*3) Figures to the **right** indicate **full** marks.*

2. List :
   i) Physical properties
   ii) Mechanical properties
   iii) Hydraulic properties
   iv) Constructability / survivability properties and
   v) Durability properties with respect to geosynthetics.

   What is the significance of thickness as a property ? **10**

3. A) List the various functions performed by geosynthetics. Explain any one in detail. **5**

   B) Explain the circular slip method of analysis of slope stability. **5**

4. A) Explain the process of construction of landfill using geosynthetics. **5**

   B) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier. **5**

5. A) List the various processes by which :
      i) Non-woven geosynthetics and
      ii) Geogrids are manufactured. **5**

   B) What are the possible modes of failure of a soil-reinforcement system. **5**

6. A) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds. **5**

   B) Discuss the construction methods for reinforced soil retaining wall. **5**

Set P

SLR-EP – 40(b)

Seat No.	

Set Q

T.E. (Civil) (Part – II) Examination, 2016
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) **Assume** additional data, if required and state **it clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(1 mark each)**

1) The thickness of a geotextile is measured at a specified normal compressive stress, generally equal to
   a) 2.0 kPa for 5 s
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   c) 20.0 kPa for 5 s
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2) The compressibility is relatively high for
   a) Woven geotextiles
   b) Needle-punched nonwoven geotextiles
   c) Thermally bonded geotextiles
   d) Knitted geotextiles

3) If a geosynthetic allows for adequate fluid flow with limited migration of soil particles across its plane over a projected service lifetime of the application under consideration, this function of geosynthetic is called
   a) Separation
   b) Filtration
   c) Drainage
   d) Protection

4) The most useful geosynthetic physical property which is closely related to engineering performance is
   a) Thickness
   b) Mass per unit area
   c) Strength
   d) Stiffness

P.T.O.

5) Reinforced earth wall need to be checked for its
   a) Internal stability only
   b) External stability only
   c) Both internal and external
   d) None

6) For external stability of RE wall it should be safe against
   a) Sliding b) Overturning
   c) Bearing d) All

7) Minimum FOS against pullout of reinforcing element of wall is
   a) 1.2 b) 1.5
   c) 2.0 d) 2.5

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 manufacture of geosynthetics are primarily synthetic polymers generally derived from
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

10) Which one of the following geosynthetics is a geocomposite ?
   a) Geogrid b) Geonet
   c) Geosynthetic clay liner d) None of the above

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SLR-EP – 40(b)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Out of Q. **2** to Q. **6**, solve **any four** question.*
*2) **Assume** additional data, if required and state **it clearly**.*
*3) Figures to the **right** indicate **full** marks.*

2. List :
   i) Physical properties
   ii) Mechanical properties
   iii) Hydraulic properties
   iv) Constructability / survivability properties and
   v) Durability properties with respect to geosynthetics.

   What is the significance of thickness as a property ? **10**

3. A) List the various functions performed by geosynthetics. Explain any one in detail. **5**

   B) Explain the circular slip method of analysis of slope stability. **5**

4. A) Explain the process of construction of landfill using geosynthetics. **5**

   B) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier. **5**

5. A) List the various processes by which :
      i) Non-woven geosynthetics and
      ii) Geogrids are manufactured. **5**

   B) What are the possible modes of failure of a soil-reinforcement system. **5**

6. A) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds. **5**

   B) Discuss the construction methods for reinforced soil retaining wall. **5**

Set Q

SLR-EP – 40(b)

Seat No.	

Set R

T.E. (Civil) (Part – II) Examination, 2016
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) **Assume** additional data, if required and state **it clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(1 mark each)**

1) The materials used in the manufacture of geosynthetics are primarily synthetic polymers generally derived from
   a) Rubber b) Fiberglass
   c) Crude petroleum oils d) Jute

2) Which one of the following geosynthetics is a geocomposite ?
   a) Geogrid b) Geonet
   c) Geosynthetic clay liner d) None of the above

3) The thickness of a geotextile is measured at a specified normal compressive stress, generally equal to
   a) 2.0 kPa for 5 s b) 2.0 kPa for 10 s
   c) 20.0 kPa for 5 s d) None of the above

4) The compressibility is relatively high for
   a) Woven geotextiles
   b) Needle-punched nonwoven geotextiles
   c) Thermally bonded geotextiles
   d) Knitted geotextiles

5) Minimum FOS against pullout of reinforcing element of wall is
   a) 1.2 b) 1.5
   c) 2.0 d) 2.5

6) 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

7) Reinforced earth wall need to be checked for its
   a) Internal stability only
   b) External stability only
   c) Both internal and external
   d) None

8) For external stability of RE wall it should be safe against
   a) Sliding b) Overturning
   c) Bearing d) All

9) If a geosynthetic allows for adequate fluid flow with limited migration of soil particles across its plane over a projected service lifetime of the application under consideration, this function of geosynthetic is called
   a) Separation b) Filtration
   c) Drainage d) Protection

10) The most useful geosynthetic physical property which is closely related to engineering performance is
   a) Thickness b) Mass per unit area
   c) Strength d) Stiffness

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SLR-EP – 40(b)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Out of Q. **2** to Q. **6**, solve **any four** question.*
*2) **Assume** additional data, if required and state **it clearly**.*
*3) Figures to the **right** indicate **full** marks.*

2. List :
   i) Physical properties
   ii) Mechanical properties
   iii) Hydraulic properties
   iv) Constructability / survivability properties and
   v) Durability properties with respect to geosynthetics.

   What is the significance of thickness as a property ? **10**

3. A) List the various functions performed by geosynthetics. Explain any one in detail. **5**

   B) Explain the circular slip method of analysis of slope stability. **5**

4. A) Explain the process of construction of landfill using geosynthetics. **5**

   B) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier. **5**

5. A) List the various processes by which :
      i) Non-woven geosynthetics and
      ii) Geogrids are manufactured. **5**

   B) What are the possible modes of failure of a soil-reinforcement system. **5**

6. A) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds. **5**

   B) Discuss the construction methods for reinforced soil retaining wall. **5**

Set R

SLR-EP – 40(b)

Seat No.	

Set S

T.E. (Civil) (Part – II) Examination, 2016
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50

Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) **Assume** additional data, if required and state **it clearly**.*

*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(1 mark each)**

1) Minimum FOS against pullout of reinforcing element of wall is

a) 1.2 b) 1.5

c) 2.0 d) 2.5

2) 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

3) The materials used in the manufacture of geosynthetics are primarily synthetic polymers generally derived from

a) Rubber b) Fiberglass

c) Crude petroleum oils d) Jute

4) Which one of the following geosynthetics is a geocomposite ?

a) Geogrid b) Geonet

c) Geosynthetic clay liner d) None of the above

P.T.O.

5) If a geosynthetic allows for adequate fluid flow with limited migration of soil particles across its plane over a projected service lifetime of the application under consideration, this function of geosynthetic is called
   a) Separation
   b) Filtration
   c) Drainage
   d) Protection

6) The most useful geosynthetic physical property which is closely related to engineering performance is
   a) Thickness
   b) Mass per unit area
   c) Strength
   d) Stiffness

7) The thickness of a geotextile is measured at a specified normal compressive stress, generally equal to
   a) 2.0 kPa for 5 s
   b) 2.0 kPa for 10 s
   c) 20.0 kPa for 5 s
   d) None of the above

8) The compressibility is relatively high for
   a) Woven geotextiles
   b) Needle-punched nonwoven geotextiles
   c) Thermally bonded geotextiles
   d) Knitted geotextiles

9) Reinforced earth wall need to be checked for its
   a) Internal stability only
   b) External stability only
   c) Both internal and external
   d) None

10) For external stability of RE wall it should be safe against
   a) Sliding
   b) Overturning
   c) Bearing
   d) All

———————

SLR-EP – 40(b)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Out of Q. **2** to Q. **6**, solve **any four** question.*
*2) **Assume** additional data, if required and state **it clearly**.*
*3) Figures to the **right** indicate **full** marks.*

2. List :
   i) Physical properties
   ii) Mechanical properties
   iii) Hydraulic properties
   iv) Constructability / survivability properties and
   v) Durability properties with respect to geosynthetics.

   What is the significance of thickness as a property ? **10**

3. A) List the various functions performed by geosynthetics. Explain any one in detail. **5**

   B) Explain the circular slip method of analysis of slope stability. **5**

4. A) Explain the process of construction of landfill using geosynthetics. **5**

   B) Explain with the help of sketch geosynthetic clay liner (GCL) as a barrier. **5**

5. A) List the various processes by which :
      i) Non-woven geosynthetics and
      ii) Geogrids are manufactured. **5**

   B) What are the possible modes of failure of a soil-reinforcement system. **5**

6. A) List the assumptions made by Binquet and Lee in their analysis of reinforced earth beds. **5**

   B) Discuss the construction methods for reinforced soil retaining wall. **5**

Set S

SLR-EP – 40(C)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
PLANNING FOR SUSTAINABLE EVLOPEMENT
Self Learning Technical

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***Instructions** : 1) Solve **any five** questions.*
*2) Figures to the **right** indicates **full** marks.*

1. Explain topology of environmental innovation. **10**
2. Discuss in detail the purpose of environmental innovation indicators. **10**
3. Explain major perspectives of sustainable development. **10**
4. Discuss concerns and criticism regarding sustainable development. **10**
5. Write a detailed note on 'event oriented thinking' with reference to sustainable development. **10**
6. What are methods for measuring for eco-innovations ? **10**
7. Discuss two way relations between sustainable development and climate change. **10**

SLR-EP – 40(e)

Seat No.	

T.E. (Civil) (Part – II) Examination, 2016
EARTHQUAKE RESISTANT NON ENGINEERED CONSTRUCTION
(Self Learning Technical Course)

Day and Date : Saturday, 26-11-2016 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

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

1. Explain the effects of an Earthquake. **10**
2. What are the causes of an Earthquake ? **10**
3. Explain the significance of RC bands in masonry construction. **10**
4. Which are the planning aspects in Earthquake resistant design ? **10**
5. What are the causes of damages due to earthquake in the masonry construction ? **10**
6. What is meant by Restoration of strength ? What are techniques for restoration ? **10**

SLR-EP – 41

Seat No.	

Set P

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Tuesday, 29-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. MCQ Q. No. **1** to **6** carries **1** mark **each** and Q. No. **7** to **13** carries **2** 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.***
*3) **IS 456-2000** is **not** allowed to refer while solving **MCQ** in **first 30 minutes**.*
*4) **Use** of **Original IS 456** and non-programmable calculator is **allowed** while solving design problems.*
*5) **Assume** suitable data if required and state **it clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **20**

1) For the cantilever slabs, span to depth ratios as per control of deflection is
   a) 20 b) 7 c) 26 d) 25

2) A trapezoidal section is desirable for a
   a) Cantilever beam b) Continuous beam
   c) Lintel d) T-beam

3) The moment of resistance of a doubly reinforced beam is
   a) Greater than Rbd^2 b) Equal to Rbd^2
   c) Less than Rbd^2 d) None of the above

4) The amount of reinforcement for main bars in a slab, is based upon
   a) Minimum bending moment b) Maximum shear force
   c) Maximum bending moment d) Minimum shear force

5) Short column fails by
   a) Buckling b) Crushing
   c) Bending d) None of the above

P.T.O.

6) If the neutral axis of a T-beam is in the flange then it acts as a rectangular beam of size

a) $b_w \times D_f$ b) $b_f \times b_w$

c) $b_f \times D_f$ d) None of the above

7) A singly reinforced rectangular section of 200 mm wide and 400 mm effective depth, reinforced with 4 bars of 20 mm diameter mild steel bars. The concrete used is M_{15}, the moment of resistance of the section is

a) 50 kN-m b) 72 kN-m c) 22 kN-m d) 108 kN-m

8) A concrete beam has 350 mm width and 700 mm effective depth. It is subjected to a superimposed bending moment of 300 kN-m at service condition. Material used are M_{15} and Fe_{415} with Fsc = 353.7 MPa. The amount of tensile and compressive steel in, mm^2 will be, use effective cover to compression and tension steel as 50 mm

a) 2164 and Zero b) 2164 and 212

c) 2164 and 412 d) 1750 and 420

9) Factored load carrying capacity of a column of 300 mm × 600 mm size with minimum percentage of steel is _____ (M_{20} and Fe_{415})

a) 1840 kN b) 180 kN c) 1829 kN d) None

10) A T-beam roof section has thickness of slab 100 mm; width of rib 300 mm; depth of beam 500 mm; C/C distance of beams 3 m; effective span of beams 6 m; distance b/w points of contra flexure 3.6 m; The effective flange width is

a) 3000 mm b) 1900 mm c) 1600 mm d) 1500 mm

11) A reinforced concrete column contains longitudinal steel equal to 1 percent of cross sectional area of the column. Assume modular ratio as 10. The loads carried (using elastic theory) by the longitudinal steel and the net area of concrete, are Ps and Pc respectively. The ratio Ps/Pc expressed as a percentage is

a) 0.1 b) 1 c) 1.1 d) 10

12) A singly reinforced beam is of width 200 mm. If the factored moment of resistance is 138 kN-m M_{20} and Fe_{415}, the effective depth of beam is

a) 400 mm b) 500 mm c) 657 mm d) 456 mm

13) The ultimate load carrying capacity of a circular section of 300 mm dia. with helical reinforcement using one percentage of reinforcement and M_{20} concrete and Fe_{415} grade steel is

a) 360 kN b) 1000 kN c) 100 kN d) 794 kN

SLR-EP – 41

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Tuesday, 29-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) Use of ***Original IS 456*** *and non-programmable calculator is* ***allowed*** *while solving design problems.*
3) ***Assume*** *suitable data* ***if required*** *and state* ***it clearly****.*
4) ***Draw*** *neat sketches* ***wherever*** *necessary.*

SECTION – I

II. A singly reinforced concrete beam has width of 300 mm and a overall depth of 600 mm. With a clear cover of 40 mm is reinforced with 4 bars of 20 mm dia. Find the flexural strength and hence,

i) the safe UDL ii) the safe central point load

On the simply supported on the beam of span 6 m. Use M_{20} concrete and Fe_{500} steel. Assume density of concrete as 25 kN/m^3. **13**

III. Design edge beam as shown in Fig. No. 1 **14**

Clear span of beams 7 m. Assume width of support 300 mm

Live load = 4 kN/m

Use M_{20} and Fe_{415} steel.

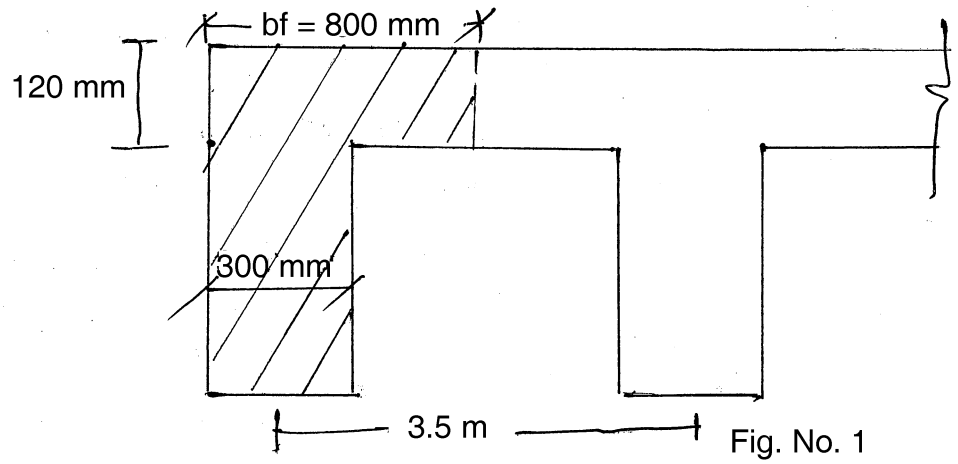

Fig. No. 1

Set P

IV. A simply supported slab supported on all four edges of a room having 6 m × 5 m clear dimensions. Design the slab if corners are held down. Use M_{20} and Fe_{415} steel. **13**

V. Design a rectangular beam of section 230 mm × 600 mm of effective span 6 m. The effective cover provided is 50 mm. The beam is carrying a Imposed load of 55 kN/m. Design the beam. Use M_{25} and Fe_{415} steel. **13**

SECTION – II

VI. Determine the reinforcement required for a beam size 300 mm × 600 mm subjected to a bending moment 98 kNm, shear force 70 kN and torsional moment of 38 kNm. Use M_{25} concrete and Fe_{415} steel. **13**

VII. Design a circular column with helical reinforcement of diameter 400 mm subjected to a load of 1150 kN. The column is 3.25 m long and is effectively held in position at the both ends but not restrained against rotation. Use M_{20} concrete and Fe_{415} steel. **13**

VIII. Design a rectangular beam, continuous over four column supports of effective spans 5.5 m each. The beam is subjected to an dead load of 10 kN/m and live load of 12 kN/m. Use M_{20} concrete and Fe_{500} steel. **14**

IX. a) A column has size 300 mm × 400 mm has effective length of 3.2 m and is subjected to a factored axial load 1050 kN and a factored uniaxial moment of 142 kN-m about the major axis. Design the column using M_{25} concrete and Fe_{500} steel. By providing the steel on two sides only. Refer Fig. No. 2. Assume the distance between extreme fibre and centre of reinforcement as 40 mm. **5**

b) Design a square column, 4 m long restrained in position and direction at both ends to carry an axial load of 1550 kN. Use M_{25} concrete and Fe_{500} steel. **8**

Compression with bending. Reinforcement Distributed Equally on Two Sides.

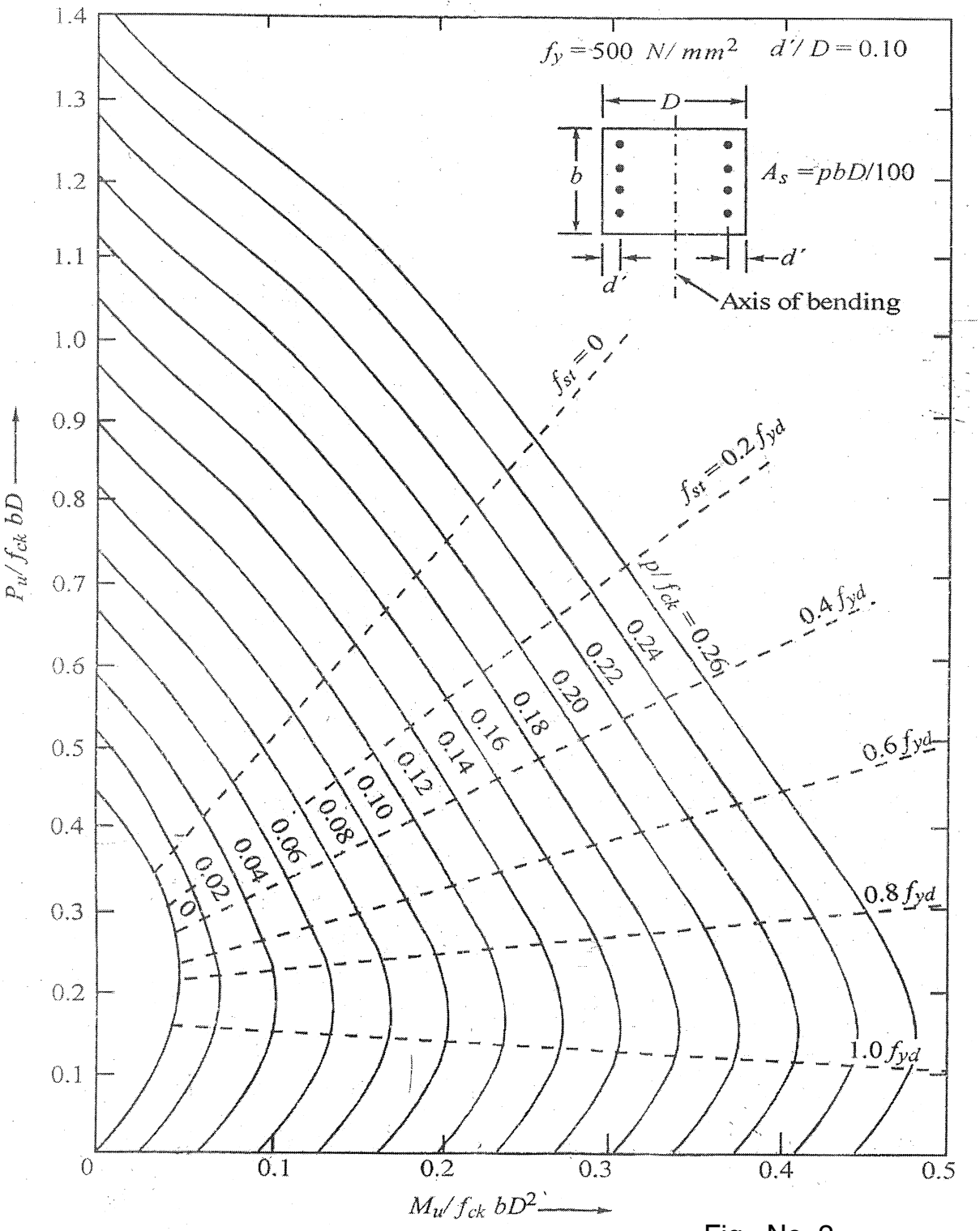

Fig. No. 2

Set P

SLR-EP – 41

Seat No.	

Set Q

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Tuesday, 29-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. MCQ Q. No. **1** to **6** carries **1** mark **each** and Q. No. **7** to **13** carries **2** 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.***
*3) **IS 456-2000** is **not** allowed to refer while solving **MCQ** in **first 30 minutes**.*
*4) **Use** of **Original IS 456** and non-programmable calculator is **allowed** while solving design problems.*
*5) **Assume** suitable data if required and state **it clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **20**

1) The moment of resistance of a doubly reinforced beam is
   a) Greater than Rbd^2 b) Equal to Rbd^2
   c) Less than Rbd^2 d) None of the above

2) The amount of reinforcement for main bars in a slab, is based upon
   a) Minimum bending moment b) Maximum shear force
   c) Maximum bending moment d) Minimum shear force

3) Short column fails by
   a) Buckling b) Crushing
   c) Bending d) None of the above

4) If the neutral axis of a T-beam is in the flange then it acts as a rectangular beam of size
   a) $b_w \times D_f$ b) $b_f \times b_w$
   c) $b_f \times D_f$ d) None of the above

P.T.O.

5) For the cantilever slabs, span to depth ratios as per control of deflection is
   a) 20 b) 7 c) 26 d) 25

6) A trapezoidal section is desirable for a
   a) Cantilever beam b) Continuous beam
   c) Lintel d) T-beam

7) Factored load carrying capacity of a column of 300 mm × 600 mm size with minimum percentage of steel is _____ (M_{20} and Fe_{415})
   a) 1840 kN b) 180 kN c) 1829 kN d) None

8) A T-beam roof section has thickness of slab 100 mm; width of rib 300 mm; depth of beam 500 mm; C/C distance of beams 3 m; effective span of beams 6 m; distance b/w points of contra flexure 3.6 m; The effective flange width is
   a) 3000 mm b) 1900 mm c) 1600 mm d) 1500 mm

9) A reinforced concrete column contains longitudinal steel equal to 1 percent of cross sectional area of the column. Assume modular ratio as 10. The loads carried (using elastic theory) by the longitudinal steel and the net area of concrete, are Ps and Pc respectively. The ratio Ps/Pc expressed as a percentage is
   a) 0.1 b) 1 c) 1.1 d) 10

10) A singly reinforced beam is of width 200 mm. If the factored moment of resistance is 138 kN-m M_{20} and Fe_{415}, the effective depth of beam is
   a) 400 mm b) 500 mm c) 657 mm d) 456 mm

11) The ultimate load carrying capacity of a circular section of 300 mm dia. with helical reinforcement using one percentage of reinforcement and M_{20} concrete and Fe_{415} grade steel is
   a) 360 kN b) 1000 kN c) 100 kN d) 794 kN

12) A singly reinforced rectangular section of 200 mm wide and 400 mm effective depth, reinforced with 4 bars of 20 mm diameter mild steel bars. The concrete used is M_{15}, the moment of resistance of the section is
   a) 50 kN-m b) 72 kN-m c) 22 kN-m d) 108 kN-m

13) A concrete beam has 350 mm width and 700 mm effective depth. It is subjected to a superimposed bending moment of 300 kN-m at service condition. Material used are M_{15} and Fe_{415} with Fsc = 353.7 MPa. The amount of tensile and compressive steel in, mm^2 will be, use effective cover to compression and tension steel as 50 mm
   a) 2164 and Zero b) 2164 and 212
   c) 2164 and 412 d) 1750 and 420

_____

SLR-EP – 41

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Tuesday, 29-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) Use of ***Original IS 456*** *and non-programmable calculator is* ***allowed*** *while solving design problems.*
3) ***Assume*** *suitable data* ***if required*** *and state* ***it clearly****.*
4) ***Draw*** *neat sketches* ***wherever*** *necessary.*

SECTION – I

II. A singly reinforced concrete beam has width of 300 mm and a overall depth of 600 mm. With a clear cover of 40 mm is reinforced with 4 bars of 20 mm dia. Find the flexural strength and hence,

i) the safe UDL ii) the safe central point load

On the simply supported on the beam of span 6 m. Use M_{20} concrete and Fe_{500} steel. Assume density of concrete as 25 kN/m^3. **13**

III. Design edge beam as shown in Fig. No. 1 **14**

Clear span of beams 7 m. Assume width of support 300 mm

Live load = 4 kN/m

Use M_{20} and Fe_{415} steel.

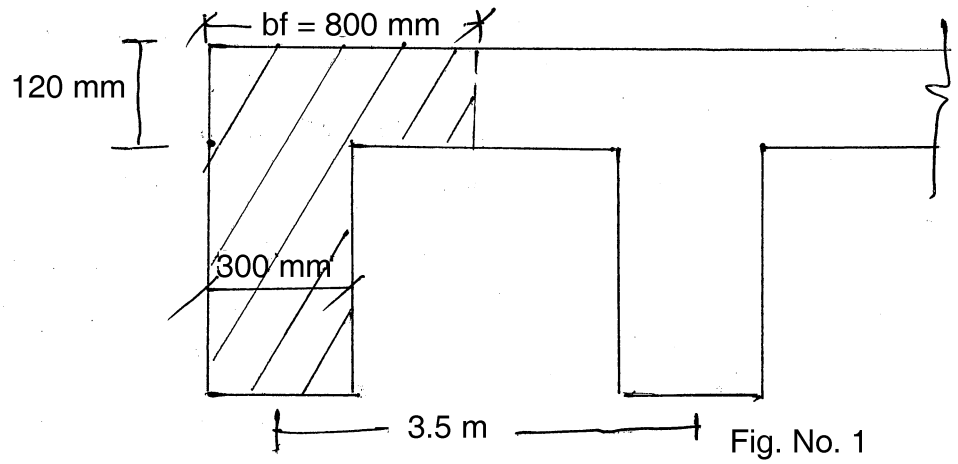

Fig. No. 1

Set Q

IV. A simply supported slab supported on all four edges of a room having 6 m × 5 m clear dimensions. Design the slab if corners are held down. Use M_{20} and Fe_{415} steel. **13**

V. Design a rectangular beam of section 230 mm × 600 mm of effective span 6 m. The effective cover provided is 50 mm. The beam is carrying a Imposed load of 55 kN/m. Design the beam. Use M_{25} and Fe_{415} steel. **13**

SECTION – II

VI. Determine the reinforcement required for a beam size 300 mm × 600 mm subjected to a bending moment 98 kNm, shear force 70 kN and torsional moment of 38 kNm. Use M_{25} concrete and Fe_{415} steel. **13**

VII. Design a circular column with helical reinforcement of diameter 400 mm subjected to a load of 1150 kN. The column is 3.25 m long and is effectively held in position at the both ends but not restrained against rotation. Use M_{20} concrete and Fe_{415} steel. **13**

VIII. Design a rectangular beam, continuous over four column supports of effective spans 5.5 m each. The beam is subjected to an dead load of 10 kN/m and live load of 12 kN/m. Use M_{20} concrete and Fe_{500} steel. **14**

IX. a) A column has size 300 mm × 400 mm has effective length of 3.2 m and is subjected to a factored axial load 1050 kN and a factored uniaxial moment of 142 kN-m about the major axis. Design the column using M_{25} concrete and Fe_{500} steel. By providing the steel on two sides only. Refer Fig. No. 2. Assume the distance between extreme fibre and centre of reinforcement as 40 mm. **5**

b) Design a square column, 4 m long restrained in position and direction at both ends to carry an axial load of 1550 kN. Use M_{25} concrete and Fe_{500} steel. **8**

Compression with bending. Reinforcement Distributed Equally on Two Sides.

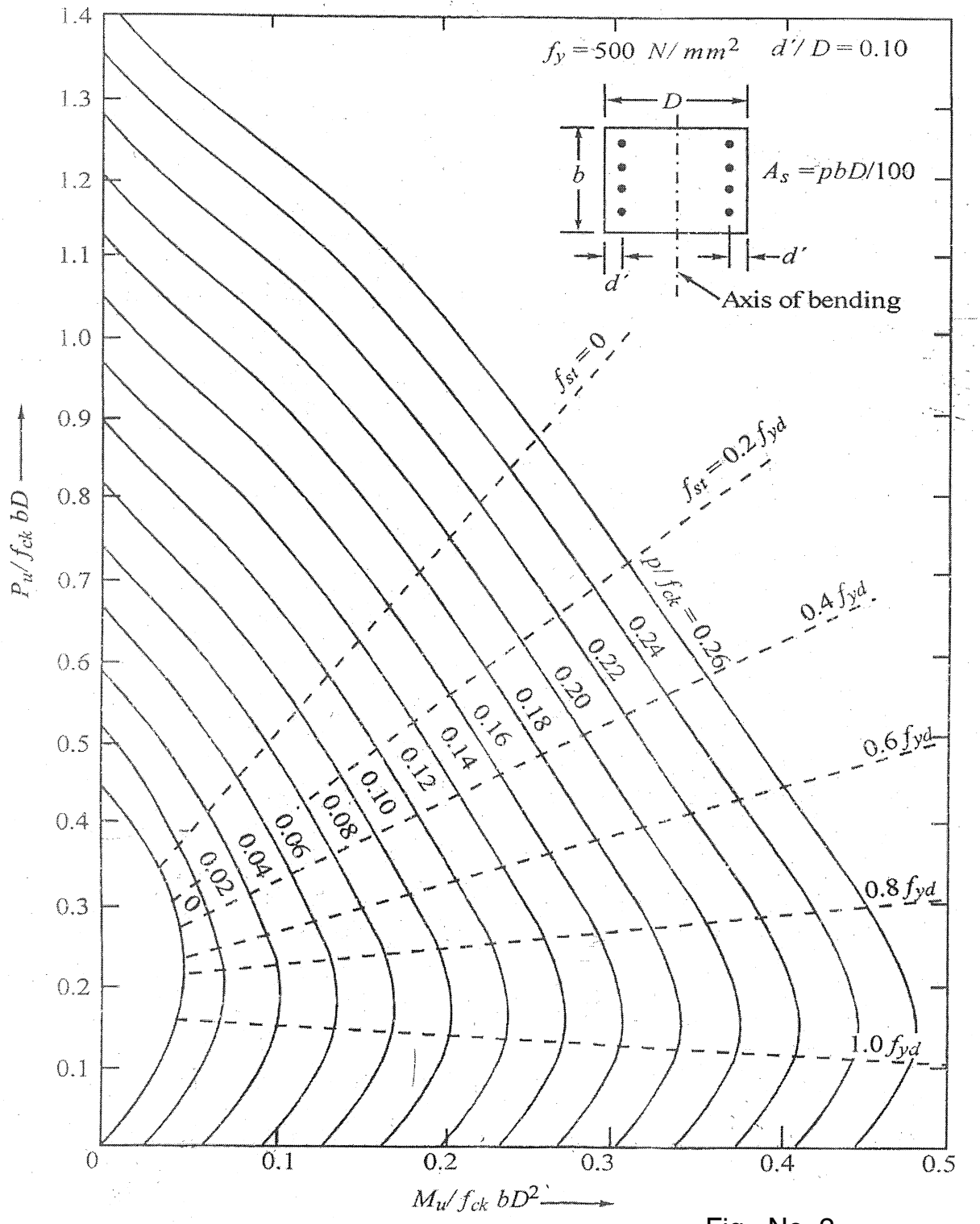

Fig. No. 2

Set Q

SLR-EP – 41

Seat No.	

Set R

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Tuesday, 29-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. MCQ Q. No. **1** to **6** carries **1** mark **each** and Q. No. **7** to **13** carries **2** 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.***
*3) **IS 456-2000** is **not** allowed to refer while solving **MCQ** in **first 30 minutes**.*
*4) **Use** of **Original IS 456** and non-programmable calculator is **allowed** while solving design problems.*
*5) **Assume** suitable data if required and state **it clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **20**

1) The amount of reinforcement for main bars in a slab, is based upon
   a) Minimum bending moment b) Maximum shear force
   c) Maximum bending moment d) Minimum shear force

2) Short column fails by
   a) Buckling b) Crushing
   c) Bending d) None of the above

3) If the neutral axis of a T-beam is in the flange then it acts as a rectangular beam of size
   a) $b_w \times D_f$ b) $b_f \times b_w$
   c) $b_f \times D_f$ d) None of the above

4) For the cantilever slabs, span to depth ratios as per control of deflection is
   a) 20 b) 7 c) 26 d) 25

5) A trapezoidal section is desirable for a
   a) Cantilever beam b) Continuous beam
   c) Lintel d) T-beam

P.T.O.

6) The moment of resistance of a doubly reinforced beam is
   a) Greater than Rbd^2 b) Equal to Rbd^2
   c) Less than Rbd^2 d) None of the above

7) A T-beam roof section has thickness of slab 100 mm; width of rib 300 mm; depth of beam 500 mm; C/C distance of beams 3 m; effective span of beams 6 m; distance b/w points of contra flexure 3.6 m; The effective flange width is
   a) 3000 mm b) 1900 mm c) 1600 mm d) 1500 mm

8) A reinforced concrete column contains longitudinal steel equal to 1 percent of cross sectional area of the column. Assume modular ratio as 10. The loads carried (using elastic theory) by the longitudinal steel and the net area of concrete, are Ps and Pc respectively. The ratio Ps/Pc expressed as a percentage is
   a) 0.1 b) 1 c) 1.1 d) 10

9) A singly reinforced beam is of width 200 mm. If the factored moment of resistance is 138 kN-m M_{20} and Fe_{415}, the effective depth of beam is
   a) 400 mm b) 500 mm c) 657 mm d) 456 mm

10) The ultimate load carrying capacity of a circular section of 300 mm dia. with helical reinforcement using one percentage of reinforcement and M_{20} concrete and Fe_{415} grade steel is
   a) 360 kN b) 1000 kN c) 100 kN d) 794 kN

11) A singly reinforced rectangular section of 200 mm wide and 400 mm effective depth, reinforced with 4 bars of 20 mm diameter mild steel bars. The concrete used is M_{15}, the moment of resistance of the section is
   a) 50 kN-m b) 72 kN-m c) 22 kN-m d) 108 kN-m

12) A concrete beam has 350 mm width and 700 mm effective depth. It is subjected to a superimposed bending moment of 300 kN-m at service condition. Material used are M_{15} and Fe_{415} with Fsc = 353.7 MPa. The amount of tensile and compressive steel in, mm^2 will be, use effective cover to compression and tension steel as 50 mm
   a) 2164 and Zero b) 2164 and 212
   c) 2164 and 412 d) 1750 and 420

13) Factored load carrying capacity of a column of 300 mm × 600 mm size with minimum percentage of steel is _____ (M_{20} and Fe_{415})
   a) 1840 kN b) 180 kN c) 1829 kN d) None

_____

SLR-EP – 41

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Tuesday, 29-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) Use of ***Original IS 456*** *and non-programmable calculator is* ***allowed*** *while solving design problems.*
3) ***Assume*** *suitable data* ***if required*** *and state* ***it clearly****.*
4) ***Draw*** *neat sketches* ***wherever*** *necessary.*

SECTION – I

II. A singly reinforced concrete beam has width of 300 mm and a overall depth of 600 mm. With a clear cover of 40 mm is reinforced with 4 bars of 20 mm dia. Find the flexural strength and hence,

i) the safe UDL ii) the safe central point load

On the simply supported on the beam of span 6 m. Use M_{20} concrete and Fe_{500} steel. Assume density of concrete as 25 kN/m^3. **13**

III. Design edge beam as shown in Fig. No. 1 **14**

Clear span of beams 7 m. Assume width of support 300 mm

Live load = 4 kN/m

Use M_{20} and Fe_{415} steel.

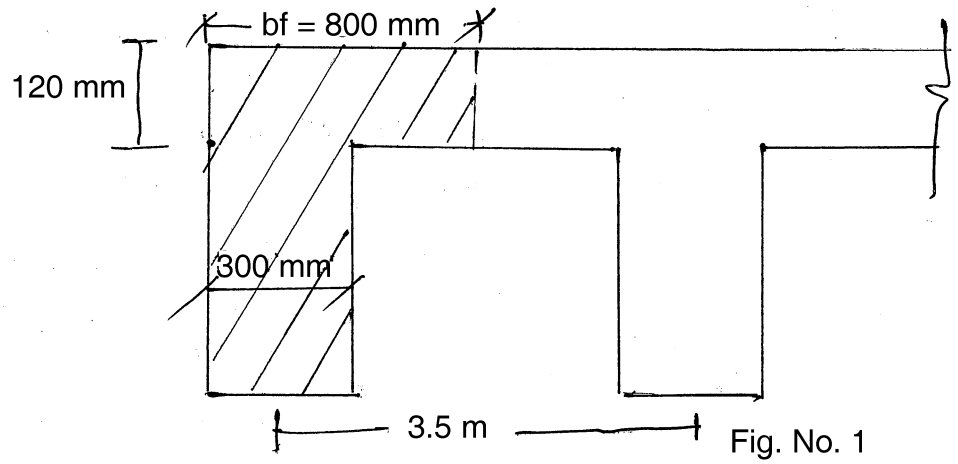

Fig. No. 1

Set R

IV. A simply supported slab supported on all four edges of a room having 6 m × 5 m clear dimensions. Design the slab if corners are held down. Use M_{20} and Fe_{415} steel. **13**

V. Design a rectangular beam of section 230 mm × 600 mm of effective span 6 m. The effective cover provided is 50 mm. The beam is carrying a Imposed load of 55 kN/m. Design the beam. Use M_{25} and Fe_{415} steel. **13**

SECTION – II

VI. Determine the reinforcement required for a beam size 300 mm × 600 mm subjected to a bending moment 98 kNm, shear force 70 kN and torsional moment of 38 kNm. Use M_{25} concrete and Fe_{415} steel. **13**

VII. Design a circular column with helical reinforcement of diameter 400 mm subjected to a load of 1150 kN. The column is 3.25 m long and is effectively held in position at the both ends but not restrained against rotation. Use M_{20} concrete and Fe_{415} steel. **13**

VIII. Design a rectangular beam, continuous over four column supports of effective spans 5.5 m each. The beam is subjected to an dead load of 10 kN/m and live load of 12 kN/m. Use M_{20} concrete and Fe_{500} steel. **14**

IX. a) A column has size 300 mm × 400 mm has effective length of 3.2 m and is subjected to a factored axial load 1050 kN and a factored uniaxial moment of 142 kN-m about the major axis. Design the column using M_{25} concrete and Fe_{500} steel. By providing the steel on two sides only. Refer Fig. No. 2. Assume the distance between extreme fibre and centre of reinforcement as 40 mm. **5**

b) Design a square column, 4 m long restrained in position and direction at both ends to carry an axial load of 1550 kN. Use M_{25} concrete and Fe_{500} steel. **8**

Compression with bending. Reinforcement Distributed Equally on Two Sides.

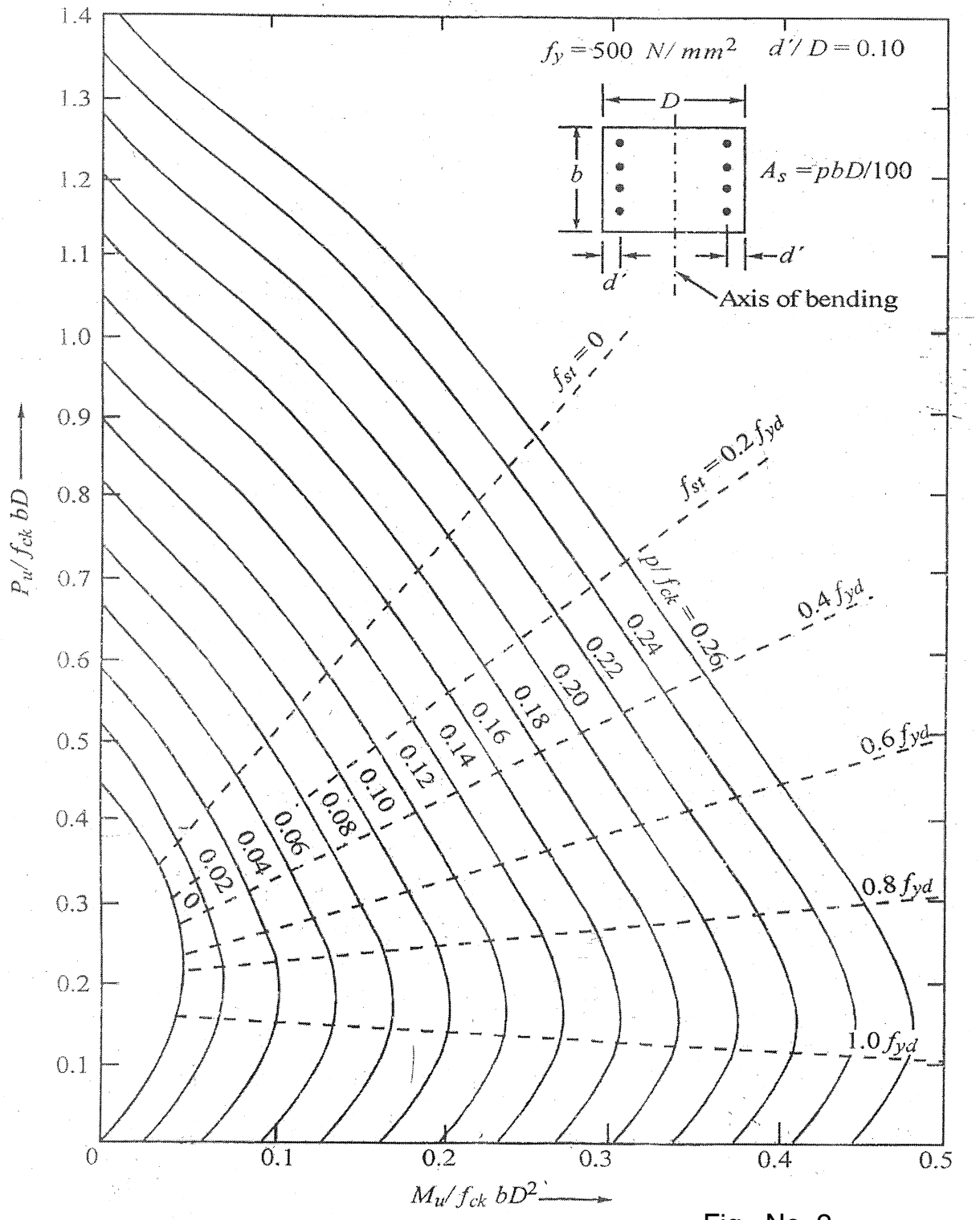

Fig. No. 2

Set R

SLR-EP – 41

Seat No.	

Set S

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Tuesday, 29-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. MCQ Q. No. **1** to **6** carries **1** mark **each** and Q. No. **7** to **13** carries **2** marks.*
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*3) **IS 456-2000** is **not** allowed to refer while solving **MCQ** in **first 30 minutes**.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **20**

1) Short column fails by
   a) Buckling b) Crushing
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2) If the neutral axis of a T-beam is in the flange then it acts as a rectangular beam of size
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   c) $b_f \times D_f$ d) None of the above

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_____

SLR-EP – 41

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Tuesday, 29-11-2016 Marks : 80
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SECTION – I

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Live load = 4 kN/m

Use M_{20} and Fe_{415} steel.

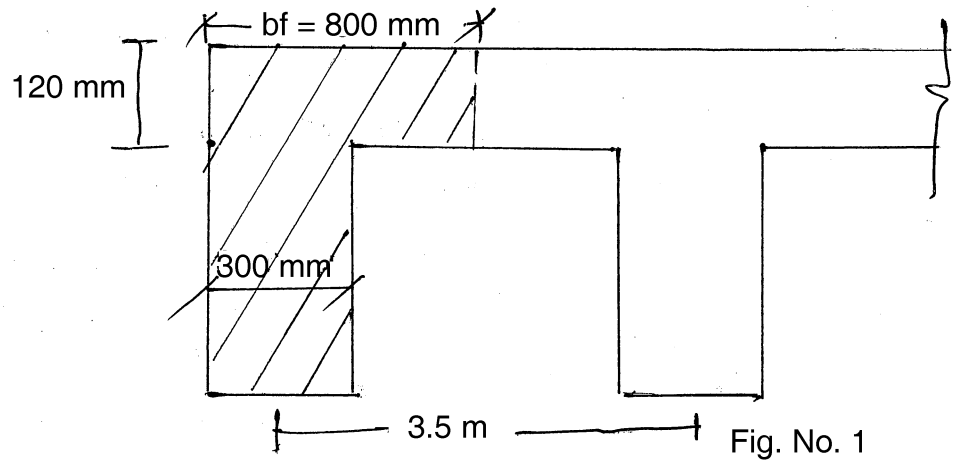

Fig. No. 1

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V. Design a rectangular beam of section 230 mm × 600 mm of effective span 6 m. The effective cover provided is 50 mm. The beam is carrying a Imposed load of 55 kN/m. Design the beam. Use M_{25} and Fe_{415} steel. **13**

SECTION – II

VI. Determine the reinforcement required for a beam size 300 mm × 600 mm subjected to a bending moment 98 kNm, shear force 70 kN and torsional moment of 38 kNm. Use M_{25} concrete and Fe_{415} steel. **13**

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b) Design a square column, 4 m long restrained in position and direction at both ends to carry an axial load of 1550 kN. Use M_{25} concrete and Fe_{500} steel. **8**

Compression with bending. Reinforcement Distributed Equally on Two Sides.

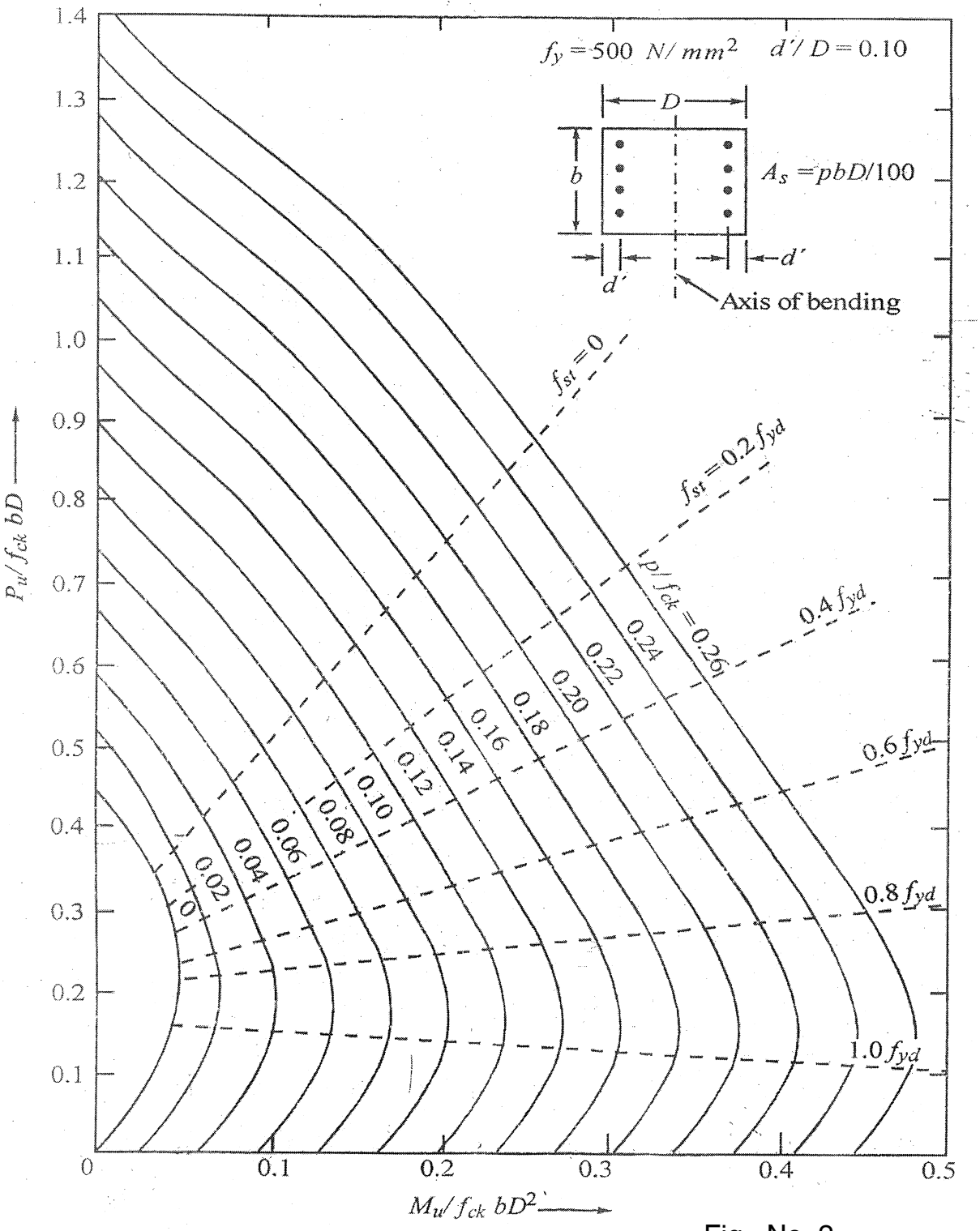


Fig. No. 2

Set S

SLR-EP – 42

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2016
QUANTITY SURVEYING AND VALUATION

Day and Date : Thursday, 1-12-2016 Total Marks : 100
Time : 3.00 p.m. to 7.00 p.m.

Instructions : *1) Q. **2** and Q. **9** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **6** to Q. **8**.*
*2) Assume suitable data **if necessary** but mention it **clearly**.*
*3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*4) **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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Detailed specification decides
a) Quality b) Quantity c) Both a) and b) d) None of these

2) Select the overhead charges out of following.
a) Labour
b) Electric power required for construction
c) Telephone and light Bill of site office
d) All the above

3) For an old building teak wood door with teak wood panels I painted from both the sides and if opening size is 1000 mm × 2100mm, area of enamel paint in m^2 shall be
a) 2.1 b) 4.2 c) 6.3 d) 5.25

4) For M20 concrete mixer with the charge be rotated for a minimum period of
a) 60 sec b) 120 sec c) 180 sec d) None of these

5) RCC M20 is required to be cured for a period of
a) 7 days b) 14 days c) 21 days d) 28 days

6) Select the act of God.
a) Flood b) Earthquake c) Both of these d) None of these

7) In the Force Mezure clause parties responsible are
a) Contractor b) Owner c) Both a) and b) d) Neither a) nor b)

8) Security Deposit can be refundable to the contractor after
a) Virtual completion of work b) Defect liability period
c) 6 months of completing job d) None of the above

P.T.O.

9) After issuing the work order if contractor fails to do the work his deposit can be forfeited
   a) Security deposit b) Earnest money deposit
   c) Registration deposit d) All the above
10) Original cost-depreciation up to previous year
   a) Distress value b) Book value c) Monopoly value d) Market value
11) When a property cannot fetch full market value, due to fear of war, it is known as
   a) Salvage value b) Scrap value
   c) Accommodation value d) Distress value
12) A copper boiler in working condition is replaced by solar water heater, the copper boiler shall have
   a) Salvage value b) Scrap value c) Book value d) Both b) and c)
13) Decrease or loss in the property value due to its wear and tear is called
   a) Depreciation b) Capital value c) Annuity d) Outgoings
14) _____ is multiplier which when multiplied by the net income of the property gives its capitalized value on the material date of valuation.
   a) Annuity b) Sinking fund
   c) Years purchase d) Capitalized value
15) The full form of B.O.T. is
   a) Build-Operate-Transfer b) Build-Own-Transfer
   c) Build-Occupy-Transfer d) Build-Operation-Termination
16) Distress value is usually
   a) More than market value b) Equal to market value
   c) Less than market value d) None of the above
17) In excavation if gold coins are found, it shall be the property of
   a) Owner of land
   b) Property of contractor
   c) Property of Government
   d) Property to be shared between the contractor and owner equally
18) In the takeoff of measurements done by centre line method and long wall short wall method the quantity worked out will be
   a) Center line method will give more quantity
   b) Equal
   c) Long wall short wall will give more quantity
   d) None of these
19) While taking he measurements of RCC the volume of reinforcement is
   a) Deducted from concrete volume b) Added to concrete volume
   c) No deduction no addition d) None of these
20) If all working drawings are issued to construct kitchen platform then mode of measurement shall be
   a) Lumpsum b) Per ‘m’ run
   c) Square meter in plan d) Square meter in elevation

_____

SLR-EP – 42

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
QUANTITY SURVEYING AND VALUATION

Day and Date : Thursday, 1-12-2016 Marks : 80
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1) Assume suitable data* ***if necessary*** *but mention it* ***clearly****.*
2) Q. ***2*** *and Q.* ***9*** *are* ***compulsory****. Attempt* ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *and* ***any two*** *out of Q.* ***6*** *to Q.* ***8****.*

2. Figure shows the plan and sectional details of a two roomed building. Estimate the quantities of the following item in measurement sheet.
   a) Ist Class brick work in cement mortar 1 : 4 in foundation and plinth. **9**
   b) RCC **5**

3. Explain :
   a) Various methods for preparation of approximate estimate of buildings ? **8**
   b) Lead specifications and Lift specifications for earthwork in excavation. **5**

4. A) Write the detailed specifications for **8**
      a) Plain Cement Concrete
      b) Brick work in superstructure

   B) Write task rates for **5**
      a) Brick layer
      b) Plasterer
      c) Painter
      d) Carpenter
      e) Mason for stone masonry.

5. A) Calculate the unit rate by performing rate analysis for the following items. **8**
      a) Cement Concrete Floor 1 : 2 : 4.
      b) 20 mm thick external plastering in 1 : 6 cement mortar for brick masonry.

   B) Explain PWD method of taking out quantities. **5**

6. A) What is a Contract ? How do you prepare contract document ? Write the general conditions of contract ? **8**

   B) What is EMD and Security Deposit ? What is its significance in Tender Documents ? **5**

Set P

7. A) What do you mean by valuation ? What is its necessity ? List various methods of valuation and describe any one of them giving example. **8**

   B) Define : **5**
   1) Value
   2) Market value
   3) Sentimental value
   4) Free tenure
   5) Distress value

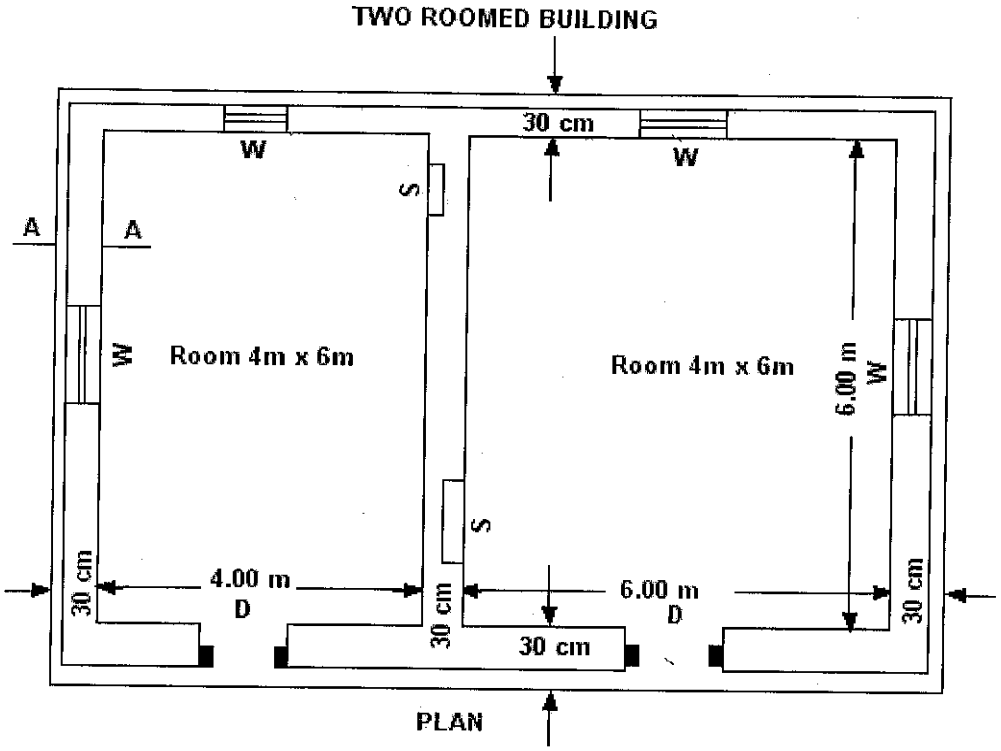
8. A) A machine was purchased for Rs. 1,20,000. Assuming its salvage value at the end of 6 years as Rs. 30,000, determine the amount of depreciation for each year by sinking fund method. **8**

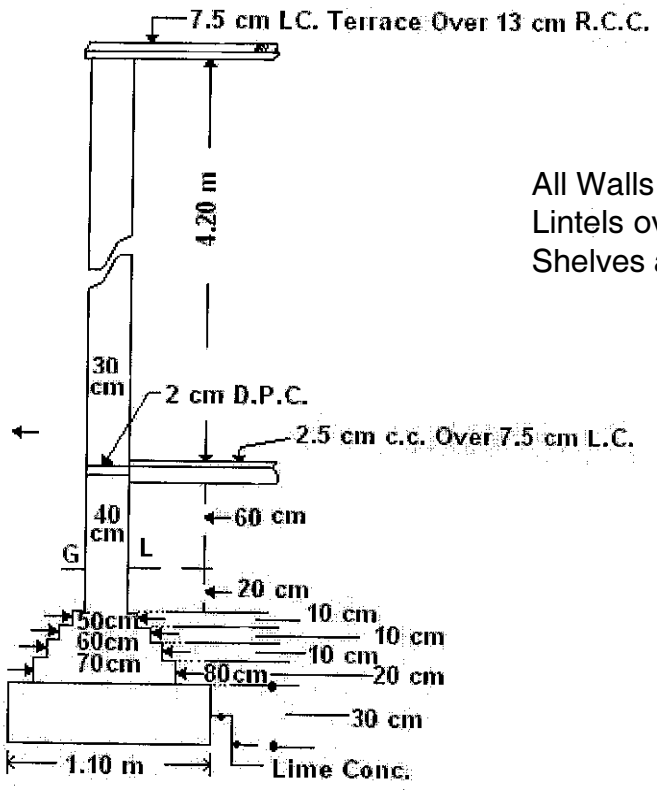
   B) Explain two envelope system. **5**

9. A) A 25 year old property is fetching an annual rent of Rs. 45,000. The full life of building was estimated as 80 years. Municipal tax is 6% of rental income. The water and sanitary charges are paid at Rs. 500 and Rs. 1,150 every year. A repair charge of building is 15% of rental income.

   The rate of interest for sinking fund is 5% and that for capitalization is 7%. After full life replacement of building will cost Rs. 7,50,000. Cost of land at present is Rs. 1,25,000 and scrap value of building after useful life is Rs. 15,000. Determine value of property. **9**

   B) Write note on Penalty Clause. **5**





All Walls are same section
Lintels over dose windows and
Shelves are 15 cm thick R.B.

Set P

SLR-EP – 42

Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2016
QUANTITY SURVEYING AND VALUATION

Day and Date : Thursday, 1-12-2016 Total Marks : 100
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Instructions : *1) Q. **2** and Q. **9** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **6** to Q. **8**.*
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*4) **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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Distress value is usually
   a) More than market value b) Equal to market value
   c) Less than market value d) None of the above
2) In excavation if gold coins are found, it shall be the property of
   a) Owner of land
   b) Property of contractor
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3) In the takeoff of measurements done by centre line method and long wall short wall method the quantity worked out will be
   a) Center line method will give more quantity
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4) While taking he measurements of RCC the volume of reinforcement is
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   a) Lumpsum b) Per 'm' run
   c) Square meter in plan d) Square meter in elevation
6) Detailed specification decides
   a) Quality b) Quantity c) Both a) and b) d) None of these

P.T.O.

7) Select the overhead charges out of following.
   a) Labour
   b) Electric power required for construction
   c) Telephone and light Bill of site office
   d) All the above

8) For an old building teak wood door with teak wood panels I painted from both the sides and if opening size is 1000 mm × 2100mm, area of enamel paint in m^2 shall be
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   a) 60 sec b) 120 sec c) 180 sec d) None of these

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11) Select the act of God.
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15) Original cost-depreciation up to previous year
   a) Distress value b) Book value c) Monopoly value d) Market value

16) When a property cannot fetch full market value, due to fear of war, it is known as
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SLR-EP – 42

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B.E. (Civil) (Part – I) Examination, 2016
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Day and Date : Thursday, 1-12-2016 Marks : 80
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1) Assume suitable data* ***if necessary*** *but mention it* ***clearly****.*
2) Q. ***2*** *and Q.* ***9*** *are* ***compulsory****. Attempt* ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *and* ***any two*** *out of Q.* ***6*** *to Q.* ***8****.*

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   a) Ist Class brick work in cement mortar 1 : 4 in foundation and plinth. **9**
   b) RCC **5**

3. Explain :
   a) Various methods for preparation of approximate estimate of buildings ? **8**
   b) Lead specifications and Lift specifications for earthwork in excavation. **5**

4. A) Write the detailed specifications for **8**
      a) Plain Cement Concrete
      b) Brick work in superstructure

   B) Write task rates for **5**
      a) Brick layer
      b) Plasterer
      c) Painter
      d) Carpenter
      e) Mason for stone masonry.

5. A) Calculate the unit rate by performing rate analysis for the following items. **8**
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      b) 20 mm thick external plastering in 1 : 6 cement mortar for brick masonry.

   B) Explain PWD method of taking out quantities. **5**

6. A) What is a Contract ? How do you prepare contract document ? Write the general conditions of contract ? **8**

   B) What is EMD and Security Deposit ? What is its significance in Tender Documents ? **5**

Set Q

7. A) What do you mean by valuation ? What is its necessity ? List various methods of valuation and describe any one of them giving example. **8**

   B) Define : **5**
   1) Value
   2) Market value
   3) Sentimental value
   4) Free tenure
   5) Distress value

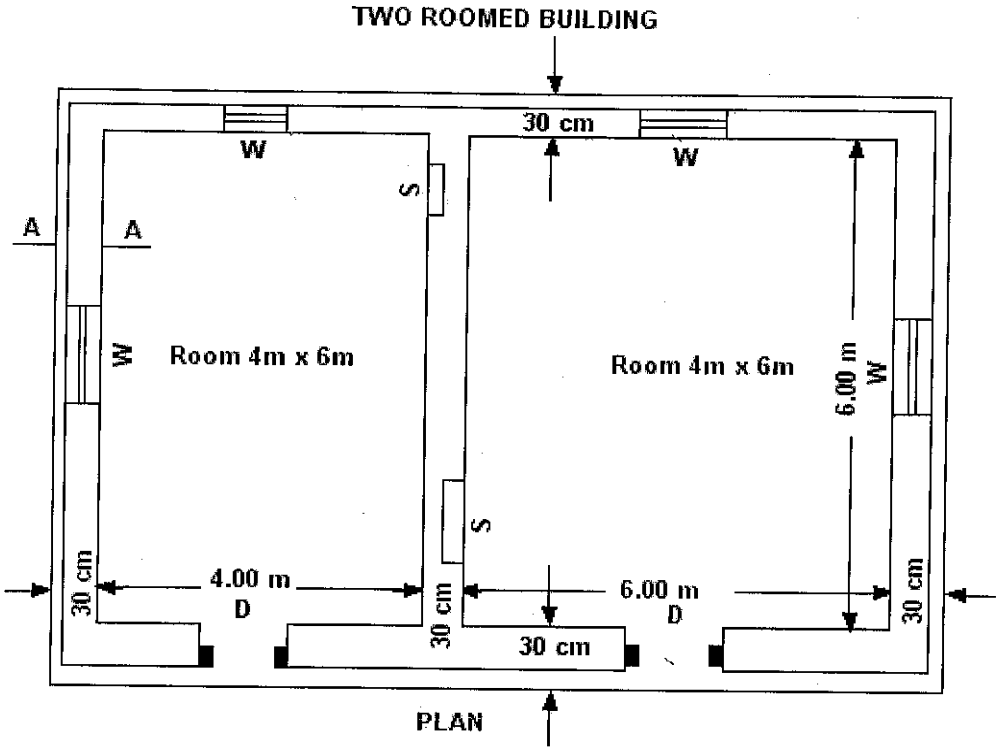
8. A) A machine was purchased for Rs. 1,20,000. Assuming its salvage value at the end of 6 years as Rs. 30,000, determine the amount of depreciation for each year by sinking fund method. **8**

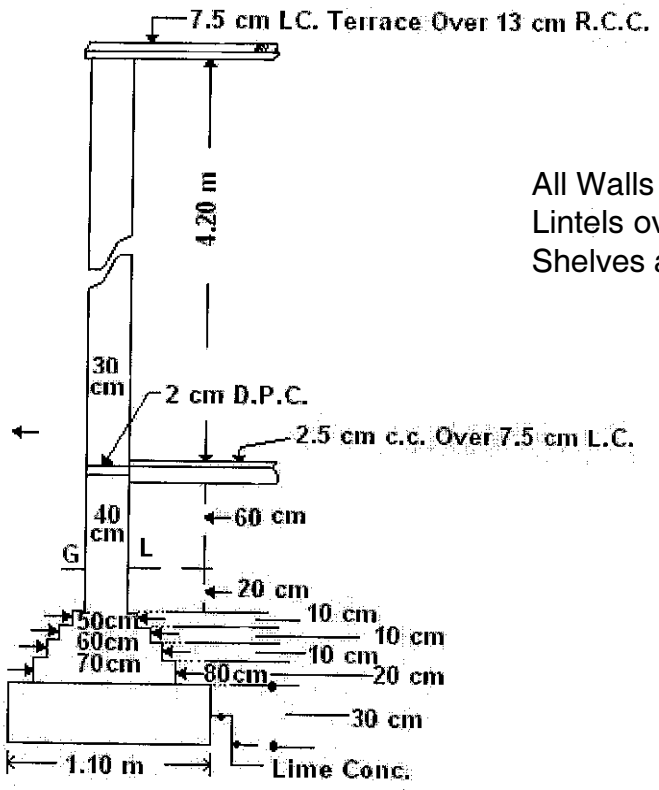
   B) Explain two envelope system. **5**

9. A) A 25 year old property is fetching an annual rent of Rs. 45,000. The full life of building was estimated as 80 years. Municipal tax is 6% of rental income. The water and sanitary charges are paid at Rs. 500 and Rs. 1,150 every year. A repair charge of building is 15% of rental income.

   The rate of interest for sinking fund is 5% and that for capitalization is 7%. After full life replacement of building will cost Rs. 7,50,000. Cost of land at present is Rs. 1,25,000 and scrap value of building after useful life is Rs. 15,000. Determine value of property. **9**

   B) Write note on Penalty Clause. **5**





All Walls are same section
Lintels over dose windows and
Shelves are 15 cm thick R.B.

Set Q

Set Q

SLR-EP – 42

Seat No.	

Set R

B.E. (Civil) (Part – I) Examination, 2016
QUANTITY SURVEYING AND VALUATION

Day and Date : Thursday, 1-12-2016 Total Marks : 100
Time : 3.00 p.m. to 7.00 p.m.

Instructions : *1) Q. **2** and Q. **9** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **6** to Q. **8**.*
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*4) **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 : 20

1. Choose the correct answer : **(20×1=20)**

1) When a property cannot fetch full market value, due to fear of war, it is known as
   a) Salvage value b) Scrap value
   c) Accommodation value d) Distress value

2) A copper boiler in working condition is replaced by solar water heater, the copper boiler shall have
   a) Salvage value b) Scrap value c) Book value d) Both b) and c)

3) Decrease or loss in the property value due to its wear and tear is called
   a) Depreciation b) Capital value c) Annuity d) Outgoings

4) _____ is multiplier which when multiplied by the net income of the property gives its capitalized value on the material date of valuation.
   a) Annuity b) Sinking fund
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5) The full form of B.O.T. is
   a) Build-Operate-Transfer b) Build-Own-Transfer
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6) Distress value is usually
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7) In excavation if gold coins are found, it shall be the property of
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P.T.O.

8) In the takeoff of measurements done by centre line method and long wall short wall method the quantity worked out will be
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10) If all working drawings are issued to construct kitchen platform then mode of measurement shall be
   a) Lumpsum b) Per 'm' run
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11) Detailed specification decides
   a) Quality b) Quantity c) Both a) and b) d) None of these
12) Select the overhead charges out of following.
   a) Labour
   b) Electric power required for construction
   c) Telephone and light Bill of site office
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13) For an old building teak wood door with teak wood panels I painted from both the sides and if opening size is 1000 mm × 2100mm, area of enamel paint in m^2 shall be
   a) 2.1 b) 4.2 c) 6.3 d) 5.25
14) For M20 concrete mixer with the charge be rotated for a minimum period of
   a) 60 sec b) 120 sec c) 180 sec d) None of these
15) RCC M20 is required to be cured for a period of
   a) 7 days b) 14 days c) 21 days d) 28 days
16) Select the act of God.
   a) Flood b) Earthquake c) Both of these d) None of these
17) In the Force Mezure clause parties responsible are
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18) Security Deposit can be refundable to the contractor after
   a) Virtual completion of work b) Defect liability period
   c) 6 months of completing job d) None of the above
19) After issuing the work order if contractor fails to do the work his deposit can be forfeited
   a) Security deposit b) Earnest money deposit
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20) Original cost-depreciation up to previous year
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SLR-EP – 42

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
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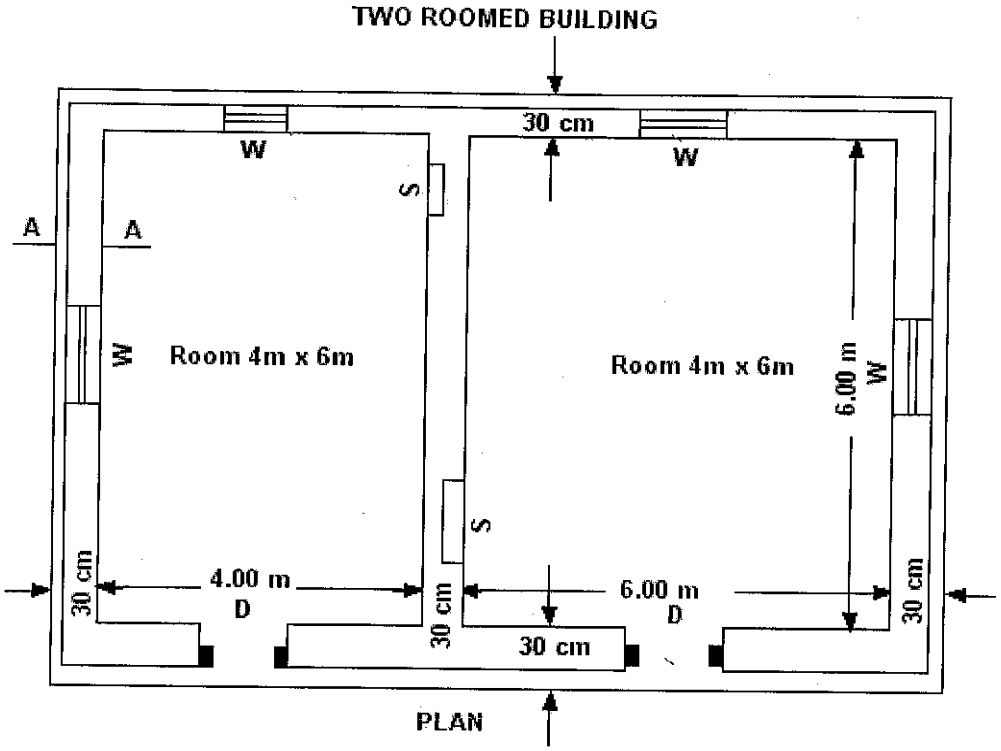

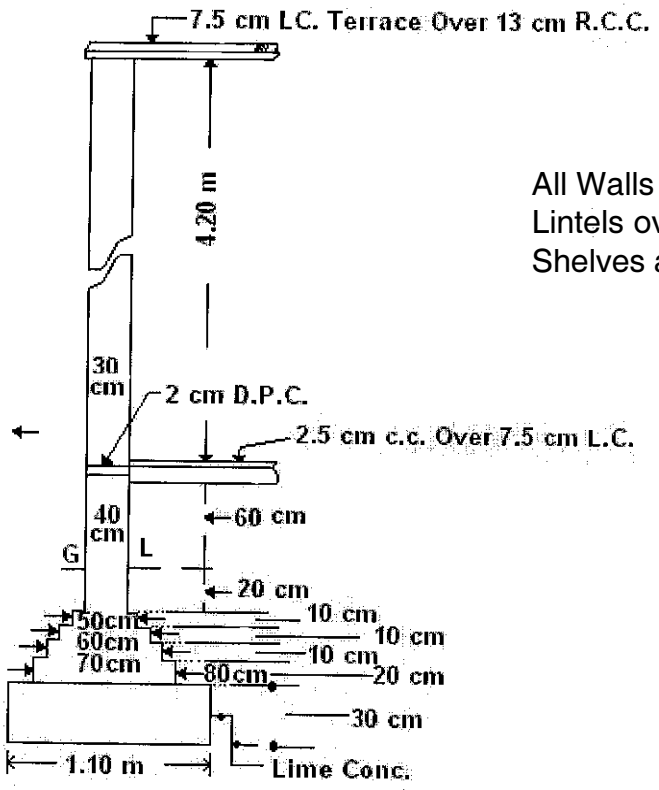

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Set R

SLR-EP – 42

Seat No.	

Set **S**

B.E. (Civil) (Part – I) Examination, 2016
QUANTITY SURVEYING AND VALUATION

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SLR-EP – 42

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
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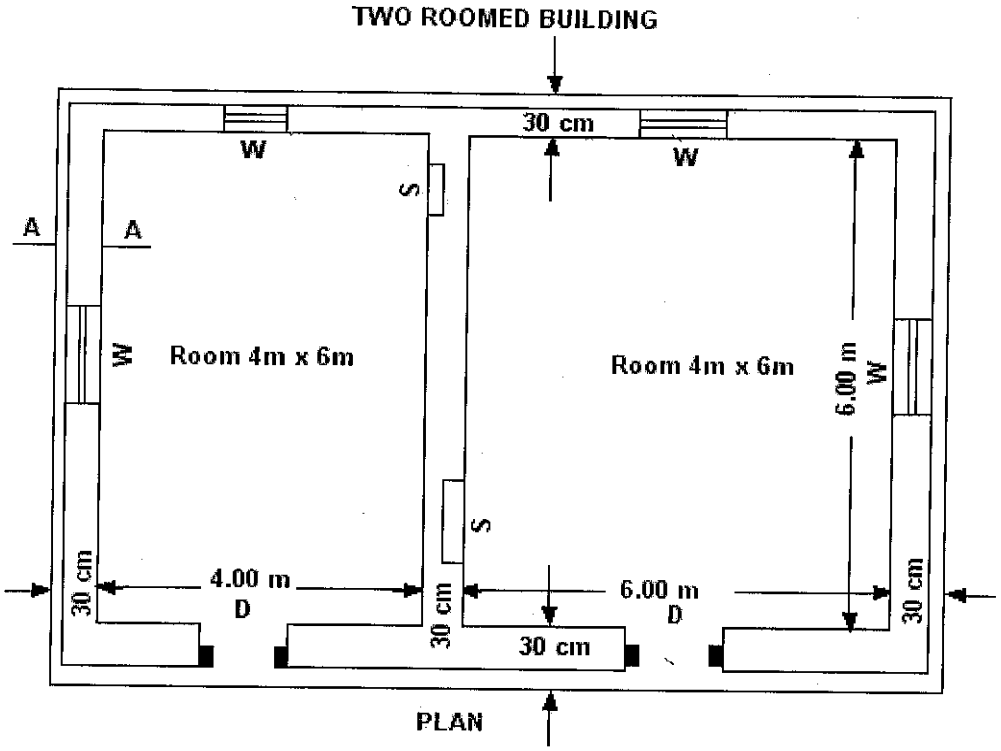

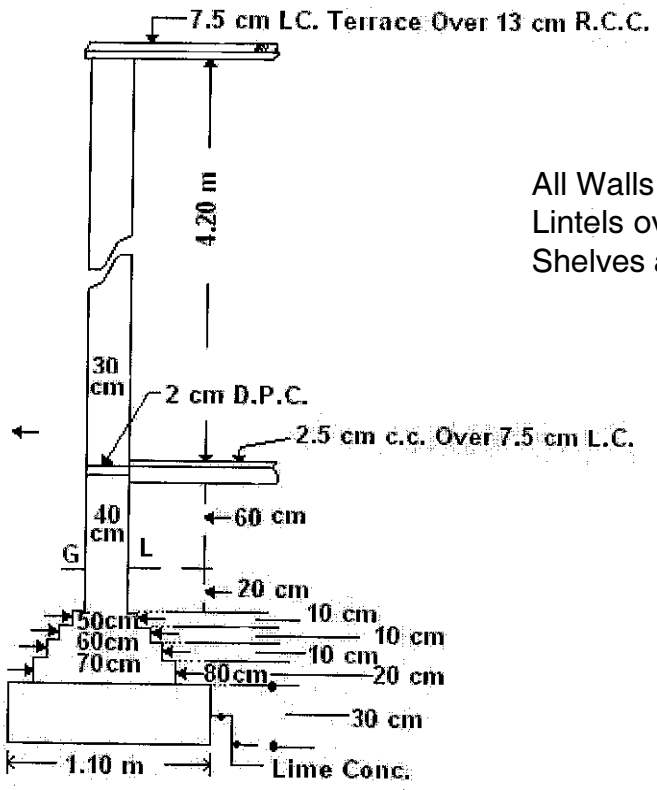

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Set S

SLR-EP – 43

Seat No.	

Set P

B.E. (Civil) (Part – I) Examination, 2016
EARTHQUAKE ENGG.

Day and Date : Saturday, 3-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*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.***
*3) MCQ **1** to 10 carries **one** mark **each** and MCQ **11** to **15** carry **two** marks **each**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) The zone factors indicate reasonably estimated values of _____ in the respective zone.
   a) Peak intensity of earthquake b) Peak ground velocity
   c) Peak ground acceleration d) Peak ground displacement

2) Choose the correct option from following statements :
   a) Earthquake causes landslide b) Landslide causes earthquake
   c) a) and b) are wrong d) a) and b) both are correct

3) Which of the following is not seismic wave of an earthquake ?
   a) P-wave b) S-wave c) L-wave d) Q-wave

4) What is the degree of freedom of three storeyed building ?
   a) 4 b) 3 c) 2 d) 1

5) In which of the following cases, the dynamic system has no oscillation but returns to equilibrium at a slower rate ?
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) Undamped case

6) The damping in a dynamic system is represented as equivalent to
   a) Coulomb damping b) Viscous damping
   c) Friction damping d) Negative damping

P.T.O.

7) The response steadily decreases when the frequency ratio is
   a) < 1 b) > 1 c) = 1 d) = 2

8) The following is not a brittle failure of an RCC structure
   a) Shear failure
   b) Yielding of reinforcement in tension
   c) Bond failure
   d) Crushing of concrete in compression

9) Ductility in the structure
   a) Increases the damping b) Increases the deformation
   c) Decreases the seismic force d) All the above

10) Special confining reinforcement is provided in the form of
   a) Longitudinal reinforcement b) Temperature reinforcement
   c) Lateral reinforcement d) Shrinkage reinforcement

11) In the equivalent static procedure, the natural period of the building is
   a) Computed by the free-vibration analysis
   b) Estimated according to the formula in IS-1893
   c) Assumed
   d) As given in book

12) The structures having high natural period
   a) Attract large seismic forces
   b) Have large drift
   c) Attract less seismic forces and have large drift
   d) Attract large seismic forces and have small drift

13) The response reduction factor with the increase in redundancy
   a) Decreases b) Increases
   c) Remains unaffected d) Remains constant

14) The spectral acceleration coefficient (S/g) values _____ with increase in damping in the structure.
   a) Increases b) Decrease
   c) Remain constant d) Assumed

15) The definition of the soft storey mainly refers to
   a) Strength b) Stiffness c) Mass d) Damping

_____

SLR-EP – 43

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
EARTHQUAKE ENGG.

Day and Date : Saturday, 3-12-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*

2) Figures to ***right*** *indicate* ***full*** *marks.*

3) ***Use*** *of only IS 1893 is* ***allowed****.*

4) ***Assume*** *suitable data if necessary and mention* ***it clearly****.*

SECTION – I

2. a) Distinguish between Body waves and surface waves. **4**

   b) What are plate tectonics and how are they related to continental drift and sea floor spreading ? **10**

3. a) Differentiate the static and dynamic analysis of structure. **4**

   b) Derive expression for the equivalent stiffness of multiple elastic forces in series and parallel. Identify the system and find the period of vibration for cantilever beam when mass 'm' is acting at the free end. The span of beam is 'L' and flexural rigidity EI. **9**

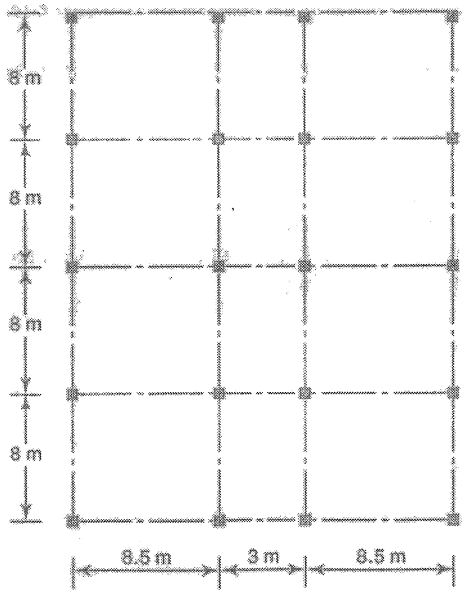
4. From first principle derive the governing differential equation of damped SDOF system subjected to external force which varying sinusoidal. Also obtain the complete solution of the differential equation. **13**

5. a) Explain the step by step procedure of construction of response spectrum. **5**

   b) What is combined spectrum ? What are its characteristics ? **8**

SECTION – II

6. A five-storey building has a plan as shown in the Fig. Dead load including self weight of slab, finishes, partitions etc. can be assumed as 5 kN/m^2 on each floor and as 1.5 kN/m^2 on the roof. LL is 1.5 kN/m^2. The building belong to zone IV. The frame is SMRF supported on medium soil. The storey height is 3.5 m. Determine the lateral forces and shears at different storey levels in both directions of building. **14**



7. a) Explain the Design Base shear. **3**

   b) Write explanatory note on : **10**

      i) Response spectrum factor

      ii) Provisions of torsion

      iii) Storey drift

      iv) Soft storey.

8. What do you understand by a response reduction factor ? How it is related to ductivity. Explain in detail. **13**

9. a) Write in brief about Categories of masonry buildings. **3**

   b) Define bands. At what levels in masonry building would you provide them ? Give justification for each of them. **10**

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SLR-EP – 43

Seat No.	

Set Q

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   b) Have large drift
   c) Attract less seismic forces and have large drift
   d) Attract large seismic forces and have small drift

12) The response reduction factor with the increase in redundancy
   a) Decreases b) Increases
   c) Remains unaffected d) Remains constant

13) The spectral acceleration coefficient (S/g) values _____ with increase in damping in the structure.
   a) Increases b) Decrease
   c) Remain constant d) Assumed

14) The definition of the soft storey mainly refers to
   a) Strength b) Stiffness c) Mass d) Damping

15) In the equivalent static procedure, the natural period of the building is
   a) Computed by the free-vibration analysis
   b) Estimated according to the formula in IS-1893
   c) Assumed
   d) As given in book

_____

SLR-EP – 43

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
EARTHQUAKE ENGG.

Day and Date : Saturday, 3-12-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*

2) Figures to ***right*** *indicate* ***full*** *marks.*

3) ***Use*** *of only IS 1893 is* ***allowed****.*

4) ***Assume*** *suitable data if necessary and mention* ***it clearly****.*

SECTION – I

2. a) Distinguish between Body waves and surface waves. **4**

   b) What are plate tectonics and how are they related to continental drift and sea floor spreading ? **10**

3. a) Differentiate the static and dynamic analysis of structure. **4**

   b) Derive expression for the equivalent stiffness of multiple elastic forces in series and parallel. Identify the system and find the period of vibration for cantilever beam when mass 'm' is acting at the free end. The span of beam is 'L' and flexural rigidity EI. **9**

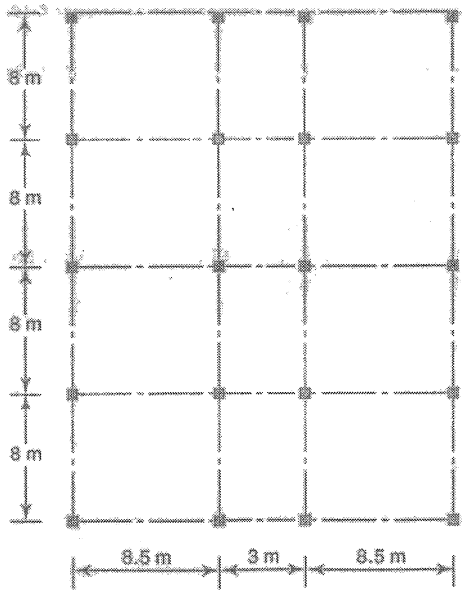
4. From first principle derive the governing differential equation of damped SDOF system subjected to external force which varying sinusoidal. Also obtain the complete solution of the differential equation. **13**

5. a) Explain the step by step procedure of construction of response spectrum. **5**

   b) What is combined spectrum ? What are its characteristics ? **8**

SECTION – II

6. A five-storey building has a plan as shown in the Fig. Dead load including self weight of slab, finishes, partitions etc. can be assumed as 5 kN/m^2 on each floor and as 1.5 kN/m^2 on the roof. LL is 1.5 kN/m^2. The building belong to zone IV. The frame is SMRF supported on medium soil. The storey height is 3.5 m. Determine the lateral forces and shears at different storey levels in both directions of building. **14**



7. a) Explain the Design Base shear. **3**

   b) Write explanatory note on : **10**

      i) Response spectrum factor

      ii) Provisions of torsion

      iii) Storey drift

      iv) Soft storey.

8. What do you understand by a response reduction factor ? How it is related to ductivity. Explain in detail. **13**

9. a) Write in brief about Categories of masonry buildings. **3**

   b) Define bands. At what levels in masonry building would you provide them ? Give justification for each of them. **10**

SLR-EP – 43

Seat No.	

Set R

B.E. (Civil) (Part – I) Examination, 2016
EARTHQUAKE ENGG.

Day and Date : Saturday, 3-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*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.***
*3) MCQ **1** to 10 carries **one** mark **each** and MCQ **11** to **15** carry **two** marks **each**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) The following is not a brittle failure of an RCC structure
   a) Shear failure
   b) Yielding of reinforcement in tension
   c) Bond failure
   d) Crushing of concrete in compression

2) Ductility in the structure
   a) Increases the damping b) Increases the deformation
   c) Decreases the seismic force d) All the above

3) Special confining reinforcement is provided in the form of
   a) Longitudinal reinforcement b) Temperature reinforcement
   c) Lateral reinforcement d) Shrinkage reinforcement

4) The zone factors indicate reasonably estimated values of _____ in the respective zone.
   a) Peak intensity of earthquake b) Peak ground velocity
   c) Peak ground acceleration d) Peak ground displacement

5) Choose the correct option from following statements :
   a) Earthquake causes landslide b) Landslide causes earthquake
   c) a) and b) are wrong d) a) and b) both are correct

6) Which of the following is not seismic wave of an earthquake ?
   a) P-wave b) S-wave c) L-wave d) Q-wave

7) What is the degree of freedom of three storeyed building ?
   a) 4 b) 3 c) 2 d) 1

8) In which of the following cases, the dynamic system has no oscillation but returns to equilibrium at a slower rate ?
   a) Critically damped case b) Over-damped case
   c) Under-damped case d) Undamped case

9) The damping in a dynamic system is represented as equivalent to
   a) Coulomb damping b) Viscous damping
   c) Friction damping d) Negative damping

10) The response steadily decreases when the frequency ratio is
   a) < 1 b) > 1 c) = 1 d) = 2

11) The response reduction factor with the increase in redundancy
   a) Decreases b) Increases
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12) The spectral acceleration coefficient (S/g) values _____ with increase in damping in the structure.
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SLR-EP – 43

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
EARTHQUAKE ENGG.

Day and Date : Saturday, 3-12-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*

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SECTION – I

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   b) Derive expression for the equivalent stiffness of multiple elastic forces in series and parallel. Identify the system and find the period of vibration for cantilever beam when mass 'm' is acting at the free end. The span of beam is 'L' and flexural rigidity EI. **9**

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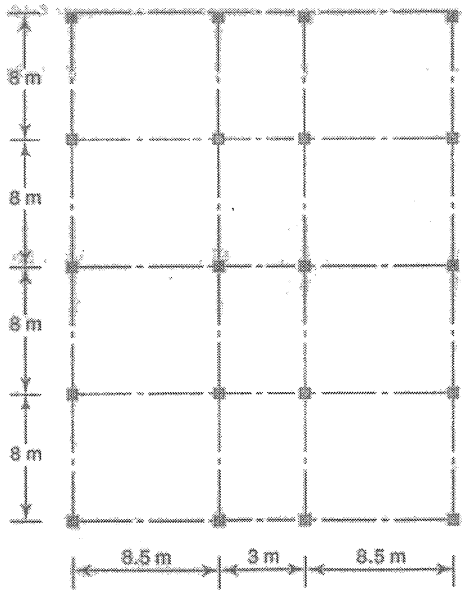
5. a) Explain the step by step procedure of construction of response spectrum. **5**

   b) What is combined spectrum ? What are its characteristics ? **8**

SECTION – II

6. A five-storey building has a plan as shown in the Fig. Dead load including self weight of slab, finishes, partitions etc. can be assumed as 5 kN/m^2 on each floor and as 1.5 kN/m^2 on the roof. LL is 1.5 kN/m^2. The building belong to zone IV. The frame is SMRF supported on medium soil. The storey height is 3.5 m. Determine the lateral forces and shears at different storey levels in both directions of building. **14**



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9. a) Write in brief about Categories of masonry buildings. **3**

   b) Define bands. At what levels in masonry building would you provide them ? Give justification for each of them. **10**

SLR-EP – 43

Seat No.	

Set S

B.E. (Civil) (Part – I) Examination, 2016
EARTHQUAKE ENGG.

Day and Date : Saturday, 3-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
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*3) MCQ **1** to 10 carries **one** mark **each** and MCQ **11** to **15** carry **two** marks **each**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) Special confining reinforcement is provided in the form of
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2) The zone factors indicate reasonably estimated values of _____ in the respective zone.
   a) Peak intensity of earthquake b) Peak ground velocity
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3) Choose the correct option from following statements :
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   a) P-wave b) S-wave c) L-wave d) Q-wave

5) What is the degree of freedom of three storeyed building ?
   a) 4 b) 3 c) 2 d) 1

6) In which of the following cases, the dynamic system has no oscillation but returns to equilibrium at a slower rate ?
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P.T.O.

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   a) Coulomb damping b) Viscous damping
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15) The response reduction factor with the increase in redundancy
   a) Decreases b) Increases
   c) Remains unaffected d) Remains constant

_____

SLR-EP – 43

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
EARTHQUAKE ENGG.

Day and Date : Saturday, 3-12-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*

2) Figures to ***right*** *indicate* ***full*** *marks.*

3) ***Use*** *of only IS 1893 is* ***allowed****.*

4) ***Assume*** *suitable data if necessary and mention* ***it clearly****.*

SECTION – I

2. a) Distinguish between Body waves and surface waves. **4**

   b) What are plate tectonics and how are they related to continental drift and sea floor spreading ? **10**

3. a) Differentiate the static and dynamic analysis of structure. **4**

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5. a) Explain the step by step procedure of construction of response spectrum. **5**

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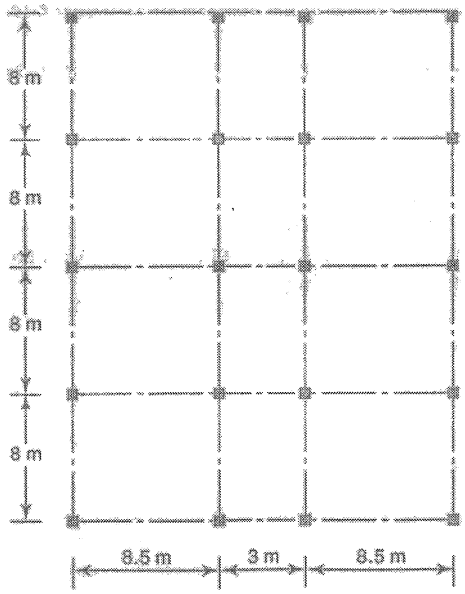
SECTION – II

6. A five-storey building has a plan as shown in the Fig. Dead load including self weight of slab, finishes, partitions etc. can be assumed as 5 kN/m^2 on each floor and as 1.5 kN/m^2 on the roof. LL is 1.5 kN/m^2. The building belong to zone IV. The frame is SMRF supported on medium soil. The storey height is 3.5 m. Determine the lateral forces and shears at different storey levels in both directions of building. **14**



7. a) Explain the Design Base shear. **3**

   b) Write explanatory note on : **10**

      i) Response spectrum factor

      ii) Provisions of torsion

      iii) Storey drift

      iv) Soft storey.

8. What do you understand by a response reduction factor ? How it is related to ductivity. Explain in detail. **13**

9. a) Write in brief about Categories of masonry buildings. **3**

   b) Define bands. At what levels in masonry building would you provide them ? Give justification for each of them. **10**

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SLR-EP – 44

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2016
WATER RESOURCES ENGINEERING – II

Day and Date : Tuesday, 6-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) *Solve* ***any three*** *questions from Section –* ***I*** *(Questions* ***2, 3, 4, 5****) and* ***any three*** *questions from Section –* ***II*** *(Questions* ***6, 7, 8, 9****).*
4) *Draw* ***neat*** *labeled sketches* ***wherever*** *necessary.*
5) ***Assume*** *suitable data if necessary and state it* ***clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) A dam reservoir, catering to flood control, irrigation and water supply, although basically designed for irrigation alone, is a
   a) multiple purpose reservoir
   b) single purpose reservoir
   c) distribution reservoir
   d) none of the above

2) With the reduction in reservoir capacity over the passage of time, the trap efficiency
   a) increases
   b) decreases
   c) remains unaffected
   d) may increase or decrease, depending upon the reservoir characteristics

3) The horizontal component of the earthquake wave, producing instability in a dam, is the one, which acts
   a) towards the reservoir
   b) towards the dam
   c) both (a) and (b)
   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 cut-off under upstream face
   c) pressure grouting in dam foundation
   d) all the above methods

5) 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

6) A rock toe and a horizontal filter is provided on the downstream base of an earthen dam in order to
   a) prevent piping action in the dam body
   b) prevent piping action in the dam foundation
   c) to reduce the seepage quantity by blocking its flow
   d) to collect and drain out the seepage flow

P.T.O.

7) The most preferred type of an earthen dam section is the one, in which the
   a) entire embankment is made of one type of soil
   b) inner embankment is made of highly porous soil, surrounded by the outer shell of highly impervious soil, both separated by transition filter material of mediocre permeability
   c) inner embankment is made of highly impervious soil surrounded by the outer shell of highly pervious soil, both separated by transition filter material of mediocre permeability
   d) none of the above

8) 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

9) The discharge passing over an ogee spillway, per unit length of its apex line, is proportional to
   a) H b) H^2 c) $H^{1/2}$ d) $H^{3/2}$

   Where H is the head over the apex of its crest.

10) In vertical stoney spillway gate, the rollers are placed between the
   a) gate and the u/s groove guide b) gate and the d/s groove guide
   c) either (a) or (b) d) none of them

11) Which one among the following is a correct choice in relation to a weir ?
   a) it is helpful in diverting excess water to a river from a canal
   b) it does not cause any heading up of water on its upstream side
   c) it stores water by raised counter-balanced gates
   d) it increases the chances of floods in the upstream areas

12) A fish ladder is provided in a canal project
   a) to catch the fish for commercial development b) to enable the fish to move freely in the river
   c) to serve the same purpose as a canal ladder d) (b) and (c) both

13) In plain areas, the irrigation canals are usually aligned along
   a) ridge lines b) contour lines c) valley lines d) across the contours

14) The canal, which may frequently encounter cross-drainage works, will be a
   a) watershed canal b) contour canal c) side slope canal d) none of them

15) Aggrading rivers are
   a) silting rivers b) scouring rivers c) rivers in regime d) meandering rivers

16) The repelling groynes which are largely constructed projecting from river embankments, as anti erosion works, are
   a) pointing upstream b) pointing downstream c) perpendicular to the bank d) none of these

17) Lining of irrigation channels
   a) increases water logging b) increases channel cross section
   c) increases command area d) increase chances of breaching

18) Water-logging of cropped land leads to reduced crop yields, due to
   a) ill-aeration of root zone, causing lack of oxygen to plants
   b) growth to water-loving plants interfering with the sown crop
   c) surrounding of the root zone by the resultant saline water, which extracts the good water from plant roots by osmosis
   d) all of the above

19) 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

20) An impulse turbine, like a Pelton's wheel, is used for
   a) low heads and high discharges b) high heads and low discharges
   c) low heads and low discharges d) high heads and high discharges

SLR-EP – 44

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
WATER RESOURCES ENGINEERING – II

Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from Section – **I** (Questions **2, 3, 4, 5**) and **any three** questions from Section – **II** (Questions **6, 7, 8, 9**).*
*2) Draw **neat** labeled sketches **wherever** necessary.*
*3) **Assume** suitable data if necessary and state it **clearly**.*

SECTION – I

2. a) Explain the mass curve method that can be used for determining reservoir capacity for fulfilling the given demand. **6**
   b) Discuss the factors which are considered for the selection of a site for a proposed dam. **7**

3. Figures (1) shows the section of a gravity dam (non overflow potion) built of concrete. Calculate (neglecting earthquake effects). **13**
   i) The maximum vertical stresses at toe and heel of the dam.
   ii) The major principal stress at the toe of the dam.
   iii) Intensity of shear stress on a horizontal plane near toe.
   Assume unit weight of concrete = 23.5 kN/m^2. Allowable compressive stress in concrete = 2500 kN/m^2.
   Allowable shear stress in concrete = 420 kN/m^2.
   Assume that reservoir is full of water upto M.W.L.

4. a) What are the methods adopted to reduce uplift in masonry dam ? **6**
   b) For a homogeneous earth dam 52 m high and 2 m free board, a flow net was constructed and following results were obtained. Number of potential drops = 25, Number of flow channels = 4. The dam has horizontal filter of 40 m length at its downstream end. Calculate the seepage discharge per meter length of the dam. Assume coefficient of permeability of the dam material as 3×10^{-3} cm/sec. **7**

5. a) A siphon spillway of rectangular cross section has the following dimensions at its throat. Height of throat = 1.5 m. Width of throat = 4 m. At the design flow, the tail water elevation is 7 m below the summit of the siphon and head water elevation is 2 m above the summit. Taking coefficient of discharge as 0.6, determine the discharge capacity of the siphon. Also determine the head that would be required on an ogee spillway 3.8 m long to discharge this flow if coefficient of discharge is 2.25. **7**
   b) Distinguish between constant radius and constant angle layouts of an 'Arch dam'. What is the best value of angle for constant angle arch dam ? **7**

SECTION – II

6. a) What are the main causes of failure of weirs on permeable foundations ? What remedies would you suggest to prevent them ? **7**
   b) Discuss the following terms in connection with a power plant : **6**
   i) Firm power ii) Load factor iii) Utilization factor.

7. a) Discuss with neat sketches the Cross Drainage works viz. Canal siphon and aqueduct. **6**

   b) Write short notes on the following :

      i) Various types of canal linings. **4**

      ii) Financial justification for lining of existing unlined canals. **4**

8. a) Explain with neat sketches the different types of 'spurs' which are commonly used for controlling and training Indian rivers. **6**

   b) Discuss different types of drainage systems provided in irrigated tracts as precautions against water-logging. Give salient features of an open drain system. **7**

9. a) What are important components of a typical hydropower plant ? Draw a layout of medium head hydropower plant. **6**

   b) A runoff stream station with an installed capacity of 15000 kW operates at 15% load factor when it serves as a peak load station.

      i) What should be the lowest discharge in the stream so that station may serve as a base load station ? It is given that plant efficiency is 75% when working under 20 m head.

      ii) Calculate the maximum load factor of the plant when the discharge in the stream rises to 20 cumecs. **7**

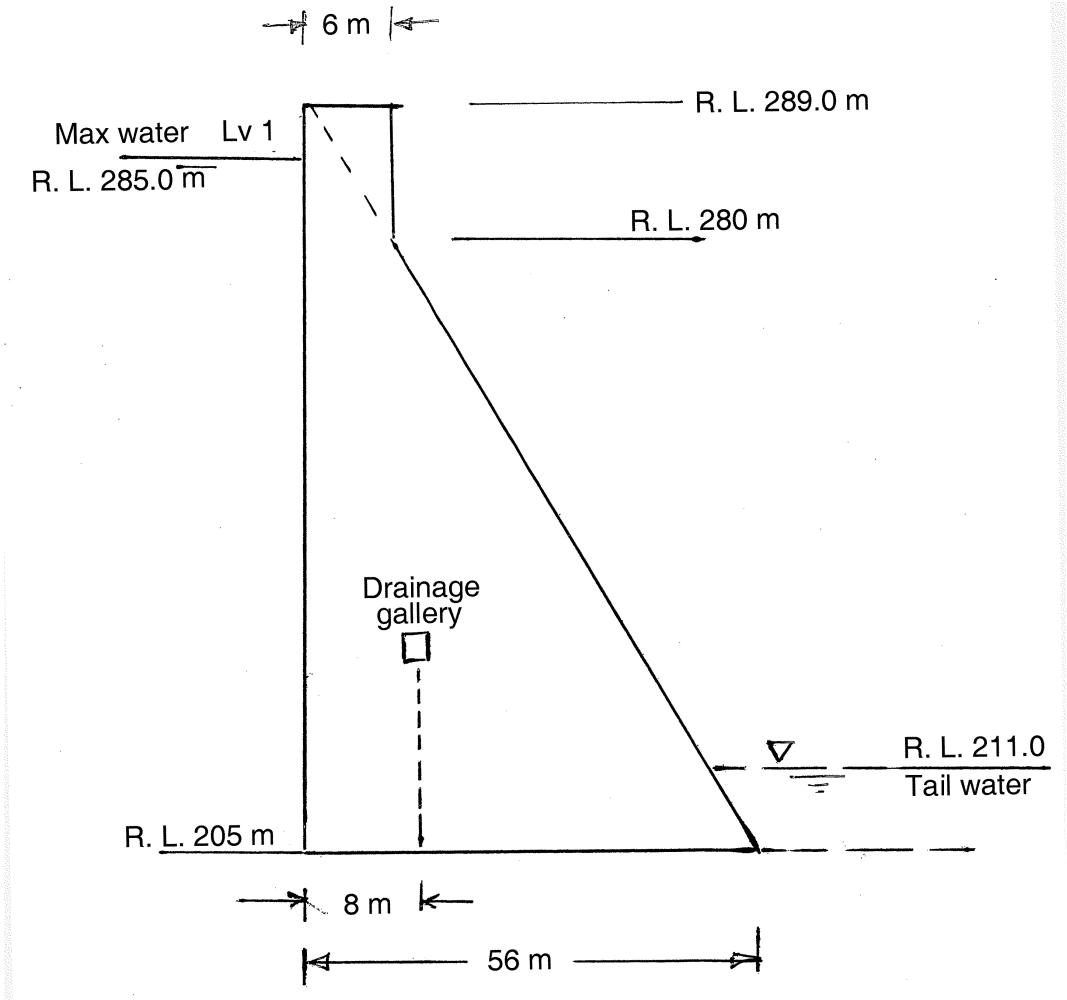

Fig. (1) with Question No. 3

Set P

SLR-EP – 44

Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2016
WATER RESOURCES ENGINEERING – II

Day and Date : Tuesday, 6-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

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a) increases
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P.T.O.

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   b) inner embankment is made of highly porous soil, surrounded by the outer shell of highly impervious soil, both separated by transition filter material of mediocre permeability
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13) 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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   a) it is helpful in diverting excess water to a river from a canal
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   a) to catch the fish for commercial development b) to enable the fish to move freely in the river
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20) Aggrading rivers are
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SLR-EP – 44

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
WATER RESOURCES ENGINEERING – II

Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from Section – **I** (Questions **2, 3, 4, 5**) and **any three** questions from Section – **II** (Questions **6, 7, 8, 9**).*
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SECTION – I

2. a) Explain the mass curve method that can be used for determining reservoir capacity for fulfilling the given demand. **6**
   b) Discuss the factors which are considered for the selection of a site for a proposed dam. **7**

3. Figures (1) shows the section of a gravity dam (non overflow potion) built of concrete. Calculate (neglecting earthquake effects). **13**
   i) The maximum vertical stresses at toe and heel of the dam.
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   Assume unit weight of concrete = 23.5 kN/m^2. Allowable compressive stress in concrete = 2500 kN/m^2.
   Allowable shear stress in concrete = 420 kN/m^2.
   Assume that reservoir is full of water upto M.W.L.

4. a) What are the methods adopted to reduce uplift in masonry dam ? **6**
   b) For a homogeneous earth dam 52 m high and 2 m free board, a flow net was constructed and following results were obtained. Number of potential drops = 25, Number of flow channels = 4. The dam has horizontal filter of 40 m length at its downstream end. Calculate the seepage discharge per meter length of the dam. Assume coefficient of permeability of the dam material as 3×10^{-3} cm/sec. **7**

5. a) A siphon spillway of rectangular cross section has the following dimensions at its throat. Height of throat = 1.5 m. Width of throat = 4 m. At the design flow, the tail water elevation is 7 m below the summit of the siphon and head water elevation is 2 m above the summit. Taking coefficient of discharge as 0.6, determine the discharge capacity of the siphon. Also determine the head that would be required on an ogee spillway 3.8 m long to discharge this flow if coefficient of discharge is 2.25. **7**
   b) Distinguish between constant radius and constant angle layouts of an 'Arch dam'. What is the best value of angle for constant angle arch dam ? **7**

SECTION – II

6. a) What are the main causes of failure of weirs on permeable foundations ? What remedies would you suggest to prevent them ? **7**
   b) Discuss the following terms in connection with a power plant : **6**
      i) Firm power ii) Load factor iii) Utilization factor.

Set Q

7. a) Discuss with neat sketches the Cross Drainage works viz. Canal siphon and aqueduct. **6**

   b) Write short notes on the following :

      i) Various types of canal linings. **4**

      ii) Financial justification for lining of existing unlined canals. **4**

8. a) Explain with neat sketches the different types of 'spurs' which are commonly used for controlling and training Indian rivers. **6**

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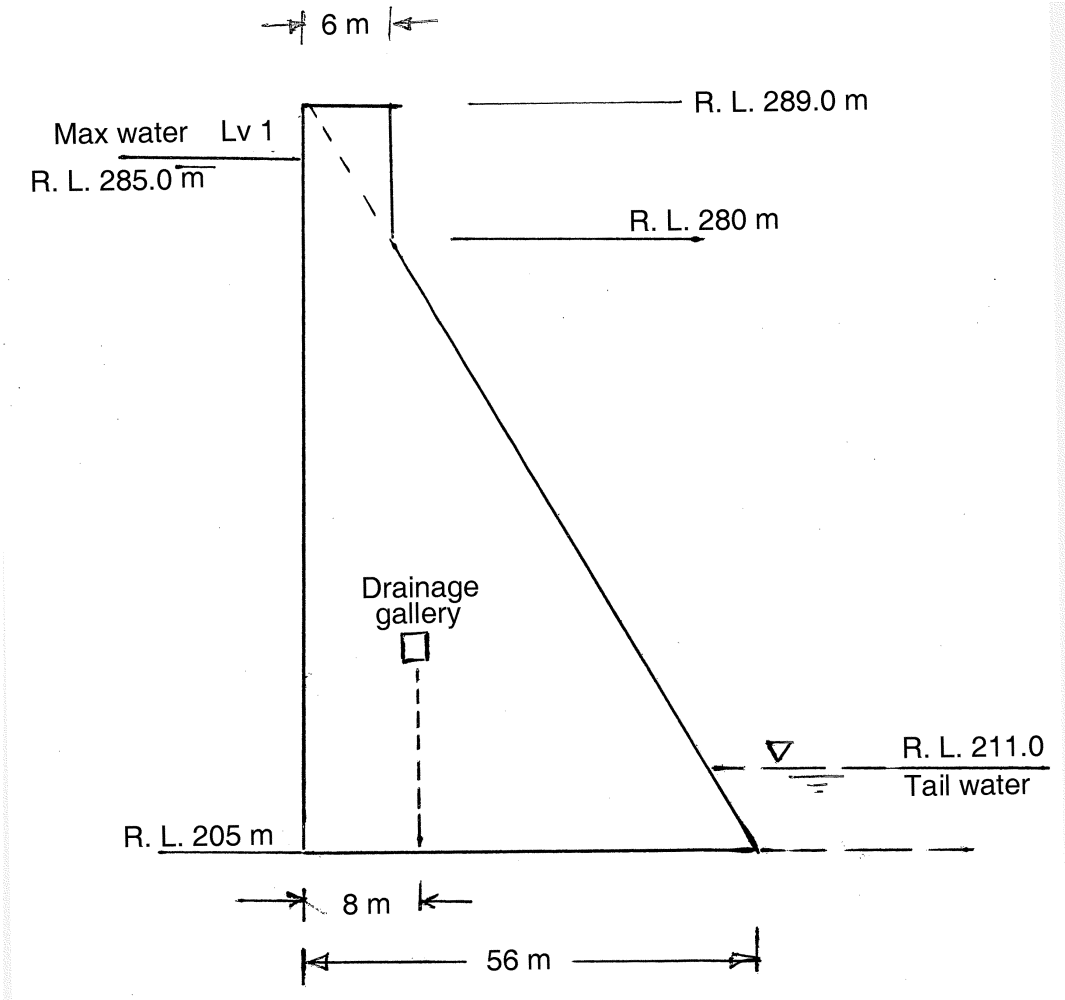

Fig. (1) with Question No. 3

Set Q

SLR-EP – 44

Seat No.	

Set **R**

B.E. (Civil) (Part – I) Examination, 2016
WATER RESOURCES ENGINEERING – II

Day and Date : Tuesday, 6-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) Which one among the following is a correct choice in relation to a weir ?
   a) it is helpful in diverting excess water to a river from a canal
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   a) increases water logging b) increases channel cross section
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   a) ill-aeration of root zone, causing lack of oxygen to plants
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P.T.O.

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   a) multiple purpose reservoir
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   a) constant radius type
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SLR-EP – 44

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
WATER RESOURCES ENGINEERING – II

Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from Section – **I** (Questions **2, 3, 4, 5**) and **any three** questions from Section – **II** (Questions **6, 7, 8, 9**).*
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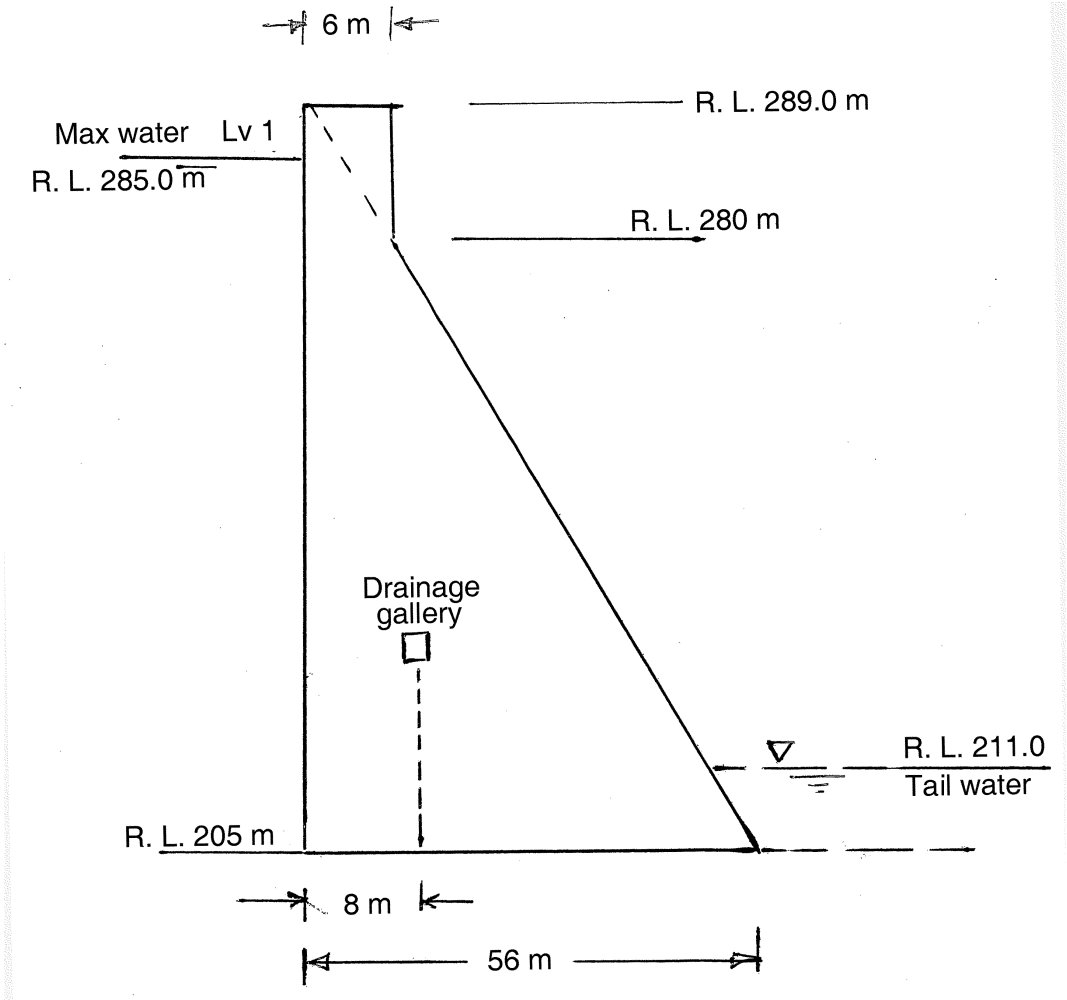

Fig. (1) with Question No. 3

Set R

SLR-EP – 44

Seat No.	

Set **S**

B.E. (Civil) (Part – I) Examination, 2016
WATER RESOURCES ENGINEERING – II

Day and Date : Tuesday, 6-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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Duration : 30 Minutes Marks : 20

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P.T.O.

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SLR-EP – 44

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
WATER RESOURCES ENGINEERING – II

Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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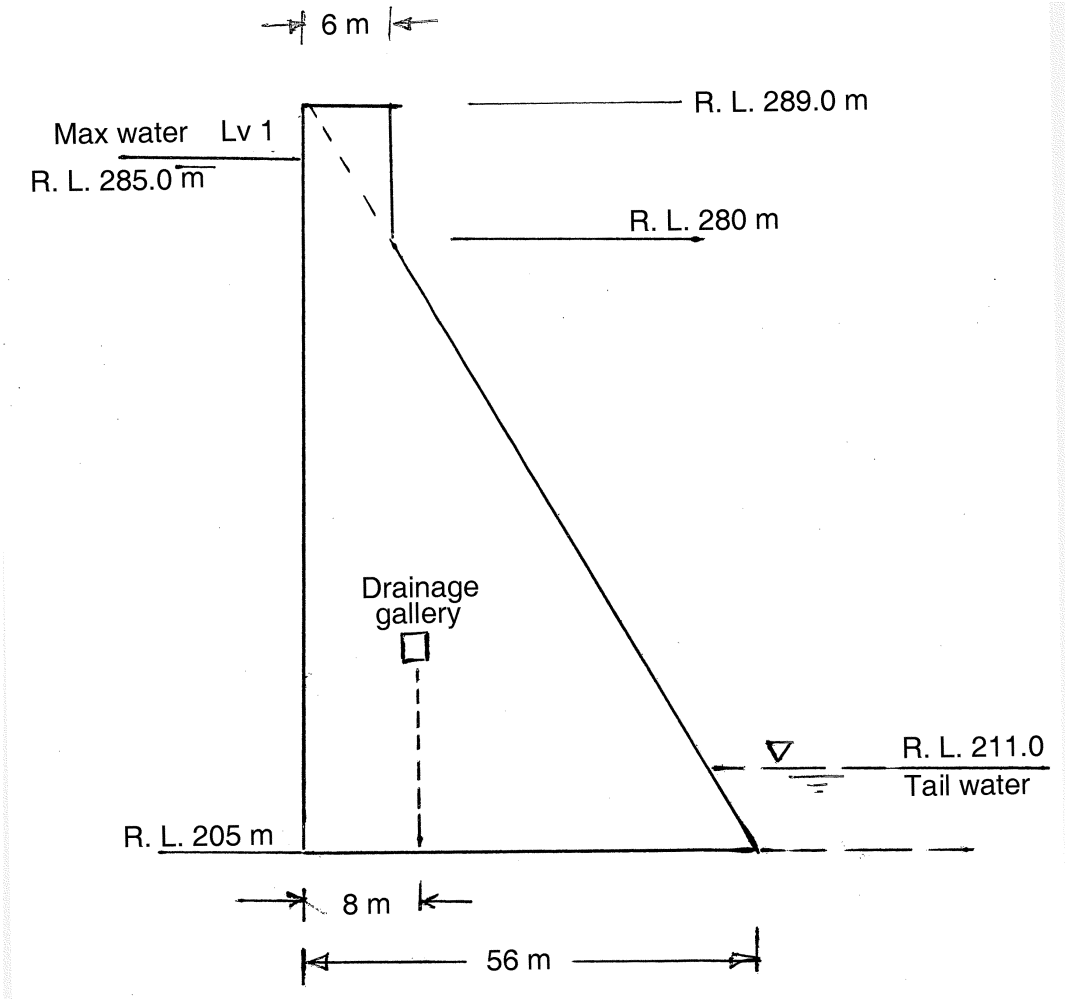

Fig. (1) with Question No. 3

Set S

SLR-EP – 46

Seat No.	

Set P

B.E. (Civil) (Part – II) (Old) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Write the correct option for **each** question.*
*4) While solving **MCQ IS 456-2000** and **IS 1343** is **not allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at
   a) Support b) Mid span c) Quarter span d) Every section
2) The minimum cube strength of concrete used for prestressed member, is
   a) 5 N/mm^2 b) 15 N/mm^2 c) 25 N/mm^2 d) 35 N/mm^2
3) Post tensioning system
   a) was widely used in earlier days
   b) is not economical and hence not generally used
   c) is economical for large spans and is adopted now a days
   d) none of these
4) In two way restrained slab the width of middle strip is _____ of span.
   a) 1/4 b) 1/8 c) 3/4 d) 1/2
5) In a prestressed beam carrying an external load W with a bent tendon is having angle of inclination θ and prestressed load P. The net downward load at the centre is
   a) W – 2P cosθ b) W – P cosθ c) W – P sinθ d) W – 2P sinθ
6) High strength of concrete is necessary for pre stressed concrete work because
   a) Large pre stressing force is applied b) High bond stress is required
   c) Bursting stress is more d) All of above
7) In prestresses concrete section _____section is effective.
   a) Above N.A b) Partially above and below
   c) Below N.A d) Entire section

P.T.O.

8) Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by
   a) Rankine formula b) Rankine Grashoff formula
   c) Marcus formula d) Grashoff formula

9) The safe stress in concrete at transfer is _____ fck.
   a) 0.4 b) 0.5 c) 0.6 d) 0.7

10) If T and R are tread and rise in cm respectively of a stair, then
   a) 2R + T = 60 b) 2R + T = 30
   c) R + 2T = 60 d) R + 2T = 30

11) The concept used for analysis of prestressed concrete section is
   a) Stress concept b) Load balancing concept
   c) Strenth concept d) All of the above

12) If a bent tendon is required to balance a concentrated load W at the centre of the span *l*, the central dip h must be at least
   a) W*l*/p b) W*l*/4p c) W*l*/3p d) W*l*/2p

13) In design of P.S.C. beam section, the no. of Fundamental stress conditions to be considered are
   a) Two b) Four c) Three d) One

14) The safe stress in concrete at service is _____ fck.
   a) 0.3 b) 0.4 c) 0.6 d) 0.5

15) The minimum reinforcement in slab is _____ of gross cross sectional area, if HYSD bars are used.
   a) 0.10% b) 0.12% c) 0.15% d) 0.20%

16) A pre-stressed concrete member is preferred because
   a) its dimensions are not decided from the diagonal tensile stress
   b) large size of long beams carrying large shear force need not be adopted
   c) removal of cracks in the members due to shrinkage
   d) all the above

17) Total pressure on the vertical face of a retaining wall of height h acts parallel to free surface and from the base at a distance of
   a) h/4 b) h/3 c) h/2 d) 2h/3

18) Cantilever retaining walls can safely be used for a height not more than
   a) 3 m b) 4 m c) 5 m d) 6 m

19) The number of treads in a flight is equal to
   a) risers in the flight b) risers minus one
   c) risers plus one d) none of these

20) If C is creep coefficient, f is original prestress in concrete, m is modular ratio, E is Young's modulus of steel and e is shrinkage strain, the combined effect of creep and shrinkage is
   a) (1 – C) mf – eE b) (C – 1) mf – eE
   c) (C – 1) mf + eE d) (1 – C) mf + eE

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SLR-EP – 46

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Use of **IS 456** and non programmable calculator is **allowed**.*
*3) **Draw** neat sketch's **where** required and **assume** suitable data **if required** and state it clearly.*

SECTION – I

II. Design a reinforced concrete slab for a room of clear dimension 4.5 m × 6 m. The slab is supported all around on the wall of width 300 mm. The slab has to carry a live load of 4 kN/m^2 including floor finish. Use M_{25} concrete and Fe_{415} steel. Assume corners are held down . Draw the reinforcement details of the slab. **13**

III. Design the dog-legged type staircase for a residential building using following data floor to floor height = 3.4 m,

No. of flight per floor = 2,

150 mm riser and 250 mm treads are provided. The live load is 3 kN/m^2 and assume width of stair is 1m. Use M_{20} concrete and Fe_{415} steel. **13**

IV. Design a three span continuous beam rectangular beam of span of 5.5 m each to carry a dead load of 18 kN/m and live load of 8 kN/m. The beam is supported by columns. Use M_{20} concrete and Fe_{500} steel. Sketch the reinforcement details. **13**

V. Design the stem slab of a counter fort retaining wall, if the height of wall above the ground level is 5.2 m. SBC of soil is 200 kN/m^2, angle of internal friction is 30° and unit weight of back fill soil 18 kN/m^2. Keep spacing of counter fort as 3 m. coefficient of friction between soil and concrete is 0.5. Use M_{25} concrete and Fe_{500} steel. **14**

SECTION – II

VI. A PSC beam of 250 mm × 450 mm is provided with 10 m. The beam is prestressed by steel wires of area 450 mm^2 provided at a uniform eccentricity of 80 mm with an initial prestress of 1250 N/mm^2. Determine the percentage loss of stress in the wires of the beam is post tensioned. Es = 2.1×10^5 N/mm^2, Ec = 3.5×10^5 N/mm^2, Relaxation loss percentage = 5%, e_{sh} = Es = 1.9×10^{-4}, creep strain 25×10^{-6} N/mm^2 of stress anchorage slip = 1.25 mm, friction coefficient = 0.00015/m. **13**

VII. A PSC beam 300 mm × 600 mm is subjected to an effective prestressing force of 1150 kN along the longitudinal centroidal axis. Design the end block by Guyon's method. **13**

VIII. Design PSC I section beam for the following span = 20 m, superimposed load = 30 kN/m, cube strength of concrete at 28 days is 35 kN/m^2, safe stress in concrete at transfer = 0.5 fck, allowable tensile stress in concrete is 0.279 $(fck)^{1/2}$, safe stress in steel in steel is 1200 MPa, total loss of stress 20%, ultimate stress in steel 1200 MPa. **14**

IX. A prestressed concrete beam 500 mm × 750 mm in section has a span 8 m and is subjected to a uniformly distributed load of 17.50 kN/m including the self wt. of the beam. The prestressing tendons are located at the lower third pt. of the section and provide an effective stresses in concrete for the mid span section. Solve by following methods : stress concept method, strain concept method, load balancing concept. Take prestressing force 1050 KN. **13**

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SLR-EP – 46

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (Old) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Write the correct option for **each** question.*
*4) While solving **MCQ IS 456-2000** and **IS 1343** is **not allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) A pre-stressed concrete member is preferred because
   a) its dimensions are not decided from the diagonal tensile stress
   b) large size of long beams carrying large shear force need not be adopted
   c) removal of cracks in the members due to shrinkage
   d) all the above

2) Total pressure on the vertical face of a retaining wall of height h acts parallel to free surface and from the base at a distance of
   a) h/4 b) h/3 c) h/2 d) 2h/3

3) Cantilever retaining walls can safely be used for a height not more than
   a) 3 m b) 4 m c) 5 m d) 6 m

4) The number of treads in a flight is equal to
   a) risers in the flight b) risers minus one
   c) risers plus one d) none of these

5) If C is creep coefficient, f is original prestress in concrete, m is modular ratio, E is Young's modulus of steel and e is shrinkage strain, the combined effect of creep and shrinkage is
   a) (1 – C) mf – eE b) (C – 1) mf – eE
   c) (C – 1) mf + eE d) (1 – C) mf + eE

6) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at
   a) Support b) Mid span c) Quarter span d) Every section

7) The minimum cube strength of concrete used for prestressed member, is
   a) 5 N/mm^2 b) 15 N/mm^2 c) 25 N/mm^2 d) 35 N/mm^2

P.T.O.

8) Post tensioning system
   a) was widely used in earlier days
   b) is not economical and hence not generally used
   c) is economical for large spans and is adopted now a days
   d) none of these

9) In two way restrained slab the width of middle strip is _____ of span.
   a) 1/4 b) 1/8 c) 3/4 d) 1/2

10) In a prestressed beam carrying an external load W with a bent tendon is having angle of inclination θ and prestressed load P. The net downward load at the centre is
   a) $W - 2P\cos\theta$ b) $W - P\cos\theta$ c) $W - P\sin\theta$ d) $W - 2P\sin\theta$

11) High strength of concrete is necessary for pre stressed concrete work because
   a) Large pre stressing force is applied b) High bond stress is required
   c) Bursting stress is more d) All of above

12) In prestresses concrete section _____section is effective.
   a) Above N.A b) Partially above and below
   c) Below N.A d) Entire section

13) Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by
   a) Rankine formula b) Rankine Grashoff formula
   c) Marcus formula d) Grashoff formula

14) The safe stress in concrete at transfer is _____ fck.
   a) 0.4 b) 0.5 c) 0.6 d) 0.7

15) If T and R are tread and rise in cm respectively of a stair, then
   a) 2R + T = 60 b) 2R + T = 30
   c) R + 2T = 60 d) R + 2T = 30

16) The concept used for analysis of prestressed concrete section is
   a) Stress concept b) Load balancing concept
   c) Strenth concept d) All of the above

17) If a bent tendon is required to balance a concentrated load W at the centre of the span *l*, the central dip h must be at least
   a) W*l*/p b) W*l*/4p c) W*l*/3p d) W*l*/2p

18) In design of P.S.C. beam section, the no. of Fundamental stress conditions to be considered are
   a) Two b) Four c) Three d) One

19) The safe stress in concrete at service is _____ fck.
   a) 0.3 b) 0.4 c) 0.6 d) 0.5

20) The minimum reinforcement in slab is _____ of gross cross sectional area, if HYSD bars are used.
   a) 0.10% b) 0.12% c) 0.15% d) 0.20%

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SLR-EP – 46

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Use of **IS 456** and non programmable calculator is **allowed**.*
*3) **Draw** neat sketch's **where** required and **assume** suitable data **if required** and state it clearly.*

SECTION – I

II. Design a reinforced concrete slab for a room of clear dimension 4.5 m × 6 m. The slab is supported all around on the wall of width 300 mm. The slab has to carry a live load of 4 kN/m^2 including floor finish. Use M_{25} concrete and Fe_{415} steel. Assume corners are held down . Draw the reinforcement details of the slab. **13**

III. Design the dog-legged type staircase for a residential building using following data floor to floor height = 3.4 m,

No. of flight per floor = 2,

150 mm riser and 250 mm treads are provided. The live load is 3 kN/m^2 and assume width of stair is 1m. Use M_{20} concrete and Fe_{415} steel. **13**

IV. Design a three span continuous beam rectangular beam of span of 5.5 m each to carry a dead load of 18 kN/m and live load of 8 kN/m. The beam is supported by columns. Use M_{20} concrete and Fe_{500} steel. Sketch the reinforcement details. **13**

V. Design the stem slab of a counter fort retaining wall, if the height of wall above the ground level is 5.2 m. SBC of soil is 200 kN/m^2, angle of internal friction is 30° and unit weight of back fill soil 18 kN/m^2. Keep spacing of counter fort as 3 m. coefficient of friction between soil and concrete is 0.5. Use M_{25} concrete and Fe_{500} steel. **14**

SECTION – II

VI. A PSC beam of 250 mm × 450 mm is provided with 10 m. The beam is prestressed by steel wires of area 450 mm^2 provided at a uniform eccentricity of 80 mm with an initial prestress of 1250 N/mm^2. Determine the percentage loss of stress in the wires of the beam is post tensioned. Es = 2.1×10^5 N/mm^2, Ec = 3.5×10^5 N/mm^2, Relaxation loss percentage = 5%, e_{sh} = Es = 1.9×10^{-4}, creep strain 25×10^{-6} N/mm^2 of stress anchorage slip = 1.25 mm, friction coefficient = 0.00015/m. **13**

VII. A PSC beam 300 mm × 600 mm is subjected to an effective prestressing force of 1150 kN along the longitudinal centroidal axis. Design the end block by Guyon's method. **13**

VIII. Design PSC I section beam for the following span = 20 m, superimposed load = 30 kN/m, cube strength of concrete at 28 days is 35 kN/m^2, safe stress in concrete at transfer = 0.5 fck, allowable tensile stress in concrete is 0.279 $(fck)^{1/2}$, safe stress in steel in steel is 1200 MPa, total loss of stress 20%, ultimate stress in steel 1200 MPa. **14**

IX. A prestressed concrete beam 500 mm × 750 mm in section has a span 8 m and is subjected to a uniformly distributed load of 17.50 kN/m including the self wt. of the beam. The prestressing tendons are located at the lower third pt. of the section and provide an effective stresses in concrete for the mid span section. Solve by following methods : stress concept method, strain concept method, load balancing concept. Take prestressing force 1050 KN. **13**

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SLR-EP – 46

Seat No.	

Set R

B.E. (Civil) (Part – II) (Old) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Write the correct option for **each** question.*
*4) While solving **MCQ IS 456-2000** and **IS 1343** is **not allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) The concept used for analysis of prestressed concrete section is
   a) Stress concept b) Load balancing concept
   c) Strenth concept d) All of the above

2) If a bent tendon is required to balance a concentrated load W at the centre of the span *l*, the central dip h must be at least
   a) W*l*/p b) W*l*/4p c) W*l*/3p d) W*l*/2p

3) In design of P.S.C. beam section, the no. of Fundamental stress conditions to be considered are
   a) Two b) Four c) Three d) One

4) The safe stress in concrete at service is _____ fck.
   a) 0.3 b) 0.4 c) 0.6 d) 0.5

5) The minimum reinforcement in slab is _____ of gross cross sectional area, if HYSD bars are used,
   a) 0.10% b) 0.12% c) 0.15% d) 0.20%

6) A pre-stressed concrete member is preferred because
   a) its dimensions are not decided from the diagonal tensile stress
   b) large size of long beams carrying large shear force need not be adopted
   c) removal of cracks in the members due to shrinkage
   d) all the above

7) Total pressure on the vertical face of a retaining wall of height h acts parallel to free surface and from the base at a distance of
   a) h/4 b) h/3 c) h/2 d) 2h/3

P.T.O.

8) Cantilever retaining walls can safely be used for a height not more than
   a) 3 m b) 4 m c) 5 m d) 6 m
9) The number of treads in a flight is equal to
   a) risers in the flight b) risers minus one
   c) risers plus one d) none of these
10) If C is creep coefficient, f is original prestress in concrete, m is modular ratio, E is Young's modulus of steel and e is shrinkage strain, the combined effect of creep and shrinkage is
   a) (1 – C) mf – eE b) (C – 1) mf – eE
   c) (C – 1) mf + eE d) (1 – C) mf + eE
11) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at
   a) Support b) Mid span c) Quarter span d) Every section
12) The minimum cube strength of concrete used for prestressed member, is
   a) 5 N/mm^2 b) 15 N/mm^2 c) 25 N/mm^2 d) 35 N/mm^2
13) Post tensioning system
   a) was widely used in earlier days
   b) is not economical and hence not generally used
   c) is economical for large spans and is adopted now a days
   d) none of these
14) In two way restrained slab the width of middle strip is _____ of span.
   a) 1/4 b) 1/8 c) 3/4 d) 1/2
15) In a prestressed beam carrying an external load W with a bent tendon is having angle of inclination θ and prestressed load P. The net downward load at the centre is
   a) $W - 2P\cos\theta$ b) $W - P\cos\theta$ c) $W - P\sin\theta$ d) $W - 2P\sin\theta$
16) High strength of concrete is necessary for pre stressed concrete work because
   a) Large pre stressing force is applied b) High bond stress is required
   c) Bursting stress is more d) All of above
17) In prestresses concrete section _____section is effective.
   a) Above N.A b) Partially above and below
   c) Below N.A d) Entire section
18) Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by
   a) Rankine formula b) Rankine Grashoff formula
   c) Marcus formula d) Grashoff formula
19) The safe stress in concrete at transfer is _____ fck.
   a) 0.4 b) 0.5 c) 0.6 d) 0.7
20) If T and R are tread and rise in cm respectively of a stair, then
   a) 2R + T = 60 b) 2R + T = 30
   c) R + 2T = 60 d) R + 2T = 30

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SLR-EP – 46

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Use of **IS 456** and non programmable calculator is **allowed**.*
*3) **Draw** neat sketch's **where** required and **assume** suitable data **if required** and state it clearly.*

SECTION – I

II. Design a reinforced concrete slab for a room of clear dimension 4.5 m × 6 m. The slab is supported all around on the wall of width 300 mm. The slab has to carry a live load of 4 kN/m^2 including floor finish. Use M_{25} concrete and Fe_{415} steel. Assume corners are held down . Draw the reinforcement details of the slab. **13**

III. Design the dog-legged type staircase for a residential building using following data floor to floor height = 3.4 m,

No. of flight per floor = 2,

150 mm riser and 250 mm treads are provided. The live load is 3 kN/m^2 and assume width of stair is 1m. Use M_{20} concrete and Fe_{415} steel. **13**

IV. Design a three span continuous beam rectangular beam of span of 5.5 m each to carry a dead load of 18 kN/m and live load of 8 kN/m. The beam is supported by columns. Use M_{20} concrete and Fe_{500} steel. Sketch the reinforcement details. **13**

V. Design the stem slab of a counter fort retaining wall, if the height of wall above the ground level is 5.2 m. SBC of soil is 200 kN/m^2, angle of internal friction is 30° and unit weight of back fill soil 18 kN/m^2. Keep spacing of counter fort as 3 m. coefficient of friction between soil and concrete is 0.5. Use M_{25} concrete and Fe_{500} steel. **14**

Set R

SECTION – II

VI. A PSC beam of 250 mm × 450 mm is provided with 10 m. The beam is prestressed by steel wires of area 450 mm^2 provided at a uniform eccentricity of 80 mm with an initial prestress of 1250 N/mm^2. Determine the percentage loss of stress in the wires of the beam is post tensioned. Es = 2.1×10^5 N/mm^2, Ec = 3.5×10^5 N/mm^2, Relaxation loss percentage = 5%, e_{sh} = Es = 1.9×10^{-4}, creep strain 25×10^{-6} N/mm^2 of stress anchorage slip = 1.25 mm, friction coefficient = 0.00015/m. **13**

VII. A PSC beam 300 mm × 600 mm is subjected to an effective prestressing force of 1150 kN along the longitudinal centroidal axis. Design the end block by Guyon's method. **13**

VIII. Design PSC I section beam for the following span = 20 m, superimposed load = 30 kN/m, cube strength of concrete at 28 days is 35 kN/m^2, safe stress in concrete at transfer = 0.5 fck, allowable tensile stress in concrete is 0.279 $(fck)^{1/2}$, safe stress in steel in steel is 1200 MPa, total loss of stress 20%, ultimate stress in steel 1200 MPa. **14**

IX. A prestressed concrete beam 500 mm × 750 mm in section has a span 8 m and is subjected to a uniformly distributed load of 17.50 kN/m including the self wt. of the beam. The prestressing tendons are located at the lower third pt. of the section and provide an effective stresses in concrete for the mid span section. Solve by following methods : stress concept method, strain concept method, load balancing concept. Take prestressing force 1050 KN. **13**

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SLR-EP – 46

Seat No.	

Set S

B.E. (Civil) (Part – II) (Old) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Write the correct option for **each** question.*
*4) While solving **MCQ IS 456-2000** and **IS 1343** is **not allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) High strength of concrete is necessary for pre stressed concrete work because
   a) Large pre stressing force is applied b) High bond stress is required
   c) Bursting stress is more d) All of above

2) In prestresses concrete section _____section is effective.
   a) Above N.A b) Partially above and below
   c) Below N.A d) Entire section

3) Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by
   a) Rankine formula b) Rankine Grashoff formula
   c) Marcus formula d) Grashoff formula

4) The safe stress in concrete at transfer is _____ fck.
   a) 0.4 b) 0.5 c) 0.6 d) 0.7

5) If T and R are tread and rise in cm respectively of a stair, then
   a) 2R + T = 60 b) 2R + T = 30
   c) R + 2T = 60 d) R + 2T = 30

6) The concept used for analysis of prestressed concrete section is
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   c) Strenth concept d) All of the above

7) If a bent tendon is required to balance a concentrated load W at the centre of the span *l*, the central dip h must be at least
   a) W*l*/p b) W*l*/4p c) W*l*/3p d) W*l*/2p

8) In design of P.S.C. beam section, the no. of Fundamental stress conditions to be considered are
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P.T.O.

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a) its dimensions are not decided from the diagonal tensile stress
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c) (C – 1) mf + eE d) (1 – C) mf + eE

16) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at
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17) The minimum cube strength of concrete used for prestressed member, is
a) 5 N/mm^2 b) 15 N/mm^2 c) 25 N/mm^2 d) 35 N/mm^2

18) Post tensioning system
a) was widely used in earlier days
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a) 1/4 b) 1/8 c) 3/4 d) 1/2

20) In a prestressed beam carrying an external load W with a bent tendon is having angle of inclination θ and prestressed load P. The net downward load at the centre is
a) $W - 2P\cos\theta$ b) $W - P\cos\theta$ c) $W - P\sin\theta$ d) $W - 2P\sin\theta$

_____

SLR-EP – 46

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
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SECTION – I

II. Design a reinforced concrete slab for a room of clear dimension 4.5 m × 6 m. The slab is supported all around on the wall of width 300 mm. The slab has to carry a live load of 4 kN/m^2 including floor finish. Use M_{25} concrete and Fe_{415} steel. Assume corners are held down . Draw the reinforcement details of the slab. **13**

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V. Design the stem slab of a counter fort retaining wall, if the height of wall above the ground level is 5.2 m. SBC of soil is 200 kN/m^2, angle of internal friction is 30° and unit weight of back fill soil 18 kN/m^2. Keep spacing of counter fort as 3 m. coefficient of friction between soil and concrete is 0.5. Use M_{25} concrete and Fe_{500} steel. **14**

SECTION – II

VI. A PSC beam of 250 mm × 450 mm is provided with 10 m. The beam is prestressed by steel wires of area 450 mm^2 provided at a uniform eccentricity of 80 mm with an initial prestress of 1250 N/mm^2. Determine the percentage loss of stress in the wires of the beam is post tensioned. Es = 2.1×10^5 N/mm^2, Ec = 3.5×10^5 N/mm^2, Relaxation loss percentage = 5%, e_{sh} = Es = 1.9×10^{-4}, creep strain 25×10^{-6} N/mm^2 of stress anchorage slip = 1.25 mm, friction coefficient = 0.00015/m. **13**

VII. A PSC beam 300 mm × 600 mm is subjected to an effective prestressing force of 1150 kN along the longitudinal centroidal axis. Design the end block by Guyon's method. **13**

VIII. Design PSC I section beam for the following span = 20 m, superimposed load = 30 kN/m, cube strength of concrete at 28 days is 35 kN/m^2, safe stress in concrete at transfer = 0.5 fck, allowable tensile stress in concrete is 0.279 $(fck)^{1/2}$, safe stress in steel in steel is 1200 MPa, total loss of stress 20%, ultimate stress in steel 1200 MPa. **14**

IX. A prestressed concrete beam 500 mm × 750 mm in section has a span 8 m and is subjected to a uniformly distributed load of 17.50 kN/m including the self wt. of the beam. The prestressing tendons are located at the lower third pt. of the section and provide an effective stresses in concrete for the mid span section. Solve by following methods : stress concept method, strain concept method, load balancing concept. Take prestressing force 1050 KN. **13**

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SLR-EP – 47

Seat No.	

Set P

B.E. (Civil) (Part – II) (Old) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) **All** questions are **compulsory**.*
*4) Figures on **right** indicate **full** marks.*
*5) Assume suitable data **wherever** required and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. A) Fill in the gaps with correct words : **10**

1) For High Rise construction site _____ is used as equipment for mobilization and fixing of members.

2) _____ is used for compaction of soil for construction of roads.

3) _____ are used for transportation of materials like cement, steel, tiles etc. to the site.

4) For Road construction, the purpose of drum dryer is to heat and dry the aggregates of the _____ mix.

5) A Latis boom crane predominantly handles _____ loads.

6) _____ Cranes are capable of travelling on public roads.

7) _____ means compaction of finer granular formation.

8) _____ means removal of material in thin layers.

9) The functioning of Pneumatic tired rollers is based on _____ action.

10) _____ are hauling equipment for horizontal movement of materials.

B) Match '**A**' group items with '**B**' group items : **10**

'**A**'	'**B**'
1) Objective of town planning	Concept of garden city
2) Parks and Gardens	Beauty-convenience-environment and health
3) Lewis Mumford	Recreational spaces
4) Nonprofit making use of land	Six stages in town growth
5) Ebenezer Howard	Roads-parks-grounds
6) It is a science and art too	Town planning
7) Lead to lack to social life	Ribbon development
8) Horizontal growth	Town growth according to direction
9) Magarpatta city, Pune	Town planning scheme
10) The form of planning	Regional planning

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SLR-EP – 47

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures on ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *required and mention it.*

SECTION – I

(Construction Practices)

2. Attempt **any five** questions: **(5×8=40)**
   a) Discuss the important stages in the lifecycle of construction projects.
   b) Explain the selection criteria's of construction equipment's.
   c) Explain the factors affecting economic life of equipment's.
   d) Explain the main features of prefabricated construction and types of precast system.
   e) What is dragline ? State its limitations.
   f) Explain safety measures in construction and prevention of accidents.
   g) Discuss the significance of Disaster management in construction industry.

SECTION – II

(Town Planning)

3. Attempt **any five** questions: **(5×8=40)**
   a) Discuss the evolution of planning and enlist the objects of town planning.
   b) Why town planning is necessary ?
   c) Explain the advantages of zoning and state the necessity of planning laws and legislation.
   d) Enlist the factors contributing to road aesthetics.
   e) What is ribbon development ? What are its disadvantages ?
   f) Discuss the important provisions of MRTP Act 1966 with proper description.
   g) Explain the role of town planning in view of smart city development of Solapur city.

Set P

Set P

SLR-EP – 47

Seat No.	

Set Q

B.E. (Civil) (Part – II) (Old) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) **All** questions are **compulsory**.*
*4) Figures on **right** indicate **full** marks.*
*5) Assume suitable data **wherever** required and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. A) Match '**A**' group items with '**B**' group items : **10**

'**A**'	'**B**'
1) Objective of town planning	Concept of garden city
2) Parks and Gardens	Beauty-convenience-environment and health
3) Lewis Mumford	Recreational spaces
4) Nonprofit making use of land	Six stages in town growth
5) Ebenezer Howard	Roads-parks-grounds
6) It is a science and art too	Town planning
7) Lead to lack to social life	Ribbon development
8) Horizontal growth	Town growth according to direction
9) Magarpatta city, Pune	Town planning scheme
10) The form of planning	Regional planning

P.T.O.

B) Fill in the gaps with correct words : **10**

1) For High Rise construction site _____ is used as equipment for mobilization and fixing of members.

2) _____ is used for compaction of soil for construction of roads.

3) _____ are used for transportation of materials like cement, steel, tiles etc. to the site.

4) For Road construction, the purpose of drum dryer is to heat and dry the aggregates of the _____ mix.

5) A Latis boom crane predominantly handles _____ loads.

6) _____ Cranes are capable of travelling on public roads.

7) _____ means compaction of finer granular formation.

8) _____ means removal of material in thin layers.

9) The functioning of Pneumatic tired rollers is based on _____ action.

10) _____ are hauling equipment for horizontal movement of materials.

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SLR-EP – 47

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures on ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *required and mention it.*

SECTION – I

(Construction Practices)

2. Attempt **any five** questions: **(5×8=40)**
   a) Discuss the important stages in the lifecycle of construction projects.
   b) Explain the selection criteria's of construction equipment's.
   c) Explain the factors affecting economic life of equipment's.
   d) Explain the main features of prefabricated construction and types of precast system.
   e) What is dragline ? State its limitations.
   f) Explain safety measures in construction and prevention of accidents.
   g) Discuss the significance of Disaster management in construction industry.

SECTION – II

(Town Planning)

3. Attempt **any five** questions: **(5×8=40)**
   a) Discuss the evolution of planning and enlist the objects of town planning.
   b) Why town planning is necessary ?
   c) Explain the advantages of zoning and state the necessity of planning laws and legislation.
   d) Enlist the factors contributing to road aesthetics.
   e) What is ribbon development ? What are its disadvantages ?
   f) Discuss the important provisions of MRTP Act 1966 with proper description.
   g) Explain the role of town planning in view of smart city development of Solapur city.

Set Q

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Set Q

SLR-EP – 47

Seat No.	

Set R

B.E. (Civil) (Part – II) (Old) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) **All** questions are **compulsory**.*
*4) Figures on **right** indicate **full** marks.*
*5) Assume suitable data **wherever** required and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. A) Fill in the gaps with correct words : **10**

1) For Road construction, the purpose of drum dryer is to heat and dry the aggregates of the _____ mix.

2) A Latis boom crane predominantly handles _____ loads.

3) _____ Cranes are capable of travelling on public roads.

4) For High Rise construction site _____ is used as equipment for mobilization and fixing of members.

5) _____ is used for compaction of soil for construction of roads.

6) _____ are used for transportation of materials like cement, steel, tiles etc. to the site.

7) _____ means compaction of finer granular formation.

8) _____ means removal of material in thin layers.

9) The functioning of Pneumatic tired rollers is based on _____ action.

10) _____ are hauling equipment for horizontal movement of materials.

P.T.O.

B) Match '**A**' group items with '**B**' group items : **10**

'**A**'	'**B**'
1) Nonprofit making use of land	Six stages in town growth
2) Ebenezer Howard	Roads-parks-grounds
3) It is a science and art too	Town planning
4) Objective of town planning	Concept of garden city
5) Parks and Gardens	Beauty-convenience-environment and health
6) Lewis Mumford	Recreational spaces
7) Lead to lack to social life	Ribbon development
8) Horizontal growth	Town growth according to direction
9) Magarpatta city, Pune	Town planning scheme
10) The form of planning	Regional planning

SLR-EP – 47

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures on ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *required and mention it.*

SECTION – I

(Construction Practices)

2. Attempt **any five** questions: **(5×8=40)**
   a) Discuss the important stages in the lifecycle of construction projects.
   b) Explain the selection criteria's of construction equipment's.
   c) Explain the factors affecting economic life of equipment's.
   d) Explain the main features of prefabricated construction and types of precast system.
   e) What is dragline ? State its limitations.
   f) Explain safety measures in construction and prevention of accidents.
   g) Discuss the significance of Disaster management in construction industry.

SECTION – II

(Town Planning)

3. Attempt **any five** questions: **(5×8=40)**
   a) Discuss the evolution of planning and enlist the objects of town planning.
   b) Why town planning is necessary ?
   c) Explain the advantages of zoning and state the necessity of planning laws and legislation.
   d) Enlist the factors contributing to road aesthetics.
   e) What is ribbon development ? What are its disadvantages ?
   f) Discuss the important provisions of MRTP Act 1966 with proper description.
   g) Explain the role of town planning in view of smart city development of Solapur city.

Set R

Set R

SLR-EP – 47

Seat No.	

Set S

B.E. (Civil) (Part – II) (Old) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) **All** questions are **compulsory**.*
*4) Figures on **right** indicate **full** marks.*
*5) Assume suitable data **wherever** required and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. A) Fill in the gaps with correct words : **10**

1) _____ means compaction of finer granular formation.

2) _____ means removal of material in thin layers.

3) The functioning of Pneumatic tired rollers is based on _____ action.

4) _____ are hauling equipment for horizontal movement of materials.

5) For Road construction, the purpose of drum dryer is to heat and dry the aggregates of the _____ mix.

6) A Latis boom crane predominantly handles _____ loads.

7) _____ Cranes are capable of travelling on public roads.

8) For High Rise construction site _____ is used as equipment for mobilization and fixing of members.

9) _____ is used for compaction of soil for construction of roads.

10) _____ are used for transportation of materials like cement, steel, tiles etc. to the site.

B) Match '**A**' group items with '**B**' group items : **10**

'**A**'	'**B**'
1) Lead to lack to social life	Ribbon development
2) Horizontal growth	Town growth according to direction
3) Magarpatta city, Pune	Town planning scheme
4) The form of planning	Regional planning
5) Nonprofit making use of land	Six stages in town growth
6) Ebenezer Howard	Roads-parks-grounds
7) It is a science and art too	Town planning
8) Objective of town planning	Concept of garden city
9) Parks and Gardens	Beauty-convenience-environment and health
10) Lewis Mumford	Recreational spaces

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SLR-EP – 47

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures on ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *required and mention it.*

SECTION – I

(Construction Practices)

2. Attempt **any five** questions: **(5×8=40)**
   a) Discuss the important stages in the lifecycle of construction projects.
   b) Explain the selection criteria's of construction equipment's.
   c) Explain the factors affecting economic life of equipment's.
   d) Explain the main features of prefabricated construction and types of precast system.
   e) What is dragline ? State its limitations.
   f) Explain safety measures in construction and prevention of accidents.
   g) Discuss the significance of Disaster management in construction industry.

SECTION – II

(Town Planning)

3. Attempt **any five** questions: **(5×8=40)**
   a) Discuss the evolution of planning and enlist the objects of town planning.
   b) Why town planning is necessary ?
   c) Explain the advantages of zoning and state the necessity of planning laws and legislation.
   d) Enlist the factors contributing to road aesthetics.
   e) What is ribbon development ? What are its disadvantages ?
   f) Discuss the important provisions of MRTP Act 1966 with proper description.
   g) Explain the role of town planning in view of smart city development of Solapur city.

Set S

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Set S

SLR-EP – 50

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (New) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 1) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*2) Write the correct option for **each** question.*
*3) While solving **MCQ IS 456-2000**, **IS 3370** and **IS 1343** are **not allowed**.*
4) 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 : 20

I. Choose the correct answer : **20**

1) Cantilever retaining walls can safely be used for a height not more than _____ **1**
a) 3 m b) 5 m c) 4 m d) 6 m

2) The number of treads in a flight is equal to _____ **1**
a) Risers in the flight b) Risers minus one
c) Risers plus one d) None of these

3) High strength of concrete is necessary for prestressed concrete work because _____ **1**
a) Large prestressing force is applied b) High bond stress is required
c) Bursting stress is more d) All of the above

4) The concept used for analysis of prestressed concrete section is _____ **1**
a) Stress concept b) Load balancing concept
c) Strength concept d) All of the above

5) For footing the minimum cover for the reinforcement shall be _____ **1**
a) 30 mm b) 50 mm c) 25 mm d) 40 mm

6) For stairs spanning horizontally, the minimum waist provided is _____ **1**
a) 4 cm b) 8 cm c) 6 cm d) 12 cm

7) A per IS : 1343, total shrinkage for a pretensioned beam, is _____ **1**
a) 3.0×10^{-2} b) 3.0×10^{-5} c) 3.0×10^{-3} d) 3.5×10^{-5}

8) In a cantilever retaining wall without a heel slab _____ **1**
a) Thickness of the stem is kept same throughout
b) Base slab is made 10 cm thicker than the stem
c) Width of the base slab is kept 0.7 time the total height of the wall
d) All of the above

P.T.O.

9) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement near the water face is _____ **1**

a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

10) A square pad type footing 3.5 m in size is designed to support a square column of 400 mm size. The effective depth of the footing is 560 mm. The safe bearing pressure below the footing is 122.4 kPa based on ultimate loads, the design bending moment in kN-m is _____ **2**

a) 515 b) 664 c) 425 d) 298

11) The prestressed concrete beam is suitable for _____ **1**

a) Large spans b) Both large spans and short spans
c) Short spans d) None of these

12) A concrete beam of rectangular cross section of 200 mm × 400 mm is prestressed with a force of 400 kN at an eccentricity of 100 mm. The maximum compressive stress in the concrete is _____ **2**

a) 12.5 MPa b) 7.5 MPa c) 5.0 MPa d) 2.5 MPa

13) In a prestressed member it is advisable to use **1**

a) Low strength concrete only
b) Low strength concrete but high tensile steel
c) High strength concrete but low tensile steel
d) High strength concrete and high tensile steel

14) If W is weight of a retaining wall and P is the horizontal earth pressure, the factor of safety against sliding, is **1**

a) 1 b) 1.5 c) 1.25 d) 2

15) The system in which high tensile alloy steel bars (silica manganese steel) are used as prestressing tendons, is known as **1**

a) Freyssinet system b) Magnel-Blaton system
c) C.C.L. standard system d) Lee-McCall system

16) If the loading on a prestressed rectangular beam, is uniformly distributed, the tendon to be provided should be **1**

a) Straight below centroidal axis b) Parabolic with convexity downward
c) Parabolic with convexity upward d) Straight above centroidal axis

17) In a load balanced prestresses concrete beam under self-load the cross section is subjected to **1**

a) Axial stress b) Axial and shear stress
c) Bending stress d) Axial and bending stress

18) The stability of retaining wall is checked for which of the following condition ? **1**

a) Overturning about toe b) Overturning about heal
c) Both a) and b) d) None of these

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SLR-EP – 50

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) ***Use*** *of* ***IS 456***, ***IS 1343*** *and* ***IS 3370*** *Part –* ***IV*** *and non programmable calculator are* ***allowed****.*
3) Draw ***neat*** *sketch's* ***where*** *required and* ***assume*** *suitable data* ***if required*** *and state* ***it clearly****.*

SECTION – I

II. Design the dog-legged type staircase for a residential building using following data :
Floor to floor height = 3.5 m,
No. of flight per floor = 2,
Size of steps = 150 mm riser and 250 mm trade, live load is 3.2 kN/m^2 and assume width of stair is 1.2 m. Use M_{20} concrete and Fe_{415} steel. Landing is supported by beams of width 300 mm at the end of landing. **13**

III. Design the stem slab of a counter fort retaining wall, if the height of wall above the ground level is 5.5 m. SBC of soil is 200 kN/m^2, angle of internal friction is 30° and unit weight of back fill soil 18 kN/m^2. Keep spacing of counter fort as 3 m. Coefficient of friction between soil and concrete is 0.5. Use M_{20} concrete and Fe_{415} steel. **14**

IV. A rectangular column 600 mm × 400 mm carries an axial load of 850 kN. Design a rectangular footing to support the column. The SBC of soil is 200 kN/m^2. Use M_{20} concrete and Fe_{500} steel. **13**

V. An open square tank 5 m × 5 m × 3 m deep rests on firm ground, is free at top and bottom as well as vertical edges are fixed. Design the water tank. Use M_{25} concrete and Fe_{415} steel. Assume free board of 300 mm. Solve by IS code method. **13**

SECTION – II

VI. A prestressed concrete beam 500 mm × 750 mm in section has a span 8 m and is subjected to a uniformly distributed load of 18 kN/m including the self wt. of the beam. The prestressing tendons are located at an eccentricity of 125 mm form bottom of the section at mid span and zero at the supports. Determine the extreme stresses in concrete at the mid span section. Solve by following methods : stress concept method, strain concept method, load balancing concept. Take prestressing force 1200 kN. **13**

VII. A PSC beam 250 mm × 600 mm is subjected to an effective prestressing force of 1400 kN along the longitudinal centroidal axis. Design the end block by Guyon's method. **13**

VIII. A pretensioned concrete beam of 230 mm × 450 mm is provided with 10 m span. The beam is prestressed by steel wires of area 450 mm^2 provided at a uniform eccentricity of 65 mm with an initial prestress of 1050 N/mm^2. Determine the percentage loss of stress in the wires of the beam is post tensioned. $Es = 2.1 \times 10^5$ N/mm^2, $Ec = 3.5 \times 10^5$ N/mm^2, Ultimate creep strain = 45×10^{-6} mm/mm per N/mm^2, Shrinkage of concrete = 300×10^{-6} Relaxation loss percentage = 5%. **13**

IX. Design PSC I section beam for the following date :

i) Span = 18 m,
ii) Superimposed load = 30 kN/m,
iii) Cube strength of concrete at 28 days is 35 kN/m^2,
iv) Safe stress in concrete at transfer = 0.5 fck,
v) Allowable tensile stress in concrete is $0.129 \sqrt{(fck)}$,
vi) Safe stress in steel is 40% of ultimate stress,
vii) Total loss of stress 18%,
viii) Ultimate stress in steel 1250 MPa,
ix) Safe stress in concrete at service = 0.4 fck. **14**

SLR-EP – 50

Seat No.	

Set Q

B.E. (Civil) (Part – II) (New) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 1) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*2) Write the correct option for **each** question.*
*3) While solving **MCQ IS 456-2000**, **IS 3370** and **IS 1343** are **not allowed**.*
*4) **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 : 20

I. Choose the correct answer : **20**

1) In a cantilever retaining wall without a heel slab _____ **1**
   a) Thickness of the stem is kept same throughout
   b) Base slab is made 10 cm thicker than the stem
   c) Width of the base slab is kept 0.7 time the total height of the wall
   d) All of the above

2) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement near the water face is _____ **1**
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

3) A square pad type footing 3.5 m in size is designed to support a square column of 400 mm size. The effective depth of the footing is 560 mm. The safe bearing pressure below the footing is 122.4 kPa based on ultimate loads, the design bending moment in kN-m is _____ **2**
   a) 515 b) 664 c) 425 d) 298

4) The prestressed concrete beam is suitable for _____ **1**
   a) Large spans b) Both large spans and short spans
   c) Short spans d) None of these

5) A concrete beam of rectangular cross section of 200 mm × 400 mm is prestressed with a force of 400 kN at an eccentricity of 100 mm. The maximum compressive stress in the concrete is _____ **2**
   a) 12.5 MPa b) 7.5 MPa c) 5.0 MPa d) 2.5 MPa

P.T.O.

6) In a prestressed member it is advisable to use **1**
   a) Low strength concrete only
   b) Low strength concrete but high tensile steel
   c) High strength concrete but low tensile steel
   d) High strength concrete and high tensile steel

7) If W is weight of a retaining wall and P is the horizontal earth pressure, the factor of safety against sliding, is **1**
   a) 1 b) 1.5 c) 1.25 d) 2

8) The system in which high tensile alloy steel bars (silica manganese steel) are used as prestressing tendons, is known as **1**
   a) Freyssinet system b) Magnel-Blaton system
   c) C.C.L. standard system d) Lee-McCall system

9) If the loading on a prestressed rectangular beam, is uniformly distributed, the tendon to be provided should be **1**
   a) Straight below centroidal axis b) Parabolic with convexity downward
   c) Parabolic with convexity upward d) Straight above centroidal axis

10) In a load balanced prestresses concrete beam under self-load the cross section is subjected to **1**
   a) Axial stress b) Axial and shear stress
   c) Bending stress d) Axial and bending stress

11) The stability of retaining wall is checked for which of the following condition ? **1**
   a) Overturning about toe b) Overturning about heal
   c) Both a) and b) d) None of these

12) Cantilever retaining walls can safely be used for a height not more than _____ **1**
   a) 3 m b) 5 m c) 4 m d) 6 m

13) The number of treads in a flight is equal to _____ **1**
   a) Risers in the flight b) Risers minus one
   c) Risers plus one d) None of these

14) High strength of concrete is necessary for prestressed concrete work because _____ **1**
   a) Large prestressing force is applied b) High bond stress is required
   c) Bursting stress is more d) All of the above

15) The concept used for analysis of prestressed concrete section is _____ **1**
   a) Stress concept b) Load balancing concept
   c) Strength concept d) All of the above

16) For footing the minimum cover for the reinforcement shall be _____ **1**
   a) 30 mm b) 50 mm c) 25 mm d) 40 mm

17) For stairs spanning horizontally, the minimum waist provided is _____ **1**
   a) 4 cm b) 8 cm c) 6 cm d) 12 cm

18) A per IS : 1343, total shrinkage for a pretensioned beam, is _____ **1**
   a) 3.0×10^{-2} b) 3.0×10^{-5} c) 3.0×10^{-3} d) 3.5×10^{-5}

_____

SLR-EP – 50

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) ***Use*** *of* ***IS 456****,* ***IS 1343*** *and* ***IS 3370*** *Part –* ***IV*** *and non programmable calculator are* ***allowed****.*
3) Draw ***neat*** *sketch's* ***where*** *required and* ***assume*** *suitable data* ***if required*** *and state* ***it clearly****.*

SECTION – I

II. Design the dog-legged type staircase for a residential building using following data :
Floor to floor height = 3.5 m,
No. of flight per floor = 2,
Size of steps = 150 mm riser and 250 mm trade, live load is 3.2 kN/m^2 and assume width of stair is 1.2 m. Use M_{20} concrete and Fe_{415} steel. Landing is supported by beams of width 300 mm at the end of landing. **13**

III. Design the stem slab of a counter fort retaining wall, if the height of wall above the ground level is 5.5 m. SBC of soil is 200 kN/m^2, angle of internal friction is 30° and unit weight of back fill soil 18 kN/m^2. Keep spacing of counter fort as 3 m. Coefficient of friction between soil and concrete is 0.5. Use M_{20} concrete and Fe_{415} steel. **14**

IV. A rectangular column 600 mm × 400 mm carries an axial load of 850 kN. Design a rectangular footing to support the column. The SBC of soil is 200 kN/m^2. Use M_{20} concrete and Fe_{500} steel. **13**

V. An open square tank 5 m × 5 m × 3 m deep rests on firm ground, is free at top and bottom as well as vertical edges are fixed. Design the water tank. Use M_{25} concrete and Fe_{415} steel. Assume free board of 300 mm. Solve by IS code method. **13**

SECTION – II

VI. A prestressed concrete beam 500 mm × 750 mm in section has a span 8 m and is subjected to a uniformly distributed load of 18 kN/m including the self wt. of the beam. The prestressing tendons are located at an eccentricity of 125 mm form bottom of the section at mid span and zero at the supports. Determine the extreme stresses in concrete at the mid span section. Solve by following methods : stress concept method, strain concept method, load balancing concept. Take prestressing force 1200 kN. **13**

VII. A PSC beam 250 mm × 600 mm is subjected to an effective prestressing force of 1400 kN along the longitudinal centroidal axis. Design the end block by Guyon's method. **13**

VIII. A pretensioned concrete beam of 230 mm × 450 mm is provided with 10 m span. The beam is prestressed by steel wires of area 450 mm^2 provided at a uniform eccentricity of 65 mm with an initial prestress of 1050 N/mm^2. Determine the percentage loss of stress in the wires of the beam is post tensioned. $Es = 2.1 \times 10^5$ N/mm^2, $Ec = 3.5 \times 10^5$ N/mm^2, Ultimate creep strain = 45×10^{-6} mm/mm per N/mm^2, Shrinkage of concrete = 300×10^{-6} Relaxation loss percentage = 5%. **13**

IX. Design PSC I section beam for the following date :

i) Span = 18 m,
ii) Superimposed load = 30 kN/m,
iii) Cube strength of concrete at 28 days is 35 kN/m^2,
iv) Safe stress in concrete at transfer = 0.5 fck,
v) Allowable tensile stress in concrete is $0.129 \sqrt{(fck)}$,
vi) Safe stress in steel is 40% of ultimate stress,
vii) Total loss of stress 18%,
viii) Ultimate stress in steel 1250 MPa,
ix) Safe stress in concrete at service = 0.4 fck. **14**

SLR-EP – 50

Seat No.	

Set R

B.E. (Civil) (Part – II) (New) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 1) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*2) Write the correct option for **each** question.*
*3) While solving **MCQ IS 456-2000**, **IS 3370** and **IS 1343** are **not allowed**.*
*4) **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 : 20

I. Choose the correct answer : **20**

1) A concrete beam of rectangular cross section of 200 mm × 400 mm is prestressed with a force of 400 kN at an eccentricity of 100 mm. The maximum compressive stress in the concrete is _____ **2**
   a) 12.5 MPa b) 7.5 MPa c) 5.0 MPa d) 2.5 MPa

2) In a prestressed member it is advisable to use **1**
   a) Low strength concrete only
   b) Low strength concrete but high tensile steel
   c) High strength concrete but low tensile steel
   d) High strength concrete and high tensile steel

3) If W is weight of a retaining wall and P is the horizontal earth pressure, the factor of safety against sliding, is **1**
   a) 1 b) 1.5 c) 1.25 d) 2

4) The system in which high tensile alloy steel bars (silica manganese steel) are used as prestressing tendons, is known as **1**
   a) Freyssinet system b) Magnel-Blaton system
   c) C.C.L. standard system d) Lee-McCall system

5) If the loading on a prestressed rectangular beam, is uniformly distributed, the tendon to be provided should be **1**
   a) Straight below centroidal axis b) Parabolic with convexity downward
   c) Parabolic with convexity upward d) Straight above centroidal axis

6) In a load balanced prestresses concrete beam under self-load the cross section is subjected to **1**
   a) Axial stress b) Axial and shear stress
   c) Bending stress d) Axial and bending stress

P.T.O.

7) The stability of retaining wall is checked for which of the following condition ? **1**
   a) Overturning about toe b) Overturning about heal
   c) Both a) and b) d) None of these

8) Cantilever retaining walls can safely be used for a height not more than _____ **1**
   a) 3 m b) 5 m c) 4 m d) 6 m

9) The number of treads in a flight is equal to _____ **1**
   a) Risers in the flight b) Risers minus one
   c) Risers plus one d) None of these

10) High strength of concrete is necessary for prestressed concrete work because _____ **1**
   a) Large prestressing force is applied b) High bond stress is required
   c) Bursting stress is more d) All of the above

11) The concept used for analysis of prestressed concrete section is _____ **1**
   a) Stress concept b) Load balancing concept
   c) Strength concept d) All of the above

12) For footing the minimum cover for the reinforcement shall be _____ **1**
   a) 30 mm b) 50 mm c) 25 mm d) 40 mm

13) For stairs spanning horizontally, the minimum waist provided is _____ **1**
   a) 4 cm b) 8 cm c) 6 cm d) 12 cm

14) A per IS : 1343, total shrinkage for a pretensioned beam, is _____ **1**
   a) 3.0×10^{-2} b) 3.0×10^{-5} c) 3.0×10^{-3} d) 3.5×10^{-5}

15) In a cantilever retaining wall without a heel slab _____ **1**
   a) Thickness of the stem is kept same throughout
   b) Base slab is made 10 cm thicker than the stem
   c) Width of the base slab is kept 0.7 time the total height of the wall
   d) All of the above

16) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement near the water face is _____ **1**
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

17) A square pad type footing 3.5 m in size is designed to support a square column of 400 mm size. The effective depth of the footing is 560 mm. The safe bearing pressure below the footing is 122.4 kPa based on ultimate loads, the design bending moment in kN-m is _____ **2**
   a) 515 b) 664 c) 425 d) 298

18) The prestressed concrete beam is suitable for _____ **1**
   a) Large spans b) Both large spans and short spans
   c) Short spans d) None of these

_____

SLR-EP – 50

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) ***Use*** *of* ***IS 456***, ***IS 1343*** *and* ***IS 3370*** *Part –* ***IV*** *and non programmable calculator are* ***allowed****.*
3) Draw ***neat*** *sketch's* ***where*** *required and* ***assume*** *suitable data* ***if required*** *and state* ***it clearly****.*

SECTION – I

II. Design the dog-legged type staircase for a residential building using following data :
Floor to floor height = 3.5 m,
No. of flight per floor = 2,
Size of steps = 150 mm riser and 250 mm trade, live load is 3.2 kN/m^2 and assume width of stair is 1.2 m. Use M_{20} concrete and Fe_{415} steel. Landing is supported by beams of width 300 mm at the end of landing. **13**

III. Design the stem slab of a counter fort retaining wall, if the height of wall above the ground level is 5.5 m. SBC of soil is 200 kN/m^2, angle of internal friction is 30° and unit weight of back fill soil 18 kN/m^2. Keep spacing of counter fort as 3 m. Coefficient of friction between soil and concrete is 0.5. Use M_{20} concrete and Fe_{415} steel. **14**

IV. A rectangular column 600 mm × 400 mm carries an axial load of 850 kN. Design a rectangular footing to support the column. The SBC of soil is 200 kN/m^2. Use M_{20} concrete and Fe_{500} steel. **13**

V. An open square tank 5 m × 5 m × 3 m deep rests on firm ground, is free at top and bottom as well as vertical edges are fixed. Design the water tank. Use M_{25} concrete and Fe_{415} steel. Assume free board of 300 mm. Solve by IS code method. **13**

SECTION – II

VI. A prestressed concrete beam 500 mm × 750 mm in section has a span 8 m and is subjected to a uniformly distributed load of 18 kN/m including the self wt. of the beam. The prestressing tendons are located at an eccentricity of 125 mm form bottom of the section at mid span and zero at the supports. Determine the extreme stresses in concrete at the mid span section. Solve by following methods : stress concept method, strain concept method, load balancing concept. Take prestressing force 1200 kN. **13**

VII. A PSC beam 250 mm × 600 mm is subjected to an effective prestressing force of 1400 kN along the longitudinal centroidal axis. Design the end block by Guyon's method. **13**

VIII. A pretensioned concrete beam of 230 mm × 450 mm is provided with 10 m span. The beam is prestressed by steel wires of area 450 mm^2 provided at a uniform eccentricity of 65 mm with an initial prestress of 1050 N/mm^2. Determine the percentage loss of stress in the wires of the beam is post tensioned. $Es = 2.1 \times 10^5$ N/mm^2, $Ec = 3.5 \times 10^5$ N/mm^2, Ultimate creep strain = 45×10^{-6} mm/mm per N/mm^2, Shrinkage of concrete = 300×10^{-6} Relaxation loss percentage = 5%. **13**

IX. Design PSC I section beam for the following date :

i) Span = 18 m,
ii) Superimposed load = 30 kN/m,
iii) Cube strength of concrete at 28 days is 35 kN/m^2,
iv) Safe stress in concrete at transfer = 0.5 fck,
v) Allowable tensile stress in concrete is $0.129 \sqrt{(fck)}$,
vi) Safe stress in steel is 40% of ultimate stress,
vii) Total loss of stress 18%,
viii) Ultimate stress in steel 1250 MPa,
ix) Safe stress in concrete at service = 0.4 fck. **14**

SLR-EP – 50

Seat No.	

Set S

B.E. (Civil) (Part – II) (New) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 1) Q. No. **I** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*2) Write the correct option for **each** question.*
*3) While solving **MCQ IS 456-2000**, **IS 3370** and **IS 1343** are **not allowed**.*
*4) **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 : 20

I. Choose the correct answer : **20**

1) If the loading on a prestressed rectangular beam, is uniformly distributed, the tendon to be provided should be **1**
   a) Straight below centroidal axis b) Parabolic with convexity downward
   c) Parabolic with convexity upward d) Straight above centroidal axis

2) In a load balanced prestresses concrete beam under self-load the cross section is subjected to **1**
   a) Axial stress b) Axial and shear stress
   c) Bending stress d) Axial and bending stress

3) The stability of retaining wall is checked for which of the following condition ? **1**
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   a) Stress concept b) Load balancing concept
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P.T.O.

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a) 30 mm b) 50 mm c) 25 mm d) 40 mm

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17) If W is weight of a retaining wall and P is the horizontal earth pressure, the factor of safety against sliding, is **1**
a) 1 b) 1.5 c) 1.25 d) 2

18) The system in which high tensile alloy steel bars (silica manganese steel) are used as prestressing tendons, is known as **1**
a) Freyssinet system b) Magnel-Blaton system
c) C.C.L. standard system d) Lee-McCall system

_____

SLR-EP – 50

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) ***Use*** *of* ***IS 456***, ***IS 1343*** *and* ***IS 3370*** *Part –* ***IV*** *and non programmable calculator are* ***allowed****.*
3) Draw ***neat*** *sketch's* ***where*** *required and* ***assume*** *suitable data* ***if required*** *and state* ***it clearly****.*

SECTION – I

II. Design the dog-legged type staircase for a residential building using following data :
Floor to floor height = 3.5 m,
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IV. A rectangular column 600 mm × 400 mm carries an axial load of 850 kN. Design a rectangular footing to support the column. The SBC of soil is 200 kN/m^2. Use M_{20} concrete and Fe_{500} steel. **13**

V. An open square tank 5 m × 5 m × 3 m deep rests on firm ground, is free at top and bottom as well as vertical edges are fixed. Design the water tank. Use M_{25} concrete and Fe_{415} steel. Assume free board of 300 mm. Solve by IS code method. **13**

SECTION – II

VI. A prestressed concrete beam 500 mm × 750 mm in section has a span 8 m and is subjected to a uniformly distributed load of 18 kN/m including the self wt. of the beam. The prestressing tendons are located at an eccentricity of 125 mm form bottom of the section at mid span and zero at the supports. Determine the extreme stresses in concrete at the mid span section. Solve by following methods : stress concept method, strain concept method, load balancing concept. Take prestressing force 1200 kN. **13**

VII. A PSC beam 250 mm × 600 mm is subjected to an effective prestressing force of 1400 kN along the longitudinal centroidal axis. Design the end block by Guyon's method. **13**

VIII. A pretensioned concrete beam of 230 mm × 450 mm is provided with 10 m span. The beam is prestressed by steel wires of area 450 mm^2 provided at a uniform eccentricity of 65 mm with an initial prestress of 1050 N/mm^2. Determine the percentage loss of stress in the wires of the beam is post tensioned. $Es = 2.1 \times 10^5$ N/mm^2, $Ec = 3.5 \times 10^5$ N/mm^2, Ultimate creep strain = 45×10^{-6} mm/mm per N/mm^2, Shrinkage of concrete = 300×10^{-6} Relaxation loss percentage = 5%. **13**

IX. Design PSC I section beam for the following date :

i) Span = 18 m,
ii) Superimposed load = 30 kN/m,
iii) Cube strength of concrete at 28 days is 35 kN/m^2,
iv) Safe stress in concrete at transfer = 0.5 fck,
v) Allowable tensile stress in concrete is 0.129 $\sqrt{}$(fck),
vi) Safe stress in steel is 40% of ultimate stress,
vii) Total loss of stress 18%,
viii) Ultimate stress in steel 1250 MPa,
ix) Safe stress in concrete at service = 0.4 fck. **14**

SLR-EP – 51

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (New) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Figures on **right** indicate **full** marks.*
*4) Assume suitable data **wherever** required and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

A) Match **'A'** group items with **'B'** group items : **10**

'A' Group	**'B' Group**
1) Industrial zone	Concept of garden city
2) Lewis Mumford	Beauty-convenience-environment and health
3) Necropolis	Land use classification
4) Ebenezer Howard	Six stages in town growth
5) Surveying before planning	Town at its worst stage
6) Lead to lack to social life	Diagnosis before treatment
7) Vertical growth	Ribbon development
8) Chandigarh city	Town growth according to direction
9) Development Plan	Town planned city
10) Objects of town planning	Planning tool

B) Fill in the gaps with correct words : **10**

1) _____ Mixers are used for RMC construction work on site.
2) _____ is self-sufficient machine which can dig, load, haul and discharge material in uniform thickness.
3) _____ is the most commonly used equipment for earth movement.

P.T.O.

4) For Road construction, the purpose of drum dryer is to heat and dry the _____ of the asphalt mix.

5) Clam shell is a part of _____ equipment.

6) _____ Cranes are capable of travelling on public roads.

7) _____ are used to press soil particles together for earth compaction.

8) _____ means removal of material in thin layers.

9) The functioning of Pneumatic tired rollers is based on _____ action.

10) _____ are hauling equipment for horizontal movement of materials.

_____

SLR-EP – 51

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Use*** *single answer book for* ***both*** *the Sections.*
2) ***All*** *questions are* ***compulsory****.*
3) Figures on ***right*** *indicate* ***full*** *marks.*
4) Assume suitable data ***wherever*** *required and mention it.*

SECTION – I

(Construction Practices)

2. Attempt **any five** questions : **(5×8=40)**
   a) Explain in general about the operating cost of construction equipments.
   b) Explain the necessity of precast system and discuss the main features of prefabricated construction.
   c) Explain the soil compacting equipments.
   d) Explain the clamshell and its component parts.
   e) Explain the importance of safety in construction industry and discuss safety measures during work on height.
   f) Explain the selection criterias for construction equipments.
   g) Explain the conceptual planning of new project with special reference to equipment planning process.

SECTION – II

(Town Planning)

3. Attempt **any five** questions : **(5×8=40)**
   a) Why town planning is necessary ? Describe in brief the objects of Town Planning.
   b) Explain the necessity and advantages of zoning.
   c) Explain the role of town planning in view of smart city development of Solapur city.
   d) Discuss the need and significance of “Integrated Rural Development Approach”.
   e) Compare advantages and disadvantages of horizontal and vertical growth pattern.
   f) Mention six stages in growth of town suggested by Lewis Mumford.
   g) Explain Geddesian Triad by Sir Patrick Geddes.

———————

Set P

Set P

SLR-EP – 51

Seat No.	

Set Q

B.E. (Civil) (Part – II) (New) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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*3) Figures on **right** indicate **full** marks.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

A) Fill in the gaps with correct words : **10**

1) _____ means removal of material in thin layers.

2) The functioning of Pneumatic tired rollers is based on _____ action.

3) _____ are hauling equipment for horizontal movement of materials.

4) Clam shell is a part of _____ equipment.

5) _____ Cranes are capable of travelling on public roads.

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7) _____ Mixers are used for RMC construction work on site.

8) _____ is self-sufficient machine which can dig, load, haul and discharge material in uniform thickness.

9) _____ is the most commonly used equipment for earth movement.

10) For Road construction, the purpose of drum dryer is to heat and dry the _____ of the asphalt mix.

P.T.O.

B) Match **'A'** group items with **'B'** group items : **10**

'A' Group	**'B' Group**
1) Industrial zone	Concept of garden city
2) Lewis Mumford	Beauty-convenience-environment and health
3) Necropolis	Land use classification
4) Ebenezer Howard	Six stages in town growth
5) Surveying before planning	Town at its worst stage
6) Lead to lack to social life	Diagnosis before treatment
7) Vertical growth	Ribbon development
8) Chandigarh city	Town growth according to direction
9) Development Plan	Town planned city
10) Objects of town planning	Planning tool

SLR-EP – 51

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Use*** *single answer book for* ***both*** *the Sections.*
2) ***All*** *questions are* ***compulsory****.*
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   a) Explain in general about the operating cost of construction equipments.
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   f) Explain the selection criterias for construction equipments.
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SECTION – II

(Town Planning)

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   a) Why town planning is necessary ? Describe in brief the objects of Town Planning.
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   e) Compare advantages and disadvantages of horizontal and vertical growth pattern.
   f) Mention six stages in growth of town suggested by Lewis Mumford.
   g) Explain Geddesian Triad by Sir Patrick Geddes.

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Set Q

Set Q

SLR-EP – 51

Seat No.	

Set R

B.E. (Civil) (Part – II) (New) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Figures on **right** indicate **full** marks.*
*4) Assume suitable data **wherever** required and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

A) Fill in the gaps with correct words : **10**

1) Clam shell is a part of _____ equipment.

2) _____ Cranes are capable of travelling on public roads.

3) _____ are used to press soil particles together for earth compaction.

4) _____ means removal of material in thin layers.

5) The functioning of Pneumatic tired rollers is based on _____ action.

6) _____ are hauling equipment for horizontal movement of materials.

7) _____ Mixers are used for RMC construction work on site.

8) _____ is self-sufficient machine which can dig, load, haul and discharge material in uniform thickness.

9) _____ is the most commonly used equipment for earth movement.

10) For Road construction, the purpose of drum dryer is to heat and dry the _____ of the asphalt mix.

P.T.O.

B) Match **'A'** group items with **'B'** group items : **10**

'A' Group	**'B' Group**
1) Lead to lack to social life	Diagnosis before treatment
2) Vertical growth	Ribbon development
3) Chandigarh city	Town growth according to direction
4) Development Plan	Town planned city
5) Objects of town planning	Planning tool
6) Industrial zone	Concept of garden city
7) Lewis Mumford	Beauty-convenience-environment and health
8) Necropolis	Land use classification
9) Ebenezer Howard	Six stages in town growth
10) Surveying before planning	Town at its worst stage

SLR-EP – 51

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Use*** *single answer book for* ***both*** *the Sections.*
2) ***All*** *questions are* ***compulsory****.*
3) Figures on ***right*** *indicate* ***full*** *marks.*
4) Assume suitable data ***wherever*** *required and mention it.*

SECTION – I

(Construction Practices)

2. Attempt **any five** questions : **(5×8=40)**
   a) Explain in general about the operating cost of construction equipments.
   b) Explain the necessity of precast system and discuss the main features of prefabricated construction.
   c) Explain the soil compacting equipments.
   d) Explain the clamshell and its component parts.
   e) Explain the importance of safety in construction industry and discuss safety measures during work on height.
   f) Explain the selection criterias for construction equipments.
   g) Explain the conceptual planning of new project with special reference to equipment planning process.

SECTION – II

(Town Planning)

3. Attempt **any five** questions : **(5×8=40)**
   a) Why town planning is necessary ? Describe in brief the objects of Town Planning.
   b) Explain the necessity and advantages of zoning.
   c) Explain the role of town planning in view of smart city development of Solapur city.
   d) Discuss the need and significance of “Integrated Rural Development Approach”.
   e) Compare advantages and disadvantages of horizontal and vertical growth pattern.
   f) Mention six stages in growth of town suggested by Lewis Mumford.
   g) Explain Geddesian Triad by Sir Patrick Geddes.

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Set R

Set R

SLR-EP – 51

Seat No.	

Set S

B.E. (Civil) (Part – II) (New) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Figures on **right** indicate **full** marks.*
*4) Assume suitable data **wherever** required and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

A) Match **'A'** group items with **'B'** group items : **10**

'A' Group	**'B' Group**
1) Lead to lack to social life	Diagnosis before treatment
2) Vertical growth	Ribbon development
3) Chandigarh city	Town growth according to direction
4) Development Plan	Town planned city
5) Objects of town planning	Planning tool
6) Industrial zone	Concept of garden city
7) Lewis Mumford	Beauty-convenience-environment and health
8) Necropolis	Land use classification
9) Ebenezer Howard	Six stages in town growth
10) Surveying before planning	Town at its worst stage

P.T.O.

B) Fill in the gaps with correct words : **10**

1) _____ Mixers are used for RMC construction work on site.
2) _____ is self-sufficient machine which can dig, load, haul and discharge material in uniform thickness.
3) _____ is the most commonly used equipment for earth movement.
4) For Road construction, the purpose of drum dryer is to heat and dry the _____ of the asphalt mix.
5) _____ means removal of material in thin layers.
6) The functioning of Pneumatic tired rollers is based on _____ action.
7) _____ are hauling equipment for horizontal movement of materials.
8) Clam shell is a part of _____ equipment.
9) _____ Cranes are capable of travelling on public roads.
10) _____ are used to press soil particles together for earth compaction.

_____

SLR-EP – 51

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Use*** *single answer book for* ***both*** *the Sections.*
2) ***All*** *questions are* ***compulsory****.*
3) Figures on ***right*** *indicate* ***full*** *marks.*
4) Assume suitable data ***wherever*** *required and mention it.*

SECTION – I

(Construction Practices)

2. Attempt **any five** questions : **(5×8=40)**
   a) Explain in general about the operating cost of construction equipments.
   b) Explain the necessity of precast system and discuss the main features of prefabricated construction.
   c) Explain the soil compacting equipments.
   d) Explain the clamshell and its component parts.
   e) Explain the importance of safety in construction industry and discuss safety measures during work on height.
   f) Explain the selection criterias for construction equipments.
   g) Explain the conceptual planning of new project with special reference to equipment planning process.

SECTION – II

(Town Planning)

3. Attempt **any five** questions : **(5×8=40)**
   a) Why town planning is necessary ? Describe in brief the objects of Town Planning.
   b) Explain the necessity and advantages of zoning.
   c) Explain the role of town planning in view of smart city development of Solapur city.
   d) Discuss the need and significance of “Integrated Rural Development Approach”.
   e) Compare advantages and disadvantages of horizontal and vertical growth pattern.
   f) Mention six stages in growth of town suggested by Lewis Mumford.
   g) Explain Geddesian Triad by Sir Patrick Geddes.

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Set S

Set S

SLR-EP – 401

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2016
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of non programmable calculator is* ***permitted****.*
3) ***Draw*** *neat sketches* ***wherever*** *necessary.,*
4) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.*
5) ***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 : 20

1. Choose the correct answer :

1) The maximum velocity in open channel occurs at **1**
   a) Little below the free surface b) At the free surface
   c) Near the channel bottom d) None

2) Flow takes place over spillfway crest, which can be assumed to be an arc of a circle, at a depth y_0. The pressure at any point on the crest will be **1**
   a) $\gamma y_0 \cos\theta$ b) $< \gamma y_0 \cos\theta$
   c) always zero d) below atmospheric pressure

3) Steady flow in open channel exist when **1**
   a) Depth does not change with time b) Flow is uniform
   c) Channel bed is not curved d) Channel is friction less

4) A rectangular channel carries a certain flow for which the alternate depths are 3.0 m and 1.0 m, then the critical depth in meter for this flow is **2**
   a) 2.65 b) 1.33 c) 1.65 d) 0.65

5) The momentum correction factor, β is given as **1**
   a) $\frac{1}{V^3A}\int V^3 dA$ b) $\frac{1}{VA}\int V dA$ c) $\frac{1}{V^3A}\int V^2 dA$ d) $\frac{1}{V^2A}\int V^2 dA$

6) For the best trapezoidal section **1**
   a) the shape is of half hexagon
   b) side slope = 45°
   c) depth of flow equal to half the bed width
   d) none

P.T.O.

7) A Hydraulic jump occurs when there is a break in grade from **1**
   a) mild slope to steep slope b) steep slope to mild slope
   c) steep slope to steeper slope d) none

8) Standard step method is used to solve **1**
   a) Bernoulli's equation b) Differential equation of GVF
   c) Momentum equation d) Differential energy equation of GUF

9) If the Froude's number is 4.6, the hydraulic jump is classified as **1**
   a) Oscillating b) Weak c) Steady d) Strong

10) The specific force is constant in **1**
   a) any open channel
   b) all horizontal channel of any shape
   c) all frictionless channel irrespective of magnitude of slope
   d) horizontal frictionless channel of any shape

11) River plains are made up of **1**
   a) Black soil b) Red soil c) Alluvium d) None

12) The Lacey's equation for a regime channel consist of a set of 'x' independent equation relating to flow, where 'x' is equal to **1**
   a) 1 b) 3 c) 5 d) 8

13) Shield's diagram is a plot of non-dimensional shear stress (τ_c) against **1**
   a) Reynold's number b) Shear Reynold's number
   c) Hydraulic radius d) Relative depth

14) River's generally form meanders in **1**
   a) Trough stage of river b) Delta stage of river
   c) Boulder stage d) None

15) Extreme condition of the meander's is called as **1**
   a) Spur b) Island c) Cutoff d) None

16) Silting of reservoir **1**
   a) Reduces storage capacity b) Reduces efficiency
   c) Raises water level d) None

17) The mean velocity in Lacey's regime channel is proportional to **1**
   a) $So^{1/2}$ b) $So^{1/3}$ c) $R^{1/3}$ d) $R^{2/3}$

18) River training work serves the following purposes **1**
   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

19) Geometric similarity between model and prototype means the similarity of **1**
   a) Length b) Forces c) Motion d) None

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SLR-EP – 401

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of non programmable calculator is* ***permitted****.*
3) ***Draw*** *neat sketches* ***wherever*** *necessary.*

SECTION – I

2. Attempt **any two** : **(8×2=16)**

a) Define 'hydraulic jump' and derive expression for it : also classify hydraulic jump on the basis of Froude's number.

b) In a hydraulic jump, loss of jump is 4.0 m and prejump Froude's number is 7.90. Determine
   i) discharge
   ii) conjugate depths of jump
   iii) % energy lost
   iv) post jump Froude's number and length of jump.

c) A rectangular channel has a bed width is 4.0 m; bottom slope is 0.00040 and mannings n = 0.019. 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 in direct step method.)

3. Attempt **any four** : **(6×4=24)**

a) The velocity distribution in a rectangular channel of width 'B' and depth 'y_0' is $V = K_1\sqrt{y}$ where K_1 = constant, calculate the average velocity for the cross-section and correction coefficients 'α' and 'β'.

b) Find the discharge and conveyance 'K' for a rectangular channel 6.0 m wide and depth of uniform flow is 2.0 m. The bed slope is 1:1000 and Chezy's constant as 55. Also state the type of flow.

c) Show that, length of one of sloping side of a trapezoidal section = half of top width.

d) Define gradually varied flow and derive the modified equation for it.

e) The width of horizontal rectangular channel is reduced from 3.50 m to 2.50 m and the floor is raised by 25 cm is elevation at the up steam section the depth of flow is 2.0 m and 'α' is 1.10. If the drop in water surface is at the contraction is 20 cm calculate discharge if :
   i) Energy loss is neglected
   ii) Energy loss is $^1/_{10}^{th}$ (one-tenth) of the up stream velocity head.

SECTION – II

4. Attempt **any two** : **(8×2=16)**

a) Explain the following terms :
   i) Regime channel
   ii) Lacey's silt factor
   iii) Sediment load
   iv) Stream gauging.

b) Design an irrigation channel carrying 40 cumecs, of discharge with B/D ratio as 2.50 and critical velocity (V_c) as 1.0 m/s. Take Kulters rugnosity coefficient, (N) as 0.00225. (Use Kennedy theory.)

c) A 1 : 10 model of an airplane is tested in a variable density wind tunnel. The prototype plane is to fly at 400 km/hr. The pressure used in wind tunnel is 10 times the atmospheric pressure. Calculate the velocity in the model. To what prototype value would measure drag of 500 N in the model correspond ? If some vertices one shed at a frequency of 25 Hz in the model, what would be the corresponding prototype frequency ?

5. Attempt **any four** : **(6×4=24)**

a) Explain 'River training works' with its types. (Draw neat sketches).

b) Discuss the mechanics of sediment transport and Shield's method for design of channel.

c) Differentiate :
   i) Distorted model and undistorted model.
   ii) Lacey's theory and Kennedy's theory.

d) Design a regime channel from following data :
   i) Discharge = 50 m^3/s
   ii) Silt factor = 1.10.
   (Use Lacey's method.)

e) i) Draw a neat sketch of current meter and explain its working.
   ii) What are the different types of rivers and their characteristics ?

SLR-EP – 401

Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2016
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of non programmable calculator is* ***permitted****.*
3) ***Draw*** *neat sketches* ***wherever*** *necessary.,*
4) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.*
5) ***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 : 20

1. Choose the correct answer :

1) The momentum correction factor, β is given as **1**

a) $\frac{1}{V^3A}\int V^3dA$ b) $\frac{1}{VA}\int VdA$ c) $\frac{1}{V^3A}\int V^2dA$ d) $\frac{1}{V^2A}\int V^2dA$

2) For the best trapezoidal section **1**
   a) the shape is of half hexagon
   b) side slope = 45°
   c) depth of flow equal to half the bed width
   d) none

3) A Hydraulic jump occurs when there is a break in grade from **1**
   a) mild slope to steep slope b) steep slope to mild slope
   c) steep slope to steeper slope d) none

4) Standard step method is used to solve **1**
   a) Bernoulli's equation b) Differential equation of GVF
   c) Momentum equation d) Differential energy equation of GUF

5) If the Froude's number is 4.6, the hydraulic jump is classified as **1**
   a) Oscillating b) Weak c) Steady d) Strong

6) The specific force is constant in **1**
   a) any open channel
   b) all horizontal channel of any shape
   c) all frictionless channel irrespective of magnitude of slope
   d) horizontal frictionless channel of any shape

P.T.O.

7) River plains are made up of **1**
   a) Black soil b) Red soil c) Alluvium d) None

8) The Lacey's equation for a regime channel consist of a set of 'x' independent equation relating to flow, where 'x' is equal to **1**
   a) 1 b) 3 c) 5 d) 8

9) Shield's diagram is a plot of non-dimensional shear stress (τ_c) against **1**
   a) Reynold's number b) Shear Reynold's number
   c) Hydraulic radius d) Relative depth

10) River's generally form meanders in **1**
   a) Trough stage of river b) Delta stage of river
   c) Boulder stage d) None

11) Extreme condition of the meander's is called as **1**
   a) Spur b) Island c) Cutoff d) None

12) Silting of reservoir **1**
   a) Reduces storage capacity b) Reduces efficiency
   c) Raises water level d) None

13) The mean velocity in Lacey's regime channel is proportional to **1**
   a) $So^{1/2}$ b) $So^{1/3}$ c) $R^{1/3}$ d) $R^{2/3}$

14) River training work serves the following purposes **1**
   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

15) Geometric similarity between model and prototype means the similarity of **1**
   a) Length b) Forces c) Motion d) None

16) The maximum velocity in open channel occurs at **1**
   a) Little below the free surface b) At the free surface
   c) Near the channel bottom d) None

17) Flow takes place over spillfway crest, which can be assumed to be an arc of a circle, at a depth y_0. The pressure at any point on the crest will be **1**
   a) $\gamma y_0 \cos\theta$ b) $< \gamma y_0 \cos\theta$
   c) always zero d) below atmospheric pressure

18) Steady flow in open channel exist when **1**
   a) Depth does not change with time b) Flow is uniform
   c) Channel bed is not curved d) Channel is friction less

19) A rectangular channel carries a certain flow for which the alternate depths are 3.0 m and 1.0 m, then the critical depth in meter for this flow is **2**
   a) 2.65 b) 1.33 c) 1.65 d) 0.65

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SLR-EP – 401

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of non programmable calculator is* ***permitted****.*
3) ***Draw*** *neat sketches* ***wherever*** *necessary.*

SECTION – I

2. Attempt **any two** : **(8×2=16)**

a) Define 'hydraulic jump' and derive expression for it : also classify hydraulic jump on the basis of Froude's number.

b) In a hydraulic jump, loss of jump is 4.0 m and prejump Froude's number is 7.90. Determine
   i) discharge
   ii) conjugate depths of jump
   iii) % energy lost
   iv) post jump Froude's number and length of jump.

c) A rectangular channel has a bed width is 4.0 m; bottom slope is 0.00040 and mannings n = 0.019. 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 in direct step method.)

3. Attempt **any four** : **(6×4=24)**

a) The velocity distribution in a rectangular channel of width 'B' and depth 'y_0' is $V = K_1\sqrt{y}$ where K_1 = constant, calculate the average velocity for the cross-section and correction coefficients 'α' and 'β'.

b) Find the discharge and conveyance 'K' for a rectangular channel 6.0 m wide and depth of uniform flow is 2.0 m. The bed slope is 1:1000 and Chezy's constant as 55. Also state the type of flow.

c) Show that, length of one of sloping side of a trapezoidal section = half of top width.

d) Define gradually varied flow and derive the modified equation for it.

e) The width of horizontal rectangular channel is reduced from 3.50 m to 2.50 m and the floor is raised by 25 cm is elevation at the up steam section the depth of flow is 2.0 m and 'α' is 1.10. If the drop in water surface is at the contraction is 20 cm calculate discharge if :
   i) Energy loss is neglected
   ii) Energy loss is $^1/_{10}^{th}$ (one-tenth) of the up stream velocity head.

SECTION – II

4. Attempt **any two** : **(8×2=16)**

a) Explain the following terms :
   i) Regime channel
   ii) Lacey's silt factor
   iii) Sediment load
   iv) Stream gauging.

b) Design an irrigation channel carrying 40 cumecs, of discharge with B/D ratio as 2.50 and critical velocity (V_c) as 1.0 m/s. Take Kulters rugnosity coefficient, (N) as 0.00225. (Use Kennedy theory.)

c) A 1 : 10 model of an airplane is tested in a variable density wind tunnel. The prototype plane is to fly at 400 km/hr. The pressure used in wind tunnel is 10 times the atmospheric pressure. Calculate the velocity in the model. To what prototype value would measure drag of 500 N in the model correspond ? If some vertices one shed at a frequency of 25 Hz in the model, what would be the corresponding prototype frequency ?

5. Attempt **any four** : **(6×4=24)**

a) Explain 'River training works' with its types. (Draw neat sketches).

b) Discuss the mechanics of sediment transport and Shield's method for design of channel.

c) Differentiate :
   i) Distorted model and undistorted model.
   ii) Lacey's theory and Kennedy's theory.

d) Design a regime channel from following data :
   i) Discharge = 50 m^3/s
   ii) Silt factor = 1.10.
   (Use Lacey's method.)

e) i) Draw a neat sketch of current meter and explain its working.
   ii) What are the different types of rivers and their characteristics ?

SLR-EP – 401

Seat No.	

Set **R**

B.E. (Civil) (Part – I) Examination, 2016
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* *1)* ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of non programmable calculator is* ***permitted****.*
3) ***Draw*** *neat sketches* ***wherever*** *necessary.,*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.*
5) ***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 : 20

1. Choose the correct answer :

1) The specific force is constant in **1**
   a) any open channel
   b) all horizontal channel of any shape
   c) all frictionless channel irrespective of magnitude of slope
   d) horizontal frictionless channel of any shape

2) River plains are made up of **1**
   a) Black soil b) Red soil c) Alluvium d) None

3) The Lacey's equation for a regime channel consist of a set of 'x' independent equation relating to flow, where 'x' is equal to **1**
   a) 1 b) 3 c) 5 d) 8

4) Shield's diagram is a plot of non-dimensional shear stress (τ_c) against **1**
   a) Reynold's number b) Shear Reynold's number
   c) Hydraulic radius d) Relative depth

5) River's generally form meanders in **1**
   a) Trough stage of river b) Delta stage of river
   c) Boulder stage d) None

6) Extreme condition of the meander's is called as **1**
   a) Spur b) Island c) Cutoff d) None

7) Silting of reservoir **1**
   a) Reduces storage capacity b) Reduces efficiency
   c) Raises water level d) None

P.T.O.

8) The mean velocity in Lacey's regime channel is proportional to **1**

a) $So^{1/2}$ b) $So^{1/3}$ c) $R^{1/3}$ d) $R^{2/3}$

9) River training work serves the following purposes **1**

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

10) Geometric similarity between model and prototype means the similarity of **1**

a) Length b) Forces c) Motion d) None

11) The maximum velocity in open channel occurs at **1**

a) Little below the free surface b) At the free surface
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12) Flow takes place over spillfway crest, which can be assumed to be an arc of a circle, at a depth y_0. The pressure at any point on the crest will be **1**

a) $\gamma y_0 \cos\theta$ b) $< \gamma y_0 \cos\theta$
c) always zero d) below atmospheric pressure

13) Steady flow in open channel exist when **1**

a) Depth does not change with time b) Flow is uniform
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14) A rectangular channel carries a certain flow for which the alternate depths are 3.0 m and 1.0 m, then the critical depth in meter for this flow is **2**

a) 2.65 b) 1.33 c) 1.65 d) 0.65

15) The momentum correction factor, β is given as **1**

a) $\frac{1}{V^3A}\int V^3 dA$ b) $\frac{1}{VA}\int V dA$ c) $\frac{1}{V^3A}\int V^2 dA$ d) $\frac{1}{V^2A}\int V^2 dA$

16) For the best trapezoidal section **1**

a) the shape is of half hexagon
b) side slope = 45°
c) depth of flow equal to half the bed width
d) none

17) A Hydraulic jump occurs when there is a break in grade from **1**

a) mild slope to steep slope b) steep slope to mild slope
c) steep slope to steeper slope d) none

18) Standard step method is used to solve **1**

a) Bernoulli's equation b) Differential equation of GVF
c) Momentum equation d) Differential energy equation of GUF

19) If the Froude's number is 4.6, the hydraulic jump is classified as **1**

a) Oscillating b) Weak c) Steady d) Strong

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SLR-EP – 401

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of non programmable calculator is* ***permitted****.*
3) ***Draw*** *neat sketches* ***wherever*** *necessary.*

SECTION – I

2. Attempt **any two** : **(8×2=16)**

a) Define 'hydraulic jump' and derive expression for it : also classify hydraulic jump on the basis of Froude's number.

b) In a hydraulic jump, loss of jump is 4.0 m and prejump Froude's number is 7.90. Determine
   i) discharge
   ii) conjugate depths of jump
   iii) % energy lost
   iv) post jump Froude's number and length of jump.

c) A rectangular channel has a bed width is 4.0 m; bottom slope is 0.00040 and mannings n = 0.019. 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 in direct step method.)

3. Attempt **any four** : **(6×4=24)**

a) The velocity distribution in a rectangular channel of width 'B' and depth 'y_0' is $V = K_1\sqrt{y}$ where K_1 = constant, calculate the average velocity for the cross-section and correction coefficients 'α' and 'β'.

b) Find the discharge and conveyance 'K' for a rectangular channel 6.0 m wide and depth of uniform flow is 2.0 m. The bed slope is 1:1000 and Chezy's constant as 55. Also state the type of flow.

c) Show that, length of one of sloping side of a trapezoidal section = half of top width.

d) Define gradually varied flow and derive the modified equation for it.

e) The width of horizontal rectangular channel is reduced from 3.50 m to 2.50 m and the floor is raised by 25 cm is elevation at the up steam section the depth of flow is 2.0 m and 'α' is 1.10. If the drop in water surface is at the contraction is 20 cm calculate discharge if :
   i) Energy loss is neglected
   ii) Energy loss is $^1/_{10}^{th}$ (one-tenth) of the up stream velocity head.

SECTION – II

4. Attempt **any two** : **(8×2=16)**

a) Explain the following terms :
   i) Regime channel
   ii) Lacey's silt factor
   iii) Sediment load
   iv) Stream gauging.

b) Design an irrigation channel carrying 40 cumecs, of discharge with B/D ratio as 2.50 and critical velocity (V_c) as 1.0 m/s. Take Kulters rugnosity coefficient, (N) as 0.00225. (Use Kennedy theory.)

c) A 1 : 10 model of an airplane is tested in a variable density wind tunnel. The prototype plane is to fly at 400 km/hr. The pressure used in wind tunnel is 10 times the atmospheric pressure. Calculate the velocity in the model. To what prototype value would measure drag of 500 N in the model correspond ? If some vertices one shed at a frequency of 25 Hz in the model, what would be the corresponding prototype frequency ?

5. Attempt **any four** : **(6×4=24)**

a) Explain 'River training works' with its types. (Draw neat sketches).

b) Discuss the mechanics of sediment transport and Shield's method for design of channel.

c) Differentiate :
   i) Distorted model and undistorted model.
   ii) Lacey's theory and Kennedy's theory.

d) Design a regime channel from following data :
   i) Discharge = 50 m^3/s
   ii) Silt factor = 1.10.
   (Use Lacey's method.)

e) i) Draw a neat sketch of current meter and explain its working.
   ii) What are the different types of rivers and their characteristics ?

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SLR-EP – 401

Seat No.	

Set **S**

B.E. (Civil) (Part – I) Examination, 2016
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* *1)* ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of non programmable calculator is* ***permitted****.*
3) ***Draw*** *neat sketches* ***wherever*** *necessary.,*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.*
5) ***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 : 20

1. Choose the correct answer :

1) Extreme condition of the meander's is called as **1**
a) Spur b) Island c) Cutoff d) None

2) Silting of reservoir **1**
a) Reduces storage capacity b) Reduces efficiency
c) Raises water level d) None

3) The mean velocity in Lacey's regime channel is proportional to **1**
a) $So^{1/2}$ b) $So^{1/3}$ c) $R^{1/3}$ d) $R^{2/3}$

4) River training work serves the following purposes **1**
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

5) Geometric similarity between model and prototype means the similarity of **1**
a) Length b) Forces c) Motion d) None

6) The maximum velocity in open channel occurs at **1**
a) Little below the free surface b) At the free surface
c) Near the channel bottom d) None

7) Flow takes place over spillfway crest, which can be assumed to be an arc of a circle, at a depth y_0. The pressure at any point on the crest will be **1**
a) $\gamma y_0 \cos\theta$ b) $< \gamma y_0 \cos\theta$
c) always zero d) below atmospheric pressure

P.T.O.

8) Steady flow in open channel exist when **1**
   a) Depth does not change with time b) Flow is uniform
   c) Channel bed is not curved d) Channel is friction less

9) A rectangular channel carries a certain flow for which the alternate depths are 3.0 m and 1.0 m, then the critical depth in meter for this flow is **2**
   a) 2.65 b) 1.33 c) 1.65 d) 0.65

10) The momentum correction factor, β is given as **1**
   a) $\frac{1}{V^3A}\int V^3 dA$ b) $\frac{1}{VA}\int V dA$ c) $\frac{1}{V^3A}\int V^2 dA$ d) $\frac{1}{V^2A}\int V^2 dA$

11) For the best trapezoidal section **1**
   a) the shape is of half hexagon
   b) side slope = 45°
   c) depth of flow equal to half the bed width
   d) none

12) A Hydraulic jump occurs when there is a break in grade from **1**
   a) mild slope to steep slope b) steep slope to mild slope
   c) steep slope to steeper slope d) none

13) Standard step method is used to solve **1**
   a) Bernoulli's equation b) Differential equation of GVF
   c) Momentum equation d) Differential energy equation of GUF

14) If the Froude's number is 4.6, the hydraulic jump is classified as **1**
   a) Oscillating b) Weak c) Steady d) Strong

15) The specific force is constant in **1**
   a) any open channel
   b) all horizontal channel of any shape
   c) all frictionless channel irrespective of magnitude of slope
   d) horizontal frictionless channel of any shape

16) River plains are made up of **1**
   a) Black soil b) Red soil c) Alluvium d) None

17) The Lacey's equation for a regime channel consist of a set of 'x' independent equation relating to flow, where 'x' is equal to **1**
   a) 1 b) 3 c) 5 d) 8

18) Shield's diagram is a plot of non-dimensional shear stress (τ_c) against **1**
   a) Reynold's number b) Shear Reynold's number
   c) Hydraulic radius d) Relative depth

19) River's generally form meanders in **1**
   a) Trough stage of river b) Delta stage of river
   c) Boulder stage d) None

SLR-EP – 401

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of non programmable calculator is* ***permitted****.*
3) ***Draw*** *neat sketches* ***wherever*** *necessary.*

SECTION – I

2. Attempt **any two** : **(8×2=16)**

a) Define 'hydraulic jump' and derive expression for it : also classify hydraulic jump on the basis of Froude's number.

b) In a hydraulic jump, loss of jump is 4.0 m and prejump Froude's number is 7.90. Determine
   i) discharge
   ii) conjugate depths of jump
   iii) % energy lost
   iv) post jump Froude's number and length of jump.

c) A rectangular channel has a bed width is 4.0 m; bottom slope is 0.00040 and mannings n = 0.019. 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 in direct step method.)

3. Attempt **any four** : **(6×4=24)**

a) The velocity distribution in a rectangular channel of width 'B' and depth 'y_0' is $V = K_1\sqrt{y}$ where K_1 = constant, calculate the average velocity for the cross-section and correction coefficients 'α' and 'β'.

b) Find the discharge and conveyance 'K' for a rectangular channel 6.0 m wide and depth of uniform flow is 2.0 m. The bed slope is 1:1000 and Chezy's constant as 55. Also state the type of flow.

c) Show that, length of one of sloping side of a trapezoidal section = half of top width.

d) Define gradually varied flow and derive the modified equation for it.

e) The width of horizontal rectangular channel is reduced from 3.50 m to 2.50 m and the floor is raised by 25 cm is elevation at the up steam section the depth of flow is 2.0 m and 'α' is 1.10. If the drop in water surface is at the contraction is 20 cm calculate discharge if :
   i) Energy loss is neglected
   ii) Energy loss is $^1/_{10}^{th}$ (one-tenth) of the up stream velocity head.

SECTION – II

4. Attempt **any two** : **(8×2=16)**

a) Explain the following terms :
   i) Regime channel
   ii) Lacey's silt factor
   iii) Sediment load
   iv) Stream gauging.

b) Design an irrigation channel carrying 40 cumecs, of discharge with B/D ratio as 2.50 and critical velocity (V_c) as 1.0 m/s. Take Kulters rugnosity coefficient, (N) as 0.00225. (Use Kennedy theory.)

c) A 1 : 10 model of an airplane is tested in a variable density wind tunnel. The prototype plane is to fly at 400 km/hr. The pressure used in wind tunnel is 10 times the atmospheric pressure. Calculate the velocity in the model. To what prototype value would measure drag of 500 N in the model correspond ? If some vertices one shed at a frequency of 25 Hz in the model, what would be the corresponding prototype frequency ?

5. Attempt **any four** : **(6×4=24)**

a) Explain 'River training works' with its types. (Draw neat sketches).

b) Discuss the mechanics of sediment transport and Shield's method for design of channel.

c) Differentiate :
   i) Distorted model and undistorted model.
   ii) Lacey's theory and Kennedy's theory.

d) Design a regime channel from following data :
   i) Discharge = 50 m^3/s
   ii) Silt factor = 1.10.
   (Use Lacey's method.)

e) i) Draw a neat sketch of current meter and explain its working.
   ii) What are the different types of rivers and their characteristics ?

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SLR-EP – 402

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2016
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) Assume suitable data ***whenever*** *required.*
4) Figure to the ***right*** *indicates* ***full*** *marks.*
5) Use of non-programmable calculator is ***allowed****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Packed bed tower is a type of
   a) Stack monitoring kit b) Dry collector
   c) Wet collector d) Bag house filter

2) Which of the following is a secondary pollutant ?
   a) CO b) CO_2 c) SO_2 d) O_3

3) Bags in bag house filter are _____ mm in diameter.
   a) 120 – 400 b) 10 – 20 c) 12 – 40 d) 1000 – 15000

4) _____ can give particulate removal efficiency up to 99.99%.
   a) Gravity settling chamber b) Cyclone separator
   c) Scrubbers d) ESP

5) In tray type gravity settler trays are fixed to _____ the efficiency.
   a) Decrease b) Increase
   c) Keep constant d) None of above

6) If stack is having cross sectional area of 4 sq.m. then no. of traverse points shall be equal to
   a) 4 b) 12 c) 20 d) 30

7) _____ is commonly found carcinogenic indoor air pollutant.
   a) CO b) NO_x c) SO_x d) Radon

8) Photochemical smog commonly occurs in _____ area.
   a) urban b) motorized c) both a and b d) none of these

P.T.O.

9) For ambient air monitoring _____ is used.
   a) High volume sampler or respirable dust sampler
   b) Auto exhaust analyzer
   c) Stack monitoring kit
   d) All of above

10) As per NAAQS standard for SO_2 for eco sensitive area considering annual average is _____ micrograms/m^3.
   a) 20 b) 100 c) 120 d) none of these

11) _____ problems extend from countries to states, nations and in the broadest sense, the globe (regional-to-continental scale).
   a) Macro-scale b) Micro-scale c) Meso-scale d) All of above

12) Carbon monoxide is a _____ pollutant.
   a) Natural b) Primary c) Secondary d) None of these

13) Molecular mass of CO is _____ grams/mole.
   a) 44 b) 64 c) 34 d) 28

14) The depletion of ozone in the outer atmosphere may result in increased
   a) Heart attack cases b) Skin cancer cases
   c) Asthma cases d) None of these

15) Dust reaching to alveolar region of lungs is called as
   a) Non respirable b) Eatable
   c) Respirable d) Edible

16) The mean maximum mixing depth is maximum is _____ season.
   a) Rainy b) Summer c) Winter d) Both b and c

17) Effective stack height is sum of physical stack height and
   a) Plume length b) Plume rise c) MMD d) Wind speed

18) _____ can be used in catalytic incineration for treatment of gaseous pollutant.
   a) Carbon b) Gold c) Silver d) Platinum

19) When velocity of stack gas (V_g) is equal to velocity of suction (V_s) in stack gas sampling probe then condition is termed as
   a) Under isokinetic sampling b) Over isokinetic sampling
   c) Isokinetic sampling d) None of these

20) Wind speed can be measured by using
   a) Hydrometer b) Hygroscope
   c) Hygrometer d) Anemometer

_____

SLR-EP – 402

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section **I** and Q. No. **6** is **compulsory** in Section **II**; solve **any two** questions from Q.No. **7** to Q.No. **9.***
*2) Figure to the **right** indicates **full** marks.*
*3) Use of non-programmable calculator is **allowed**.*
*4) Assume suitable data **whenever** required.*

SECTION – I

2. a) Define 'Air pollution'. Give composition of clean air. **5**
   b) Give detailed classification of Air pollutants. **8**

3. a) Discuss effects fo CO on human health with the help of tabular format. **5**
   b) If SO_2, CO and NO_2 are found out to be 1000 ppm, 600 ppm, 200 ppm and CO_2 300 ppm respectively in an air quality survey. What are concentrations in $\mu g/m^3$ at 25°C and 1 atm. pressure ? **8**

4. a) What are different inversion conditions ? Discuss each type with the help of sketch. **7**
   b) A coal-burning electric generating plant emits 1.1 kg/min of SO_2 from a stack with an effective height of 60 m. On a thinly overcast evening, with a wind speed of 5.0 m/s, what will be the ground level concentration of SO_2 500 M directly downwind from the stack i.e. C(x, 0, 0, H) ? **6**

   Assume Class D stability. Then, at x = 0.5 km, σy = 35 m and σz= 19 m.

5. Write short notes on **any three** of the following. **14**
   i) Stability conditions
   ii) Adiabatic cooling
   iii) Plume rise formulae
   iv) Acid rain.

SECTION – II

6. a) Give national ambient air quality standards for 5 major pollutants i.e. **5**

   $RPM_{2.5}$, RPM_{10}, SO_2, NO_2, CO and NH_3.

   b) Enlist components of respirable dust sampler. Explain stepwise how will you determine concentration of SPM in ambient air by using respirable dust sampler. **7**

7. a) Explain working of cyclone with neat sketch. **5**

   b) An ESP is to be constructed to remove fly ash particles from stack gases flowing at the rate of 10 m^3/s. Analysis of similar system showed that drift velocity can be taken as $\omega = 3\times10^5.d_p$ m/s. **9**

   Determine the plate area required to collect 0.5 μ m particles with

   i) 90% efficiency

   ii) 99% efficiency.

8. a) List out various methods used in gaseous pollution control. Explain thermal incineration. **5**

   b) What is stack monitoring ? Write in detail isokinetic sampling ? Explain in detail with the help of figures. **9**

9. Write short notes on **any three** following. **14**

   1) Electrostatic precipitator

   2) The Air Act, 1981

   3) Scrubbers

   4) Photochemical Smog.

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SLR-EP – 402

Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2016
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) Assume suitable data ***whenever*** *required.*
4) Figure to the ***right*** *indicates* ***full*** *marks.*
5) Use of non-programmable calculator is ***allowed****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The mean maximum mixing depth is maximum is _____ season.
a) Rainy b) Summer c) Winter d) Both b and c

2) Effective stack height is sum of physical stack height and
a) Plume length b) Plume rise c) MMD d) Wind speed

3) _____ can be used in catalytic incineration for treatment of gaseous pollutant.
a) Carbon b) Gold c) Silver d) Platinum

4) When velocity of stack gas (V_g) is equal to velocity of suction (V_s) in stack gas sampling probe then condition is termed as
a) Under isokinetic sampling b) Over isokinetic sampling
c) Isokinetic sampling d) None of these

5) Wind speed can be measured by using
a) Hydrometer b) Hygroscope
c) Hygrometer d) Anemometer

6) Packed bed tower is a type of
a) Stack monitoring kit b) Dry collector
c) Wet collector d) Bag house filter

7) Which of the following is a secondary pollutant ?
a) CO b) CO_2 c) SO_2 d) O_3

8) Bags in bag house filter are _____ mm in diameter.
a) 120 – 400 b) 10 – 20 c) 12 – 40 d) 1000 – 15000

P.T.O.

9) _____ can give particulate removal efficiency up to 99.99%.
   a) Gravity settling chamber b) Cyclone separator
   c) Scrubbers d) ESP

10) In tray type gravity settler trays are fixed to _____ the efficiency.
   a) Decrease b) Increase
   c) Keep constant d) None of above

11) If stack is having cross sectional area of 4 sq.m. then no. of traverse points shall be equal to
   a) 4 b) 12 c) 20 d) 30

12) _____ is commonly found carcinogenic indoor air pollutant.
   a) CO b) NO_x c) SO_x d) Radon

13) Photochemical smog commonly occurs in _____ area.
   a) urban b) motorized c) both a and b d) none of these

14) For ambient air monitoring _____ is used.
   a) High volume sampler or respirable dust sampler
   b) Auto exhaust analyzer
   c) Stack monitoring kit
   d) All of above

15) As per NAAQS standard for SO_2 for eco sensitive area considering annual average is _____ micrograms/m^3.
   a) 20 b) 100 c) 120 d) none of these

16) _____ problems extend from countries to states, nations and in the broadest sense, the globe (regional-to-continental scale).
   a) Macro-scale b) Micro-scale c) Meso-scale d) All of above

17) Carbon monoxide is a _____ pollutant.
   a) Natural b) Primary c) Secondary d) None of these

18) Molecular mass of CO is _____ grams/mole.
   a) 44 b) 64 c) 34 d) 28

19) The depletion of ozone in the outer atmosphere may result in increased
   a) Heart attack cases b) Skin cancer cases
   c) Asthma cases d) None of these

20) Dust reaching to alveolar region of lungs is called as
   a) Non respirable b) Eatable
   c) Respirable d) Edible

_____

SLR-EP – 402

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section **I** and Q. No. **6** is **compulsory** in Section **II**; solve **any two** questions from Q.No. **7** to Q.No. **9.***
*2) Figure to the **right** indicates **full** marks.*
*3) Use of non-programmable calculator is **allowed**.*
*4) Assume suitable data **whenever** required.*

SECTION – I

2. a) Define 'Air pollution'. Give composition of clean air. **5**
   b) Give detailed classification of Air pollutants. **8**

3. a) Discuss effects fo CO on human health with the help of tabular format. **5**
   b) If SO_2, CO and NO_2 are found out to be 1000 ppm, 600 ppm, 200 ppm and CO_2 300 ppm respectively in an air quality survey. What are concentrations in $\mu g/m^3$ at 25°C and 1 atm. pressure ? **8**

4. a) What are different inversion conditions ? Discuss each type with the help of sketch. **7**
   b) A coal-burning electric generating plant emits 1.1 kg/min of SO_2 from a stack with an effective height of 60 m. On a thinly overcast evening, with a wind speed of 5.0 m/s, what will be the ground level concentration of SO_2 500 M directly downwind from the stack i.e. C(x, 0, 0, H) ? **6**

   Assume Class D stability. Then, at x = 0.5 km, σy = 35 m and σz= 19 m.

5. Write short notes on **any three** of the following. **14**
   i) Stability conditions
   ii) Adiabatic cooling
   iii) Plume rise formulae
   iv) Acid rain.

SECTION – II

6. a) Give national ambient air quality standards for 5 major pollutants i.e. **5**

   $RPM_{2.5}$, RPM_{10}, SO_2, NO_2, CO and NH_3.

   b) Enlist components of respirable dust sampler. Explain stepwise how will you determine concentration of SPM in ambient air by using respirable dust sampler. **7**

7. a) Explain working of cyclone with neat sketch. **5**

   b) An ESP is to be constructed to remove fly ash particles from stack gases flowing at the rate of 10 m^3/s. Analysis of similar system showed that drift velocity can be taken as $\omega = 3\times10^5.d_p$ m/s. **9**

   Determine the plate area required to collect 0.5 μ m particles with

   i) 90% efficiency

   ii) 99% efficiency.

8. a) List out various methods used in gaseous pollution control. Explain thermal incineration. **5**

   b) What is stack monitoring ? Write in detail isokinetic sampling ? Explain in detail with the help of figures. **9**

9. Write short notes on **any three** following. **14**

   1) Electrostatic precipitator

   2) The Air Act, 1981

   3) Scrubbers

   4) Photochemical Smog.

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SLR-EP – 402

Seat No.	

Set **R**

B.E. (Civil) (Part – I) Examination, 2016
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) Assume suitable data ***whenever*** *required.*
4) Figure to the ***right*** *indicates* ***full*** *marks.*
5) Use of non-programmable calculator is ***allowed****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) _____ problems extend from countries to states, nations and in the broadest sense, the globe (regional-to-continental scale).
a) Macro-scale b) Micro-scale c) Meso-scale d) All of above

2) Carbon monoxide is a _____ pollutant.
a) Natural b) Primary c) Secondary d) None of these

3) Molecular mass of CO is _____ grams/mole.
a) 44 b) 64 c) 34 d) 28

4) The depletion of ozone in the outer atmosphere may result in increased
a) Heart attack cases b) Skin cancer cases
c) Asthma cases d) None of these

5) Dust reaching to alveolar region of lungs is called as
a) Non respirable b) Eatable
c) Respirable d) Edible

6) The mean maximum mixing depth is maximum is _____ season.
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7) Effective stack height is sum of physical stack height and
a) Plume length b) Plume rise c) MMD d) Wind speed

8) _____ can be used in catalytic incineration for treatment of gaseous pollutant.
a) Carbon b) Gold c) Silver d) Platinum

P.T.O.

9) When velocity of stack gas (V_g) is equal to velocity of suction (V_s) in stack gas sampling probe then condition is termed as
   a) Under isokinetic sampling
   b) Over isokinetic sampling
   c) Isokinetic sampling
   d) None of these

10) Wind speed can be measured by using
   a) Hydrometer
   b) Hygroscope
   c) Hygrometer
   d) Anemometer

11) Packed bed tower is a type of
   a) Stack monitoring kit
   b) Dry collector
   c) Wet collector
   d) Bag house filter

12) Which of the following is a secondary pollutant ?
   a) CO b) CO_2 c) SO_2 d) O_3

13) Bags in bag house filter are _____ mm in diameter.
   a) 120 – 400 b) 10 – 20 c) 12 – 40 d) 1000 – 15000

14) _____ can give particulate removal efficiency up to 99.99%.
   a) Gravity settling chamber
   b) Cyclone separator
   c) Scrubbers
   d) ESP

15) In tray type gravity settler trays are fixed to _____ the efficiency.
   a) Decrease
   b) Increase
   c) Keep constant
   d) None of above

16) If stack is having cross sectional area of 4 sq.m. then no. of traverse points shall be equal to
   a) 4 b) 12 c) 20 d) 30

17) _____ is commonly found carcinogenic indoor air pollutant.
   a) CO b) NO_x c) SO_x d) Radon

18) Photochemical smog commonly occurs in _____ area.
   a) urban b) motorized c) both a and b d) none of these

19) For ambient air monitoring _____ is used.
   a) High volume sampler or respirable dust sampler
   b) Auto exhaust analyzer
   c) Stack monitoring kit
   d) All of above

20) As per NAAQS standard for SO_2 for eco sensitive area considering annual average is _____ micrograms/m^3.
   a) 20 b) 100 c) 120 d) none of these

_____

SLR-EP – 402

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section **I** and Q. No. **6** is **compulsory** in Section **II**; solve **any two** questions from Q.No. **7** to Q.No. **9.***
*2) Figure to the **right** indicates **full** marks.*
*3) Use of non-programmable calculator is **allowed**.*
*4) Assume suitable data **whenever** required.*

SECTION – I

2. a) Define 'Air pollution'. Give composition of clean air. **5**
   b) Give detailed classification of Air pollutants. **8**

3. a) Discuss effects fo CO on human health with the help of tabular format. **5**
   b) If SO_2, CO and NO_2 are found out to be 1000 ppm, 600 ppm, 200 ppm and CO_2 300 ppm respectively in an air quality survey. What are concentrations in $\mu g/m^3$ at 25°C and 1 atm. pressure ? **8**

4. a) What are different inversion conditions ? Discuss each type with the help of sketch. **7**
   b) A coal-burning electric generating plant emits 1.1 kg/min of SO_2 from a stack with an effective height of 60 m. On a thinly overcast evening, with a wind speed of 5.0 m/s, what will be the ground level concentration of SO_2 500 M directly downwind from the stack i.e. C(x, 0, 0, H) ? **6**

   Assume Class D stability. Then, at x = 0.5 km, σy = 35 m and σz= 19 m.

5. Write short notes on **any three** of the following. **14**
   i) Stability conditions
   ii) Adiabatic cooling
   iii) Plume rise formulae
   iv) Acid rain.

Set R

SECTION – II

6. a) Give national ambient air quality standards for 5 major pollutants i.e. **5**

   $RPM_{2.5}$, RPM_{10}, SO_2, NO_2, CO and NH_3.

   b) Enlist components of respirable dust sampler. Explain stepwise how will you determine concentration of SPM in ambient air by using respirable dust sampler. **7**

7. a) Explain working of cyclone with neat sketch. **5**

   b) An ESP is to be constructed to remove fly ash particles from stack gases flowing at the rate of 10 m^3/s. Analysis of similar system showed that drift velocity can be taken as $\omega = 3\times10^5.d_p$ m/s. **9**

   Determine the plate area required to collect 0.5 μ m particles with

   i) 90% efficiency

   ii) 99% efficiency.

8. a) List out various methods used in gaseous pollution control. Explain thermal incineration. **5**

   b) What is stack monitoring ? Write in detail isokinetic sampling ? Explain in detail with the help of figures. **9**

9. Write short notes on **any three** following. **14**

   1) Electrostatic precipitator

   2) The Air Act, 1981

   3) Scrubbers

   4) Photochemical Smog.

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SLR-EP – 402

Seat No.	

Set **S**

B.E. (Civil) (Part – I) Examination, 2016
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) Assume suitable data ***whenever*** *required.*
4) Figure to the ***right*** *indicates* ***full*** *marks.*
5) Use of non-programmable calculator is ***allowed****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) If stack is having cross sectional area of 4 sq.m. then no. of traverse points shall be equal to
a) 4 b) 12 c) 20 d) 30

2) _____ is commonly found carcinogenic indoor air pollutant.
a) CO b) NO_x c) SO_x d) Radon

3) Photochemical smog commonly occurs in _____ area.
a) urban b) motorized c) both a and b d) none of these

4) For ambient air monitoring _____ is used.
a) High volume sampler or respirable dust sampler
b) Auto exhaust analyzer
c) Stack monitoring kit
d) All of above

5) As per NAAQS standard for SO_2 for eco sensitive area considering annual average is _____ micrograms/m^3.
a) 20 b) 100 c) 120 d) none of these

6) _____ problems extend from countries to states, nations and in the broadest sense, the globe (regional-to-continental scale).
a) Macro-scale b) Micro-scale c) Meso-scale d) All of above

7) Carbon monoxide is a _____ pollutant.
a) Natural b) Primary c) Secondary d) None of these

P.T.O.

8) Molecular mass of CO is _____ grams/mole.
   a) 44 b) 64 c) 34 d) 28

9) The depletion of ozone in the outer atmosphere may result in increased
   a) Heart attack cases b) Skin cancer cases
   c) Asthma cases d) None of these

10) Dust reaching to alveolar region of lungs is called as
   a) Non respirable b) Eatable
   c) Respirable d) Edible

11) The mean maximum mixing depth is maximum is _____ season.
   a) Rainy b) Summer c) Winter d) Both b and c

12) Effective stack height is sum of physical stack height and
   a) Plume length b) Plume rise c) MMD d) Wind speed

13) _____ can be used in catalytic incineration for treatment of gaseous pollutant.
   a) Carbon b) Gold c) Silver d) Platinum

14) When velocity of stack gas (V_g) is equal to velocity of suction (V_s) in stack gas sampling probe then condition is termed as
   a) Under isokinetic sampling b) Over isokinetic sampling
   c) Isokinetic sampling d) None of these

15) Wind speed can be measured by using
   a) Hydrometer b) Hygroscope
   c) Hygrometer d) Anemometer

16) Packed bed tower is a type of
   a) Stack monitoring kit b) Dry collector
   c) Wet collector d) Bag house filter

17) Which of the following is a secondary pollutant ?
   a) CO b) CO_2 c) SO_2 d) O_3

18) Bags in bag house filter are _____ mm in diameter.
   a) 120 – 400 b) 10 – 20 c) 12 – 40 d) 1000 – 15000

19) _____ can give particulate removal efficiency up to 99.99%.
   a) Gravity settling chamber b) Cyclone separator
   c) Scrubbers d) ESP

20) In tray type gravity settler trays are fixed to _____ the efficiency.
   a) Decrease b) Increase
   c) Keep constant d) None of above

_____

SLR-EP – 402

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section **I** and Q. No. **6** is **compulsory** in Section **II**; solve **any two** questions from Q.No. **7** to Q.No. **9.***
*2) Figure to the **right** indicates **full** marks.*
*3) Use of non-programmable calculator is **allowed**.*
*4) Assume suitable data **whenever** required.*

SECTION – I

2. a) Define 'Air pollution'. Give composition of clean air. **5**
   b) Give detailed classification of Air pollutants. **8**

3. a) Discuss effects fo CO on human health with the help of tabular format. **5**
   b) If SO_2, CO and NO_2 are found out to be 1000 ppm, 600 ppm, 200 ppm and CO_2 300 ppm respectively in an air quality survey. What are concentrations in $\mu g/m^3$ at 25°C and 1 atm. pressure ? **8**

4. a) What are different inversion conditions ? Discuss each type with the help of sketch. **7**
   b) A coal-burning electric generating plant emits 1.1 kg/min of SO_2 from a stack with an effective height of 60 m. On a thinly overcast evening, with a wind speed of 5.0 m/s, what will be the ground level concentration of SO_2 500 M directly downwind from the stack i.e. C(x, 0, 0, H) ? **6**

   Assume Class D stability. Then, at x = 0.5 km, σy = 35 m and σz= 19 m.

5. Write short notes on **any three** of the following. **14**
   i) Stability conditions
   ii) Adiabatic cooling
   iii) Plume rise formulae
   iv) Acid rain.

SECTION – II

6. a) Give national ambient air quality standards for 5 major pollutants i.e. **5**

   $RPM_{2.5}$, RPM_{10}, SO_2, NO_2, CO and NH_3.

   b) Enlist components of respirable dust sampler. Explain stepwise how will you determine concentration of SPM in ambient air by using respirable dust sampler. **7**

7. a) Explain working of cyclone with neat sketch. **5**

   b) An ESP is to be constructed to remove fly ash particles from stack gases flowing at the rate of 10 m^3/s. Analysis of similar system showed that drift velocity can be taken as $\omega = 3\times10^5.d_p$ m/s. **9**

   Determine the plate area required to collect 0.5 μ m particles with

   i) 90% efficiency

   ii) 99% efficiency.

8. a) List out various methods used in gaseous pollution control. Explain thermal incineration. **5**

   b) What is stack monitoring ? Write in detail isokinetic sampling ? Explain in detail with the help of figures. **9**

9. Write short notes on **any three** following. **14**

   1) Electrostatic precipitator

   2) The Air Act, 1981

   3) Scrubbers

   4) Photochemical Smog.

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SLR-EP – 403

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF FOUNDATIONS (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Question **2** from Section **I** and Question **6** from Section **II** are **compulsory**.*
2) *Solve **any two** questions (other than question **2** and **6**) from **each** Section.*
3) *Assume **any** missing data suitably and mention **clearly**.*
4) ***Use** of electronic calculator and relevant **I. S.** codes are **allowed**.*
5) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
6) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Dilatancy correction is applied to SPT test results when **1**
   a) soil is silty sand
   b) water table is present above test level
   c) value of SPT corrected for overburden is more than 15
   d) all the above

2) The rotation of block foundation about X axis is known as **1**
   a) Yawing b) Pitching c) Rocking d) None of the above

3) Three piles are arranged in a triangular form, efficiency of pile group by Feld's rule **1**
   a) 33.33% b) 50% c) 75% d) 87.5%

4) The bottom plug in well foundation is usually made up of **1**
   a) Brick Masonry b) RCC
   c) Cement Concrete d) None

5) The critical force system to be considered for stability of well foundation is **1**
   a) Vertical direction
   b) Direction perpendicular to water flow
   c) Direction parallel to water flow
   d) Horizontal direction

P.T.O.

6) Identify the incorrect statement. A sheet pile may fail in any one of the following ways **1**
   a) Forward movement of the base b) Failure by bending
   c) Failure by shear d) Failure by anchors

7) The two criteria for the determination of allowable bearing capacity of foundation are **1**
   a) Tension failure and compression failure
   b) Tension failure and settlement
   c) Bond failure and shear failure
   d) Shear failure and settlement

8) In case of well foundation, the grip length is defined as, **1**
   a) length below top of the well cap to the cutting edge
   b) length between bottom of well cap and cutting edge
   c) depth of bottom of well to the minimum scour level
   d) depth of bottom of well to the maximum scour level

9) The sheet pile which derives its stability entirely from the lateral resistance of the soil into which it is driven is called **1**
   a) Anchored sheet pile b) Cantilever sheet pile
   c) Braced sheeting d) None

10) A caisson has its lower end designed as working chamber in which compressed air is forced to prevent the entry of water is called, **1**
   a) Open Caisson b) Box Caisson
   c) Pneumatic Caisson d) None of the above

11) _____ is a line which connects all points of equal stress below the ground surface. **1**
   a) Isobars b) Isotopes c) Histogram d) Isochem

12) The maximum differential settlement should not exceed _____ mm in foundation on clayey soils. **1**
   a) 40 b) 20 c) 60 d) 10

13) What is the ultimate load carrying capacity of pile group of 9 piles arranged in a square pattern if spacing between the piles is 90 cm, diameter of the pile 30 cm, length of pile 10m, cohesion of clay 35 kN/m^2 and adhesion factor 0.6. Neglect end bearing ? **2**
   a) 1780 kN b) 2940 kN c) 5880 kN d) 3560 kN

14) The area ratio of a Shelby tube type sampler of internal diameter 48 mm and 51 mm external diameter is **2**
   a) 15% b) 15.5% c) 12% d) 12.9%

15) A footing 3 m × 1.5 m in plan transmits a pressure of 160 kN/m^2 on a cohesive soil having $E = 8 \times 10^4$ kN/m^2 and $\mu = 0.48$. Assume $I_W = 1.52$ and footing to be flexible. The immediate settlement at the center is, **2**
   a) 4.51 mm b) 3.51 mm c) 2.51 m d) 6.51 mm

16) Arrange the order of various stages of construction of under reamed pile foundation
   1) Concreting pile cap 2) Boring by Auger 3) Placing reinforcement cage in position
   4) Under reaming by under reamer 5) Concreting Pile **2**
   a) 4, 5, 2, 3, 1 b) 2, 4, 3, 5, 1 c) 2, 3, 4, 5, 1 d) 2, 3, 5, 4, 1

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SLR-EP – 403

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF FOUNDATIONS (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Question **2** from Section **I** and Question **6** from Section **II** are **compulsory**.*
*2) Solve **any two** questions (other than question **2** and **6**) from **each** Section.*
*3) Assume **any** missing data suitably and mention **clearly**.*
*4) **Use** of electronic calculator and relevant **I. S.** codes are **allowed**.*

SECTION – I

2. a) Derive Terzaghi's equation for bearing capacity. **8**

   b) A rectangular footing 2m × 2.7 m is subjected a vertical load of 1800 kN. The footing is placed at a depth of 1m. The foundation soil consists of deposit of dense soil sand having its unit weight of 18 kN/m^3 and angle of internal friction of 36°. (N_c = 60, N_q = 42, N_γ = 47). Determine the factor of safety against shear failure. Using Terzaghi's approach. **6**

3. a) Write note on design consideration for raft foundation. **7**

   b) Describe shear failures of soil with sketches. **6**

4. a) Calculate the consolidation settlement with following data :
      i) Foundation size = 2m × 2m
      ii) Load on foundation = 500 kN
      iii) Footing level = 1.5 m below ground level
      iv) Soil density = 18 kN/m^3
      v) Depth of compressible stratum below founding level is 1.5 m
      vi) Compression index, Cc = 0.28
      vii) Initial voids ratio, e_0 = 0.6
      viii) Divide the compressible layer in to 3 equal strips for settlement computation
      ix) Assume 2 : 1 contact pressure distribution. **8**

   b) With neat sketches explain the effect of swelling on foundations. **5**

5. a) Write note on effect of water table on bearing capacity of soil. **5**

   b) Write note on limitations of plate load test. **4**

   c) Explain various types of settlement below footing. **4**

Set P

SECTION – II

6. a) A group of 16 piles has to be arranged in the form of a square in soft clay with uniform spacing. Neglecting end bearing, determine optimum value of spacing of piles in terms of pile diameter, assume adhesion factor of 0.7. **8**

   b) With explanatory sketches, write a note on under-reamed pile foundation. **6**

7. a) Write detail note on methods of underpinning. **8**

   b) Explain Feld's approach for finding the efficiency of the pile group. **5**

8. a) Write a short note on : i) Caisson Disease ii) Pneumatic Caisson. **8**

   b) What do you understand by scour depth and grip length ? What is its importance in well foundation ? **5**

9. a) Resonance occurs at a frequency of 20 cycles/sec. in vertical vibration of test block 1m × 1m × 1m, weight of oscillator was 500 N. Calculate the coefficient of uniform elastic compression. **8**

   b) Write a short notes on types of machine foundation. **5**

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SLR-EP – 403

Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF FOUNDATIONS (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Question **2** from Section **I** and Question **6** from Section **II** are **compulsory**.*
*2) Solve **any two** questions (other than question **2** and **6**) from **each** Section.*
*3) Assume **any** missing data suitably and mention **clearly**.*
*4) **Use** of electronic calculator and relevant **I. S.** codes are **allowed**.*
*5) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*6) **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 : 20

1. Choose the correct answer : **(20×1=20)**

1) The critical force system to be considered for stability of well foundation is **1**
   a) Vertical direction
   b) Direction perpendicular to water flow
   c) Direction parallel to water flow
   d) Horizontal direction

2) Identify the incorrect statement. A sheet pile may fail in any one of the following ways **1**
   a) Forward movement of the base b) Failure by bending
   c) Failure by shear d) Failure by anchors

3) The two criteria for the determination of allowable bearing capacity of foundation are **1**
   a) Tension failure and compression failure
   b) Tension failure and settlement
   c) Bond failure and shear failure
   d) Shear failure and settlement

4) In case of well foundation, the grip length is defined as, **1**
   a) length below top of the well cap to the cutting edge
   b) length between bottom of well cap and cutting edge
   c) depth of bottom of well to the minimum scour level
   d) depth of bottom of well to the maximum scour level

P.T.O.

5) The sheet pile which derives its stability entirely from the lateral resistance of the soil into which it is driven is called **1**
   a) Anchored sheet pile b) Cantilever sheet pile
   c) Braced sheeting d) None

6) A caisson has its lower end designed as working chamber in which compressed air is forced to prevent the entry of water is called, **1**
   a) Open Caisson b) Box Caisson
   c) Pneumatic Caisson d) None of the above

7) _____ is a line which connects all points of equal stress below the ground surface. **1**
   a) Isobars b) Isotopes c) Histogram d) Isochem

8) The maximum differential settlement should not exceed _____ mm in foundation on clayey soils. **1**
   a) 40 b) 20 c) 60 d) 10

9) What is the ultimate load carrying capacity of pile group of 9 piles arranged in a square pattern if spacing between the piles is 90 cm, diameter of the pile 30 cm, length of pile 10m, cohesion of clay 35 kN/m^2 and adhesion factor 0.6. Neglect end bearing ? **2**
   a) 1780 kN b) 2940 kN c) 5880 kN d) 3560 kN

10) The area ratio of a Shelby tube type sampler of internal diameter 48 mm and 51 mm external diameter is **2**
   a) 15% b) 15.5% c) 12% d) 12.9%

11) A footing 3 m × 1.5 m in plan transmits a pressure of 160 kN/m^2 on a cohesive soil having $E = 8 \times 10^4$ kN/m^2 and $\mu = 0.48$. Assume $I_W = 1.52$ and footing to be flexible. The immediate settlement at the center is, **2**
   a) 4.51 mm b) 3.51 mm c) 2.51 m d) 6.51 mm

12) Arrange the order of various stages of construction of under reamed pile foundation
   1) Concreting pile cap 2) Boring by Auger 3) Placing reinforcement cage in position
   4) Under reaming by under reamer 5) Concreting Pile **2**
   a) 4, 5, 2, 3, 1 b) 2, 4, 3, 5, 1 c) 2, 3, 4, 5, 1 d) 2, 3, 5, 4, 1

13) Dilatancy correction is applied to SPT test results when **1**
   a) soil is silty sand
   b) water table is present above test level
   c) value of SPT corrected for overburden is more than 15
   d) all the above

14) The rotation of block foundation about X axis is known as **1**
   a) Yawing b) Pitching c) Rocking d) None of the above

15) Three piles are arranged in a triangular form, efficiency of pile group by Feld's rule **1**
   a) 33.33% b) 50% c) 75% d) 87.5%

16) The bottom plug in well foundation is usually made up of **1**
   a) Brick Masonry b) RCC
   c) Cement Concrete d) None

_____

SLR-EP – 403

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF FOUNDATIONS (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Question **2** from Section **I** and Question **6** from Section **II** are **compulsory**.*
*2) Solve **any two** questions (other than question **2** and **6**) from **each** Section.*
*3) Assume **any** missing data suitably and mention **clearly**.*
*4) **Use** of electronic calculator and relevant **I. S.** codes are **allowed**.*

SECTION – I

2. a) Derive Terzaghi's equation for bearing capacity. **8**

   b) A rectangular footing 2m × 2.7 m is subjected a vertical load of 1800 kN. The footing is placed at a depth of 1m. The foundation soil consists of deposit of dense soil sand having its unit weight of 18 kN/m^3 and angle of internal friction of 36°. (N_c = 60, N_q = 42, N_γ = 47). Determine the factor of safety against shear failure. Using Terzaghi's approach. **6**

3. a) Write note on design consideration for raft foundation. **7**

   b) Describe shear failures of soil with sketches. **6**

4. a) Calculate the consolidation settlement with following data :
   i) Foundation size = 2m × 2m
   ii) Load on foundation = 500 kN
   iii) Footing level = 1.5 m below ground level
   iv) Soil density = 18 kN/m^3
   v) Depth of compressible stratum below founding level is 1.5 m
   vi) Compression index, Cc = 0.28
   vii) Initial voids ratio, e_0 = 0.6
   viii) Divide the compressible layer in to 3 equal strips for settlement computation
   ix) Assume 2 : 1 contact pressure distribution. **8**

   b) With neat sketches explain the effect of swelling on foundations. **5**

5. a) Write note on effect of water table on bearing capacity of soil. **5**

   b) Write note on limitations of plate load test. **4**

   c) Explain various types of settlement below footing. **4**

Set Q

SECTION – II

6. a) A group of 16 piles has to be arranged in the form of a square in soft clay with uniform spacing. Neglecting end bearing, determine optimum value of spacing of piles in terms of pile diameter, assume adhesion factor of 0.7. **8**

   b) With explanatory sketches, write a note on under-reamed pile foundation. **6**

7. a) Write detail note on methods of underpinning. **8**

   b) Explain Feld's approach for finding the efficiency of the pile group. **5**

8. a) Write a short note on : i) Caisson Disease ii) Pneumatic Caisson. **8**

   b) What do you understand by scour depth and grip length ? What is its importance in well foundation ? **5**

9. a) Resonance occurs at a frequency of 20 cycles/sec. in vertical vibration of test block 1m × 1m × 1m, weight of oscillator was 500 N. Calculate the coefficient of uniform elastic compression. **8**

   b) Write a short notes on types of machine foundation. **5**

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SLR-EP – 403

Seat No.	

Set **R**

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF FOUNDATIONS (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Question **2** from Section **I** and Question **6** from Section **II** are **compulsory**.*
2) *Solve **any two** questions (other than question **2** and **6**) from **each** Section.*
3) *Assume **any** missing data suitably and mention **clearly**.*
4) ***Use** of electronic calculator and relevant **I. S.** codes are **allowed**.*
5) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
6) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

1) The sheet pile which derives its stability entirely from the lateral resistance of the soil into which it is driven is called **1**
   a) Anchored sheet pile b) Cantilever sheet pile
   c) Braced sheeting d) None

2) A caisson has its lower end designed as working chamber in which compressed air is forced to prevent the entry of water is called, **1**
   a) Open Caisson b) Box Caisson
   c) Pneumatic Caisson d) None of the above

3) _____ is a line which connects all points of equal stress below the ground surface. **1**
   a) Isobars b) Isotopes c) Histogram d) Isochem

4) The maximum differential settlement should not exceed _____ mm in foundation on clayey soils. **1**
   a) 40 b) 20 c) 60 d) 10

5) What is the ultimate load carrying capacity of pile group of 9 piles arranged in a square pattern if spacing between the piles is 90 cm, diameter of the pile 30 cm, length of pile 10m, cohesion of clay 35 kN/m^2 and adhesion factor 0.6. Neglect end bearing ? **2**
   a) 1780 kN b) 2940 kN c) 5880 kN d) 3560 kN

P.T.O.

6) The area ratio of a Shelby tube type sampler of internal diameter 48 mm and 51 mm external diameter is **2**
   a) 15% b) 15.5% c) 12% d) 12.9%

7) A footing 3 m × 1.5 m in plan transmits a pressure of 160 kN/m^2 on a cohesive soil having E = 8 × 10^4 kN/m^2 and μ = 0.48. Assume I_W = 1.52 and footing to be flexible. The immediate settlement at the center is, **2**
   a) 4.51 mm b) 3.51 mm c) 2.51 m d) 6.51 mm

8) Arrange the order of various stages of construction of under reamed pile foundation
   1) Concreting pile cap 2) Boring by Auger 3) Placing reinforcement cage in position
   4) Under reaming by under reamer 5) Concreting Pile **2**
   a) 4, 5, 2, 3, 1 b) 2, 4, 3, 5, 1 c) 2, 3, 4, 5, 1 d) 2, 3, 5, 4, 1

9) Dilatancy correction is applied to SPT test results when **1**
   a) soil is silty sand
   b) water table is present above test level
   c) value of SPT corrected for overburden is more than 15
   d) all the above

10) The rotation of block foundation about X axis is known as **1**
   a) Yawing b) Pitching c) Rocking d) None of the above

11) Three piles are arranged in a triangular form, efficiency of pile group by Feld's rule **1**
   a) 33.33% b) 50% c) 75% d) 87.5%

12) The bottom plug in well foundation is usually made up of **1**
   a) Brick Masonry b) RCC c) Cement Concrete d) None

13) The critical force system to be considered for stability of well foundation is **1**
   a) Vertical direction
   b) Direction perpendicular to water flow
   c) Direction parallel to water flow
   d) Horizontal direction

14) Identify the incorrect statement. A sheet pile may fail in any one of the following ways **1**
   a) Forward movement of the base b) Failure by bending
   c) Failure by shear d) Failure by anchors

15) The two criteria for the determination of allowable bearing capacity of foundation are **1**
   a) Tension failure and compression failure
   b) Tension failure and settlement
   c) Bond failure and shear failure
   d) Shear failure and settlement

16) In case of well foundation, the grip length is defined as, **1**
   a) length below top of the well cap to the cutting edge
   b) length between bottom of well cap and cutting edge
   c) depth of bottom of well to the minimum scour level
   d) depth of bottom of well to the maximum scour level

SLR-EP – 403

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF FOUNDATIONS (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Question **2** from Section **I** and Question **6** from Section **II** are **compulsory**.*
*2) Solve **any two** questions (other than question **2** and **6**) from **each** Section.*
*3) Assume **any** missing data suitably and mention **clearly**.*
*4) **Use** of electronic calculator and relevant **I. S.** codes are **allowed**.*

SECTION – I

2. a) Derive Terzaghi's equation for bearing capacity. **8**

   b) A rectangular footing 2m × 2.7 m is subjected a vertical load of 1800 kN. The footing is placed at a depth of 1m. The foundation soil consists of deposit of dense soil sand having its unit weight of 18 kN/m^3 and angle of internal friction of 36°. (N_c = 60, N_q = 42, N_γ = 47). Determine the factor of safety against shear failure. Using Terzaghi's approach. **6**

3. a) Write note on design consideration for raft foundation. **7**

   b) Describe shear failures of soil with sketches. **6**

4. a) Calculate the consolidation settlement with following data :
   i) Foundation size = 2m × 2m
   ii) Load on foundation = 500 kN
   iii) Footing level = 1.5 m below ground level
   iv) Soil density = 18 kN/m^3
   v) Depth of compressible stratum below founding level is 1.5 m
   vi) Compression index, Cc = 0.28
   vii) Initial voids ratio, e_0 = 0.6
   viii) Divide the compressible layer in to 3 equal strips for settlement computation
   ix) Assume 2 : 1 contact pressure distribution. **8**

   b) With neat sketches explain the effect of swelling on foundations. **5**

5. a) Write note on effect of water table on bearing capacity of soil. **5**

   b) Write note on limitations of plate load test. **4**

   c) Explain various types of settlement below footing. **4**

Set R

SECTION – II

6. a) A group of 16 piles has to be arranged in the form of a square in soft clay with uniform spacing. Neglecting end bearing, determine optimum value of spacing of piles in terms of pile diameter, assume adhesion factor of 0.7. **8**

   b) With explanatory sketches, write a note on under-reamed pile foundation. **6**

7. a) Write detail note on methods of underpinning. **8**

   b) Explain Feld's approach for finding the efficiency of the pile group. **5**

8. a) Write a short note on : i) Caisson Disease ii) Pneumatic Caisson. **8**

   b) What do you understand by scour depth and grip length ? What is its importance in well foundation ? **5**

9. a) Resonance occurs at a frequency of 20 cycles/sec. in vertical vibration of test block 1m × 1m × 1m, weight of oscillator was 500 N. Calculate the coefficient of uniform elastic compression. **8**

   b) Write a short notes on types of machine foundation. **5**

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SLR-EP – 403

Seat No.	

Set **S**

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF FOUNDATIONS (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Question **2** from Section **I** and Question **6** from Section **II** are **compulsory**.*
*2) Solve **any two** questions (other than question **2** and **6**) from **each** Section.*
*3) Assume **any** missing data suitably and mention **clearly**.*
*4) **Use** of electronic calculator and relevant **I. S.** codes are **allowed**.*
*5) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*6) **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 : 20

1. Choose the correct answer : **(20×1=20)**

1) What is the ultimate load carrying capacity of pile group of 9 piles arranged in a square pattern if spacing between the piles is 90 cm, diameter of the pile 30 cm, length of pile 10m, cohesion of clay 35 kN/m^2 and adhesion factor 0.6. Neglect end bearing ? **2**
a) 1780 kN b) 2940 kN c) 5880 kN d) 3560 kN

2) The area ratio of a Shelby tube type sampler of internal diameter 48 mm and 51 mm external diameter is **2**
a) 15% b) 15.5% c) 12% d) 12.9%

3) A footing 3 m × 1.5 m in plan transmits a pressure of 160 kN/m^2 on a cohesive soil having $E = 8 \times 10^4$ kN/m^2 and $\mu = 0.48$. Assume $I_W = 1.52$ and footing to be flexible. The immediate settlement at the center is, **2**
a) 4.51 mm b) 3.51 mm c) 2.51 m d) 6.51 mm

4) Arrange the order of various stages of construction of under reamed pile foundation
1) Concreting pile cap 2) Boring by Auger 3) Placing reinforcement cage in position
4) Under reaming by under reamer 5) Concreting Pile **2**
a) 4, 5, 2, 3, 1 b) 2, 4, 3, 5, 1 c) 2, 3, 4, 5, 1 d) 2, 3, 5, 4, 1

P.T.O.

5) Dilatancy correction is applied to SPT test results when **1**
   a) soil is silty sand
   b) water table is present above test level
   c) value of SPT corrected for overburden is more than 15
   d) all the above

6) The rotation of block foundation about X axis is known as **1**
   a) Yawing b) Pitching c) Rocking d) None of the above

7) Three piles are arranged in a triangular form, efficiency of pile group by Feld's rule **1**
   a) 33.33% b) 50% c) 75% d) 87.5%

8) The bottom plug in well foundation is usually made up of **1**
   a) Brick Masonry b) RCC c) Cement Concrete d) None

9) The critical force system to be considered for stability of well foundation is **1**
   a) Vertical direction b) Direction perpendicular to water flow
   c) Direction parallel to water flow d) Horizontal direction

10) Identify the incorrect statement. A sheet pile may fail in any one of the following ways **1**
   a) Forward movement of the base b) Failure by bending
   c) Failure by shear d) Failure by anchors

11) The two criteria for the determination of allowable bearing capacity of foundation are **1**
   a) Tension failure and compression failure
   b) Tension failure and settlement
   c) Bond failure and shear failure
   d) Shear failure and settlement

12) In case of well foundation, the grip length is defined as, **1**
   a) length below top of the well cap to the cutting edge
   b) length between bottom of well cap and cutting edge
   c) depth of bottom of well to the minimum scour level
   d) depth of bottom of well to the maximum scour level

13) The sheet pile which derives its stability entirely from the lateral resistance of the soil into which it is driven is called **1**
   a) Anchored sheet pile b) Cantilever sheet pile
   c) Braced sheeting d) None

14) A caisson has its lower end designed as working chamber in which compressed air is forced to prevent the entry of water is called, **1**
   a) Open Caisson b) Box Caisson
   c) Pneumatic Caisson d) None of the above

15) _____ is a line which connects all points of equal stress below the ground surface. **1**
   a) Isobars b) Isotopes c) Histogram d) Isochem

16) The maximum differential settlement should not exceed _____ mm in foundation on clayey soils. **1**
   a) 40 b) 20 c) 60 d) 10

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SLR-EP – 403

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
DESIGN OF FOUNDATIONS (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Question **2** from Section **I** and Question **6** from Section **II** are **compulsory**.*
*2) Solve **any two** questions (other than question **2** and **6**) from **each** Section.*
*3) Assume **any** missing data suitably and mention **clearly**.*
*4) **Use** of electronic calculator and relevant **I. S.** codes are **allowed**.*

SECTION – I

2. a) Derive Terzaghi's equation for bearing capacity. **8**

   b) A rectangular footing 2m × 2.7 m is subjected a vertical load of 1800 kN. The footing is placed at a depth of 1m. The foundation soil consists of deposit of dense soil sand having its unit weight of 18 kN/m^3 and angle of internal friction of 36°. (N_c = 60, N_q = 42, N_γ = 47). Determine the factor of safety against shear failure. Using Terzaghi's approach. **6**

3. a) Write note on design consideration for raft foundation. **7**

   b) Describe shear failures of soil with sketches. **6**

4. a) Calculate the consolidation settlement with following data :
   i) Foundation size = 2m × 2m
   ii) Load on foundation = 500 kN
   iii) Footing level = 1.5 m below ground level
   iv) Soil density = 18 kN/m^3
   v) Depth of compressible stratum below founding level is 1.5 m
   vi) Compression index, Cc = 0.28
   vii) Initial voids ratio, e_0 = 0.6
   viii) Divide the compressible layer in to 3 equal strips for settlement computation
   ix) Assume 2 : 1 contact pressure distribution. **8**

   b) With neat sketches explain the effect of swelling on foundations. **5**

5. a) Write note on effect of water table on bearing capacity of soil. **5**

   b) Write note on limitations of plate load test. **4**

   c) Explain various types of settlement below footing. **4**

Set S

SECTION – II

6. a) A group of 16 piles has to be arranged in the form of a square in soft clay with uniform spacing. Neglecting end bearing, determine optimum value of spacing of piles in terms of pile diameter, assume adhesion factor of 0.7. **8**

   b) With explanatory sketches, write a note on under-reamed pile foundation. **6**

7. a) Write detail note on methods of underpinning. **8**

   b) Explain Feld's approach for finding the efficiency of the pile group. **5**

8. a) Write a short note on : i) Caisson Disease ii) Pneumatic Caisson. **8**

   b) What do you understand by scour depth and grip length ? What is its importance in well foundation ? **5**

9. a) Resonance occurs at a frequency of 20 cycles/sec. in vertical vibration of test block 1m × 1m × 1m, weight of oscillator was 500 N. Calculate the coefficient of uniform elastic compression. **8**

   b) Write a short notes on types of machine foundation. **5**

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SLR-EP – 404

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*
ii) ***Use*** *of IS 456 and IS 3370.*
iii) ***Assume*** *suitable data if* ***necessary****.*
iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*
v) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
vi) ***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 : 20

1. Choose the correct answer : **20**

1) As per IS 456-2000 recommendation in case of grid slab, width of beams should not be less than _____ mm.
a) 65 mm b) 80 mm c) 75 mm d) 70 mm

2) In water tanks the compressive (permissible) stress in column subjected to direct load is _____ N/mm^2 for HYSD bars.
a) 115 b) 125 c) 175 d) 150

3) For fixed slab Mr at centre in case of circular slab is given by _____
a) $1/16\ qR^2$ b) $2/16\ qR^2$ c) $3/16\ qR^2$ d) $4/16\ qR^2$

4) Middle strip in flat slab means the design strip bounded on each of its opposite sides by
a) Panel b) Column strip c) Drop d) Column heads

5) In case of circular slab, for fixed slab Mr at support is _____
a) $-2/16\ qR^2$ b) $3/16\ qR^2$ c) $1/16\ qR^2$ d) $4/16\ qR^2$

6) In case of grid slab the in situ ribs shall not be less than _____ mm wide.
a) 60 b) 50 c) 65 d) 75

7) The minimum longitudinal reinforcement in pile should not be less than _____ % of c/s area of pile for piles having length up to 30 times their least lateral dimension.
a) 1 b) 2 c) 1.25 d) 1.5

P.T.O.

8) While designing a combined footing there is restriction of space on both sides of column then which type of footing is used
   a) Rectangular combined footing b) Stap footing
   c) Trapezoidal combined footing d) Raft footing

9) The lateral reinforcement in the body of pile is provided at _____ % of gross volume.
   a) 0.12 b) 0.15 c) 0.6 d) 0.2

10) The minimum spacing of piles shall be _____ to _____ times diameter of the pile.
   a) 2 to 3 b) 2.5 to 3 c) 1.5 to 2 d) 1 to 1.5

11) In case of water tank for concrete permissible stress in bending tension for grade of M25 concrete is _____ N/mm^2.
   a) 1.8 b) 2.5 c) 2.8 d) 2.7

12) The permissible tensile stress in M.S. bars on liquid retaining face is _____ N/mm^2.
   a) 115 b) 100 c) 125 d) 150

13) The analysis should be used for design of over head water tank _____
   a) Structural analysis b) Staging analysis
   c) Surface analysis d) All of these

14) In order to minimize cracking due to shrinkage and temperature, minimum reinforcement for thickness less than 100 mm is recommended as _____
   a) 0.3% b) 0.2% c) 0.1% d) 0.4%

15) The critical section for the combined footing when there is a one way shear action _____
   a) d/2 b) d c) d/4 d) 2d

16) The value of 6_{cbc} for M20 concrete is _____
   a) 7 b) 8 c) 8.5 d) 7.5

17) The floors of the underground water tanks are designed for _____ pressure, for the full tank condition.
   a) Uplift b) Water c) Earth d) All of these

18) For design of water tanks the permissible stress in bending tension in mild steel bars is for is _____ N/mm^2.
   a) 115 b) 140 c) 150 d) 230

19) In case of water tanks the permissible shear stress for M20 grade concrete is _____ cN/mm^2.
   a) 1 b) 1.2 c) 1.25 d) 1.7

20) The walls of underground water tanks are designed for _____ pressure, specially under the condition when tank is empty.
   a) Water b) Earth c) Both a) and b) d) All of these

_____

SLR-EP – 404

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*
ii) ***Use*** *of IS 456 and IS 3370.*
iii) ***Assume*** *suitable data if* ***necessary****.*
iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*

SECTION – I

2. Design the interior panel of a flat slab 5 m × 5 m in size, for a super imposed load of 4 kN/m^2, column size 500 mm × 500 mm. Provide without drop. Use M20 grade of concrete and Fe415 steel. **20**

3. Design a pile under column transmitting on axial load of 800 kN. The pile is to be driven to hard stratum is available to depth 8 m. Use M20 concrete and Fe 415 steel. **20**

4. a) Design a reinforced concrete raft foundation connecting the columns of multistoried building. The column are arrayed in square grid 12 m × 12 m with their spacing 4 m apart. The SBC of the soil in 100 kN/m^2. The total service load on all column in 2700 kN. The columns are 400 mm × 400 mm in section. Adopt M20 concrete and Fe 500 steel. Sketch the details of reinforcement in the raft foundation. **15**

   b) Explain combined footing with their different types and draw suitable sketches. **5**

SECTION – II

5. A circular water tank of capacity 800000 lit. is resting on ground. The depth of tank is limited to 6 m. A free board of 300 mm may be provided the wall and base slab is casting integrally. Design the water tank using IS code method. Use M20 grade of concrete and Fe 415 steel. Draw reinforcement detail. **20**

6. Design a underground water tank of internal dimensions 6m × 3m × 3m soil surrounding the tank always remains the dry. The tank should be provided with a roof slab soil weight is 16 kN/m^3. Use M20 concrete and mild steel. **20**

7. A rectangular water tank 6 m long, 5 m wide and 4 m high has its walls rigidly jointed at the critical edges. Design the tank by approximate method, it is supported an all sides under the wall. Use M25 grade of concrete and Fe 415 steel. **20**

Set P

Set P

SLR-EP – 404

Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*
ii) ***Use*** *of IS 456 and IS 3370.*
iii) ***Assume*** *suitable data if* ***necessary****.*
iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*
v) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
vi) ***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 : 20

1. Choose the correct answer : **20**

1) The value of 6_{cbc} for M20 concrete is _____
a) 7 b) 8 c) 8.5 d) 7.5

2) The floors of the underground water tanks are designed for _____ pressure, for the full tank condition.
a) Uplift b) Water c) Earth d) All of these

3) For design of water tanks the permissible stress in bending tension in mild steel bars is for is _____ N/mm^2.
a) 115 b) 140 c) 150 d) 230

4) In case of water tanks the permissible shear stress for M20 grade concrete is _____ cN/mm^2.
a) 1 b) 1.2 c) 1.25 d) 1.7

5) The walls of underground water tanks are designed for _____ pressure, specially under the condition when tank is empty.
a) Water b) Earth c) Both a) and b) d) All of these

6) As per IS 456-2000 recommendation in case of grid slab, width of beams should not be less than _____ mm.
a) 65 mm b) 80 mm c) 75 mm d) 70 mm

7) In water tanks the compressive (permissible) stress in column subjected to direct load is _____ N/mm^2 for HYSD bars.
a) 115 b) 125 c) 175 d) 150

P.T.O.

8) For fixed slab Mr at centre in case of circular slab is given by _____
a) 1/16 qR^2 b) 2/16 qR^2 c) 3/16 qR^2 d) 4/16 qR^2

9) Middle strip in flat slab means the design strip bounded on each of its opposite sides by
a) Panel b) Column strip c) Drop d) Column heads

10) In case of circular slab, for fixed slab Mr at support is _____
a) –2/16 qR^2 b) 3/16 qR^2 c) 1/16 qR^2 d) 4/16 qR^2

11) In case of grid slab the in situ ribs shall not be less than _____ mm wide.
a) 60 b) 50 c) 65 d) 75

12) The minimum longitudinal reinforcement in pile should not be less than _____ % of c/s area of pile for piles having length up to 30 times their least lateral dimension.
a) 1 b) 2 c) 1.25 d) 1.5

13) While designing a combined footing there is restriction of space on both sides of column then which type of footing is used
a) Rectangular combined footing b) Stap footing
c) Trapezoidal combined footing d) Raft footing

14) The lateral reinforcement in the body of pile is provided at _____ % of gross volume.
a) 0.12 b) 0.15 c) 0.6 d) 0.2

15) The minimum spacing of piles shall be _____ to _____ times diameter of the pile.
a) 2 to 3 b) 2.5 to 3 c) 1.5 to 2 d) 1 to 1.5

16) In case of water tank for concrete permissible stress in bending tension for grade of M25 concrete is _____ N/mm^2.
a) 1.8 b) 2.5 c) 2.8 d) 2.7

17) The permissible tensile stress in M.S. bars on liquid retaining face is _____ N/mm^2.
a) 115 b) 100 c) 125 d) 150

18) The analysis should be used for design of over head water tank _____
a) Structural analysis b) Staging analysis
c) Surface analysis d) All of these

19) In order to minimize cracking due to shrinkage and temperature, minimum reinforcement for thickness less than 100 mm is recommended as _____
a) 0.3% b) 0.2% c) 0.1% d) 0.4%

20) The critical section for the combined footing when there is a one way shear action _____
a) d/2 b) d c) d/4 d) 2d

_____

SLR-EP – 404

Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*
ii) ***Use*** *of IS 456 and IS 3370.*
iii) ***Assume*** *suitable data if* ***necessary****.*
iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*

SECTION – I

2. Design the interior panel of a flat slab 5 m × 5 m in size, for a super imposed load of 4 kN/m^2, column size 500 mm × 500 mm. Provide without drop. Use M20 grade of concrete and Fe415 steel. **20**

3. Design a pile under column transmitting on axial load of 800 kN. The pile is to be driven to hard stratum is available to depth 8 m. Use M20 concrete and Fe 415 steel. **20**

4. a) Design a reinforced concrete raft foundation connecting the columns of multistoried building. The column are arrayed in square grid 12 m × 12 m with their spacing 4 m apart. The SBC of the soil in 100 kN/m^2. The total service load on all column in 2700 kN. The columns are 400 mm × 400 mm in section. Adopt M20 concrete and Fe 500 steel. Sketch the details of reinforcement in the raft foundation. **15**

   b) Explain combined footing with their different types and draw suitable sketches. **5**

SECTION – II

5. A circular water tank of capacity 800000 lit. is resting on ground. The depth of tank is limited to 6 m. A free board of 300 mm may be provided the wall and base slab is casting integrally. Design the water tank using IS code method. Use M20 grade of concrete and Fe 415 steel. Draw reinforcement detail. **20**

6. Design a underground water tank of internal dimensions 6m × 3m × 3m soil surrounding the tank always remains the dry. The tank should be provided with a roof slab soil weight is 16 kN/m^3. Use M20 concrete and mild steel. **20**

7. A rectangular water tank 6 m long, 5 m wide and 4 m high has its walls rigidly jointed at the critical edges. Design the tank by approximate method, it is supported an all sides under the wall. Use M25 grade of concrete and Fe 415 steel. **20**

Set Q

Set Q

SLR-EP – 404

Seat No.	

Set **R**

B.E. (Civil) (Part – I) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*
ii) ***Use*** *of IS 456 and IS 3370.*
iii) ***Assume*** *suitable data if* ***necessary****.*
iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*
v) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
vi) ***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 : 20

1. Choose the correct answer : **20**

1) In case of water tank for concrete permissible stress in bending tension for grade of M25 concrete is _____ N/mm^2.
a) 1.8 b) 2.5 c) 2.8 d) 2.7

2) The permissible tensile stress in M.S. bars on liquid retaining face is _____ N/mm^2.
a) 115 b) 100 c) 125 d) 150

3) The analysis should be used for design of over head water tank _____
a) Structural analysis b) Staging analysis
c) Surface analysis d) All of these

4) In order to minimize cracking due to shrinkage and temperature, minimum reinforcement for thickness less than 100 mm is recommended as _____
a) 0.3% b) 0.2% c) 0.1% d) 0.4%

5) The critical section for the combined footing when there is a one way shear action _____
a) d/2 b) d c) d/4 d) 2d

6) The value of 6_{cbc} for M20 concrete is _____
a) 7 b) 8 c) 8.5 d) 7.5

7) The floors of the underground water tanks are designed for _____ pressure, for the full tank condition.
a) Uplift b) Water c) Earth d) All of these

8) For design of water tanks the permissible stress in bending tension in mild steel bars is for is _____ N/mm^2.
   a) 115 b) 140 c) 150 d) 230

9) In case of water tanks the permissible shear stress for M20 grade concrete is _____ cN/mm^2.
   a) 1 b) 1.2 c) 1.25 d) 1.7

10) The walls of underground water tanks are designed for _____ pressure, specially under the condition when tank is empty.
   a) Water b) Earth c) Both a) and b) d) All of these

11) As per IS 456-2000 recommendation in case of grid slab, width of beams should not be less than _____ mm.
   a) 65 mm b) 80 mm c) 75 mm d) 70 mm

12) In water tanks the compressive (permissible) stress in column subjected to direct load is _____ N/mm^2 for HYSD bars.
   a) 115 b) 125 c) 175 d) 150

13) For fixed slab Mr at centre in case of circular slab is given by _____
   a) $1/16\ qR^2$ b) $2/16\ qR^2$ c) $3/16\ qR^2$ d) $4/16\ qR^2$

14) Middle strip in flat slab means the design strip bounded on each of its opposite sides by
   a) Panel b) Column strip c) Drop d) Column heads

15) In case of circular slab, for fixed slab Mr at support is _____
   a) $-2/16\ qR^2$ b) $3/16\ qR^2$ c) $1/16\ qR^2$ d) $4/16\ qR^2$

16) In case of grid slab the in situ ribs shall not be less than _____ mm wide.
   a) 60 b) 50 c) 65 d) 75

17) The minimum longitudinal reinforcement in pile should not be less than _____ % of c/s area of pile for piles having length up to 30 times their least lateral dimension.
   a) 1 b) 2 c) 1.25 d) 1.5

18) While designing a combined footing there is restriction of space on both sides of column then which type of footing is used
   a) Rectangular combined footing b) Stap footing
   c) Trapezoidal combined footing d) Raft footing

19) The lateral reinforcement in the body of pile is provided at _____ % of gross volume.
   a) 0.12 b) 0.15 c) 0.6 d) 0.2

20) The minimum spacing of piles shall be _____ to _____ times diameter of the pile.
   a) 2 to 3 b) 2.5 to 3 c) 1.5 to 2 d) 1 to 1.5

_____

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Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: i) Answer **any two** questions from **each** Section.*
*ii) **Use** of IS 456 and IS 3370.*
*iii) **Assume** suitable data if **necessary**.*
*iv) Draw **neat** sketches **wherever** necessary.*

SECTION – I

2. Design the interior panel of a flat slab 5 m × 5 m in size, for a super imposed load of 4 kN/m^2, column size 500 mm × 500 mm. Provide without drop. Use M20 grade of concrete and Fe415 steel. **20**

3. Design a pile under column transmitting on axial load of 800 kN. The pile is to be driven to hard stratum is available to depth 8 m. Use M20 concrete and Fe 415 steel. **20**

4. a) Design a reinforced concrete raft foundation connecting the columns of multistoried building. The column are arrayed in square grid 12 m × 12 m with their spacing 4 m apart. The SBC of the soil in 100 kN/m^2. The total service load on all column in 2700 kN. The columns are 400 mm × 400 mm in section. Adopt M20 concrete and Fe 500 steel. Sketch the details of reinforcement in the raft foundation. **15**

   b) Explain combined footing with their different types and draw suitable sketches. **5**

SECTION – II

5. A circular water tank of capacity 800000 lit. is resting on ground. The depth of tank is limited to 6 m. A free board of 300 mm may be provided the wall and base slab is casting integrally. Design the water tank using IS code method. Use M20 grade of concrete and Fe 415 steel. Draw reinforcement detail. **20**

6. Design a underground water tank of internal dimensions 6m × 3m × 3m soil surrounding the tank always remains the dry. The tank should be provided with a roof slab soil weight is 16 kN/m^3. Use M20 concrete and mild steel. **20**

7. A rectangular water tank 6 m long, 5 m wide and 4 m high has its walls rigidly jointed at the critical edges. Design the tank by approximate method, it is supported an all sides under the wall. Use M25 grade of concrete and Fe 415 steel. **20**

Set R

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Seat No.	

Set **S**

B.E. (Civil) (Part – I) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*
ii) ***Use*** *of IS 456 and IS 3370.*
iii) ***Assume*** *suitable data if* ***necessary****.*
iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*
v) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
vi) ***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 : 20

1. Choose the correct answer : **20**

1) In case of grid slab the in situ ribs shall not be less than _____ mm wide.
a) 60 b) 50 c) 65 d) 75

2) The minimum longitudinal reinforcement in pile should not be less than _____ % of c/s area of pile for piles having length up to 30 times their least lateral dimension.
a) 1 b) 2 c) 1.25 d) 1.5

3) While designing a combined footing there is restriction of space on both sides of column then which type of footing is used
a) Rectangular combined footing b) Stap footing
c) Trapezoidal combined footing d) Raft footing

4) The lateral reinforcement in the body of pile is provided at _____ % of gross volume.
a) 0.12 b) 0.15 c) 0.6 d) 0.2

5) The minimum spacing of piles shall be _____ to _____ times diameter of the pile.
a) 2 to 3 b) 2.5 to 3 c) 1.5 to 2 d) 1 to 1.5

6) In case of water tank for concrete permissible stress in bending tension for grade of M25 concrete is _____ N/mm^2.
a) 1.8 b) 2.5 c) 2.8 d) 2.7

7) The permissible tensile stress in M.S. bars on liquid retaining face is _____ N/mm^2.
   a) 115 b) 100 c) 125 d) 150

8) The analysis should be used for design of over head water tank _____
   a) Structural analysis b) Staging analysis
   c) Surface analysis d) All of these

9) In order to minimize cracking due to shrinkage and temperature, minimum reinforcement for thickness less than 100 mm is recommended as _____
   a) 0.3% b) 0.2% c) 0.1% d) 0.4%

10) The critical section for the combined footing when there is a one way shear action _____
   a) d/2 b) d c) d/4 d) 2d

11) The value of 6_{cbc} for M20 concrete is _____
   a) 7 b) 8 c) 8.5 d) 7.5

12) The floors of the underground water tanks are designed for _____ pressure, for the full tank condition.
   a) Uplift b) Water c) Earth d) All of these

13) For design of water tanks the permissible stress in bending tension in mild steel bars is for is _____ N/mm^2.
   a) 115 b) 140 c) 150 d) 230

14) In case of water tanks the permissible shear stress for M20 grade concrete is _____ cN/mm^2.
   a) 1 b) 1.2 c) 1.25 d) 1.7

15) The walls of underground water tanks are designed for _____ pressure, specially under the condition when tank is empty.
   a) Water b) Earth c) Both a) and b) d) All of these

16) As per IS 456-2000 recommendation in case of grid slab, width of beams should not be less than _____ mm.
   a) 65 mm b) 80 mm c) 75 mm d) 70 mm

17) In water tanks the compressive (permissible) stress in column subjected to direct load is _____ N/mm^2 for HYSD bars.
   a) 115 b) 125 c) 175 d) 150

18) For fixed slab Mr at centre in case of circular slab is given by _____
   a) $1/16\ qR^2$ b) $2/16\ qR^2$ c) $3/16\ qR^2$ d) $4/16\ qR^2$

19) Middle strip in flat slab means the design strip bounded on each of its opposite sides by
   a) Panel b) Column strip c) Drop d) Column heads

20) In case of circular slab, for fixed slab Mr at support is _____
   a) $-2/16\ qR^2$ b) $3/16\ qR^2$ c) $1/16\ qR^2$ d) $4/16\ qR^2$

_____

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Seat No.	

B.E. (Civil) (Part – I) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: i) Answer **any two** questions from **each** Section.*
*ii) **Use** of IS 456 and IS 3370.*
*iii) **Assume** suitable data if **necessary**.*
*iv) Draw **neat** sketches **wherever** necessary.*

SECTION – I

2. Design the interior panel of a flat slab 5 m × 5 m in size, for a super imposed load of 4 kN/m^2, column size 500 mm × 500 mm. Provide without drop. Use M20 grade of concrete and Fe415 steel. **20**

3. Design a pile under column transmitting on axial load of 800 kN. The pile is to be driven to hard stratum is available to depth 8 m. Use M20 concrete and Fe 415 steel. **20**

4. a) Design a reinforced concrete raft foundation connecting the columns of multistoried building. The column are arrayed in square grid 12 m × 12 m with their spacing 4 m apart. The SBC of the soil in 100 kN/m^2. The total service load on all column in 2700 kN. The columns are 400 mm × 400 mm in section. Adopt M20 concrete and Fe 500 steel. Sketch the details of reinforcement in the raft foundation. **15**

   b) Explain combined footing with their different types and draw suitable sketches. **5**

SECTION – II

5. A circular water tank of capacity 800000 lit. is resting on ground. The depth of tank is limited to 6 m. A free board of 300 mm may be provided the wall and base slab is casting integrally. Design the water tank using IS code method. Use M20 grade of concrete and Fe 415 steel. Draw reinforcement detail. **20**

6. Design a underground water tank of internal dimensions 6m × 3m × 3m soil surrounding the tank always remains the dry. The tank should be provided with a roof slab soil weight is 16 kN/m^3. Use M20 concrete and mild steel. **20**

7. A rectangular water tank 6 m long, 5 m wide and 4 m high has its walls rigidly jointed at the critical edges. Design the tank by approximate method, it is supported an all sides under the wall. Use M25 grade of concrete and Fe 415 steel. **20**

Set S

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Seat No.	

Set **P**

B.E. (Civil) Part – I Examination, 2016
MANAGERIAL TECHNIQUES (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Work study consists of
   a) Effective use of plant and equipment b) Effective use of human effort
   c) Evaluation of human work d) All of the above

2) Work study examines
   a) Method b) Duration of work
   c) Both a) and b) d) None of the above

3) Work study is also recognised as
   a) Time study b) Motion study
   c) Both a) and b) d) None of the above

4) The correct order of procedure in method study is
   a) Select – Record – Examine – Develop – Define – Install – Maintain
   b) Select – Define – Examine – Develop – Record – Install – Maintain
   c) Select – Record – Develop – Examine – Define – Install – Maintain
   d) Select – Record – Examine – Define – Develop – Install – Maintain

5) The following factor(s) must be considered while selecting the work for method study
   a) Economic considerations b) Technical considerations
   c) Human reactions d) All of the above

6) In process charts, the symbol used for storage is
   a) Circle b) Square
   c) Arrow d) Triangle

7) In process charts, the symbol used for inspection is
   a) Circle b) Square
   c) Arrow d) Triangle

8) Delay occurs when
   a) Someone stops the process b) Product wait for next event
   c) Both a) and b) d) None of the above

P.T.O.

9) A milk powder tin is being weighed as it is filled is an example of
   a) Operation cum transportation
   b) Operation cum inspection
   c) Transportation cum inspection
   d) None of the above

10) In outline process chart, the horizontal lines represent
   a) General flow of process
   b) Materials being introduced
   c) Both a) and b)
   d) None of the above

11) In outline (operation) process chart, the following symbols are used
   a) Operation and inspection
   b) Operation cum transportation
   c) Inspection and transportation
   d) Operation and storage

12) The following is (are) the type(s) of flow process chart
   i) Man type
   ii) Material type
   iii) Equipment type

   The correct answer is
   a) Only i
   b) i and ii
   c) ii and iii
   d) All of the above

13) What is systematic recording and critical examination of the existing and proposed ways of doing work ?
   a) Work study
   b) Time study
   c) Method study
   d) System study

14) What establishes the time taken by qualified worker to complete a specified job at a defined level of performance ?
   a) Method study
   b) Work study
   c) Motion study
   d) Work Measurement

15) Which of the following is not a time measuring device ?
   a) Stop watch
   b) Electronic timer
   c) Digital camera
   d) Time recording machine

16) The amount of time required to complete a unit of work under given working conditions is called
   a) Basic time
   b) Standard time
   c) Allowance time
   d) Normal time

17) Total Quality Management (TQM) focuses on
   a) Employee
   b) Customer
   c) Both a) and b)
   d) None of the above

18) TQM and ISO both focuses on
   a) Customer
   b) Employee
   c) Supplier
   d) All of the above

19) According to Deming, Quality problems are
   a) Due to management
   b) Due to method
   c) Due to machine
   d) Due to material

20) While setting quality objective _____ to be considered.
   a) Material quality
   b) Customer need
   c) Market demand
   d) All of the above

_____

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Seat No.	

B.E. (Civil) Part – I Examination, 2016
MANAGERIAL TECHNIQUES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Question No. **2** is **compulsory**. Answer **any two** questions out of **3**, **4** and **5**.*
*2) Assume suitable data **if** necessary. But mention it **clearly**.*
*3) Question No. **6** is **compulsory**. Answer **any two** questions out of Q. No. **7**, **8** and **9**.*

SECTION – I

2. a) In a time study for a job done by a worker rating is 80, the data are as follows :

Observed time = 15 min, personal need allowance 5% of the basic time,
fatigue allowance = 2% of basic time, contingency work allowance = 1% of basic time,
contingency delay allowance = 2% of basic time. Find
i) Basic time
ii) Work content
iii) Standard time. **9**

b) Describe the procedure for making a method study. **7**

3. a) Explain the three main types of information recording techniques. **6**

b) Explain Therbligs and SIMO chart. **6**

4. a) Explain Cycle Graph and Chrono Cycle Graph. **6**

b) Explain Demings 14 points for top management. **6**

5. a) Explain the contribution by Juran in TQM. **6**

b) Explain the 'TQM implementation plan'. **6**

SECTION – II

6. a) Explain the three phases of work sampling procedure. **6**

b) Write the uses of work sampling. **4**

c) What are the essential tasks in reliability analysis ? Which tools and aids should be available to conduct efficient and effective reliability analysis ? **6**

Set P

7. a) Explain redundancy techniques and their applications in reliability. **6**

   b) Define creative thinking. Write the three laws of creative thinking. **6**

8. a) Explain the criteria to evaluate the value. **6**

   b) Explain the judgement phase in value engineering. **6**

9. a) Compare normal, binomial and Poisson distribution. **6**

   b) Write note on development phase of value engineering. **6**

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Seat No.	

Set **Q**

B.E. (Civil) Part – I Examination, 2016
MANAGERIAL TECHNIQUES (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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 : 20

1. Choose the correct answer : **(20×1=20)**

1) The amount of time required to complete a unit of work under given working conditions is called
   a) Basic time b) Standard time
   c) Allowance time d) Normal time

2) Total Quality Management (TQM) focuses on
   a) Employee b) Customer
   c) Both a) and b) d) None of the above

3) TQM and ISO both focuses on
   a) Customer b) Employee c) Supplier d) All of the above

4) According to Deming, Quality problems are
   a) Due to management b) Due to method
   c) Due to machine d) Due to material

5) While setting quality objective _____ to be considered.
   a) Material quality b) Customer need
   c) Market demand d) All of the above

6) Work study consists of
   a) Effective use of plant and equipment b) Effective use of human effort
   c) Evaluation of human work d) All of the above

7) Work study examines
   a) Method b) Duration of work
   c) Both a) and b) d) None of the above

8) Work study is also recognised as
   a) Time study b) Motion study c) Both a) and b) d) None of the above

9) The correct order of procedure in method study is
   a) Select – Record – Examine – Develop – Define – Install – Maintain
   b) Select – Define – Examine – Develop – Record – Install – Maintain
   c) Select – Record – Develop – Examine – Define – Install – Maintain
   d) Select – Record – Examine – Define – Develop – Install – Maintain

P.T.O.

10) The following factor(s) must be considered while selecting the work for method study
   a) Economic considerations
   b) Technical considerations
   c) Human reactions
   d) All of the above

11) In process charts, the symbol used for storage is
   a) Circle
   b) Square
   c) Arrow
   d) Triangle

12) In process charts, the symbol used for inspection is
   a) Circle
   b) Square
   c) Arrow
   d) Triangle

13) Delay occurs when
   a) Someone stops the process
   b) Product wait for next event
   c) Both a) and b)
   d) None of the above

14) A milk powder tin is being weighed as it is filled is an example of
   a) Operation cum transportation
   b) Operation cum inspection
   c) Transportation cum inspection
   d) None of the above

15) In outline process chart, the horizontal lines represent
   a) General flow of process
   b) Materials being introduced
   c) Both a) and b)
   d) None of the above

16) In outline (operation) process chart, the following symbols are used
   a) Operation and inspection
   b) Operation cum transportation
   c) Inspection and transportation
   d) Operation and storage

17) The following is (are) the type(s) of flow process chart
   i) Man type
   ii) Material type
   iii) Equipment type

   The correct answer is
   a) Only i
   b) i and ii
   c) ii and iii
   d) All of the above

18) What is systematic recording and critical examination of the existing and proposed ways of doing work ?
   a) Work study
   b) Time study
   c) Method study
   d) System study

19) What establishes the time taken by qualified worker to complete a specified job at a defined level of performance ?
   a) Method study
   b) Work study
   c) Motion study
   d) Work Measurement

20) Which of the following is not a time measuring device ?
   a) Stop watch
   b) Electronic timer
   c) Digital camera
   d) Time recording machine

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Seat No.	

B.E. (Civil) Part – I Examination, 2016
MANAGERIAL TECHNIQUES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Question No. **2** is **compulsory**. Answer **any two** questions out of **3**, **4** and **5**.*
*2) Assume suitable data **if** necessary. But mention it **clearly**.*
*3) Question No. **6** is **compulsory**. Answer **any two** questions out of Q. No. **7**, **8** and **9**.*

SECTION – I

2. a) In a time study for a job done by a worker rating is 80, the data are as follows :

Observed time = 15 min, personal need allowance 5% of the basic time,
fatigue allowance = 2% of basic time, contingency work allowance = 1% of basic time,
contingency delay allowance = 2% of basic time. Find
i) Basic time
ii) Work content
iii) Standard time. **9**

b) Describe the procedure for making a method study. **7**

3. a) Explain the three main types of information recording techniques. **6**

b) Explain Therbligs and SIMO chart. **6**

4. a) Explain Cycle Graph and Chrono Cycle Graph. **6**

b) Explain Demings 14 points for top management. **6**

5. a) Explain the contribution by Juran in TQM. **6**

b) Explain the 'TQM implementation plan'. **6**

SECTION – II

6. a) Explain the three phases of work sampling procedure. **6**

b) Write the uses of work sampling. **4**

c) What are the essential tasks in reliability analysis ? Which tools and aids should be available to conduct efficient and effective reliability analysis ? **6**

Set Q

7. a) Explain redundancy techniques and their applications in reliability. **6**

   b) Define creative thinking. Write the three laws of creative thinking. **6**

8. a) Explain the criteria to evaluate the value. **6**

   b) Explain the judgement phase in value engineering. **6**

9. a) Compare normal, binomial and Poisson distribution. **6**

   b) Write note on development phase of value engineering. **6**

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Seat No.	

Set **R**

B.E. (Civil) Part – I Examination, 2016
MANAGERIAL TECHNIQUES (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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 : 20

1. Choose the correct answer : **(20×1=20)**

1) In outline (operation) process chart, the following symbols are used
   a) Operation and inspection
   b) Operation cum transportation
   c) Inspection and transportation
   d) Operation and storage

2) The following is (are) the type(s) of flow process chart
   i) Man type
   ii) Material type
   iii) Equipment type

   The correct answer is
   a) Only i
   b) i and ii
   c) ii and iii
   d) All of the above

3) What is systematic recording and critical examination of the existing and proposed ways of doing work ?
   a) Work study
   b) Time study
   c) Method study
   d) System study

4) What establishes the time taken by qualified worker to complete a specified job at a defined level of performance ?
   a) Method study
   b) Work study
   c) Motion study
   d) Work Measurement

5) Which of the following is not a time measuring device ?
   a) Stop watch
   b) Electronic timer
   c) Digital camera
   d) Time recording machine

6) The amount of time required to complete a unit of work under given working conditions is called
   a) Basic time
   b) Standard time
   c) Allowance time
   d) Normal time

7) Total Quality Management (TQM) focuses on
   a) Employee
   b) Customer
   c) Both a) and b)
   d) None of the above

P.T.O.

8) TQM and ISO both focuses on
   a) Customer b) Employee
   c) Supplier d) All of the above

9) According to Deming, Quality problems are
   a) Due to management b) Due to method
   c) Due to machine d) Due to material

10) While setting quality objective _____ to be considered.
   a) Material quality b) Customer need
   c) Market demand d) All of the above

11) Work study consists of
   a) Effective use of plant and equipment b) Effective use of human effort
   c) Evaluation of human work d) All of the above

12) Work study examines
   a) Method b) Duration of work
   c) Both a) and b) d) None of the above

13) Work study is also recognised as
   a) Time study b) Motion study
   c) Both a) and b) d) None of the above

14) The correct order of procedure in method study is
   a) Select – Record – Examine – Develop – Define – Install – Maintain
   b) Select – Define – Examine – Develop – Record – Install – Maintain
   c) Select – Record – Develop – Examine – Define – Install – Maintain
   d) Select – Record – Examine – Define – Develop – Install – Maintain

15) The following factor(s) must be considered while selecting the work for method study
   a) Economic considerations b) Technical considerations
   c) Human reactions d) All of the above

16) In process charts, the symbol used for storage is
   a) Circle b) Square
   c) Arrow d) Triangle

17) In process charts, the symbol used for inspection is
   a) Circle b) Square c) Arrow d) Triangle

18) Delay occurs when
   a) Someone stops the process b) Product wait for next event
   c) Both a) and b) d) None of the above

19) A milk powder tin is being weighed as it is filled is an example of
   a) Operation cum transportation b) Operation cum inspection
   c) Transportation cum inspection d) None of the above

20) In outline process chart, the horizontal lines represent
   a) General flow of process b) Materials being introduced
   c) Both a) and b) d) None of the above

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Seat No.	

B.E. (Civil) Part – I Examination, 2016
MANAGERIAL TECHNIQUES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Question No. **2** is **compulsory**. Answer **any two** questions out of **3**, **4** and **5**.*
*2) Assume suitable data **if** necessary. But mention it **clearly**.*
*3) Question No. **6** is **compulsory**. Answer **any two** questions out of Q. No. **7**, **8** and **9**.*

SECTION – I

2. a) In a time study for a job done by a worker rating is 80, the data are as follows :

Observed time = 15 min, personal need allowance 5% of the basic time,
fatigue allowance = 2% of basic time, contingency work allowance = 1% of basic time,
contingency delay allowance = 2% of basic time. Find
i) Basic time
ii) Work content
iii) Standard time. **9**

b) Describe the procedure for making a method study. **7**

3. a) Explain the three main types of information recording techniques. **6**

b) Explain Therbligs and SIMO chart. **6**

4. a) Explain Cycle Graph and Chrono Cycle Graph. **6**

b) Explain Demings 14 points for top management. **6**

5. a) Explain the contribution by Juran in TQM. **6**

b) Explain the 'TQM implementation plan'. **6**

SECTION – II

6. a) Explain the three phases of work sampling procedure. **6**

b) Write the uses of work sampling. **4**

c) What are the essential tasks in reliability analysis ? Which tools and aids should be available to conduct efficient and effective reliability analysis ? **6**

Set R

7. a) Explain redundancy techniques and their applications in reliability. **6**

   b) Define creative thinking. Write the three laws of creative thinking. **6**

8. a) Explain the criteria to evaluate the value. **6**

   b) Explain the judgement phase in value engineering. **6**

9. a) Compare normal, binomial and Poisson distribution. **6**

   b) Write note on development phase of value engineering. **6**

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SLR-EP – 405

Seat No.	

Set **S**

B.E. (Civil) Part – I Examination, 2016
MANAGERIAL TECHNIQUES (Elective – I)

Day and Date : Thursday, 8-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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 : 20

1. Choose the correct answer : **(20×1=20)**

1) In process charts, the symbol used for storage is
a) Circle b) Square c) Arrow d) Triangle

2) In process charts, the symbol used for inspection is
a) Circle b) Square
c) Arrow d) Triangle

3) Delay occurs when
a) Someone stops the process b) Product wait for next event
c) Both a) and b) d) None of the above

4) A milk powder tin is being weighed as it is filled is an example of
a) Operation cum transportation b) Operation cum inspection
c) Transportation cum inspection d) None of the above

5) In outline process chart, the horizontal lines represent
a) General flow of process b) Materials being introduced
c) Both a) and b) d) None of the above

6) In outline (operation) process chart, the following symbols are used
a) Operation and inspection b) Operation cum transportation
c) Inspection and transportation d) Operation and storage

7) The following is (are) the type(s) of flow process chart
i) Man type
ii) Material type
iii) Equipment type

The correct answer is
a) Only i b) i and ii
c) ii and iii d) All of the above

8) What is systematic recording and critical examination of the existing and proposed ways of doing work ?
a) Work study b) Time study
c) Method study d) System study

P.T.O.

9) What establishes the time taken by qualified worker to complete a specified job at a defined level of performance ?
   a) Method study b) Work study
   c) Motion study d) Work Measurement

10) Which of the following is not a time measuring device ?
   a) Stop watch b) Electronic timer
   c) Digital camera d) Time recording machine

11) The amount of time required to complete a unit of work under given working conditions is called
   a) Basic time b) Standard time
   c) Allowance time d) Normal time

12) Total Quality Management (TQM) focuses on
   a) Employee b) Customer
   c) Both a) and b) d) None of the above

13) TQM and ISO both focuses on
   a) Customer b) Employee
   c) Supplier d) All of the above

14) According to Deming, Quality problems are
   a) Due to management b) Due to method
   c) Due to machine d) Due to material

15) While setting quality objective _____ to be considered.
   a) Material quality b) Customer need
   c) Market demand d) All of the above

16) Work study consists of
   a) Effective use of plant and equipment b) Effective use of human effort
   c) Evaluation of human work d) All of the above

17) Work study examines
   a) Method b) Duration of work
   c) Both a) and b) d) None of the above

18) Work study is also recognised as
   a) Time study b) Motion study
   c) Both a) and b) d) None of the above

19) The correct order of procedure in method study is
   a) Select – Record – Examine – Develop – Define – Install – Maintain
   b) Select – Define – Examine – Develop – Record – Install – Maintain
   c) Select – Record – Develop – Examine – Define – Install – Maintain
   d) Select – Record – Examine – Define – Develop – Install – Maintain

20) The following factor(s) must be considered while selecting the work for method study
   a) Economic considerations b) Technical considerations
   c) Human reactions d) All of the above

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SLR-EP – 405

Seat No.	

B.E. (Civil) Part – I Examination, 2016
MANAGERIAL TECHNIQUES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Question No. **2** is **compulsory**. Answer **any two** questions out of **3**, **4** and **5**.*
*2) Assume suitable data **if** necessary. But mention it **clearly**.*
*3) Question No. **6** is **compulsory**. Answer **any two** questions out of Q. No. **7**, **8** and **9**.*

SECTION – I

2. a) In a time study for a job done by a worker rating is 80, the data are as follows :

Observed time = 15 min, personal need allowance 5% of the basic time,
fatigue allowance = 2% of basic time, contingency work allowance = 1% of basic time,
contingency delay allowance = 2% of basic time. Find
i) Basic time
ii) Work content
iii) Standard time. **9**

b) Describe the procedure for making a method study. **7**

3. a) Explain the three main types of information recording techniques. **6**

b) Explain Therbligs and SIMO chart. **6**

4. a) Explain Cycle Graph and Chrono Cycle Graph. **6**

b) Explain Demings 14 points for top management. **6**

5. a) Explain the contribution by Juran in TQM. **6**

b) Explain the 'TQM implementation plan'. **6**

SECTION – II

6. a) Explain the three phases of work sampling procedure. **6**

b) Write the uses of work sampling. **4**

c) What are the essential tasks in reliability analysis ? Which tools and aids should be available to conduct efficient and effective reliability analysis ? **6**

Set S

7. a) Explain redundancy techniques and their applications in reliability. **6**

   b) Define creative thinking. Write the three laws of creative thinking. **6**

8. a) Explain the criteria to evaluate the value. **6**

   b) Explain the judgement phase in value engineering. **6**

9. a) Compare normal, binomial and Poisson distribution. **6**

   b) Write note on development phase of value engineering. **6**

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SLR-EP – 410

Seat No.	

Set **P**

B.E. (Civil) Part – II (Old) Examination, 2016
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *From Section – **I**, Q. **2** is **compulsory**. Attempt **any 2** in the remaining questions.*
2) *From Section – **II**, Q. **6** is **compulsory**. Attempt **any 2** in the remaining questions.*
3) *The maximum mark to **each** question is mentioned in the **right** side of **each** question.*
4) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
5) ***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 : 20

1. Choose the correct alternatives : **(20×1=20)**

1) Which is not an objective of ground improvement ?
   a) Increase strength b) Increase strain
   c) Reduce erodibility d) Reduce compressibility

2) Which one is not the aim of mechanical modification ?
   a) Reduce durability b) Reduce permeability
   c) Reduce compressibility d) Reduce liquefaction potential

3) To ensure discharge capacity of drain not to hamper maximum longitudinal strain at failure should be limited to
   a) 2% b) 5% c) 10% d) None

4) Which of following is not a temporary dewatering method ?
   a) Sheetpiling b) Well point system
   c) Deep bored well d) Vacuum method

5) Vibroflotation cannot be used when clay content is
   a) 0% b) < 2% c) < 3% d) < 7.5%

6) By vibro compaction hydraulic conductivity of soil get reduced
   a) 100 fold b) 500 fold c) 100 – 200 fold d) 2 – 50 fold

7) Vibroflot is inserted into the ground by
   a) Hammering it b) Lifting it and dropping it
   c) Pushing it d) Jetting

P.T.O.

8) In case of collapsible clays and silty soil ; ideal method of stone column construction is
   a) Bottom feed method b) Wet top feed method
   c) Dry top feed method d) None

9) While calculating ultimate capacity for stone column ; in absence of pressuremeter the value of radial stress will be taken as
   a) CU b) 2 CU c) 4 CU d) None

10) In Priebe method the value of Poissons ratio of stone column material is assumed to be
   a) 1/2 b) 1/3 c) 1/4 d) 1/5

11) If the strength of a geotextile in a technical report is written as 100/40 kN/m, then its strength in the cross machine direction will be
   a) 100 kN/m. b) 40 kN/m.
   c) 60 kN/m. d) None of the above

12) The ability of a geosynthetic to withstand localized stresses generated by penetrating objects under quasi-static conditions is called its
   a) Tensile strength b) Tearing strength
   c) Bursting strength d) Puncture strength

13) Filtration function also provides
   a) Reinforcement benefits b) Separation benefits
   c) Fluid barrier benefits d) None of the above

14) The compressibility is relatively high for
   a) Woven geotextiles
   b) Needle-punched nonwoven geotextiles
   c) Thermally bonded geotextiles
   d) Knitted geotextiles

15) For rapid impact compaction frequency of blows is
   a) 4 blow/min. b) 4 blow/sec. c) 40 blow/hr. d) 40 blow/min.

16) In case of deep dynamic compaction contact pressure developed under the tamper is
   a) 10-20 kPa b) 20-40 kPa c) 40-60 kPa d) 40-70 kPa

17) Which soil does not respond to compaction ?
   a) C-soil b) ϕ - soil c) C-ϕ soil d) Organic soil

18) Calcium oxide is also called
   a) Hydrated lime b) Quick lime c) Agricultural lime d) None

19) Grout should not move much away from its destination can be controlled by
   a) Groutability b) Stability c) Permanence d) Setting time

20) Relatively thin grout with low viscosity is used in case of
   a) Intrusion grouting b) Jet grouting
   c) Permeation grouting d) Fracture grouting

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SLR-EP – 410

Seat No.	

B.E. (Civil) Part – II (Old) Examination, 2016
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) From Section – **I**, Q. **2** is **compulsory**. Attempt **any 2** in the remaining questions.*
*2) From Section – **II**, Q. **6** is **compulsory**. Attempt **any 2** in the remaining questions.*
*3) The maximum mark to **each** question is mentioned in the **right** side of **each** question.*

SECTION – I

2. Write note on **any three** : **(4×3=12)**
   a) Vibro compaction process.
   b) Factors affecting drain efficiency.
   c) Dewatering.
   d) Types of dynamic compaction method.
   e) Equipments used for shallow foundation.

3. a) Design a stone column system for a structure carrying 20000 kN. Substrata consists of clayey soil having undrained cohesion of 32 kPa. The angle of wall friction for the material of stone column is 42°. Assume FOS = 2, draw plan and elevation of the proposal. **6**
   b) Compare sand drain and prefabricated vertical drain. **4**
   c) What are the factors affecting selection of ground improvement technique ? **4**

4. a) What are the common methods of dewatering ? Discuss applicability of dewatering system in different soil. **6**
   b) How do you decide the filter material for PVD system ? **4**
   c) Derive the relationship between spacing and equivalent diameter for square grid and triangular grid. **4**

5. a) Design suitable deep compaction system for the site to improve 10 m thick deposit of soil which lies in Zone II. Assume suitable data for design. Draw neat sketch of the proposal. **6**
   b) Why do we install sand drains along with preload ? Explain with a neat sketch. **4**
   c) What are the different types of specifications for compaction control ? **4**

Set P

SECTION – II

6. Write a note on **any three** : **(4×3=12)**
   a) Commonly adopted tests for geotextiles.
   b) Grout Monitoring.
   c) Functions of geosynthetics in highway.
   d) Soil lime reaction.
   e) Reinforced earth wall.

7. a) Design reinforcement for the earth wall to suit the following parameters. Height of wall 12 m, backfill soil unit weight – 22 kN/m^3, $\phi = 30°$, C = 0, Yield stress for the reinforcement strip – 250 kPa, Angle of wall friction – 0.5ϕ. **6**
   b) Discuss the purpose of soil stabilization. **4**
   c) Enumerate and describe the various types of lime used in stabilization of soil. **4**

8. a) With the help of neat sketch, explain in detail various methods of grouting. **6**
   b) List the major functions that the geotextiles are intended to perform. Explain any one in detail. **4**
   c) Discuss about factor of safety of R.E Wall. **4**

9. a) Discuss the different forms of geogrid and state their functions in the stabilization of soil. **6**
   b) With a neat sketch, explain the functions of each component of the grouting equipments. **4**
   c) What do you understand by slope stabilization ? List the various methods of slope stabilization. **4**

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SLR-EP – 410

Seat No.	

Set **Q**

B.E. (Civil) Part – II (Old) Examination, 2016
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) From Section – **I**, Q. **2** is **compulsory**. Attempt **any 2** in the remaining questions.*

*2) From Section – **II**, Q. **6** is **compulsory**. Attempt **any 2** in the remaining questions.*

*3) The maximum mark to **each** question is mentioned in the **right** side of **each** question.*

*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*5) **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 : 20

1. Choose the correct alternatives : **(20×1=20)**

1) In case of deep dynamic compaction contact pressure developed under the tamper is
a) 10-20 kPa b) 20-40 kPa c) 40-60 kPa d) 40-70 kPa

2) Which soil does not respond to compaction ?
a) C-soil b) ϕ - soil c) C-ϕ soil d) Organic soil

3) Calcium oxide is also called
a) Hydrated lime b) Quick lime c) Agricultural lime d) None

4) Grout should not move much away from its destination can be controlled by
a) Groutability b) Stability c) Permanence d) Setting time

5) Relatively thin grout with low viscosity is used in case of
a) Intrusion grouting b) Jet grouting
c) Permeation grouting d) Fracture grouting

6) Which is not an objective of ground improvement ?
a) Increase strength b) Increase strain
c) Reduce erodibility d) Reduce compressibility

7) Which one is not the aim of mechanical modification ?
a) Reduce durability b) Reduce permeability
c) Reduce compressibility d) Reduce liquefaction potential

P.T.O.

8) To ensure discharge capacity of drain not to hamper maximum longitudinal strain at failure should be limited to
   a) 2% b) 5% c) 10% d) None

9) Which of following is not a temporary dewatering method ?
   a) Sheetpiling b) Well point system
   c) Deep bored well d) Vacuum method

10) Vibroflotation cannot be used when clay content is
   a) 0% b) < 2% c) < 3% d) < 7.5%

11) By vibro compaction hydraulic conductivity of soil get reduced
   a) 100 fold b) 500 fold c) 100 – 200 fold d) 2 – 50 fold

12) Vibroflot is inserted into the ground by
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13) In case of collapsible clays and silty soil ; ideal method of stone column construction is
   a) Bottom feed method b) Wet top feed method
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14) While calculating ultimate capacity for stone column ; in absence of pressuremeter the value of radial stress will be taken as
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15) In Priebe method the value of Poissons ratio of stone column material is assumed to be
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16) If the strength of a geotextile in a technical report is written as 100/40 kN/m, then its strength in the cross machine direction will be
   a) 100 kN/m. b) 40 kN/m.
   c) 60 kN/m. d) None of the above

17) The ability of a geosynthetic to withstand localized stresses generated by penetrating objects under quasi-static conditions is called its
   a) Tensile strength b) Tearing strength
   c) Bursting strength d) Puncture strength

18) Filtration function also provides
   a) Reinforcement benefits b) Separation benefits
   c) Fluid barrier benefits d) None of the above

19) The compressibility is relatively high for
   a) Woven geotextiles
   b) Needle-punched nonwoven geotextiles
   c) Thermally bonded geotextiles
   d) Knitted geotextiles

20) For rapid impact compaction frequency of blows is
   a) 4 blow/min. b) 4 blow/sec. c) 40 blow/hr. d) 40 blow/min.

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SLR-EP – 410

Seat No.	

B.E. (Civil) Part – II (Old) Examination, 2016
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) From Section – **I**, Q. **2** is **compulsory**. Attempt **any 2** in the remaining questions.*
*2) From Section – **II**, Q. **6** is **compulsory**. Attempt **any 2** in the remaining questions.*
*3) The maximum mark to **each** question is mentioned in the **right** side of **each** question.*

SECTION – I

2. Write note on **any three** : **(4×3=12)**
   a) Vibro compaction process.
   b) Factors affecting drain efficiency.
   c) Dewatering.
   d) Types of dynamic compaction method.
   e) Equipments used for shallow foundation.

3. a) Design a stone column system for a structure carrying 20000 kN. Substrata consists of clayey soil having undrained cohesion of 32 kPa. The angle of wall friction for the material of stone column is 42°. Assume FOS = 2, draw plan and elevation of the proposal. **6**
   b) Compare sand drain and prefabricated vertical drain. **4**
   c) What are the factors affecting selection of ground improvement technique ? **4**

4. a) What are the common methods of dewatering ? Discuss applicability of dewatering system in different soil. **6**
   b) How do you decide the filter material for PVD system ? **4**
   c) Derive the relationship between spacing and equivalent diameter for square grid and triangular grid. **4**

5. a) Design suitable deep compaction system for the site to improve 10 m thick deposit of soil which lies in Zone II. Assume suitable data for design. Draw neat sketch of the proposal. **6**
   b) Why do we install sand drains along with preload ? Explain with a neat sketch. **4**
   c) What are the different types of specifications for compaction control ? **4**

Set Q

SECTION – II

6. Write a note on **any three** : **(4×3=12)**
   a) Commonly adopted tests for geotextiles.
   b) Grout Monitoring.
   c) Functions of geosynthetics in highway.
   d) Soil lime reaction.
   e) Reinforced earth wall.

7. a) Design reinforcement for the earth wall to suit the following parameters. Height of wall 12 m, backfill soil unit weight – 22 kN/m^3, $\phi = 30°$, C = 0, Yield stress for the reinforcement strip – 250 kPa, Angle of wall friction – 0.5ϕ. **6**
   b) Discuss the purpose of soil stabilization. **4**
   c) Enumerate and describe the various types of lime used in stabilization of soil. **4**

8. a) With the help of neat sketch, explain in detail various methods of grouting. **6**
   b) List the major functions that the geotextiles are intended to perform. Explain any one in detail. **4**
   c) Discuss about factor of safety of R.E Wall. **4**

9. a) Discuss the different forms of geogrid and state their functions in the stabilization of soil. **6**
   b) With a neat sketch, explain the functions of each component of the grouting equipments. **4**
   c) What do you understand by slope stabilization ? List the various methods of slope stabilization. **4**

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SLR-EP – 410

Seat No.	

Set **R**

B.E. (Civil) Part – II (Old) Examination, 2016
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *From Section – **I**, Q. **2** is **compulsory**. Attempt **any 2** in the remaining questions.*
2) *From Section – **II**, Q. **6** is **compulsory**. Attempt **any 2** in the remaining questions.*
3) *The maximum mark to **each** question is mentioned in the **right** side of **each** question.*
4) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
5) ***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 : 20

1. Choose the correct alternatives : **(20×1=20)**

1) If the strength of a geotextile in a technical report is written as 100/40 kN/m, then its strength in the cross machine direction will be
   a) 100 kN/m. b) 40 kN/m.
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2) The ability of a geosynthetic to withstand localized stresses generated by penetrating objects under quasi-static conditions is called its
   a) Tensile strength b) Tearing strength
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4) The compressibility is relatively high for
   a) Woven geotextiles
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   c) Thermally bonded geotextiles
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5) For rapid impact compaction frequency of blows is
   a) 4 blow/min. b) 4 blow/sec. c) 40 blow/hr. d) 40 blow/min.

P.T.O.

6) In case of deep dynamic compaction contact pressure developed under the tamper is
a) 10-20 kPa b) 20-40 kPa c) 40-60 kPa d) 40-70 kPa

7) Which soil does not respond to compaction ?
a) C-soil b) ϕ - soil c) C-ϕ soil d) Organic soil

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13) To ensure discharge capacity of drain not to hamper maximum longitudinal strain at failure should be limited to
a) 2% b) 5% c) 10% d) None

14) Which of following is not a temporary dewatering method ?
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15) Vibroflotation cannot be used when clay content is
a) 0% b) < 2% c) < 3% d) < 7.5%

16) By vibro compaction hydraulic conductivity of soil get reduced
a) 100 fold b) 500 fold c) 100 – 200 fold d) 2 – 50 fold

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a) Bottom feed method b) Wet top feed method
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19) While calculating ultimate capacity for stone column ; in absence of pressuremeter the value of radial stress will be taken as
a) CU b) 2 CU c) 4 CU d) None

20) In Priebe method the value of Poissons ratio of stone column material is assumed to be
a) 1/2 b) 1/3 c) 1/4 d) 1/5

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SLR-EP – 410

Seat No.	

B.E. (Civil) Part – II (Old) Examination, 2016
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) From Section – **I**, Q. **2** is **compulsory**. Attempt **any 2** in the remaining questions.*
*2) From Section – **II**, Q. **6** is **compulsory**. Attempt **any 2** in the remaining questions.*
*3) The maximum mark to **each** question is mentioned in the **right** side of **each** question.*

SECTION – I

2. Write note on **any three** : **(4×3=12)**
   a) Vibro compaction process.
   b) Factors affecting drain efficiency.
   c) Dewatering.
   d) Types of dynamic compaction method.
   e) Equipments used for shallow foundation.

3. a) Design a stone column system for a structure carrying 20000 kN. Substrata consists of clayey soil having undrained cohesion of 32 kPa. The angle of wall friction for the material of stone column is 42°. Assume FOS = 2, draw plan and elevation of the proposal. **6**
   b) Compare sand drain and prefabricated vertical drain. **4**
   c) What are the factors affecting selection of ground improvement technique ? **4**

4. a) What are the common methods of dewatering ? Discuss applicability of dewatering system in different soil. **6**
   b) How do you decide the filter material for PVD system ? **4**
   c) Derive the relationship between spacing and equivalent diameter for square grid and triangular grid. **4**

5. a) Design suitable deep compaction system for the site to improve 10 m thick deposit of soil which lies in Zone II. Assume suitable data for design. Draw neat sketch of the proposal. **6**
   b) Why do we install sand drains along with preload ? Explain with a neat sketch. **4**
   c) What are the different types of specifications for compaction control ? **4**

Set R

SECTION – II

6. Write a note on **any three** : **(4×3=12)**
   a) Commonly adopted tests for geotextiles.
   b) Grout Monitoring.
   c) Functions of geosynthetics in highway.
   d) Soil lime reaction.
   e) Reinforced earth wall.

7. a) Design reinforcement for the earth wall to suit the following parameters. Height of wall 12 m, backfill soil unit weight – 22 kN/m^3, $\phi = 30°$, C = 0, Yield stress for the reinforcement strip – 250 kPa, Angle of wall friction – 0.5ϕ. **6**
   b) Discuss the purpose of soil stabilization. **4**
   c) Enumerate and describe the various types of lime used in stabilization of soil. **4**

8. a) With the help of neat sketch, explain in detail various methods of grouting. **6**
   b) List the major functions that the geotextiles are intended to perform. Explain any one in detail. **4**
   c) Discuss about factor of safety of R.E Wall. **4**

9. a) Discuss the different forms of geogrid and state their functions in the stabilization of soil. **6**
   b) With a neat sketch, explain the functions of each component of the grouting equipments. **4**
   c) What do you understand by slope stabilization ? List the various methods of slope stabilization. **4**

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SLR-EP – 410

Seat No.	

Set **S**

B.E. (Civil) Part – II (Old) Examination, 2016
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) From Section – **I**, Q. **2** is **compulsory**. Attempt **any 2** in the remaining questions.*

*2) From Section – **II**, Q. **6** is **compulsory**. Attempt **any 2** in the remaining questions.*

*3) The maximum mark to **each** question is mentioned in the **right** side of **each** question.*

*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

5) 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 : 20

1. Choose the correct alternatives : **(20×1=20)**

1) By vibro compaction hydraulic conductivity of soil get reduced
   a) 100 fold b) 500 fold c) 100 – 200 fold d) 2 – 50 fold

2) Vibroflot is inserted into the ground by
   a) Hammering it b) Lifting it and dropping it
   c) Pushing it d) Jetting

3) In case of collapsible clays and silty soil ; ideal method of stone column construction is
   a) Bottom feed method b) Wet top feed method
   c) Dry top feed method d) None

4) While calculating ultimate capacity for stone column ; in absence of pressuremeter the value of radial stress will be taken as
   a) CU b) 2 CU c) 4 CU d) None

5) In Priebe method the value of Poissons ratio of stone column material is assumed to be
   a) 1/2 b) 1/3 c) 1/4 d) 1/5

6) If the strength of a geotextile in a technical report is written as 100/40 kN/m, then its strength in the cross machine direction will be
   a) 100 kN/m. b) 40 kN/m.
   c) 60 kN/m. d) None of the above

7) The ability of a geosynthetic to withstand localized stresses generated by penetrating objects under quasi-static conditions is called its
   a) Tensile strength b) Tearing strength
   c) Bursting strength d) Puncture strength

8) Filtration function also provides
   a) Reinforcement benefits b) Separation benefits
   c) Fluid barrier benefits d) None of the above

9) The compressibility is relatively high for
   a) Woven geotextiles
   b) Needle-punched nonwoven geotextiles
   c) Thermally bonded geotextiles
   d) Knitted geotextiles

10) For rapid impact compaction frequency of blows is
   a) 4 blow/min. b) 4 blow/sec. c) 40 blow/hr. d) 40 blow/min.

11) In case of deep dynamic compaction contact pressure developed under the tamper is
   a) 10-20 kPa b) 20-40 kPa c) 40-60 kPa d) 40-70 kPa

12) Which soil does not respond to compaction ?
   a) C-soil b) ϕ - soil c) C-ϕ soil d) Organic soil

13) Calcium oxide is also called
   a) Hydrated lime b) Quick lime c) Agricultural lime d) None

14) Grout should not move much away from its destination can be controlled by
   a) Groutability b) Stability c) Permanence d) Setting time

15) Relatively thin grout with low viscosity is used in case of
   a) Intrusion grouting b) Jet grouting
   c) Permeation grouting d) Fracture grouting

16) Which is not an objective of ground improvement ?
   a) Increase strength b) Increase strain
   c) Reduce erodibility d) Reduce compressibility

17) Which one is not the aim of mechanical modification ?
   a) Reduce durability b) Reduce permeability
   c) Reduce compressibility d) Reduce liquefaction potential

18) To ensure discharge capacity of drain not to hamper maximum longitudinal strain at failure should be limited to
   a) 2% b) 5% c) 10% d) None

19) Which of following is not a temporary dewatering method ?
   a) Sheetpiling b) Well point system
   c) Deep bored well d) Vacuum method

20) Vibroflotation cannot be used when clay content is
   a) 0% b) < 2% c) < 3% d) < 7.5%

SLR-EP – 410

Seat No.	

B.E. (Civil) Part – II (Old) Examination, 2016
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) From Section – **I**, Q. **2** is **compulsory**. Attempt **any 2** in the remaining questions.*
*2) From Section – **II**, Q. **6** is **compulsory**. Attempt **any 2** in the remaining questions.*
*3) The maximum mark to **each** question is mentioned in the **right** side of **each** question.*

SECTION – I

2. Write note on **any three** : **(4×3=12)**
   a) Vibro compaction process.
   b) Factors affecting drain efficiency.
   c) Dewatering.
   d) Types of dynamic compaction method.
   e) Equipments used for shallow foundation.

3. a) Design a stone column system for a structure carrying 20000 kN. Substrata consists of clayey soil having undrained cohesion of 32 kPa. The angle of wall friction for the material of stone column is 42°. Assume FOS = 2, draw plan and elevation of the proposal. **6**
   b) Compare sand drain and prefabricated vertical drain. **4**
   c) What are the factors affecting selection of ground improvement technique ? **4**

4. a) What are the common methods of dewatering ? Discuss applicability of dewatering system in different soil. **6**
   b) How do you decide the filter material for PVD system ? **4**
   c) Derive the relationship between spacing and equivalent diameter for square grid and triangular grid. **4**

5. a) Design suitable deep compaction system for the site to improve 10 m thick deposit of soil which lies in Zone II. Assume suitable data for design. Draw neat sketch of the proposal. **6**
   b) Why do we install sand drains along with preload ? Explain with a neat sketch. **4**
   c) What are the different types of specifications for compaction control ? **4**

Set S

SECTION – II

6. Write a note on **any three** : **(4×3=12)**
   a) Commonly adopted tests for geotextiles.
   b) Grout Monitoring.
   c) Functions of geosynthetics in highway.
   d) Soil lime reaction.
   e) Reinforced earth wall.

7. a) Design reinforcement for the earth wall to suit the following parameters. Height of wall 12 m, backfill soil unit weight – 22 kN/m^3, $\phi = 30°$, C = 0, Yield stress for the reinforcement strip – 250 kPa, Angle of wall friction – 0.5ϕ. **6**
   b) Discuss the purpose of soil stabilization. **4**
   c) Enumerate and describe the various types of lime used in stabilization of soil. **4**

8. a) With the help of neat sketch, explain in detail various methods of grouting. **6**
   b) List the major functions that the geotextiles are intended to perform. Explain any one in detail. **4**
   c) Discuss about factor of safety of R.E Wall. **4**

9. a) Discuss the different forms of geogrid and state their functions in the stabilization of soil. **6**
   b) With a neat sketch, explain the functions of each component of the grouting equipments. **4**
   c) What do you understand by slope stabilization ? List the various methods of slope stabilization. **4**

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SLR-EP – 411

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (Old) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicates* ***full*** *marks.*
2) Assume any missing data ***suitably****.*
3) Q. No. ***I*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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 : 20

I. 1) Choose the correct answer : **(20×1=20)**

1) The 30^{th} hourly volume means
   a) Hourly volume that will be exceeded only 29 times in a year
   b) Hourly volume that will be exceeded only 30 times in a year
   c) Hourly volume that will be exceeded only 70 times in a year
   d) None of the above

2) Cumulative speed distribution curve is usually adopted for geometric design of highway. The percentile speed adopted for geometric design is
   a) 85^{th} percentile b) 90^{th} percentile c) 98^{th} percentile d) 99.9^{th} percentile

3) With increasing the value of speed, the volume
   a) Increases
   b) Decreases
   c) Increase up to certain limit and thereafter decreases
   d) Initially decreases and thereafter increases

4) Spot speed is the
   a) Instantaneous speed of vehicle at a specified location or section
   b) Average speed of the vehicle at a specified location or section
   c) Effective speed of the vehicle at a specified location or section
   d) Normal speed of the vehicle at a specified location or section

5) Spot speed data is useful in
   a) Deciding the speed trends b) Studying the traffic capacity
   c) Planning traffic control devices d) All the above

6) In cumulative distribution curve 85^{th} percentile speed represents
   a) 85% of the vehicles travelling on this speed
   b) 15% of the vehicles exceed this speed
   c) 85% of the vehicles travelling more than this speed
   d) Both a) and b)

P.T.O.

7) License plate or vehicle number method is classified under
   a) Speed and delay survey b) Origin and destination survey
   c) Spot speed study d) Both a) and b)

8) As the speed increases beyond optimum speed, the capacity is
   a) Decreases b) Increases
   c) Constant d) None of the above

9) The STOP sign board will be in _____ shape.
   a) Octagonal b) Circle c) Triangle d) Rectangle

10) Skid resistance of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump integrator
   c) Photometer d) Pedometer

11) In the conditions diagram, the features shown in the diagram are
   a) Property lines b) Street lighting
   c) Traffic signs, signals and markings d) All the above

12) The maximum speed allowed in rural area for medium or heavy passenger motor vehicle is
   a) 60 kmph b) 50 kmph c) 90 kmph d) 100 kmph

13) Object markers are placed at
   a) Median openings b) On curves c) Footpath d) Urban location

14) A part of the signal cycle allocated to a traffic movement or a combination of a traffic movement is called
   a) Cycle b) Phase
   c) Amber d) None of the above

15) The principle of linking the adjacent signals to secure maximum flow is called
   a) Continuous flow signals b) Signal co-ordination
   c) Signal control d) Automatic signal

16) In Indian practice, the time assigned for amber period is
   a) 6 sec. b) 4 sec. c) 2 sec. d) 5 sec.

17) STOP sign should not be used
   a) On through roads or express ways b) For speed control
   c) At signalized intersection d) All the above

18) The basic requirement of any sign board are
   a) High visibility during day and night
   b) Lettering or symbols of adequate size
   c) Signs should be placed at closer intervals
   d) Both a) and b)

19) The number of centerlines marked for 6 lane divided highway on one side are
   a) 3 b) 6 c) 2 d) 5

20) As per IRC, minimum space requirement for parking of truck is
   a) 3 × 8 m b) 3.75 × 7.5 m c) 2.5 × 5 m d) 3 × 6 m

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SLR-EP – 411

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicates* ***full*** *marks.*
2) Assume any missing data ***suitably****.*

PART – A

II. Answer **any two full** questions (**each** carries **20** marks) :

2) a) Discuss briefly the various factors which affect the road user characteristics and their effects in traffic performance. **8**

b) List and explain the factors which affect the vehicle characteristics. **6**

c) Define reaction time of a driver and hence explain the PIEV theory with neat sketch. **6**

3) a) List out the different types of traffic studies and explain any one in detail. **6**

b) Define spot speed, running speed, space mean speed and time mean speed. **6**

c) Spot speed studies were carried out at a certain stretch of a highway with mixed traffic flow and the consolidated data collected are given below :

Speed Range, kmph	No.of vehicles observed	Speed Range, kmph	No. of vehicles observed
0 to 10	12	50 to 60	255
10 to 20	18	60 to 70	119
20 to 30	68	70 to 80	43
30 to 40	89	80 to 90	33
40 to 50	204	90 to 100	9

Determine (i) The upper and lower speed limit values for installing regulation signs (ii) The design speed for checking the geometric design elements of the highway. **8**

4) a) Write a short note on moving car observer method with its advantages. **6**

b) Write a short note on off-street parking. **6**

c) A vehicle of weight 2.0 tonne skids through a distance equal to 40 m before colliding with another parked vehicle of weight 1.0 tonne. After collision both the vehicles skid through a distance equal to 12 m before stopping. Compute the initial speed of the moving vehicle. Assume average coefficient of friction as 0.5. **8**

PART – B

III. Answer **any two full** questions (**each** carries **20** marks) :

5) a) Write a short note on "Regulation on Speed". **6**

b) Discuss the advantages and disadvantages of one way street. **6**

c) If 'A' vehicle travelling on the major or preferential street and 'B' vehicle travelling on the minor street. Assume the speed of vehicle 'A' is 60 kmph and the distance to the obstacle from vehicle 'A' and 'B' are 15 m and 20 m respectively. Calculate the speed limit on the minor street by (i) National Safety Council method and (ii) AASTHO method. **8**

6) a) Explain with neat sketch different types of warning signs. **6**

b) Calculate the spacing between the lighting units to produce a lux equal to 6.0 from the following data :
Width of road = 15 m
Mounting height = 7.5 m
Lamp size = 6000 lumen
Luminaire type = II (Use Figure – 1 to solve this problem). **8**

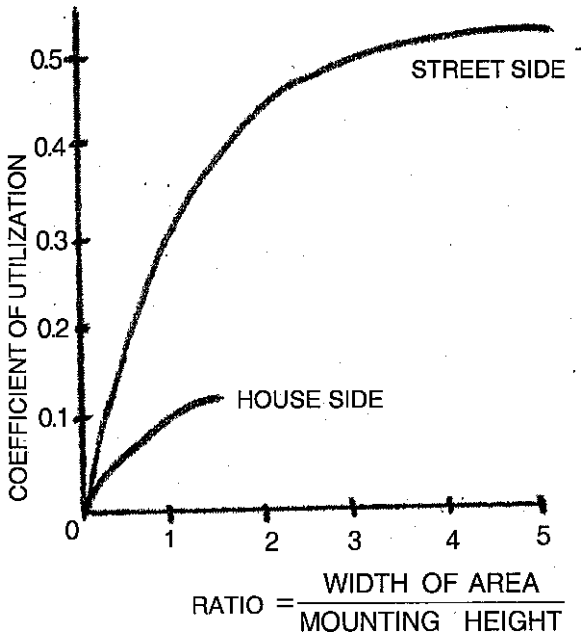

Figure – 1 : Coefficient of Utilization

c) Write a short note on (i) PCU (ii) LOS. **6**

7) a) Explain the application of (i) Bump Integrator and (ii) Portable Skid Resistance Tester. **8**

b) List the different types of road marking. Explain with neat sketch (i) Road centerline marking and (ii) No overtaking zone markings. **6**

c) Explain the function of roadway delineators and object markers with neat sketch. **6**

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Set P

SLR-EP – 411

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (Old) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicates* ***full*** *marks.*
2) Assume any missing data ***suitably****.*
3) Q. No. ***I*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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 : 20

I. 1) Choose the correct answer : **(20×1=20)**

1) In Indian practice, the time assigned for amber period is
   a) 6 sec. b) 4 sec. c) 2 sec. d) 5 sec.

2) STOP sign should not be used
   a) On through roads or express ways b) For speed control
   c) At signalized intersection d) All the above

3) The basic requirement of any sign board are
   a) High visibility during day and night
   b) Lettering or symbols of adequate size
   c) Signs should be placed at closer intervals
   d) Both a) and b)

4) The number of centerlines marked for 6 lane divided highway on one side are
   a) 3 b) 6 c) 2 d) 5

5) As per IRC, minimum space requirement for parking of truck is
   a) 3 × 8 m b) 3.75 × 7.5 m c) 2.5 × 5 m d) 3 × 6 m

6) The 30^{th} hourly volume means
   a) Hourly volume that will be exceeded only 29 times in a year
   b) Hourly volume that will be exceeded only 30 times in a year
   c) Hourly volume that will be exceeded only 70 times in a year
   d) None of the above

7) Cumulative speed distribution curve is usually adopted for geometric design of highway. The percentile speed adopted for geometric design is
   a) 85^{th} percentile b) 90^{th} percentile c) 98^{th} percentile d) 99.9^{th} percentile

8) With increasing the value of speed, the volume
   a) Increases
   b) Decreases
   c) Increase up to certain limit and thereafter decreases
   d) Initially decreases and thereafter increases

P.T.O.

9) Spot speed is the
   a) Instantaneous speed of vehicle at a specified location or section
   b) Average speed of the vehicle at a specified location or section
   c) Effective speed of the vehicle at a specified location or section
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10) Spot speed data is useful in
   a) Deciding the speed trends b) Studying the traffic capacity
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11) In cumulative distribution curve 85^{th} percentile speed represents
   a) 85% of the vehicles travelling on this speed
   b) 15% of the vehicles exceed this speed
   c) 85% of the vehicles travelling more than this speed
   d) Both a) and b)

12) License plate or vehicle number method is classified under
   a) Speed and delay survey b) Origin and destination survey
   c) Spot speed study d) Both a) and b)

13) As the speed increases beyond optimum speed, the capacity is
   a) Decreases b) Increases
   c) Constant d) None of the above

14) The STOP sign board will be in _____ shape.
   a) Octagonal b) Circle c) Triangle d) Rectangle

15) Skid resistance of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump integrator
   c) Photometer d) Pedometer

16) In the conditions diagram, the features shown in the diagram are
   a) Property lines b) Street lighting
   c) Traffic signs, signals and markings d) All the above

17) The maximum speed allowed in rural area for medium or heavy passenger motor vehicle is
   a) 60 kmph b) 50 kmph c) 90 kmph d) 100 kmph

18) Object markers are placed at
   a) Median openings b) On curves c) Footpath d) Urban location

19) A part of the signal cycle allocated to a traffic movement or a combination of a traffic movement is called
   a) Cycle b) Phase
   c) Amber d) None of the above

20) The principle of linking the adjacent signals to secure maximum flow is called
   a) Continuous flow signals b) Signal co-ordination
   c) Signal control d) Automatic signal

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SLR-EP – 411

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicates* ***full*** *marks.*
2) Assume any missing data ***suitably****.*

PART – A

II. Answer **any two full** questions (**each** carries **20** marks) :

2) a) Discuss briefly the various factors which affect the road user characteristics and their effects in traffic performance. **8**

b) List and explain the factors which affect the vehicle characteristics. **6**

c) Define reaction time of a driver and hence explain the PIEV theory with neat sketch. **6**

3) a) List out the different types of traffic studies and explain any one in detail. **6**

b) Define spot speed, running speed, space mean speed and time mean speed. **6**

c) Spot speed studies were carried out at a certain stretch of a highway with mixed traffic flow and the consolidated data collected are given below :

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Determine (i) The upper and lower speed limit values for installing regulation signs (ii) The design speed for checking the geometric design elements of the highway. **8**

4) a) Write a short note on moving car observer method with its advantages. **6**

b) Write a short note on off-street parking. **6**

c) A vehicle of weight 2.0 tonne skids through a distance equal to 40 m before colliding with another parked vehicle of weight 1.0 tonne. After collision both the vehicles skid through a distance equal to 12 m before stopping. Compute the initial speed of the moving vehicle. Assume average coefficient of friction as 0.5. **8**

PART – B

III. Answer **any two full** questions (**each** carries **20** marks) :

5) a) Write a short note on "Regulation on Speed". **6**

b) Discuss the advantages and disadvantages of one way street. **6**

c) If 'A' vehicle travelling on the major or preferential street and 'B' vehicle travelling on the minor street. Assume the speed of vehicle 'A' is 60 kmph and the distance to the obstacle from vehicle 'A' and 'B' are 15 m and 20 m respectively. Calculate the speed limit on the minor street by (i) National Safety Council method and (ii) AASTHO method. **8**

6) a) Explain with neat sketch different types of warning signs. **6**

b) Calculate the spacing between the lighting units to produce a lux equal to 6.0 from the following data :
Width of road = 15 m
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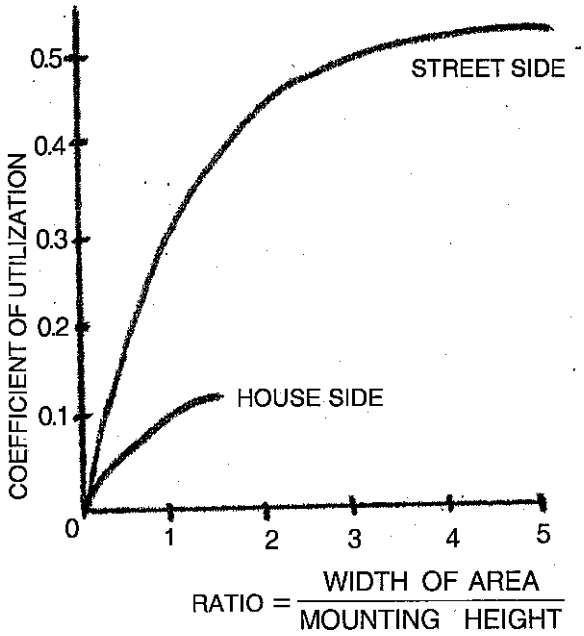

Figure – 1 : Coefficient of Utilization

c) Write a short note on (i) PCU (ii) LOS. **6**

7) a) Explain the application of (i) Bump Integrator and (ii) Portable Skid Resistance Tester. **8**

b) List the different types of road marking. Explain with neat sketch (i) Road centerline marking and (ii) No overtaking zone markings. **6**

c) Explain the function of roadway delineators and object markers with neat sketch. **6**

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Set Q

SLR-EP – 411

Seat No.	

Set **R**

B.E. (Civil) (Part – II) (Old) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicates* ***full*** *marks.*
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3) Q. No. ***I*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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 : 20

I. 1) Choose the correct answer : **(20×1=20)**

1) In the conditions diagram, the features shown in the diagram are
   a) Property lines b) Street lighting
   c) Traffic signs, signals and markings d) All the above

2) The maximum speed allowed in rural area for medium or heavy passenger motor vehicle is
   a) 60 kmph b) 50 kmph c) 90 kmph d) 100 kmph

3) Object markers are placed at
   a) Median openings b) On curves c) Footpath d) Urban location

4) A part of the signal cycle allocated to a traffic movement or a combination of a traffic movement is called
   a) Cycle b) Phase
   c) Amber d) None of the above

5) The principle of linking the adjacent signals to secure maximum flow is called
   a) Continuous flow signals b) Signal co-ordination
   c) Signal control d) Automatic signal

6) In Indian practice, the time assigned for amber period is
   a) 6 sec. b) 4 sec. c) 2 sec. d) 5 sec.

7) STOP sign should not be used
   a) On through roads or express ways b) For speed control
   c) At signalized intersection d) All the above

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   a) High visibility during day and night
   b) Lettering or symbols of adequate size
   c) Signs should be placed at closer intervals
   d) Both a) and b)

P.T.O.

9) The number of centerlines marked for 6 lane divided highway on one side are
   a) 3 b) 6 c) 2 d) 5

10) As per IRC, minimum space requirement for parking of truck is
   a) 3 × 8 m b) 3.75 × 7.5 m c) 2.5 × 5 m d) 3 × 6 m

11) The 30^{th} hourly volume means
   a) Hourly volume that will be exceeded only 29 times in a year
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   d) None of the above

12) Cumulative speed distribution curve is usually adopted for geometric design of highway. The percentile speed adopted for geometric design is
   a) 85^{th} percentile b) 90^{th} percentile c) 98^{th} percentile d) 99.9^{th} percentile

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   a) Increases
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   a) Instantaneous speed of vehicle at a specified location or section
   b) Average speed of the vehicle at a specified location or section
   c) Effective speed of the vehicle at a specified location or section
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15) Spot speed data is useful in
   a) Deciding the speed trends b) Studying the traffic capacity
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16) In cumulative distribution curve 85^{th} percentile speed represents
   a) 85% of the vehicles travelling on this speed
   b) 15% of the vehicles exceed this speed
   c) 85% of the vehicles travelling more than this speed
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17) License plate or vehicle number method is classified under
   a) Speed and delay survey b) Origin and destination survey
   c) Spot speed study d) Both a) and b)

18) As the speed increases beyond optimum speed, the capacity is
   a) Decreases b) Increases
   c) Constant d) None of the above

19) The STOP sign board will be in _____ shape.
   a) Octagonal b) Circle c) Triangle d) Rectangle

20) Skid resistance of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump integrator
   c) Photometer d) Pedometer

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Set R

SLR-EP – 411

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicates* ***full*** *marks.*
2) Assume any missing data ***suitably****.*

PART – A

II. Answer **any two full** questions (**each** carries **20** marks) :

2) a) Discuss briefly the various factors which affect the road user characteristics and their effects in traffic performance. **8**

b) List and explain the factors which affect the vehicle characteristics. **6**

c) Define reaction time of a driver and hence explain the PIEV theory with neat sketch. **6**

3) a) List out the different types of traffic studies and explain any one in detail. **6**

b) Define spot speed, running speed, space mean speed and time mean speed. **6**

c) Spot speed studies were carried out at a certain stretch of a highway with mixed traffic flow and the consolidated data collected are given below :

Speed Range, kmph	No.of vehicles observed	Speed Range, kmph	No. of vehicles observed
0 to 10	12	50 to 60	255
10 to 20	18	60 to 70	119
20 to 30	68	70 to 80	43
30 to 40	89	80 to 90	33
40 to 50	204	90 to 100	9

Determine (i) The upper and lower speed limit values for installing regulation signs (ii) The design speed for checking the geometric design elements of the highway. **8**

4) a) Write a short note on moving car observer method with its advantages. **6**

b) Write a short note on off-street parking. **6**

c) A vehicle of weight 2.0 tonne skids through a distance equal to 40 m before colliding with another parked vehicle of weight 1.0 tonne. After collision both the vehicles skid through a distance equal to 12 m before stopping. Compute the initial speed of the moving vehicle. Assume average coefficient of friction as 0.5. **8**

PART – B

III. Answer **any two full** questions (**each** carries **20** marks) :

5) a) Write a short note on "Regulation on Speed". **6**

b) Discuss the advantages and disadvantages of one way street. **6**

c) If 'A' vehicle travelling on the major or preferential street and 'B' vehicle travelling on the minor street. Assume the speed of vehicle 'A' is 60 kmph and the distance to the obstacle from vehicle 'A' and 'B' are 15 m and 20 m respectively. Calculate the speed limit on the minor street by (i) National Safety Council method and (ii) AASTHO method. **8**

6) a) Explain with neat sketch different types of warning signs. **6**

b) Calculate the spacing between the lighting units to produce a lux equal to 6.0 from the following data :
Width of road = 15 m
Mounting height = 7.5 m
Lamp size = 6000 lumen
Luminaire type = II (Use Figure – 1 to solve this problem). **8**

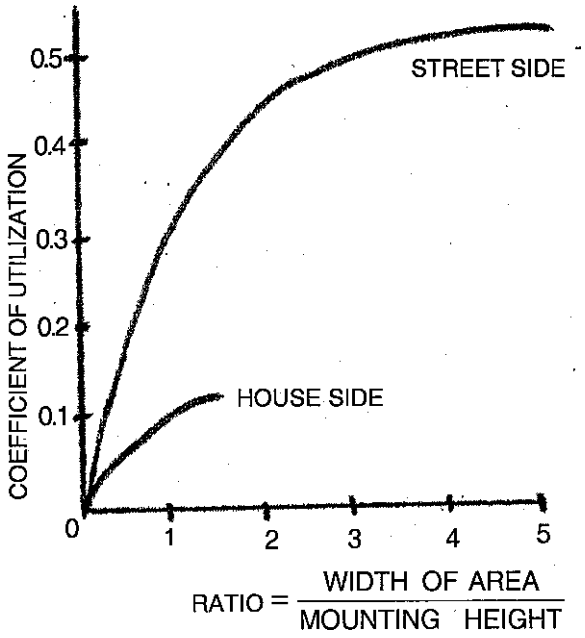

Figure – 1 : Coefficient of Utilization

c) Write a short note on (i) PCU (ii) LOS. **6**

7) a) Explain the application of (i) Bump Integrator and (ii) Portable Skid Resistance Tester. **8**

b) List the different types of road marking. Explain with neat sketch (i) Road centerline marking and (ii) No overtaking zone markings. **6**

c) Explain the function of roadway delineators and object markers with neat sketch. **6**

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SLR-EP – 411

Seat No.	

Set **S**

B.E. (Civil) (Part – II) (Old) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicates* ***full*** *marks.*
2) Assume any missing data ***suitably****.*
3) Q. No. ***I*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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 : 20

I. 1) Choose the correct answer : **(20×1=20)**

1) In cumulative distribution curve 85th percentile speed represents
   a) 85% of the vehicles travelling on this speed
   b) 15% of the vehicles exceed this speed
   c) 85% of the vehicles travelling more than this speed
   d) Both a) and b)

2) License plate or vehicle number method is classified under
   a) Speed and delay survey b) Origin and destination survey
   c) Spot speed study d) Both a) and b)

3) As the speed increases beyond optimum speed, the capacity is
   a) Decreases b) Increases
   c) Constant d) None of the above

4) The STOP sign board will be in _____ shape.
   a) Octagonal b) Circle c) Triangle d) Rectangle

5) Skid resistance of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump integrator
   c) Photometer d) Pedometer

6) In the conditions diagram, the features shown in the diagram are
   a) Property lines b) Street lighting
   c) Traffic signs, signals and markings d) All the above

7) The maximum speed allowed in rural area for medium or heavy passenger motor vehicle is
   a) 60 kmph b) 50 kmph c) 90 kmph d) 100 kmph

8) Object markers are placed at
   a) Median openings b) On curves c) Footpath d) Urban location

P.T.O.

9) A part of the signal cycle allocated to a traffic movement or a combination of a traffic movement is called
   a) Cycle b) Phase
   c) Amber d) None of the above

10) The principle of linking the adjacent signals to secure maximum flow is called
   a) Continuous flow signals b) Signal co-ordination
   c) Signal control d) Automatic signal

11) In Indian practice, the time assigned for amber period is
   a) 6 sec. b) 4 sec. c) 2 sec. d) 5 sec.

12) STOP sign should not be used
   a) On through roads or express ways b) For speed control
   c) At signalized intersection d) All the above

13) The basic requirement of any sign board are
   a) High visibility during day and night
   b) Lettering or symbols of adequate size
   c) Signs should be placed at closer intervals
   d) Both a) and b)

14) The number of centerlines marked for 6 lane divided highway on one side are
   a) 3 b) 6 c) 2 d) 5

15) As per IRC, minimum space requirement for parking of truck is
   a) 3×8 m b) 3.75×7.5 m c) 2.5×5 m d) 3×6 m

16) The 30^{th} hourly volume means
   a) Hourly volume that will be exceeded only 29 times in a year
   b) Hourly volume that will be exceeded only 30 times in a year
   c) Hourly volume that will be exceeded only 70 times in a year
   d) None of the above

17) Cumulative speed distribution curve is usually adopted for geometric design of highway. The percentile speed adopted for geometric design is
   a) 85^{th} percentile b) 90^{th} percentile c) 98^{th} percentile d) 99.9^{th} percentile

18) With increasing the value of speed, the volume
   a) Increases
   b) Decreases
   c) Increase up to certain limit and thereafter decreases
   d) Initially decreases and thereafter increases

19) Spot speed is the
   a) Instantaneous speed of vehicle at a specified location or section
   b) Average speed of the vehicle at a specified location or section
   c) Effective speed of the vehicle at a specified location or section
   d) Normal speed of the vehicle at a specified location or section

20) Spot speed data is useful in
   a) Deciding the speed trends b) Studying the traffic capacity
   c) Planning traffic control devices d) All the above

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SLR-EP – 411

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicates* ***full*** *marks.*
2) Assume any missing data ***suitably****.*

PART – A

II. Answer **any two full** questions (**each** carries **20** marks) :

2) a) Discuss briefly the various factors which affect the road user characteristics and their effects in traffic performance. **8**

b) List and explain the factors which affect the vehicle characteristics. **6**

c) Define reaction time of a driver and hence explain the PIEV theory with neat sketch. **6**

3) a) List out the different types of traffic studies and explain any one in detail. **6**

b) Define spot speed, running speed, space mean speed and time mean speed. **6**

c) Spot speed studies were carried out at a certain stretch of a highway with mixed traffic flow and the consolidated data collected are given below :

Speed Range, kmph	No.of vehicles observed	Speed Range, kmph	No. of vehicles observed
0 to 10	12	50 to 60	255
10 to 20	18	60 to 70	119
20 to 30	68	70 to 80	43
30 to 40	89	80 to 90	33
40 to 50	204	90 to 100	9

Determine (i) The upper and lower speed limit values for installing regulation signs (ii) The design speed for checking the geometric design elements of the highway. **8**

4) a) Write a short note on moving car observer method with its advantages. **6**

b) Write a short note on off-street parking. **6**

c) A vehicle of weight 2.0 tonne skids through a distance equal to 40 m before colliding with another parked vehicle of weight 1.0 tonne. After collision both the vehicles skid through a distance equal to 12 m before stopping. Compute the initial speed of the moving vehicle. Assume average coefficient of friction as 0.5. **8**

PART – B

III. Answer **any two full** questions (**each** carries **20** marks) :

5) a) Write a short note on "Regulation on Speed". **6**

b) Discuss the advantages and disadvantages of one way street. **6**

c) If 'A' vehicle travelling on the major or preferential street and 'B' vehicle travelling on the minor street. Assume the speed of vehicle 'A' is 60 kmph and the distance to the obstacle from vehicle 'A' and 'B' are 15 m and 20 m respectively. Calculate the speed limit on the minor street by (i) National Safety Council method and (ii) AASTHO method. **8**

6) a) Explain with neat sketch different types of warning signs. **6**

b) Calculate the spacing between the lighting units to produce a lux equal to 6.0 from the following data :
Width of road = 15 m
Mounting height = 7.5 m
Lamp size = 6000 lumen
Luminaire type = II (Use Figure – 1 to solve this problem). **8**

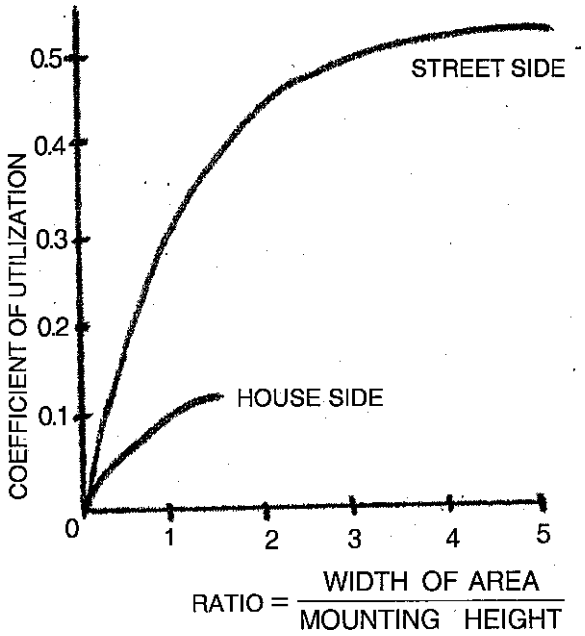

Figure – 1 : Coefficient of Utilization

c) Write a short note on (i) PCU (ii) LOS. **6**

7) a) Explain the application of (i) Bump Integrator and (ii) Portable Skid Resistance Tester. **8**

b) List the different types of road marking. Explain with neat sketch (i) Road centerline marking and (ii) No overtaking zone markings. **6**

c) Explain the function of roadway delineators and object markers with neat sketch. **6**

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Set S

SLR-EP – 412

Seat No.	

Set P

B.E. (Civil) (Part – II) (Old) Examination, 2016
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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.***
*3) Solve **any three** questions from Section – **I**, i.e. Question No. **2** to Question No. **5**. Question No. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*4) Figures to the **right** indicate **full** marks.*
*5) Assume suitable data **wherever** necessary and mention it **clearly**.*
*6) **Use** of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **20**

1) Tub grinders are used for grinding _____
   a) Cloth waste b) Glass waste
   c) Yard waste d) None of these

2) Recovery of energy in the form of heat is obtained from _____
   a) Combustion process b) Sanitary land filling
   c) Anaerobic process d) None of these

3) Leachate is coloured liquid that comes out of _____
   a) Septic tank b) Sanitary land fill
   c) Aerated lagoons d) None of these

4) Stoichiometric amount of air for combustion of solid waste means _____
   a) Amount of oxygen required for burning
   b) Amount of carbon required for burning
   c) Amount of sulphur required for burning
   d) None of these

P.T.O.

5) Sanitary landfills may cause trouble during _____
   a) Peak Summers
   b) Peak Winters
   c) Peak monsoon
   d) None of these

6) The corresponding concentration of gas in leachate can be computed using Henry's law _____
   a) $Cs = K_s.P$
   b) $Cs = K_s/K_t$
   c) $Cs = \mu_t/\mu_{60}$
   d) None of these

7) Household hazardous waste includes batteries and _____
   a) Radioactive waste
   b) Food waste
   c) Leachate
   d) Nail polish

8) Explosive waste may not exist in _____
   a) Solid form
   b) Liquid form
   c) Solid, liquid and gaseous form
   d) None of above

9) Important aspect in the implementation of sanitary land fills includes _____
   a) Site selection
   b) Land filing methods
   c) Movement and control of landfill and leachate
   d) All of above

10) The biomedical Waste Management Act were enacted in _____
   a) 1988
   b) 1996
   c) 1976
   d) 1998

_____

SLR-EP – 412

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section – **I**, i.e. Question No. **2** to Question No. **5**. Question No. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. a) Estimate the moisture content of solid waste sample of 100 kg using the following data : **8**

Sr. No.	Component	% by mass	% by moisture content
1	food waste	16	65
2	paper	36	08
3	cardboards	05	05
4	plastic	10	02
5	grass	12	55
6	wood	08	04
7	metals	13	03

b) Explain in details municipal solid waste collection method. **6**

3. a) Explain theory of composting in brief. **6**

b) Distinguish between Indore method and Bangalore method of composting. **7**

4. a) Explain with figure the different types of magnetic separation methods. **7**
   b) Write short note on need for MSW management. **6**
5. a) Explain different factors affecting incineration. **5**
   b) Write short note on Solid Waste (Management and Handling) rules. **4**
   c) Write short note on pyrolysis and its products. **4**

SECTION – II

Instruction : *Question No.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*

6. a) Define Hazardous waste. Explain in brief characteristics of hazardous waste. **5**
   b) Write a note on 'Risk Management'. **5**
   c) Explain in brief how will you minimize the damage due to manmade hazard. **4**
7. a) What are the different factors affecting the site selection for storage of hazardous waste ? Explain in brief. **6**
   b) Define leachate and explain in short any two methods used to control the flow of leachate. **7**
8. a) Explain natural and manmade hazards with examples. **7**
   b) Write in details about the qualitative estimation of damages. **6**
9. a) Write a detailed note on 'waste minimization'. **7**
   b) Explain in details any one case study of hazards. **6**

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SLR-EP – 412

Seat No.	

Set Q

B.E. (Civil) (Part – II) (Old) Examination, 2016
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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.***

*3) Solve **any three** questions from Section – **I**, i.e. Question No. **2** to Question No. **5**. Question No. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*

*4) Figures to the **right** indicate **full** marks.*

*5) Assume suitable data **wherever** necessary and mention it **clearly**.*

*6) **Use** of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **20**

1) Important aspect in the implementation of sanitary land fills includes _____
   a) Site selection
   b) Land filing methods
   c) Movement and control of landfill and leachate
   d) All of above

2) The biomedical Waste Management Act were enacted in _____
   a) 1988 b) 1996
   c) 1976 d) 1998

3) Household hazardous waste includes batteries and _____
   a) Radioactive waste b) Food waste
   c) Leachate d) Nail polish

P.T.O.

4) Explosive waste may not exist in _____
   a) Solid form
   b) Liquid form
   c) Solid, liquid and gaseous form
   d) None of above

5) Tub grinders are used for grinding _____
   a) Cloth waste
   b) Glass waste
   c) Yard waste
   d) None of these

6) Recovery of energy in the form of heat is obtained from _____
   a) Combustion process
   b) Sanitary land filling
   c) Anaerobic process
   d) None of these

7) Leachate is coloured liquid that comes out of _____
   a) Septic tank
   b) Sanitary land fill
   c) Aerated lagoons
   d) None of these

8) Stoichiometric amount of air for combustion of solid waste means _____
   a) Amount of oxygen required for burning
   b) Amount of carbon required for burning
   c) Amount of sulphur required for burning
   d) None of these

9) Sanitary landfills may cause trouble during _____
   a) Peak Summers
   b) Peak Winters
   c) Peak monsoon
   d) None of these

10) The corresponding concentration of gas in leachate can be computed using Henry's law _____
   a) $Cs = K_s.P$
   b) $Cs = K_s/K_t$
   c) $Cs = \mu_t/\mu_{60}$
   d) None of these

_____

SLR-EP – 412

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section – **I**, i.e. Question No. **2** to Question No. **5**. Question No. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. a) Estimate the moisture content of solid waste sample of 100 kg using the following data : **8**

Sr. No.	Component	% by mass	% by moisture content
1	food waste	16	65
2	paper	36	08
3	cardboards	05	05
4	plastic	10	02
5	grass	12	55
6	wood	08	04
7	metals	13	03

b) Explain in details municipal solid waste collection method. **6**

3. a) Explain theory of composting in brief. **6**

b) Distinguish between Indore method and Bangalore method of composting. **7**

4. a) Explain with figure the different types of magnetic separation methods. **7**
   b) Write short note on need for MSW management. **6**
5. a) Explain different factors affecting incineration. **5**
   b) Write short note on Solid Waste (Management and Handling) rules. **4**
   c) Write short note on pyrolysis and its products. **4**

SECTION – II

Instruction : *Question No.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*

6. a) Define Hazardous waste. Explain in brief characteristics of hazardous waste. **5**
   b) Write a note on 'Risk Management'. **5**
   c) Explain in brief how will you minimize the damage due to manmade hazard. **4**
7. a) What are the different factors affecting the site selection for storage of hazardous waste ? Explain in brief. **6**
   b) Define leachate and explain in short any two methods used to control the flow of leachate. **7**
8. a) Explain natural and manmade hazards with examples. **7**
   b) Write in details about the qualitative estimation of damages. **6**
9. a) Write a detailed note on 'waste minimization'. **7**
   b) Explain in details any one case study of hazards. **6**

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SLR-EP – 412

Seat No.	

Set R

B.E. (Civil) (Part – II) (Old) Examination, 2016
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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.***
*3) Solve **any three** questions from Section – **I**, i.e. Question No. **2** to Question No. **5**. Question No. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*4) Figures to the **right** indicate **full** marks.*
*5) Assume suitable data **wherever** necessary and mention it **clearly**.*
*6) **Use** of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **20**

1) Sanitary landfills may cause trouble during _____
   a) Peak Summers b) Peak Winters
   c) Peak monsoon d) None of these

2) The corresponding concentration of gas in leachate can be computed using Henry's law _____
   a) $Cs = K_s.P$ b) $Cs = K_s/K_t$
   c) $Cs = \mu_t/\mu_{60}$ d) None of these

3) Important aspect in the implementation of sanitary land fills includes _____
   a) Site selection
   b) Land filing methods
   c) Movement and control of landfill and leachate
   d) All of above

P.T.O.

4) The biomedical Waste Management Act were enacted in _____
   a) 1988 b) 1996
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5) Leachate is coloured liquid that comes out of _____
   a) Septic tank b) Sanitary land fill
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6) Stoichiometric amount of air for combustion of solid waste means _____
   a) Amount of oxygen required for burning
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7) Tub grinders are used for grinding _____
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8) Recovery of energy in the form of heat is obtained from _____
   a) Combustion process b) Sanitary land filling
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9) Household hazardous waste includes batteries and _____
   a) Radioactive waste b) Food waste
   c) Leachate d) Nail polish

10) Explosive waste may not exist in _____
   a) Solid form
   b) Liquid form
   c) Solid, liquid and gaseous form
   d) None of above

_____

SLR-EP – 412

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section – **I**, i.e. Question No. **2** to Question No. **5**. Question No. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. a) Estimate the moisture content of solid waste sample of 100 kg using the following data : **8**

Sr. No.	Component	% by mass	% by moisture content
1	food waste	16	65
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b) Explain in details municipal solid waste collection method. **6**

3. a) Explain theory of composting in brief. **6**

b) Distinguish between Indore method and Bangalore method of composting. **7**

4. a) Explain with figure the different types of magnetic separation methods. **7**
   b) Write short note on need for MSW management. **6**
5. a) Explain different factors affecting incineration. **5**
   b) Write short note on Solid Waste (Management and Handling) rules. **4**
   c) Write short note on pyrolysis and its products. **4**

SECTION – II

Instruction : *Question No.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*

6. a) Define Hazardous waste. Explain in brief characteristics of hazardous waste. **5**
   b) Write a note on 'Risk Management'. **5**
   c) Explain in brief how will you minimize the damage due to manmade hazard. **4**
7. a) What are the different factors affecting the site selection for storage of hazardous waste ? Explain in brief. **6**
   b) Define leachate and explain in short any two methods used to control the flow of leachate. **7**
8. a) Explain natural and manmade hazards with examples. **7**
   b) Write in details about the qualitative estimation of damages. **6**
9. a) Write a detailed note on 'waste minimization'. **7**
   b) Explain in details any one case study of hazards. **6**

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SLR-EP – 412

Seat No.	

Set S

B.E. (Civil) (Part – II) (Old) Examination, 2016
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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.***

*3) Solve **any three** questions from Section – **I**, i.e. Question No. **2** to Question No. **5**. Question No. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*

*4) Figures to the **right** indicate **full** marks.*

*5) Assume suitable data **wherever** necessary and mention it **clearly**.*

*6) **Use** of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **20**

1) Leachate is coloured liquid that comes out of _____
   a) Septic tank b) Sanitary land fill
   c) Aerated lagoons d) None of these

2) Stoichiometric amount of air for combustion of solid waste means _____
   a) Amount of oxygen required for burning
   b) Amount of carbon required for burning
   c) Amount of sulphur required for burning
   d) None of these

3) Sanitary landfills may cause trouble during _____
   a) Peak Summers b) Peak Winters
   c) Peak monsoon d) None of these

P.T.O.

4) The corresponding concentration of gas in leachate can be computed using Henry's law _____
   a) $Cs = K_s.P$
   b) $Cs = K_s/K_t$
   c) $Cs = \mu_t/\mu_{60}$
   d) None of these

5) Household hazardous waste includes batteries and _____
   a) Radioactive waste
   b) Food waste
   c) Leachate
   d) Nail polish

6) Explosive waste may not exist in _____
   a) Solid form
   b) Liquid form
   c) Solid, liquid and gaseous form
   d) None of above

7) Important aspect in the implementation of sanitary land fills includes _____
   a) Site selection
   b) Land filing methods
   c) Movement and control of landfill and leachate
   d) All of above

8) The biomedical Waste Management Act were enacted in _____
   a) 1988
   b) 1996
   c) 1976
   d) 1998

9) Tub grinders are used for grinding _____
   a) Cloth waste
   b) Glass waste
   c) Yard waste
   d) None of these

10) Recovery of energy in the form of heat is obtained from _____
   a) Combustion process
   b) Sanitary land filling
   c) Anaerobic process
   d) None of these

_____

SLR-EP – 412

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section – **I**, i.e. Question No. **2** to Question No. **5**. Question No. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. a) Estimate the moisture content of solid waste sample of 100 kg using the following data : **8**

Sr. No.	Component	% by mass	% by moisture content
1	food waste	16	65
2	paper	36	08
3	cardboards	05	05
4	plastic	10	02
5	grass	12	55
6	wood	08	04
7	metals	13	03

b) Explain in details municipal solid waste collection method. **6**

3. a) Explain theory of composting in brief. **6**

b) Distinguish between Indore method and Bangalore method of composting. **7**

4. a) Explain with figure the different types of magnetic separation methods. **7**
   b) Write short note on need for MSW management. **6**
5. a) Explain different factors affecting incineration. **5**
   b) Write short note on Solid Waste (Management and Handling) rules. **4**
   c) Write short note on pyrolysis and its products. **4**

SECTION – II

Instruction : *Question No.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*

6. a) Define Hazardous waste. Explain in brief characteristics of hazardous waste. **5**
   b) Write a note on 'Risk Management'. **5**
   c) Explain in brief how will you minimize the damage due to manmade hazard. **4**
7. a) What are the different factors affecting the site selection for storage of hazardous waste ? Explain in brief. **6**
   b) Define leachate and explain in short any two methods used to control the flow of leachate. **7**
8. a) Explain natural and manmade hazards with examples. **7**
   b) Write in details about the qualitative estimation of damages. **6**
9. a) Write a detailed note on 'waste minimization'. **7**
   b) Explain in details any one case study of hazards. **6**

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SLR-EP – 413

Seat No.	

Set P

B.E. (Civil) (Part – II) (Old) Examination, 2016

Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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.***

3) Solve ***any three*** *questions* ***each*** *from Section* ***I*** *and Section* ***II****.*

4) Figures to the ***right*** *indicate* ***full*** *marks.*

5) Assume suitable data if necessary and mention it ***clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Give the correct option for the following questions : **(1×20=20)**

1) The minimum width of carriage way for a two lane bridge is

a) 4.25 m b) 10 m c) 6 m d) 7.5 m

2) Section VII of IRC bridge code deals with

a) Composite construction b) Bearings

c) Cement concrete d) Foundations and substructure

3) To provide for the possible variation of the direction of the water current, allowance for an extra variation of water current direction is

a) 15° b) 20° c) 25° d) 35°

4) The minimum clearance for class AA loading is

a) 0.15 m b) 1.0 m c) 1.1 m d) None of these

5) The pier cap or abutment cap should be of minimum _____ concrete.

a) M 20 grade b) M 25 garde c) M 30 grade d) None of these

6) Permissible shear stress (T_{co}) for M-25 concrete is

a) 0.28 N/mm^2 b) 0.34 N/mm^2 c) 0.4 N/mm^2 d) 0.45 N/mm^2

7) Total load in case of IRC 70 R tracked loading is

a) 700 kN b) 710 kN c) 1000 kN d) 554 kN

8) Pigeaud's curves are used to calculate

a) Bending moment coefficients b) Load factor

c) Impact factor d) Effective span

P.T.O.

9) Load factor 'K' by Courbon's theory for uniform MI is given by

a) $\frac{\Sigma W}{n}\left[1+\frac{n e I_1 X_1}{\Sigma I_i X_i^2}\right]$ b) $\frac{\Sigma W}{n}\left[n+\frac{e X_1}{\Sigma X^2}\right]$

c) $\frac{\Sigma W}{n}\left[1+\frac{n e X_1}{\Sigma X^2}\right]$ d) $\frac{\Sigma W}{n}\left[n+\frac{e I_1 X_1}{\Sigma I_i X_i^2}\right]$

10) Permissible maximum compressive stress of plain concrete M 20 is

a) 7.0 MPa b) 2.7 MPa c) 5.0 MPa d) 1.5 MPa

11) Braking force is taken as ___ of the design vehicle load.

a) 0.2 b) 0.4 c) 0.6 d) 0.8

12) Following is not type of expansion bearing

a) Sliding plate beam b) Steel roller-cum-rocker bearing

c) Elastomeric bearing d) Rocker bearing

13) Elastomeric having ultimate tensile strain

a) 300 percent maximum b) 300 percent minimum

c) 400 percent maximum d) 400 percent minimum

14) Guideline for the design of bridge foundation are available in IRC bridge code section

a) I b) III c) V d) VII

15) Which of the following statement is not true ?

a) Seismic and wind forces shall be considered to act simultaneously

b) Horizontal force due to seismic effect shall be taken to act through the C.G. of all the force under consideration

c) Centrifugal force shall be considered to act at the height of 1.2 m above the level of carriage way

d) None of the above

16) Expansion joint are provided at

a) Support b) Foundation c) Abutment d) None of these

17) For selecting bearing, following factor is considered

a) High vertical load taking capability

b) Movement capability to cope with horizontal movements

c) Rotational capability

d) All

18) Rocker bearing are suitable for

a) R.C.C. bridge b) Timber bridge

c) Straight steel bridges d) All

19) For pre-stress concrete bridge minimum grade of concrete is

a) M-30 b) M-20 c) M-40 d) M-50

20) Hardness of elastomeric bearing shall be _____ on IRHD.

a) 75 ± 5 degrees b) 25 ± 5 degrees c) 60 ± 5 degrees d) 80 ± 5 degrees

_____

SLR-EP – 413

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016

Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any three** questions **each** from Section **I** and Section **II**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume suitable data if necessary and mention it **clearly**.*

SECTION – I

2. Answer the following :
   A) What are the basic components of bridge structure ? Explain with the help of sketch. **5**
   B) What is the importance of subsoil exploration in the design of major bridges ? List the data to be obtained from such explorations. **5**
   C) Give a critical review of IRC loading for bridges. **4**

3. Find the design bending moment of two lane bridge solid deck slab for following data :
   a) Effective span – 6.5 m
   b) Carriage way width – 9 m
   c) Kerb – 600 × 275 on both side
   d) Live load – IRC Class A (Two lane)
   e) Wearing coat – 100 mm thick
   f) Use M-30 concrete and Fe-415 steel
   g) Use α = 2.77

   Find the percentage change in the design bending moment if the live load of IRC class AA tracked is used. **13**

4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Determine the design bending moment for central longitudinal girders. Use following additional data,
   a) Carriage way width – 7.5 m
   b) Span of bridge – 16 m
   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 – 300 mm
   g) Use M-30 concrete and Fe-415 steel

   Find the percentage change in the design bending moment of central girder if four longitudinal girders are provided with spacing of 250 mm. **13**

5. Design a slab panel having size of 2.7 m × 3.375 m. Consider IRC class AA tracked loading. Consider thickness of slab as 200 mm and wearing coat thickness as 85 mm. Use M-30 concrete and Fe-415 steel.
   Pigeuad's coefficient – $m_1 = 0.085$
   $m_2 = 0.035$ **13**

Set P

SECTION – II

6. Verify the adequacy of pier for the following data :
Top width of pier – 1.8 m, Height of pier upto springing level – 12 m, C/C distance of bearing – 1.2 m, Side batter 1:14, HFL – 1.5 m below the bearing level, span of bridge – 16 m, Self weight of the superstructure = 250 kN/m, Live load – IRC class AA tracked. Material of pier = M 20 concrete. **13**

7. Verify the suitability of abutment as shown in the fig. 7.1. Use the following data Density of soil – 17 kN/m^3, Friction angle of soil (Ø) = 30°.
Coefficient of friction – 0.6, Live load IRC class AA tracked. **13**

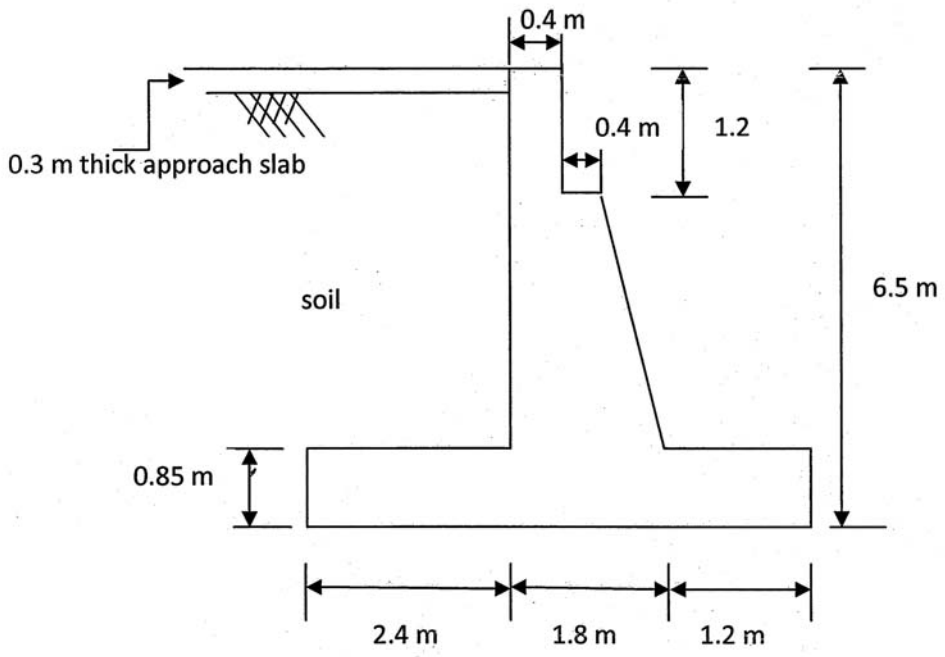

Fig. no. 7.1

8. A) Design a elastomeric unreinforced bearing pad for following data
Vertical load (sustained) = 185 kN,
Vertical load (dynamic) = 60 kN,
Horizontal force = 85 kN
Modulus of rigidity of elastomer = 1.2 N/mm^2
Coefficient of friction = 0.35. **8**

B) Write a note on expansion joints. **5**

9. Write a note on following : **(3.5×4=14)**

a) Types of bridge pier with their suitability

b) Functions of bearing

c) Reinforced earth retaining wall

d) Importance of bridge inspection.

SLR-EP – 413

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (Old) Examination, 2016

Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Give the correct option for the following questions : **(1×20=20)**

1) Expansion joint are provided at

a) Support b) Foundation c) Abutment d) None of these

2) For selecting bearing, following factor is considered

a) High vertical load taking capability

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d) All

3) Rocker bearing are suitable for

a) R.C.C. bridge b) Timber bridge

c) Straight steel bridges d) All

4) For pre-stress concrete bridge minimum grade of concrete is

a) M-30 b) M-20 c) M-40 d) M-50

5) Hardness of elastomeric bearing shall be _____ on IRHD.

a) 75 ± 5 degrees b) 25 ± 5 degrees c) 60 ± 5 degrees d) 80 ± 5 degrees

6) The minimum width of carriage way for a two lane bridge is

a) 4.25 m b) 10 m c) 6 m d) 7.5 m

7) Section VII of IRC bridge code deals with

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P.T.O.

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a) 15° b) 20° c) 25° d) 35°

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19) Guideline for the design of bridge foundation are available in IRC bridge code section

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20) Which of the following statement is not true ?

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_____

SLR-EP – 413

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016

Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Marks : 80
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SECTION – I

2. Answer the following :
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3. Find the design bending moment of two lane bridge solid deck slab for following data :
   a) Effective span – 6.5 m
   b) Carriage way width – 9 m
   c) Kerb – 600 × 275 on both side
   d) Live load – IRC Class A (Two lane)
   e) Wearing coat – 100 mm thick
   f) Use M-30 concrete and Fe-415 steel
   g) Use α = 2.77

   Find the percentage change in the design bending moment if the live load of IRC class AA tracked is used. **13**

4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Determine the design bending moment for central longitudinal girders. Use following additional data,
   a) Carriage way width – 7.5 m
   b) Span of bridge – 16 m
   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
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   Find the percentage change in the design bending moment of central girder if four longitudinal girders are provided with spacing of 250 mm. **13**

5. Design a slab panel having size of 2.7 m × 3.375 m. Consider IRC class AA tracked loading. Consider thickness of slab as 200 mm and wearing coat thickness as 85 mm. Use M-30 concrete and Fe-415 steel.
   Pigeuad's coefficient – $m_1 = 0.085$
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Set Q

SECTION – II

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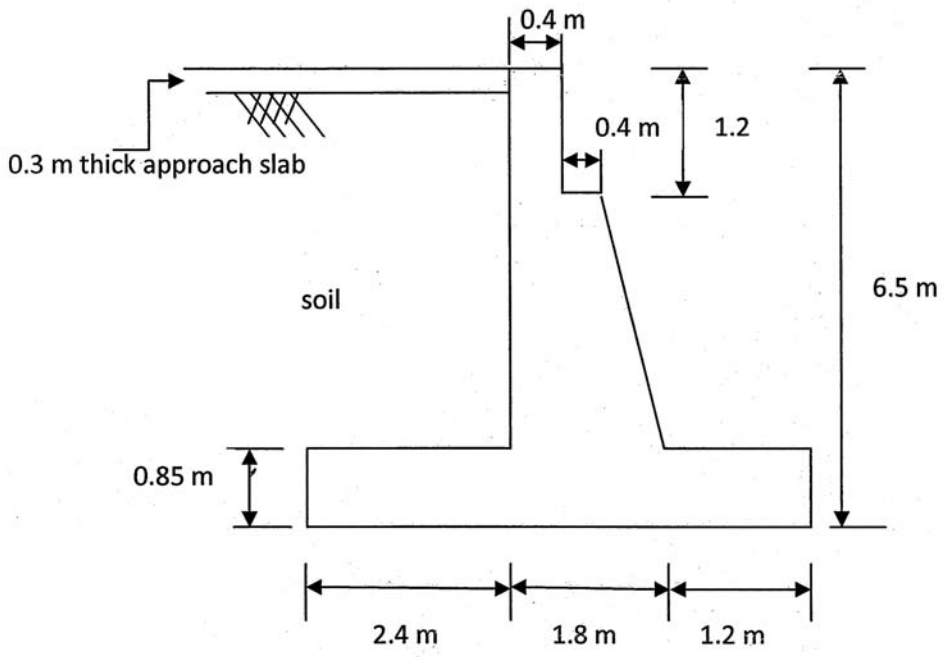

Fig. no. 7.1

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SLR-EP – 413

Seat No.	

Set R

B.E. (Civil) (Part – II) (Old) Examination, 2016

Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Give the correct option for the following questions : **(1×20=20)**

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4) Guideline for the design of bridge foundation are available in IRC bridge code section
   a) I b) III c) V d) VII

5) Which of the following statement is not true ?
   a) Seismic and wind forces shall be considered to act simultaneously
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P.T.O.

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9) For pre-stress concrete bridge minimum grade of concrete is
   a) M-30 b) M-20 c) M-40 d) M-50

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12) Section VII of IRC bridge code deals with
   a) Composite construction b) Bearings
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   a) 15° b) 20° c) 25° d) 35°

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   a) 0.15 m b) 1.0 m c) 1.1 m d) None of these

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   a) 0.28 N/mm^2 b) 0.34 N/mm^2 c) 0.4 N/mm^2 d) 0.45 N/mm^2

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20) Permissible maximum compressive stress of plain concrete M 20 is
   a) 7.0 MPa b) 2.7 MPa c) 5.0 MPa d) 1.5 MPa

_____

SLR-EP – 413

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016

Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any three** questions **each** from Section **I** and Section **II**.*
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SECTION – I

2. Answer the following :
   A) What are the basic components of bridge structure ? Explain with the help of sketch. **5**
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   d) Live load – IRC Class A (Two lane)
   e) Wearing coat – 100 mm thick
   f) Use M-30 concrete and Fe-415 steel
   g) Use α = 2.77

   Find the percentage change in the design bending moment if the live load of IRC class AA tracked is used. **13**

4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Determine the design bending moment for central longitudinal girders. Use following additional data,
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   e) Web thickness for longitudinal and cross girder – 300 mm
   f) Longitudinal Girder spacing – 300 mm
   g) Use M-30 concrete and Fe-415 steel

   Find the percentage change in the design bending moment of central girder if four longitudinal girders are provided with spacing of 250 mm. **13**

5. Design a slab panel having size of 2.7 m × 3.375 m. Consider IRC class AA tracked loading. Consider thickness of slab as 200 mm and wearing coat thickness as 85 mm. Use M-30 concrete and Fe-415 steel.
   Pigeuad's coefficient – $m_1 = 0.085$
   $m_2 = 0.035$ **13**

Set R

SECTION – II

6. Verify the adequacy of pier for the following data :
Top width of pier – 1.8 m, Height of pier upto springing level – 12 m, C/C distance of bearing – 1.2 m, Side batter 1:14, HFL – 1.5 m below the bearing level, span of bridge – 16 m, Self weight of the superstructure = 250 kN/m, Live load – IRC class AA tracked. Material of pier = M 20 concrete. **13**

7. Verify the suitability of abutment as shown in the fig. 7.1. Use the following data Density of soil – 17 kN/m^3, Friction angle of soil (Ø) = 30°.
Coefficient of friction – 0.6, Live load IRC class AA tracked. **13**

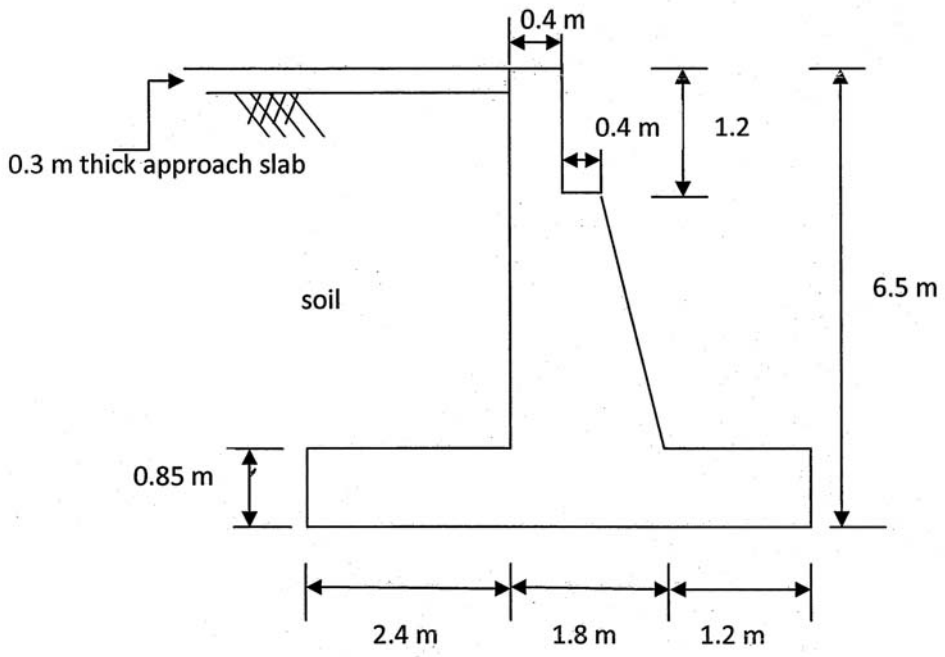

Fig. no. 7.1

8. A) Design a elastomeric unreinforced bearing pad for following data
Vertical load (sustained) = 185 kN,
Vertical load (dynamic) = 60 kN,
Horizontal force = 85 kN
Modulus of rigidity of elastomer = 1.2 N/mm^2
Coefficient of friction = 0.35. **8**

B) Write a note on expansion joints. **5**

9. Write a note on following : **(3.5×4=14)**

a) Types of bridge pier with their suitability

b) Functions of bearing

c) Reinforced earth retaining wall

d) Importance of bridge inspection.

Set R

SLR-EP – 413

Seat No.	

Set **S**

B.E. (Civil) (Part – II) (Old) Examination, 2016

Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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.***

3) Solve ***any three*** *questions* ***each*** *from Section* ***I*** *and Section* ***II****.*

4) Figures to the ***right*** *indicate* ***full*** *marks.*

5) Assume suitable data if necessary and mention it ***clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Give the correct option for the following questions : **(1×20=20)**

1) Permissible shear stress (T_{co}) for M-25 concrete is

a) 0.28 N/mm^2 b) 0.34 N/mm^2 c) 0.4 N/mm^2 d) 0.45 N/mm^2

2) Total load in case of IRC 70 R tracked loading is

a) 700 kN b) 710 kN c) 1000 kN d) 554 kN

3) Pigeaud's curves are used to calculate

a) Bending moment coefficients b) Load factor

c) Impact factor d) Effective span

4) Load factor 'K' by Courbon's theory for uniform MI is given by

a) $\frac{\Sigma W}{n}\left[1+\frac{n e I_1 X_1}{\Sigma I_i X_i^2}\right]$ b) $\frac{\Sigma W}{n}\left[n+\frac{e X_1}{\Sigma X^2}\right]$

c) $\frac{\Sigma W}{n}\left[1+\frac{n e X_1}{\Sigma X^2}\right]$ d) $\frac{\Sigma W}{n}\left[n+\frac{e I_1 X_1}{\Sigma I_i X_i^2}\right]$

5) Permissible maximum compressive stress of plain concrete M 20 is

a) 7.0 MPa b) 2.7 MPa c) 5.0 MPa d) 1.5 MPa

6) Braking force is taken as ___ of the design vehicle load.

a) 0.2 b) 0.4 c) 0.6 d) 0.8

7) Following is not type of expansion bearing

a) Sliding plate beam b) Steel roller-cum-rocker bearing

c) Elastomeric bearing d) Rocker bearing

P.T.O.

8) Elastomeric having ultimate tensile strain
   a) 300 percent maximum
   b) 300 percent minimum
   c) 400 percent maximum
   d) 400 percent minimum

9) Guideline for the design of bridge foundation are available in IRC bridge code section
   a) I b) III c) V d) VII

10) Which of the following statement is not true ?
   a) Seismic and wind forces shall be considered to act simultaneously
   b) Horizontal force due to seismic effect shall be taken to act through the C.G. of all the force under consideration
   c) Centrifugal force shall be considered to act at the height of 1.2 m above the level of carriage way
   d) None of the above

11) Expansion joint are provided at
   a) Support b) Foundation c) Abutment d) None of these

12) For selecting bearing, following factor is considered
   a) High vertical load taking capability
   b) Movement capability to cope with horizontal movements
   c) Rotational capability
   d) All

13) Rocker bearing are suitable for
   a) R.C.C. bridge
   b) Timber bridge
   c) Straight steel bridges
   d) All

14) For pre-stress concrete bridge minimum grade of concrete is
   a) M-30 b) M-20 c) M-40 d) M-50

15) Hardness of elastomeric bearing shall be _____ on IRHD.
   a) 75 ± 5 degrees b) 25 ± 5 degrees c) 60 ± 5 degrees d) 80 ± 5 degrees

16) The minimum width of carriage way for a two lane bridge is
   a) 4.25 m b) 10 m c) 6 m d) 7.5 m

17) Section VII of IRC bridge code deals with
   a) Composite construction
   b) Bearings
   c) Cement concrete
   d) Foundations and substructure

18) To provide for the possible variation of the direction of the water current, allowance for an extra variation of water current direction is
   a) 15° b) 20° c) 25° d) 35°

19) The minimum clearance for class AA loading is
   a) 0.15 m b) 1.0 m c) 1.1 m d) None of these

20) The pier cap or abutment cap should be of minimum _____ concrete.
   a) M 20 grade b) M 25 garde c) M 30 grade d) None of these

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SLR-EP – 413

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016

Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any three** questions **each** from Section **I** and Section **II**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume suitable data if necessary and mention it **clearly**.*

SECTION – I

2. Answer the following :
   A) What are the basic components of bridge structure ? Explain with the help of sketch. **5**
   B) What is the importance of subsoil exploration in the design of major bridges ? List the data to be obtained from such explorations. **5**
   C) Give a critical review of IRC loading for bridges. **4**

3. Find the design bending moment of two lane bridge solid deck slab for following data :
   a) Effective span – 6.5 m
   b) Carriage way width – 9 m
   c) Kerb – 600 × 275 on both side
   d) Live load – IRC Class A (Two lane)
   e) Wearing coat – 100 mm thick
   f) Use M-30 concrete and Fe-415 steel
   g) Use α = 2.77

   Find the percentage change in the design bending moment if the live load of IRC class AA tracked is used. **13**

4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Determine the design bending moment for central longitudinal girders. Use following additional data,
   a) Carriage way width – 7.5 m
   b) Span of bridge – 16 m
   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 – 300 mm
   g) Use M-30 concrete and Fe-415 steel

   Find the percentage change in the design bending moment of central girder if four longitudinal girders are provided with spacing of 250 mm. **13**

5. Design a slab panel having size of 2.7 m × 3.375 m. Consider IRC class AA tracked loading. Consider thickness of slab as 200 mm and wearing coat thickness as 85 mm. Use M-30 concrete and Fe-415 steel.
   Pigeuad's coefficient – $m_1 = 0.085$
   $m_2 = 0.035$ **13**

Set S

SECTION – II

6. Verify the adequacy of pier for the following data :
Top width of pier – 1.8 m, Height of pier upto springing level – 12 m, C/C distance of bearing – 1.2 m, Side batter 1:14, HFL – 1.5 m below the bearing level, span of bridge – 16 m, Self weight of the superstructure = 250 kN/m, Live load – IRC class AA tracked. Material of pier = M 20 concrete. **13**

7. Verify the suitability of abutment as shown in the fig. 7.1. Use the following data Density of soil – 17 kN/m^3, Friction angle of soil (Ø) = 30°.
Coefficient of friction – 0.6, Live load IRC class AA tracked. **13**

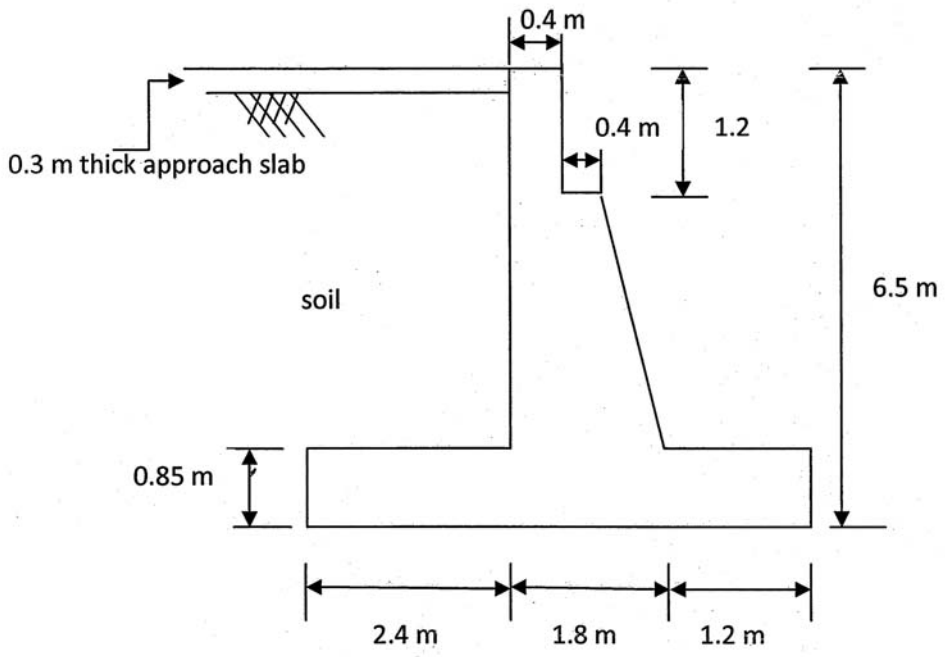

Fig. no. 7.1

8. A) Design a elastomeric unreinforced bearing pad for following data
Vertical load (sustained) = 185 kN,
Vertical load (dynamic) = 60 kN,
Horizontal force = 85 kN
Modulus of rigidity of elastomer = 1.2 N/mm^2
Coefficient of friction = 0.35. **8**

B) Write a note on expansion joints. **5**

9. Write a note on following : **(3.5×4=14)**

a) Types of bridge pier with their suitability

b) Functions of bearing

c) Reinforced earth retaining wall

d) Importance of bridge inspection.

SLR-EP – 414

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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 : 20

Choose the correct alternatives : **(10×2=20)**

1) What is meant by contract type O and M ?
   a) Operation and Maintenance
   b) Own and Maintenance
   c) Operate and Manage
   d) Own and Manage

2) Which of the following is correct term for DBFMO ?
   a) Design Build Finance Maintain Own
   b) Design Build Finance Maintain Operate
   c) Design Build Finance Manage Operate
   d) Design Build Finance Manage Own

3) Which of the following is not principle of Public Private Partnership ?
   a) Ownership by stakeholder
   b) Joint venture
   c) Simplicity in usage and management
   d) Flexibility

4) Which of the following is benefit for Public sector of Public Private Partnership ?
   a) Life cycle cost management
   b) Business opportunities
   c) Export
   d) None of the above

5) Which of the following is benefit for Private sector of Public Private Partnership ?
   a) Innovative solutions
   b) Export opportunities
   c) Construction management
   d) Sharing the assets

6) Which of the following is not a type of contract ?
   a) Service contracts
   b) Lease-develop-Operate or Buy
   c) Design build
   d) Lease-develop-Operate and Buy

7) Which of the following is correct term for DBFM ?
   a) Design Build Finance Maintain
   b) Design Building Finance Maintain
   c) Design Build Finance Manage
   d) Develop Build Finance Manage

8) Which of the following is not the principal aspect of sustainable development ?
   a) Energy
   b) Environmental
   c) Social
   d) Economic

9) Which of the following is not one of the key challenges for sustainability ?
   a) Water
   b) Energy
   c) Waste
   d) Rural development

10) Which of the following is suitable as VGF scheme ?
   a) Viability Gap Funding Scheme
   b) Viability Gap Finance Scheme
   c) Volatile Gap Funding Scheme
   d) Volatile Growth Funding Scheme

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SLR-EP – 414

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section **I** and **any three** questions from Section **II**.*
*2) **Assume** necessary data if required and mention it **clearly**.*
*3) Figures to **right** indicate **full** marks.*

SECTION – I

1. a) Explain the term Design Build Finance Maintain (DBFM). **4**
   b) State the major problems with the transport sector in India. **10**
2. a) What are the disadvantages of Public Private Partnership ? **4**
   b) Explain the challenges in privatization of water supply. **9**
3. a) Explain in brief output based aid contracts. **4**
   b) What are the points to be considered in Public Private Partnership to protect the public interest ? **9**
4. a) Draw a schematic diagram for project management execution activities. **4**
   b) Explain in detail project management execution activities. **9**

SECTION – II

5. a) Draw a schematic diagram of four phases of the project life cycle. **4**
   b) What activities are considered in project initiation ? **10**
6. a) Explain risk identification in detail. **4**
   b) Explain risk allocation in Public Private Partnership project to private sector. **9**
7. a) Write a short note on risk mitigation. **4**
   b) Explain Quantitative and Qualitative techniques of risk assessment. **9**
8. a) State and discuss five key sustainability challenges. **4**
   b) State the strengths and weaknesses of developing commercially viable infrastructure projects. **9**

Set P

Set P

SLR-EP – 414

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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 : 20

Choose the correct alternatives : **(10×2=20)**

1) Which of the following is not one of the key challenges for sustainability ?
   a) Water
   b) Energy
   c) Waste
   d) Rural development

2) Which of the following is suitable as VGF scheme ?
   a) Viability Gap Funding Scheme
   b) Viability Gap Finance Scheme
   c) Volatile Gap Funding Scheme
   d) Volatile Growth Funding Scheme

3) Which of the following is correct term for DBFM ?
   a) Design Build Finance Maintain
   b) Design Building Finance Maintain
   c) Design Build Finance Manage
   d) Develop Build Finance Manage

4) Which of the following is not the principal aspect of sustainable development ?
   a) Energy
   b) Environmental
   c) Social
   d) Economic

5) What is meant by contract type O and M ?
   a) Operation and Maintenance
   b) Own and Maintenance
   c) Operate and Manage
   d) Own and Manage

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   a) Ownership by stakeholder
   b) Joint venture
   c) Simplicity in usage and management
   d) Flexibility

8) Which of the following is benefit for Public sector of Public Private Partnership ?
   a) Life cycle cost management
   b) Business opportunities
   c) Export
   d) None of the above

9) Which of the following is benefit for Private sector of Public Private Partnership ?
   a) Innovative solutions
   b) Export opportunities
   c) Construction management
   d) Sharing the assets

10) Which of the following is not a type of contract ?
   a) Service contracts
   b) Lease-develop-Operate or Buy
   c) Design build
   d) Lease-develop-Operate and Buy

SLR-EP – 414

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section **I** and **any three** questions from Section **II**.*
*2) **Assume** necessary data if required and mention it **clearly**.*
*3) Figures to **right** indicate **full** marks.*

SECTION – I

1. a) Explain the term Design Build Finance Maintain (DBFM). **4**
   b) State the major problems with the transport sector in India. **10**
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Set Q

Set Q

SLR-EP – 414

Seat No.	

Set **R**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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 : 20

Choose the correct alternatives : **(10×2=20)**

1) Which of the following is benefit for Private sector of Public Private Partnership ?
   a) Innovative solutions
   b) Export opportunities
   c) Construction management
   d) Sharing the assets

2) Which of the following is not a type of contract ?
   a) Service contracts
   b) Lease-develop-Operate or Buy
   c) Design build
   d) Lease-develop-Operate and Buy

3) Which of the following is not one of the key challenges for sustainability ?
   a) Water
   b) Energy
   c) Waste
   d) Rural development

4) Which of the following is suitable as VGF scheme ?
   a) Viability Gap Funding Scheme
   b) Viability Gap Finance Scheme
   c) Volatile Gap Funding Scheme
   d) Volatile Growth Funding Scheme

P.T.O.

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   a) Energy
   b) Environmental
   c) Social
   d) Economic

SLR-EP – 414

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section **I** and **any three** questions from Section **II**.*
*2) **Assume** necessary data if required and mention it **clearly**.*
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SECTION – I

1. a) Explain the term Design Build Finance Maintain (DBFM). **4**
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Set R

Set R

SLR-EP – 414

Seat No.	

Set **S**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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 : 20

Choose the correct alternatives : **(10×2=20)**

1) Which of the following is not principle of Public Private Partnership ?
   a) Ownership by stakeholder
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P.T.O.

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SLR-EP – 414

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section **I** and **any three** questions from Section **II**.*
*2) **Assume** necessary data if required and mention it **clearly**.*
*3) Figures to **right** indicate **full** marks.*

SECTION – I

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   b) Explain the challenges in privatization of water supply. **9**
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SECTION – II

5. a) Draw a schematic diagram of four phases of the project life cycle. **4**
   b) What activities are considered in project initiation ? **10**
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   b) Explain risk allocation in Public Private Partnership project to private sector. **9**
7. a) Write a short note on risk mitigation. **4**
   b) Explain Quantitative and Qualitative techniques of risk assessment. **9**
8. a) State and discuss five key sustainability challenges. **4**
   b) State the strengths and weaknesses of developing commercially viable infrastructure projects. **9**

Set S

Set S

SLR-EP – 415

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (Old) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
ii) ***Use*** *of IS 456 and IS 3370 is* ***not allowed****.*
iii) ***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 : 20

1. Choose the correct answer : **(1×20=20)**

1) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement away from water face is _____
a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

2) A foundation rests on
a) base of the foundation b) subgrade
c) foundation soil d) both b) and c)

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) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

4) For a circular slab carrying a uniformly distributed load, the ratio of the maximum negative to maximum positive radial moment, is
a) 1 b) 2 c) 3 d) 4

5) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement near the water face is _____
a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

6) The effective width of a column strip of a flat slab, is
a) one-fourth the width of the panel b) radius of the column
c) half the width of the panel d) none of these

7) A pile of length L carrying a uniformly distributed load W per metre length is suspended at two points, the maximum, B.M. at the centre of the pile or at the points of suspension, is

a) $\frac{WL}{8}$ b) $\frac{WL^2}{24}$ c) $\frac{WL^2}{47}$ d) $\frac{WL^2}{26}$

8) 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

9) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement away from water face is _____
   a) 125 N/mm^2 b) 245 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

10) According to I.S. : 456, 1978 the thickness of reinforced concrete footing on piles at its edges, is kept less than
   a) 20 cm b) 30 cm c) 40 cm d) 50 cm

11) The advantage of a concrete pile over a timber pile, is
   a) no decay due to termites b) no restriction on length
   c) higher bearing capacity d) all of the above

12) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement away from the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

13) On piles, the drop must be at least
   a) 80 cm b) 100 cm c) 120 cm d) 140 cm

14) A raft foundation is provided if its area exceeds the plan area of the building
   a) 10% b) 20% c) 30% d) 50%

15) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

16) 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

17) 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

18) 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 of the above

19) The self-weight of the footing, is
   a) not considered for calculating the upward pressure on footing
   b) also considered for calculating the upward pressure on footing
   c) not considered for calculating the area of the footing
   d) both b) and c)

20) The weight of a foundation is assumed as
   a) 5% of wall weight b) 7% of wall weight
   c) 10% of wall weight d) 12% of wall weight

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SLR-EP – 415

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

***Instructions**:* *i) Answer **any two** questions from **each** Section.*

*ii) **Use** of IS 456 and IS 3370 Part **IV** are **allowed**.*

*iii) Assume suitable data **if necessary**.*

*iv) Draw **neat** sketches **wherever** necessary.*

SECTION – I

2. a) Design the interior panel of a flat slab for live load of 3500 N/m^2. The panels are 6 m × 6 m in size. The drop shall be provided. Use M_{25} grade of concrete and Fe_{415} steel. **12**

   b) Sketch the reinforcement details for circular slab. **8**

3. Design combined rectangular footing for two columns each 400 mm × 400 mm located 4 m centre to centre. Each column carries an axial load of 900 kN. The safe bearing capacity of soil may be taken as 275 kN/m^2. Use M_{20} grade of concrete and Fe_{500} steel. **20**

4. A column carrying a load of 2200 kN has to be supported by four piles each size of 300 mm × 300 mm. The piles are spaced at 1 m centre to centre. The size of column is 600 mm × 600 mm. Design a suitable pile cap. Use M_{20} grade of concrete and Fe_{415} steel. **20**

SECTION – II

5. Design a circular water tank with fixed base for capacity of 3 lakh litres. The depth of water is to be 4 m including a free board of 200 mm. Use M_{25} grade of concrete and Fe_{415} steel. The tank is free at top and fixed at base. Take unit weight of water as 9.8 kN/m^3. Use IS code method. **20**

6. A rectangular water tank 4.5 m long 2.5 m wide and 2.5 m high has its walls rigidly jointed at the critical edges. Design the tank by IS code method, it is supported an all sides under the wall. Use M_{25} grade of concrete and Fe_{415} steel. **20**

7. Design an underground water tank 4 m × 7 m × 3 m deep. The subsoil consists of sand having angle of repose of 30° and saturated unit weight of 18 kN/m^3. The water table is likely to rise up to ground level. Use M_{25} grade of concrete and Fe_{500} steel. Take unit weight of water as 9.81 kN/m^3. **20**

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SLR-EP – 415

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (Old) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
ii) ***Use*** *of IS 456 and IS 3370 is* ***not allowed****.*
iii) ***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 : 20

1. Choose the correct answer : **(1×20=20)**

1) 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

2) 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

3) 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 of the above

4) The self-weight of the footing, is
   a) not considered for calculating the upward pressure on footing
   b) also considered for calculating the upward pressure on footing
   c) not considered for calculating the area of the footing
   d) both b) and c)

5) The weight of a foundation is assumed as
   a) 5% of wall weight b) 7% of wall weight
   c) 10% of wall weight d) 12% of wall weight

6) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement away from water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

7) A foundation rests on
   a) base of the foundation b) subgrade
   c) foundation soil d) both b) and c)

P.T.O.

8) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

9) For a circular slab carrying a uniformly distributed load, the ratio of the maximum negative to maximum positive radial moment, is
   a) 1 b) 2 c) 3 d) 4

10) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

11) The effective width of a column strip of a flat slab, is
   a) one-fourth the width of the panel b) radius of the column
   c) half the width of the panel d) none of these

12) A pile of length L carrying a uniformly distributed load W per metre length is suspended at two points, the maximum, B.M. at the centre of the pile or at the points of suspension, is

   a) $\frac{WL}{8}$ b) $\frac{WL^2}{24}$ c) $\frac{WL^2}{47}$ d) $\frac{WL^2}{26}$

13) 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

14) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement away from water face is _____
   a) 125 N/mm^2 b) 245 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

15) According to I.S. : 456, 1978 the thickness of reinforced concrete footing on piles at its edges, is kept less than
   a) 20 cm b) 30 cm c) 40 cm d) 50 cm

16) The advantage of a concrete pile over a timber pile, is
   a) no decay due to termites b) no restriction on length
   c) higher bearing capacity d) all of the above

17) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement away from the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

18) On piles, the drop must be at least
   a) 80 cm b) 100 cm c) 120 cm d) 140 cm

19) A raft foundation is provided if its area exceeds the plan area of the building
   a) 10% b) 20% c) 30% d) 50%

20) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

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SLR-EP – 415

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*

ii) ***Use*** *of IS 456 and IS 3370 Part* ***IV*** *are* ***allowed****.*

iii) Assume suitable data ***if necessary****.*

iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*

SECTION – I

2. a) Design the interior panel of a flat slab for live load of 3500 N/m^2. The panels are 6 m × 6 m in size. The drop shall be provided. Use M_{25} grade of concrete and Fe_{415} steel. **12**

   b) Sketch the reinforcement details for circular slab. **8**

3. Design combined rectangular footing for two columns each 400 mm × 400 mm located 4 m centre to centre. Each column carries an axial load of 900 kN. The safe bearing capacity of soil may be taken as 275 kN/m^2. Use M_{20} grade of concrete and Fe_{500} steel. **20**

4. A column carrying a load of 2200 kN has to be supported by four piles each size of 300 mm × 300 mm. The piles are spaced at 1 m centre to centre. The size of column is 600 mm × 600 mm. Design a suitable pile cap. Use M_{20} grade of concrete and Fe_{415} steel. **20**

SECTION – II

5. Design a circular water tank with fixed base for capacity of 3 lakh litres. The depth of water is to be 4 m including a free board of 200 mm. Use M_{25} grade of concrete and Fe_{415} steel. The tank is free at top and fixed at base. Take unit weight of water as 9.8 kN/m^3. Use IS code method. **20**

6. A rectangular water tank 4.5 m long 2.5 m wide and 2.5 m high has its walls rigidly jointed at the critical edges. Design the tank by IS code method, it is supported an all sides under the wall. Use M_{25} grade of concrete and Fe_{415} steel. **20**

7. Design an underground water tank 4 m × 7 m × 3 m deep. The subsoil consists of sand having angle of repose of 30° and saturated unit weight of 18 kN/m^3. The water table is likely to rise up to ground level. Use M_{25} grade of concrete and Fe_{500} steel. Take unit weight of water as 9.81 kN/m^3. **20**

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SLR-EP – 415

Seat No.	

Set **R**

B.E. (Civil) (Part – II) (Old) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
ii) ***Use*** *of IS 456 and IS 3370 is* ***not allowed****.*
iii) ***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 : 20

1. Choose the correct answer : **(1×20=20)**

1) The advantage of a concrete pile over a timber pile, is
   a) no decay due to termites b) no restriction on length
   c) higher bearing capacity d) all of the above

2) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement away from the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

3) On piles, the drop must be at least
   a) 80 cm b) 100 cm c) 120 cm d) 140 cm

4) A raft foundation is provided if its area exceeds the plan area of the building
   a) 10% b) 20% c) 30% d) 50%

5) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

6) 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

7) 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

8) 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 of the above

9) The self-weight of the footing, is
   a) not considered for calculating the upward pressure on footing
   b) also considered for calculating the upward pressure on footing
   c) not considered for calculating the area of the footing
   d) both b) and c)

10) The weight of a foundation is assumed as
   a) 5% of wall weight b) 7% of wall weight
   c) 10% of wall weight d) 12% of wall weight

11) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement away from water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

12) A foundation rests on
   a) base of the foundation b) subgrade
   c) foundation soil d) both b) and c)

13) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

14) For a circular slab carrying a uniformly distributed load, the ratio of the maximum negative to maximum positive radial moment, is
   a) 1 b) 2 c) 3 d) 4

15) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

16) The effective width of a column strip of a flat slab, is
   a) one-fourth the width of the panel b) radius of the column
   c) half the width of the panel d) none of these

17) A pile of length L carrying a uniformly distributed load W per metre length is suspended at two points, the maximum, B.M. at the centre of the pile or at the points of suspension, is

   a) $\frac{WL}{8}$ b) $\frac{WL^2}{24}$ c) $\frac{WL^2}{47}$ d) $\frac{WL^2}{26}$

18) 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

19) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement away from water face is _____
   a) 125 N/mm^2 b) 245 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

20) According to I.S. : 456, 1978 the thickness of reinforced concrete footing on piles at its edges, is kept less than
   a) 20 cm b) 30 cm c) 40 cm d) 50 cm

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SLR-EP – 415

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

***Instructions**:* *i) Answer **any two** questions from **each** Section.*

*ii) **Use** of IS 456 and IS 3370 Part **IV** are **allowed**.*

*iii) Assume suitable data **if necessary**.*

*iv) Draw **neat** sketches **wherever** necessary.*

SECTION – I

2. a) Design the interior panel of a flat slab for live load of 3500 N/m^2. The panels are 6 m × 6 m in size. The drop shall be provided. Use M_{25} grade of concrete and Fe_{415} steel. **12**

   b) Sketch the reinforcement details for circular slab. **8**

3. Design combined rectangular footing for two columns each 400 mm × 400 mm located 4 m centre to centre. Each column carries an axial load of 900 kN. The safe bearing capacity of soil may be taken as 275 kN/m^2. Use M_{20} grade of concrete and Fe_{500} steel. **20**

4. A column carrying a load of 2200 kN has to be supported by four piles each size of 300 mm × 300 mm. The piles are spaced at 1 m centre to centre. The size of column is 600 mm × 600 mm. Design a suitable pile cap. Use M_{20} grade of concrete and Fe_{415} steel. **20**

SECTION – II

5. Design a circular water tank with fixed base for capacity of 3 lakh litres. The depth of water is to be 4 m including a free board of 200 mm. Use M_{25} grade of concrete and Fe_{415} steel. The tank is free at top and fixed at base. Take unit weight of water as 9.8 kN/m^3. Use IS code method. **20**

6. A rectangular water tank 4.5 m long 2.5 m wide and 2.5 m high has its walls rigidly jointed at the critical edges. Design the tank by IS code method, it is supported an all sides under the wall. Use M_{25} grade of concrete and Fe_{415} steel. **20**

7. Design an underground water tank 4 m × 7 m × 3 m deep. The subsoil consists of sand having angle of repose of 30° and saturated unit weight of 18 kN/m^3. The water table is likely to rise up to ground level. Use M_{25} grade of concrete and Fe_{500} steel. Take unit weight of water as 9.81 kN/m^3. **20**

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SLR-EP – 415

Seat No.	

Set **S**

B.E. (Civil) (Part – II) (Old) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* *i) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
ii) ***Use*** *of IS 456 and IS 3370 is* ***not allowed****.*
iii) ***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 : 20

1. Choose the correct answer : **(1×20=20)**

1) The effective width of a column strip of a flat slab, is
   a) one-fourth the width of the panel b) radius of the column
   c) half the width of the panel d) none of these

2) A pile of length L carrying a uniformly distributed load W per metre length is suspended at two points, the maximum, B.M. at the centre of the pile or at the points of suspension, is

   a) $\frac{WL}{8}$ b) $\frac{WL^2}{24}$ c) $\frac{WL^2}{47}$ d) $\frac{WL^2}{26}$

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) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement away from water face is _____
   a) 125 N/mm^2 b) 245 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

5) According to I.S. : 456, 1978 the thickness of reinforced concrete footing on piles at its edges, is kept less than
   a) 20 cm b) 30 cm c) 40 cm d) 50 cm

6) The advantage of a concrete pile over a timber pile, is
   a) no decay due to termites b) no restriction on length
   c) higher bearing capacity d) all of the above

7) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement away from the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

8) On piles, the drop must be at least
   a) 80 cm b) 100 cm c) 120 cm d) 140 cm

P.T.O.

9) A raft foundation is provided if its area exceeds the plan area of the building
   a) 10% b) 20% c) 30% d) 50%

10) In water tank, for Fe_{500} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/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 of the above

14) The self-weight of the footing, is
   a) not considered for calculating the upward pressure on footing
   b) also considered for calculating the upward pressure on footing
   c) not considered for calculating the area of the footing
   d) both b) and c)

15) The weight of a foundation is assumed as
   a) 5% of wall weight b) 7% of wall weight
   c) 10% of wall weight d) 12% of wall weight

16) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement away from water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

17) A foundation rests on
   a) base of the foundation b) subgrade
   c) foundation soil d) both b) and c)

18) In water tank, for Fe_{250} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 115 N/mm^2 d) 145 N/mm^2

19) For a circular slab carrying a uniformly distributed load, the ratio of the maximum negative to maximum positive radial moment, is
   a) 1 b) 2 c) 3 d) 4

20) In water tank, for Fe_{415} the permissible tensile stress in the reinforcement near the water face is _____
   a) 125 N/mm^2 b) 150 N/mm^2 c) 205 N/mm^2 d) 190 N/mm^2

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SLR-EP – 415

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*

ii) ***Use*** *of IS 456 and IS 3370 Part* ***IV*** *are* ***allowed****.*

iii) Assume suitable data ***if necessary****.*

iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*

SECTION – I

2. a) Design the interior panel of a flat slab for live load of 3500 N/m^2. The panels are 6 m × 6 m in size. The drop shall be provided. Use M_{25} grade of concrete and Fe_{415} steel. **12**

   b) Sketch the reinforcement details for circular slab. **8**

3. Design combined rectangular footing for two columns each 400 mm × 400 mm located 4 m centre to centre. Each column carries an axial load of 900 kN. The safe bearing capacity of soil may be taken as 275 kN/m^2. Use M_{20} grade of concrete and Fe_{500} steel. **20**

4. A column carrying a load of 2200 kN has to be supported by four piles each size of 300 mm × 300 mm. The piles are spaced at 1 m centre to centre. The size of column is 600 mm × 600 mm. Design a suitable pile cap. Use M_{20} grade of concrete and Fe_{415} steel. **20**

SECTION – II

5. Design a circular water tank with fixed base for capacity of 3 lakh litres. The depth of water is to be 4 m including a free board of 200 mm. Use M_{25} grade of concrete and Fe_{415} steel. The tank is free at top and fixed at base. Take unit weight of water as 9.8 kN/m^3. Use IS code method. **20**

6. A rectangular water tank 4.5 m long 2.5 m wide and 2.5 m high has its walls rigidly jointed at the critical edges. Design the tank by IS code method, it is supported an all sides under the wall. Use M_{25} grade of concrete and Fe_{415} steel. **20**

7. Design an underground water tank 4 m × 7 m × 3 m deep. The subsoil consists of sand having angle of repose of 30° and saturated unit weight of 18 kN/m^3. The water table is likely to rise up to ground level. Use M_{25} grade of concrete and Fe_{500} steel. Take unit weight of water as 9.81 kN/m^3. **20**

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SLR-EP – 416

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *i.e. Question no.* ***2*** *to Question no.* ***5****. Question no.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*
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****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
6) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

1) _____ condition in effluent treatment can be achieved by the use of diffused aeration.
a) Neutralization b) Anaerobic c) Aerobic d) Anoxic

2) Thickening is meant for reduction of _____ in sludge.
a) Organic content b) Drainability
c) Volume d) Moisture content

3) _____ is a convenient device for measuring flow in a sewer.
a) Parshall flume b) Thermometer c) Manometer d) Water meters

4) Polyelectrolyte is used to improve _____ of coagulated substance in wastewater.
a) Aeration b) Settling and separation
c) Organic removal d) Turbidity

5) _____ removal in aeration tank is accomplished by Chemical precipitation.
a) Phosphate b) Nitrates c) Sulphates d) Chlorides

6) _____ is expressed as sum of absorbance at wave lengths.
a) Turbidity b) Colour c) Dissolved solids d) Odour

7) Biological treatment units are operated in _____ growth phase of microorganism.
   a) Endogenous b) Lag c) Declining d) All of the above
8) Addition of _____ to Kraft process results information of white liquor.
   a) Ferric chloride b) Polyelectrolyte
   c) Alum d) Lime
9) Beater and Jordan are manufacturing process of _____ industry.
   a) Pulp and paper b) Sugar c) Textile d) Tannery
10) Yeast sludge containing rich in proteins, carbohydrates vitamins are treated separately for
   a) Segregation b) Recycle
   c) Byproduct recovery d) High efficiency
11) _____ is a process in which yarn is strengthened by loading starch.
   a) Mercerizing b) Slashing c) Weaving d) Carding
12) Addition of _____ to concentrated black liquor result in formation of green liquor.
   a) Potassium sulphate b) Calcium sulphate
   c) Chromium d) Sodium sulphate
13) _____ process involves burning and oxidation.
   a) Dewatering b) Precipitation
   c) Thermal reduction d) Steaming
14) _____ is exposure of waste in increasing the concentration of initial microbiological population.
   a) Pickling b) Scrubbing c) Metabolism d) Acclimatisation
15) The Fibrous residue of sugar mill house is known as
   a) Molasses b) Bagasses c) Biogas d) Lignin
16) The degree of treatment of the acidic or alkaline waste is determined
   a) pH b) Hardness c) Toxicity d) Organic wastes
17) The milk waste becomes _____ due to composition of lactose under anaerobic condition.
   a) Alkaline b) Acidic c) Crystalline d) Neutral
18) Segregation of spent chrome-tan liquor is advised for chemical recovery and better pollution abatement in
   a) Sugar industry b) Fertilizer industry
   c) Pulp and paper d) Tannery industry
19) Lime treatment is suggested for removal of strong colour in
   a) Tannery industry b) Sugar industry
   c) Pulp and paper industry d) Milk industry
20) The end products of anaerobic digestion are
   a) Methane and oxygen b) Methane and ammonia
   c) Methane and carbon dioxide d) Carbon dioxide and ammonia

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SLR-EP – 416

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. a) Enlist various methods of waste of waste strength reduction. Explain any one in detail. **8**
   b) List various components of wastewater flow. Give typical rates of water use for various industries. **6**

3. a) The data of sewage and stream flow is given below : **9**

Parameter	Sewage	Stream
Discharge (m^3/S)	150	1600
BOD_5 (mg/L)	200	7
D. O (mg/L)	0	9.12 saturated

   The deoxygenation constant (K) 0.12/day, The average velocity of flow is 0.15 m/S. The self purification constant is 3.2. Find critical D.O deficit.
   b) Discuss any one method of neutralization of acidic waste. **5**

4. a) What is meant by self purification capacity of stream ? **6**
   b) Discuss any one method of removal of colour from wastewater. **7**

5. Write short note on :
   I) Equipment change. **6**
   II) Sludge disposal. **7**

Set P

SECTION – II

6. a) Mention pollution characteristics of industrial waste and suggest treatment methods for any four industries. **8**

   b) Explain the effects of Tannery waste on receiving streams. **4**

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

   a) Tannery industry. **7**

   b) Pulp and paper. **7**

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

   a) Sugar industry. **7**

   b) Cotton textile industry. **7**

9. Write short note on : **14**

   I) Maharashtra Pollution Control Board.

   II) Recycling of waste.

SLR-EP – 416

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *i.e. Question no.* ***2*** *to Question no.* ***5****. Question no.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*
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****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
6) ***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 : 20

1. Choose the correct answer : **(20×1=20)**
   1) The degree of treatment of the acidic or alkaline waste is determined
      a) pH b) Hardness c) Toxicity d) Organic wastes
   2) The milk waste becomes _____ due to composition of lactose under anaerobic condition.
      a) Alkaline b) Acidic c) Crystalline d) Neutral
   3) Segregation of spent chrome-tan liquor is advised for chemical recovery and better pollution abatement in
      a) Sugar industry b) Fertilizer industry
      c) Pulp and paper d) Tannery industry
   4) Lime treatment is suggested for removal of strong colour in
      a) Tannery industry b) Sugar industry
      c) Pulp and paper industry d) Milk industry
   5) The end products of anaerobic digestion are
      a) Methane and oxygen b) Methane and ammonia
      c) Methane and carbon dioxide d) Carbon dioxide and ammonia
   6) _____ condition in effluent treatment can be achieved by the use of diffused aeration.
      a) Neutralization b) Anaerobic c) Aerobic d) Anoxic

7) Thickening is meant for reduction of _____ in sludge.
   a) Organic content b) Drainability
   c) Volume d) Moisture content
8) _____ is a convenient device for measuring flow in a sewer.
   a) Parshall flume b) Thermometer c) Manometer d) Water meters
9) Polyelectrolyte is used to improve _____ of coagulated substance in wastewater.
   a) Aeration b) Settling and separation
   c) Organic removal d) Turbidity
10) _____ removal in aeration tank is accomplished by Chemical precipitation.
   a) Phosphate b) Nitrates c) Sulphates d) Chlorides
11) _____ is expressed as sum of absorbance at wave lengths.
   a) Turbidity b) Colour c) Dissolved solids d) Odour
12) Biological treatment units are operated in _____ growth phase of microorganism.
   a) Endogenous b) Lag c) Declining d) All of the above
13) Addition of _____ to Kraft process results information of white liquor.
   a) Ferric chloride b) Polyelectrolyte
   c) Alum d) Lime
14) Beater and Jordan are manufacturing process of _____ industry.
   a) Pulp and paper b) Sugar c) Textile d) Tannery
15) Yeast sludge containing rich in proteins, carbohydrates vitamins are treated separately for
   a) Segregation b) Recycle
   c) Byproduct recovery d) High efficiency
16) _____ is a process in which yarn is strengthened by loading starch.
   a) Mercerizing b) Slashing c) Weaving d) Carding
17) Addition of _____ to concentrated black liquor result in formation of green liquor.
   a) Potassium sulphate b) Calcium sulphate
   c) Chromium d) Sodium sulphate
18) _____ process involves burning and oxidation.
   a) Dewatering b) Precipitation
   c) Thermal reduction d) Steaming
19) _____ is exposure of waste in increasing the concentration of initial microbiological population.
   a) Pickling b) Scrubbing c) Metabolism d) Acclimatisation
20) The Fibrous residue of sugar mill house is known as
   a) Molasses b) Bagasses c) Biogas d) Lignin

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SLR-EP – 416

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Solve* ***any three*** *questions from Section –* ***I*** *i.e. Question no.* ***2*** *to Question no.* ***5****. Question no.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*
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****.*

SECTION – I

2. a) Enlist various methods of waste of waste strength reduction. Explain any one in detail. **8**
   b) List various components of wastewater flow. Give typical rates of water use for various industries. **6**

3. a) The data of sewage and stream flow is given below : **9**

Parameter	**Sewage**	**Stream**
Discharge (m^3/S)	150	1600
BOD_5 (mg/L)	200	7
D. O (mg/L)	0	9.12 saturated

   The deoxygenation constant (K) 0.12/day, The average velocity of flow is 0.15 m/S. The self purification constant is 3.2. Find critical D.O deficit.
   b) Discuss any one method of neutralization of acidic waste. **5**

4. a) What is meant by self purification capacity of stream ? **6**
   b) Discuss any one method of removal of colour from wastewater. **7**

5. Write short note on :
   I) Equipment change. **6**
   II) Sludge disposal. **7**

Set Q

SECTION – II

6. a) Mention pollution characteristics of industrial waste and suggest treatment methods for any four industries. **8**

   b) Explain the effects of Tannery waste on receiving streams. **4**

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

   a) Tannery industry. **7**

   b) Pulp and paper. **7**

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

   a) Sugar industry. **7**

   b) Cotton textile industry. **7**

9. Write short note on : **14**

   I) Maharashtra Pollution Control Board.

   II) Recycling of waste.

SLR-EP – 416

Seat No.	

Set **R**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *i.e. Question no.* ***2*** *to Question no.* ***5****. Question no.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*
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****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
6) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

1) _____ is a process in which yarn is strengthened by loading starch.
a) Mercerizing b) Slashing c) Weaving d) Carding

2) Addition of _____ to concentrated black liquor result in formation of green liquor.
a) Potassium sulphate b) Calcium sulphate
c) Chromium d) Sodium sulphate

3) _____ process involves burning and oxidation.
a) Dewatering b) Precipitation
c) Thermal reduction d) Steaming

4) _____ is exposure of waste in increasing the concentration of initial microbiological population.
a) Pickling b) Scrubbing c) Metabolism d) Acclimatisation

5) The Fibrous residue of sugar mill house is known as
a) Molasses b) Bagasses c) Biogas d) Lignin

6) The degree of treatment of the acidic or alkaline waste is determined
a) pH b) Hardness c) Toxicity d) Organic wastes

7) The milk waste becomes _____ due to composition of lactose under anaerobic condition.
a) Alkaline b) Acidic c) Crystalline d) Neutral

8) Segregation of spent chrome-tan liquor is advised for chemical recovery and better pollution abatement in
   a) Sugar industry b) Fertilizer industry
   c) Pulp and paper d) Tannery industry
9) Lime treatment is suggested for removal of strong colour in
   a) Tannery industry b) Sugar industry
   c) Pulp and paper industry d) Milk industry
10) The end products of anaerobic digestion are
   a) Methane and oxygen b) Methane and ammonia
   c) Methane and carbon dioxide d) Carbon dioxide and ammonia
11) _____ condition in effluent treatment can be achieved by the use of diffused aeration.
   a) Neutralization b) Anaerobic c) Aerobic d) Anoxic
12) Thickening is meant for reduction of _____ in sludge.
   a) Organic content b) Drainability
   c) Volume d) Moisture content
13) _____ is a convenient device for measuring flow in a sewer.
   a) Parshall flume b) Thermometer c) Manometer d) Water meters
14) Polyelectrolyte is used to improve _____ of coagulated substance in wastewater.
   a) Aeration b) Settling and separation
   c) Organic removal d) Turbidity
15) _____ removal in aeration tank is accomplished by Chemical precipitation.
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16) _____ is expressed as sum of absorbance at wave lengths.
   a) Turbidity b) Colour c) Dissolved solids d) Odour
17) Biological treatment units are operated in _____ growth phase of microorganism.
   a) Endogenous b) Lag c) Declining d) All of the above
18) Addition of _____ to Kraft process results information of white liquor.
   a) Ferric chloride b) Polyelectrolyte
   c) Alum d) Lime
19) Beater and Jordan are manufacturing process of _____ industry.
   a) Pulp and paper b) Sugar c) Textile d) Tannery
20) Yeast sludge containing rich in proteins, carbohydrates vitamins are treated separately for
   a) Segregation b) Recycle
   c) Byproduct recovery d) High efficiency

_____

SLR-EP – 416

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Solve* ***any three*** *questions from Section –* ***I*** *i.e. Question no.* ***2*** *to Question no.* ***5****. Question no.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*
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****.*

SECTION – I

2. a) Enlist various methods of waste of waste strength reduction. Explain any one in detail. **8**
   b) List various components of wastewater flow. Give typical rates of water use for various industries. **6**

3. a) The data of sewage and stream flow is given below : **9**

Parameter	**Sewage**	**Stream**
Discharge (m^3/S)	150	1600
BOD_5 (mg/L)	200	7
D. O (mg/L)	0	9.12 saturated

   The deoxygenation constant (K) 0.12/day, The average velocity of flow is 0.15 m/S. The self purification constant is 3.2. Find critical D.O deficit.
   b) Discuss any one method of neutralization of acidic waste. **5**

4. a) What is meant by self purification capacity of stream ? **6**
   b) Discuss any one method of removal of colour from wastewater. **7**

5. Write short note on :
   I) Equipment change. **6**
   II) Sludge disposal. **7**

Set R

SECTION – II

6. a) Mention pollution characteristics of industrial waste and suggest treatment methods for any four industries. **8**

   b) Explain the effects of Tannery waste on receiving streams. **4**

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

   a) Tannery industry. **7**

   b) Pulp and paper. **7**

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

   a) Sugar industry. **7**

   b) Cotton textile industry. **7**

9. Write short note on : **14**

   I) Maharashtra Pollution Control Board.

   II) Recycling of waste.

SLR-EP – 416

Seat No.	

Set **S**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *i.e. Question no.* ***2*** *to Question no.* ***5****. Question no.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*
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****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
6) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

1) _____ is expressed as sum of absorbance at wave lengths.
a) Turbidity b) Colour c) Dissolved solids d) Odour

2) Biological treatment units are operated in _____ growth phase of microorganism.
a) Endogenous b) Lag c) Declining d) All of the above

3) Addition of _____ to Kraft process results information of white liquor.
a) Ferric chloride b) Polyelectrolyte
c) Alum d) Lime

4) Beater and Jordan are manufacturing process of _____ industry.
a) Pulp and paper b) Sugar c) Textile d) Tannery

5) Yeast sludge containing rich in proteins, carbohydrates vitamins are treated separately for
a) Segregation b) Recycle
c) Byproduct recovery d) High efficiency

6) _____ is a process in which yarn is strengthened by loading starch.
a) Mercerizing b) Slashing c) Weaving d) Carding

7) Addition of _____ to concentrated black liquor result in formation of green liquor.
a) Potassium sulphate b) Calcium sulphate
c) Chromium d) Sodium sulphate

P.T.O.

8) _____ process involves burning and oxidation.
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9) _____ is exposure of waste in increasing the concentration of initial microbiological population.
   a) Pickling b) Scrubbing c) Metabolism d) Acclimatisation
10) The Fibrous residue of sugar mill house is known as
   a) Molasses b) Bagasses c) Biogas d) Lignin
11) The degree of treatment of the acidic or alkaline waste is determined
   a) pH b) Hardness c) Toxicity d) Organic wastes
12) The milk waste becomes _____ due to composition of lactose under anaerobic condition.
   a) Alkaline b) Acidic c) Crystalline d) Neutral
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   c) Pulp and paper d) Tannery industry
14) Lime treatment is suggested for removal of strong colour in
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18) _____ is a convenient device for measuring flow in a sewer.
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20) _____ removal in aeration tank is accomplished by Chemical precipitation.
   a) Phosphate b) Nitrates c) Sulphates d) Chlorides

_____

SLR-EP – 416

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Solve* ***any three*** *questions from Section –* ***I*** *i.e. Question no.* ***2*** *to Question no.* ***5****. Question no.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*
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****.*

SECTION – I

2. a) Enlist various methods of waste of waste strength reduction. Explain any one in detail. **8**
   b) List various components of wastewater flow. Give typical rates of water use for various industries. **6**

3. a) The data of sewage and stream flow is given below : **9**

Parameter	**Sewage**	**Stream**
Discharge (m^3/S)	150	1600
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   The deoxygenation constant (K) 0.12/day, The average velocity of flow is 0.15 m/S. The self purification constant is 3.2. Find critical D.O deficit.
   b) Discuss any one method of neutralization of acidic waste. **5**

4. a) What is meant by self purification capacity of stream ? **6**
   b) Discuss any one method of removal of colour from wastewater. **7**

5. Write short note on :
   I) Equipment change. **6**
   II) Sludge disposal. **7**

Set S

SECTION – II

6. a) Mention pollution characteristics of industrial waste and suggest treatment methods for any four industries. **8**

   b) Explain the effects of Tannery waste on receiving streams. **4**

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

   a) Tannery industry. **7**

   b) Pulp and paper. **7**

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

   a) Sugar industry. **7**

   b) Cotton textile industry. **7**

9. Write short note on : **14**

   I) Maharashtra Pollution Control Board.

   II) Recycling of waste.

SLR-EP – 417

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : WATER POWER ENGINEERING

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m

Instructions : *1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Draw **neat** labeled sketches **wherever** necessary.*
*4) Assume **suitable** data **if necessary** and state **it clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) A nuclear power development scheme is essentially a
   a) thermal power scheme b) hydropower scheme
   c) neither (a) nor (b) d) both (a) as well as (b)

2) 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) none of these

3) The only statement, which is incorrect in regard to hydropower, is
   a) the system efficiency of a hydroplant is quite high
   b) the installation cost of a hydroplant 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

4) If the peak load for a power plant equals the plant capacity, then the ratio of capacity factor to load factor will be
   a) 1 b) 0 c) < 1 d) > 1

5) Load factor of a power station is generally
   a) equal to unity
   b) less than unity
   c) more than unity
   d) equal to zero diversity factor is always

6) High load factor indicates
   a) cost of generation per unit power is increased
   b) total plant capacity is utilized for most of the time
   c) total plant capacity is not properly utilized for most of the time
   d) none of the above

7) Which of the following generating station has minimum running cost ?
   a) Nuclear b) Hydro c) Thermal d) Diesel

P.T.O.

8) _____ is invariably used as base load plant.
   a) Diesel engine plant b) Nuclear power plant
   c) Gas turbine plant d) Pumped storage plant

9) You have to select turbines for a hydropower plant, working on 150 m 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) none of these

10) Pondage requirement in a hydropower plant includes the need
   a) to balance the varying demand
   b) to compensate for wastage and spillage
   c) to balance short time fluctuations in the flow
   d) all of these

11) 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

12) A storage hydro plant essentially involves
   a) a barrage or a weir b) a dam
   c) either (a) or (b) d) Neither (a) nor (b)

13) Turbine runs at constant speed. The speed is kept constant by varying
   a) Load b) Discharge c) Net head d) Inlet valve

14) For high head and low discharge, the suitable turbine is
   a) Pelton b) Francis c) Kaplan d) Propeller

15) 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

16) A turbine is called reaction turbine if at the inlet of turbine the total energy is
   a) Kinetic b) Pressure
   c) Kinetic and pressure d) none of the above

17) Unit power of a turbine is given by
   a) $\frac{P}{H^{1/2}}$ b) $\frac{P}{H^{1/4}}$ c) $\frac{P}{H^{3/4}}$ d) $\frac{P}{H^{3/2}}$

18) In general sense, water turbines may be put in the following decreasing order of specific speed as
   a) Propeller, Francis, Pelton b) Francis, Kaplan, Pelton
   c) Kaplan, Impulse, Francis d) None of the above

19) Higher specific speed of turbine (300 to 800) indicates turbine is
   a) Pelton b) Kaplan c) Francis d) none of these

20) The units of specific speed of turbine are
   a) RPM b) no units
   c) rev/minutes $kwm^{1/2}$ d) none of these

Set P

SLR-EP – 417

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : WATER POWER ENGINEERING

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m

Instructions : *Solve **any three** questions from Section – **I** and **any three** questions from Section – **II**.*

SECTION – I

2. a) What are the basic resources in India for power generation ? List out their capacities in different regions of India. **6**

   b) Explain the construction of flow duration curve and discuss its importance in comparing the power potentiality of different storages used for power generation. **7**

3. a) Give a brief account of salient features of low, medium and high head plants with regard to head, topography, discharge, storage/pondage, generation cost etc. **6**

   b) What do you understand by run-off river power plant ? How its performance is increased by introducing a pondage in the plant ? **7**

4. a) What do you understand by water hammer and what are its effects on the power plant design ? **6**

   b) Differentiate between a conduit and penstock. How the length of penstock is decided in the hydraulic power plant ? What are the advantages and disadvantages of exposed penstock over buried penstock ? **7**

5. a) Describe with a suitable sketch, typical 'differential surge tank'. What are the advantages of such tank over the 'simple surge tank' ? **6**

   b) A penstock 2000 m long and 4 m diameter has a surge tank 20 m in diameter. For a discharge of 30 cumec, friction factor f = 0.018. Normal reservoir level is 500 m. Determine maximum and minimum water levels in the surge tank. **8**

SECTION – II

6. a) What topographical features are in favors of underground power house ? What are the different types of underground power stations ? Draw a neat layout of one of them. **6**

   b) What do you understand by the term specific speed of a water turbine ? What information does it give and how it is made use in practice ? Indicate how the form of a reaction turbine depends upon "specific sped". **7**

7. a) Describe the characteristics of various types of turbines used in hydro-electric power stations with reference to (a) head (b) part load efficiency and maximum efficiency and (c) specific speed. State how these factors help in the choice of the turbine. **6**

   b) A Pelton wheel turbine develops 14000 kW working under head of 900 m and at 600 rpm. Obtain the least diameter of the jet and the mean wheel diameter for the overall efficiency of 90%. Also determine the jet ratio and water power. **8**

8. a) What do you understand by "pump storage plant" ? What are the advantages and limitations of such power plant ? Where can such schemes be best applied ? **6**

   b) Pumped storage plants convert low value off peak energy into high value on peak energy. Discuss with the suitable electricity generating schedule diagram. **7**

9. a) Describe the mechanism behind generation of tides in ocean. How the tidal cycle can be used for Water Power Generation ? **6**

   b) What is draft tube ? What are the functions of draft tube ? Explain different types with figures and draft tube theory. **7**

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Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : WATER POWER ENGINEERING

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) *Draw* ***neat*** *labeled sketches* ***wherever*** *necessary.*
4) *Assume* ***suitable*** *data* ***if*** *necessary and state* ***it clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) A turbine is called reaction turbine if at the inlet of turbine the total energy is
   a) Kinetic b) Pressure
   c) Kinetic and pressure d) None of the above

2) Unit power of a turbine is given by
   a) $\frac{P}{H^{1/2}}$ b) $\frac{P}{H^{1/4}}$ c) $\frac{P}{H^{3/4}}$ d) $\frac{P}{H^{3/2}}$

3) In general sense, water turbines may be put in the following decreasing order of specific speed as
   a) Propeller, Francis, Pelton b) Francis, Kaplan, Pelton
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4) Higher specific speed of turbine (300 to 800) indicates turbine is
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5) The units of specific speed of turbine are
   a) RPM b) no units
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6) A nuclear power development scheme is essentially a
   a) thermal power scheme b) hydropower scheme
   c) neither (a) nor (b) d) both (a) as well as (b)

7) 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) none of these

8) The only statement, which is incorrect in regard to hydropower, is
   a) the system efficiency of a hydroplant is quite high
   b) the installation cost of a hydroplant 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

P.T.O.

9) If the peak load for a power plant equals the plant capacity, then the ratio of capacity factor to load factor will be
   a) 1 b) 0 c) < 1 d) > 1

10) Load factor of a power station is generally
   a) equal to unity
   b) less than unity
   c) more than unity
   d) equal to zero diversity factor is always

11) High load factor indicates
   a) cost of generation per unit power is increased
   b) total plant capacity is utilized for most of the time
   c) total plant capacity is not properly utilized for most of the time
   d) none of the above

12) Which of the following generating station has minimum running cost ?
   a) Nuclear b) Hydro c) Thermal d) Diesel

13) _____ is invariably used as base load plant.
   a) Diesel engine plant b) Nuclear power plant
   c) Gas turbine plant d) Pumped storage plant

14) You have to select turbines for a hydropower plant, working on 150 m 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) None of these

15) Pondage requirement in a hydropower plant includes the need
   a) to balance the varying demand
   b) to compensate for wastage and spillage
   c) to balance short time fluctuations in the flow
   d) all of these

16) 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

17) A storage hydro plant essentially involves
   a) a barrage or a weir b) a dam
   c) either (a) or (b) d) neither (a) nor (b)

18) Turbine runs at constant speed. The speed is kept constant by varying
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   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

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Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : WATER POWER ENGINEERING

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m

Instructions *: Solve **any three** questions from Section – **I** and **any three** questions from Section – **II**.*

SECTION – I

2. a) What are the basic resources in India for power generation ? List out their capacities in different regions of India. **6**

   b) Explain the construction of flow duration curve and discuss its importance in comparing the power potentiality of different storages used for power generation. **7**

3. a) Give a brief account of salient features of low, medium and high head plants with regard to head, topography, discharge, storage/pondage, generation cost etc. **6**

   b) What do you understand by run-off river power plant ? How its performance is increased by introducing a pondage in the plant ? **7**

4. a) What do you understand by water hammer and what are its effects on the power plant design ? **6**

   b) Differentiate between a conduit and penstock. How the length of penstock is decided in the hydraulic power plant ? What are the advantages and disadvantages of exposed penstock over buried penstock ? **7**

5. a) Describe with a suitable sketch, typical 'differential surge tank'. What are the advantages of such tank over the 'simple surge tank' ? **6**

   b) A penstock 2000 m long and 4 m diameter has a surge tank 20 m in diameter. For a discharge of 30 cumec, friction factor f = 0.018. Normal reservoir level is 500 m. Determine maximum and minimum water levels in the surge tank. **8**

SECTION – II

6. a) What topographical features are in favors of underground power house ? What are the different types of underground power stations ? Draw a neat layout of one of them. **6**

   b) What do you understand by the term specific speed of a water turbine ? What information does it give and how it is made use in practice ? Indicate how the form of a reaction turbine depends upon "specific sped". **7**

7. a) Describe the characteristics of various types of turbines used in hydro-electric power stations with reference to (a) head (b) part load efficiency and maximum efficiency and (c) specific speed. State how these factors help in the choice of the turbine. **6**

   b) A Pelton wheel turbine develops 14000 kW working under head of 900 m and at 600 rpm. Obtain the least diameter of the jet and the mean wheel diameter for the overall efficiency of 90%. Also determine the jet ratio and water power. **8**

8. a) What do you understand by "pump storage plant" ? What are the advantages and limitations of such power plant ? Where can such schemes be best applied ? **6**

   b) Pumped storage plants convert low value off peak energy into high value on peak energy. Discuss with the suitable electricity generating schedule diagram. **7**

9. a) Describe the mechanism behind generation of tides in ocean. How the tidal cycle can be used for Water Power Generation ? **6**

   b) What is draft tube ? What are the functions of draft tube ? Explain different types with figures and draft tube theory. **7**

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Seat No.	

Set **R**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : WATER POWER ENGINEERING

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) *Draw* ***neat*** *labeled sketches* ***wherever*** *necessary.*
4) *Assume* ***suitable*** *data* ***if*** *necessary and state* ***it clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) 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

2) A storage hydro plant essentially involves
   a) a barrage or a weir b) a dam
   c) either (a) or (b) d) neither (a) nor (b)

3) Turbine runs at constant speed. The speed is kept constant by varying
   a) Load b) Discharge c) Net head d) Inlet valve

4) For high head and low discharge, the suitable turbine is
   a) Pelton b) Francis c) Kaplan d) Propeller

5) Jet ratio (m) is defined as the ratio of
   a) Diameter of jet of water to diameter of Pelton wheel
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   c) Velocity of flow to velocity of jet of water
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6) A turbine is called reaction turbine if at the inlet of turbine the total energy is
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   a) $\frac{P}{H^{1/2}}$ b) $\frac{P}{H^{1/4}}$ c) $\frac{P}{H^{3/4}}$ d) $\frac{P}{H^{3/2}}$

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P.T.O.

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   a) cost of generation per unit power is increased
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17) Which of the following generating station has minimum running cost ?
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18) _____ is invariably used as base load plant.
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19) You have to select turbines for a hydropower plant, working on 150 m 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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   b) to compensate for wastage and spillage
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SLR-EP – 417

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : WATER POWER ENGINEERING

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m

Instructions *: Solve* ***any three*** *questions from Section –* ***I*** *and* ***any three*** *questions from Section –* ***II****.*

SECTION – I

2. a) What are the basic resources in India for power generation ? List out their capacities in different regions of India. **6**

   b) Explain the construction of flow duration curve and discuss its importance in comparing the power potentiality of different storages used for power generation. **7**

3. a) Give a brief account of salient features of low, medium and high head plants with regard to head, topography, discharge, storage/pondage, generation cost etc. **6**

   b) What do you understand by run-off river power plant ? How its performance is increased by introducing a pondage in the plant ? **7**

4. a) What do you understand by water hammer and what are its effects on the power plant design ? **6**

   b) Differentiate between a conduit and penstock. How the length of penstock is decided in the hydraulic power plant ? What are the advantages and disadvantages of exposed penstock over buried penstock ? **7**

5. a) Describe with a suitable sketch, typical 'differential surge tank'. What are the advantages of such tank over the 'simple surge tank' ? **6**

   b) A penstock 2000 m long and 4 m diameter has a surge tank 20 m in diameter. For a discharge of 30 cumec, friction factor f = 0.018. Normal reservoir level is 500 m. Determine maximum and minimum water levels in the surge tank. **8**

SECTION – II

6. a) What topographical features are in favors of underground power house ? What are the different types of underground power stations ? Draw a neat layout of one of them. **6**

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   b) Pumped storage plants convert low value off peak energy into high value on peak energy. Discuss with the suitable electricity generating schedule diagram. **7**

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   b) What is draft tube ? What are the functions of draft tube ? Explain different types with figures and draft tube theory. **7**

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Seat No.	

Set **S**

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : WATER POWER ENGINEERING

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m

Instructions : *1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Draw **neat** labeled sketches **wherever** necessary.*
*4) Assume **suitable** data **if** necessary and state **it clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) High load factor indicates
   a) cost of generation per unit power is increased
   b) total plant capacity is utilized for most of the time
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2) Which of the following generating station has minimum running cost ?
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P.T.O.

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Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
Elective – III : WATER POWER ENGINEERING

Day and Date : Thursday, 24-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m

Instructions *: Solve* ***any three*** *questions from Section –* ***I*** *and* ***any three*** *questions from Section –* ***II****.*

SECTION – I

2. a) What are the basic resources in India for power generation ? List out their capacities in different regions of India. **6**

   b) Explain the construction of flow duration curve and discuss its importance in comparing the power potentiality of different storages used for power generation. **7**

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5. a) Describe with a suitable sketch, typical 'differential surge tank'. What are the advantages of such tank over the 'simple surge tank' ? **6**

   b) A penstock 2000 m long and 4 m diameter has a surge tank 20 m in diameter. For a discharge of 30 cumec, friction factor f = 0.018. Normal reservoir level is 500 m. Determine maximum and minimum water levels in the surge tank. **8**

SECTION – II

6. a) What topographical features are in favors of underground power house ? What are the different types of underground power stations ? Draw a neat layout of one of them. **6**

   b) What do you understand by the term specific speed of a water turbine ? What information does it give and how it is made use in practice ? Indicate how the form of a reaction turbine depends upon "specific sped". **7**

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Seat No.	

Set **P**

B.E. (Civil) (Part – II) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III) (Old)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed but mention it* ***clearly****.*
2) ***Use*** *of nonprogrammable calculators is* ***allowed****.*
3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions out of Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *from Section –* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section –* ***II****.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

1) If the saddle point does not exist
   a) It is deterministic game
   b) Mixed strategies are used
   c) Maximin-Minimax criteria are used
   d) It is a fair game

2) A game is said to be fair if
   a) Saddle point exists
   b) Pure strategies are used
   c) Value of the game is zero
   d) It is a zero sum game

3) Which of the following methods can not be used for the games without saddle points ?
   a) Algebraic method
   b) Linear programming
   c) Graphical solution
   d) Minimax-maximin criteria

4) If there are more than one local minimum or local maximum then they
   a) Need not have same value
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   c) First is necessarily less than second
   d) First is necessarily greater than second

5) In Vogel's Approximation Method, the opportunity cost associated with a row is determined by
   a) The difference between the smallest cost and next smallest cost in that row
   b) The difference between the smallest unused cost and the next smallest unused cost in that row
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6) The maximum number of items that can be allocated to an unused route with the stepping stone algorithm is
   a) The maximum number in any cell
   b) The minimum number in any cell
   c) The minimum number in an increasing cell
   d) The minimum number in a decreasing cell on the stepping stone path for that node

7) The Modi method uses the stepping stone path
   a) To calculate the marginal cost of unused cells
   b) To determine how many items to allocate to the selected unused cells
   c) To determine the values of the row and minimum indices
   d) None of these

P.T.O.

8) An unbalanced transportation problem is the one in which
   a) The number of jobs are equal to number of facilities
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9) The degeneracy occurs in a transportation problem when
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10) If the value of the game is zero then the game strategy is known as
   a) Pure strategy b) Mixed strategy c) Fair game d) Pure game

11) When minimum and maximum criteria match, then
   a) Saddle point exist b) Fair game is resulted
   c) Mixed strategies are adopted d) Game will be unfair

12) Predetermined plan of actions based on which the games are played that does not change during the game is said to be
   a) Fair strategy b) Pure strategy
   c) Mixed strategy d) Value of the game

13) Which of the following is true in the case of row dominance in a game theory ?
   a) Least of the row $\geq$ highest of the another row
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   c) Every element of a row $\geq$ corresponding element of another row
   d) Every element of a row $\leq$ corresponding element of another row

14) If the gain of a player is loss of another player then the game is called
   a) Fair game b) Unfair game
   c) Zero sum game d) Non zero sum game

15) In a two person zero sum game, the following assumption is working
   a) Row player is always a loser b) Column player always minimizes the
   c) Genetic algorithm d) Dynamic Programming

16) Games with saddle point are _____ in the nature.
   a) Deterministic b) Probabilistic
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17) The shortest acyclic route network problems can be solved by
   a) Arithmetic method b) Graphical method
   c) Statistical method d) Simulation method

18) Which of the following criteria for decision making uses optimistic and pessimistic decisions ?
   a) Minimax b) Maximin
   c) Laplace d) Hurwicz

19) A TV repairer spends about 30 min on each job exponentially distributed and is busy for 5 hours in a eight hour day. The mean arrival rate is
   a) 10 per 8 hr. day b) 10 per hr.
   c) 6 per hr. d) None of these

20) On an average 30 goods trains arrive at a station poissonally loading time is distributed exponentially at 36 min. Then average number of trains in queue will be
   a) 2 b) 3
   c) 4 d) None of these

_____

SLR-EP – 419

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III) (Old)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed but mention it* ***clearly****.*
2) ***Use*** *of nonprogrammbale calculators is* ***allowed****.*
3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions out of Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *from Section –* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section –* ***II****.*

SECTION – I

2. Solve the following using Big M method : **14**
Minimise $2x_1 + 3x_2 + 4x_3$
Subject to $3x_1 + x_2 + 4x_3 \leq 600$
$2x_1 + 4x_2 + 2x_3 \geq 480$
$2x_1 + 3x_2 + 3x_2 = 540$
$x_1, x_2, x_3 \geq 0.$

OR

2. A firm owns facilities at three places. It has manufacturing plants at four places A, B, C and D with daily output of 5, 8, 7 and 14 units of an item respectively. It has warehouses at places P, Q, and R with daily requirements of 7, 9 and 18 units respectively. Per unit shipping charges for different routes are given below :

To	P	Q	R
From A	2	7	4
From B	3	3	1
From C	5	4	7
From D	1	6	2

The firm wants to send the outputs from various plants to warehouses involving minimum transportation cost. How should it route the product so as to achieve the objective ?

a) Use minimum cost method for initial solution **7**

b) Test the optimality using MODI method. **7**

3. Solve the integer Programming Problem using cutting planes. **13**
Maximise $Z = X_1 + X_2$
Subjected to $2X_1 + 5X_2 \leq 16$
$6X_1 + 5X_2 \leq 30$
$X_1, X_2 \geq 0$ and integer.

4. Explain EOQ, Reorder level, annual total variable Inventory cost, Inventory cycle, no. of orders, Rupee value of EOQ and Rupee value of average inventory. Write their formula with usual notations. **13**

5. Find the optimal strategies of A and B in the following game. Also obtain the value of the game. **13**

		B's strategies		
		B1	**B2**	**B3**
A's	A1	3	–1	–3
Strategies	A2	–3	3	–1
	A3	–4	–3	3

SECTION – II

6. a) Write notes on : **8**
   i) Dynamic programming
   ii) Simulation

   b) Maximize $F(x) = 20x - 3x^2 - x^4$ and Minimize $f(x) = x^4 + x^3 - x^2 - x + 1$. **8**

7. Dakota furniture makes desks, tables and chairs, Each product needs the limited resources of lumber, carpentry and finishing ; as described in the table. At most 5 tables can be sold per week. Maximize weekly revenue. **12**

Resource	**Desk**	**Table**	**Chair**	**Max. Avail.**
Lumber (Board ft.)	8	6	1	48
Finishing hours	4	2	1.5	20
Carpentry hours	2	1.5	.5	8
Max Demand	unlimited	5	unlimited	
Price ($)	60	30	20	

8. Bevco manufactures an orange flavored soft drink called Oranj by combining orange soda and orange juice. Each ounce of orange soda contains 0.5 oz of sugar and 1 mg of Vitamin C. Each ounce of orange juice contains 0.25 oz of sugar and 3 mg of Vitamin C. It costs Bevco 2$ to produce an ounce of orange soda and 3$ to produce an ounce of orange juice. Marketing department has decided that each 10 oz bottle of Oranj must contain at least 20 mg of Vitamin C and at most 4 oz of sugar. Use LP to determine how Bevco can meet marketing dept.'s requirements at minimum cost. **12**

9. Convert the primal to its dual.
   Max $z = 40x_1 + 50x_2$
   S.t $2x_1 + 3x_2 \leq 3$
   $8x_1 + 4x_2 \leq 5$
   $x_1, x_2 \geq 0$

   Prove that the optimal solution to primal is same as the optimal solution to dual. **12**

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Seat No.	

Set **Q**

B.E. (Civil) (Part – II) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III) (Old)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed but mention it* ***clearly****.*
2) ***Use*** *of nonprogrammable calculators is* ***allowed****.*
3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions out of Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *from Section –* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section –* ***II****.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

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

2) The shortest acyclic route network problems can be solved by
   a) Arithmetic method b) Graphical method
   c) Statistical method d) Simulation method

3) Which of the following criteria for decision making uses optimistic and pessimistic decisions ?
   a) Minimax b) Maximin
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4) A TV repairer spends about 30 min on each job exponentially distributed and is busy for 5 hours in a eight hour day. The mean arrival rate is
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5) On an average 30 goods trains arrive at a station poissonally loading time is distributed exponentially at 36 min. Then average number of trains in queue will be
   a) 2 b) 3
   c) 4 d) None of these

6) If the saddle point does not exist
   a) It is deterministic game b) Mixed strategies are used
   c) Maximin-Minimax criteria are used d) It is a fair game

7) A game is said to be fair if
   a) Saddle point exists b) Pure strategies are used
   c) Value of the game is zero d) It is a zero sum game

8) Which of the following methods can not be used for the games without saddle points ?
   a) Algebraic method b) Linear programming
   c) Graphical solution d) Minimax-maximin criteria

P.T.O.

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18) Which of the following is true in the case of row dominance in a game theory ?
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19) If the gain of a player is loss of another player then the game is called
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   a) Row player is always a loser
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Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III) (Old)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed but mention it* ***clearly****.*
2) ***Use*** *of nonprogrammbale calculators is* ***allowed****.*
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SECTION – I

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2. A firm owns facilities at three places. It has manufacturing plants at four places A, B, C and D with daily output of 5, 8, 7 and 14 units of an item respectively. It has warehouses at places P, Q, and R with daily requirements of 7, 9 and 18 units respectively. Per unit shipping charges for different routes are given below :

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The firm wants to send the outputs from various plants to warehouses involving minimum transportation cost. How should it route the product so as to achieve the objective ?

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Maximise $Z = X_1 + X_2$
Subjected to $2X_1 + 5X_2 \leq 16$
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		B's strategies		
		B1	**B2**	**B3**
A's	A1	3	–1	–3
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SECTION – II

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8. Bevco manufactures an orange flavored soft drink called Oranj by combining orange soda and orange juice. Each ounce of orange soda contains 0.5 oz of sugar and 1 mg of Vitamin C. Each ounce of orange juice contains 0.25 oz of sugar and 3 mg of Vitamin C. It costs Bevco 2$ to produce an ounce of orange soda and 3$ to produce an ounce of orange juice. Marketing department has decided that each 10 oz bottle of Oranj must contain at least 20 mg of Vitamin C and at most 4 oz of sugar. Use LP to determine how Bevco can meet marketing dept.'s requirements at minimum cost. **12**

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Seat No.	

Set **R**

B.E. (Civil) (Part – II) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III) (Old)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed but mention it* ***clearly****.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) When minimum and maximum criteria match, then
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P.T.O.

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SLR-EP – 419

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III) (Old)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed but mention it* ***clearly****.*
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SECTION – I

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SECTION – II

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SLR-EP – 419

Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III) (Old)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
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3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions out of Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *from Section –* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section –* ***II****.*
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5) ***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 : 20

1. Choose the correct answer : **(20×1=20)**

1) The maximum number of items that can be allocated to an unused route with the stepping stone algorithm is
   a) The maximum number in any cell
   b) The minimum number in any cell
   c) The minimum number in an increasing cell
   d) The minimum number in a decreasing cell on the stepping stone path for that node

2) The Modi method uses the stepping stone path
   a) To calculate the marginal cost of unused cells
   b) To determine how many items to allocate to the selected unused cells
   c) To determine the values of the row and minimum indices
   d) None of these

3) An unbalanced transportation problem is the one in which
   a) The number of jobs are equal to number of facilities
   b) The total supply is not equal to total requirement
   c) The total supply is same as total requirement
   d) None of these

4) The degeneracy occurs in a transportation problem when
   a) Demand exceed supply
   b) When exactly one used cell becomes unused while moving items to a currently unused cell
   c) When less than m + n – 1 cells are used
   d) None of the above

5) If the value of the game is zero then the game strategy is known as
   a) Pure strategy b) Mixed strategy c) Fair game d) Pure game

6) When minimum and maximum criteria match, then
   a) Saddle point exist b) Fair game is resulted
   c) Mixed strategies are adopted d) Game will be unfair

P.T.O.

7) Predetermined plan of actions based on which the games are played that does not change during the game is said to be
   a) Fair strategy
   b) Pure strategy
   c) Mixed strategy
   d) Value of the game

8) Which of the following is true in the case of row dominance in a game theory ?
   a) Least of the row $\geq$ highest of the another row
   b) Least of the row $\leq$ highest of the another row
   c) Every element of a row $\geq$ corresponding element of another row
   d) Every element of a row $\leq$ corresponding element of another row

9) If the gain of a player is loss of another player then the game is called
   a) Fair game
   b) Unfair game
   c) Zero sum game
   d) Non zero sum game

10) In a two person zero sum game, the following assumption is working
   a) Row player is always a loser
   b) Column player always minimizes the
   c) Genetic algorithm
   d) Dynamic Programming

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

12) The shortest acyclic route network problems can be solved by
   a) Arithmetic method
   b) Graphical method
   c) Statistical method
   d) Simulation method

13) Which of the following criteria for decision making uses optimistic and pessimistic decisions ?
   a) Minimax
   b) Maximin
   c) Laplace
   d) Hurwicz

14) A TV repairer spends about 30 min on each job exponentially distributed and is busy for 5 hours in a eight hour day. The mean arrival rate is
   a) 10 per 8 hr. day
   b) 10 per hr.
   c) 6 per hr.
   d) None of these

15) On an average 30 goods trains arrive at a station poissonally loading time is distributed exponentially at 36 min. Then average number of trains in queue will be
   a) 2
   b) 3
   c) 4
   d) None of these

16) If the saddle point does not exist
   a) It is deterministic game
   b) Mixed strategies are used
   c) Maximin-Minimax criteria are used
   d) It is a fair game

17) A game is said to be fair if
   a) Saddle point exists
   b) Pure strategies are used
   c) Value of the game is zero
   d) It is a zero sum game

18) Which of the following methods can not be used for the games without saddle points ?
   a) Algebraic method
   b) Linear programming
   c) Graphical solution
   d) Minimax-maximin criteria

19) If there are more than one local minimum or local maximum then they
   a) Need not have same value
   b) Same value is compulsory
   c) First is necessarily less than second
   d) First is necessarily greater than second

20) In Vogel's Approximation Method, the opportunity cost associated with a row is determined by
   a) The difference between the smallest cost and next smallest cost in that row
   b) The difference between the smallest unused cost and the next smallest unused cost in that row
   c) The difference between the smallest cost and the next smallest unused cost in the row
   d) None of these

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III) (Old)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *needed but mention it* ***clearly****.*
2) ***Use*** *of nonprogrammbale calculators is* ***allowed****.*
3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions out of Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *from Section –* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section –* ***II****.*

SECTION – I

2. Solve the following using Big M method : **14**
Minimise $2x_1 + 3x_2 + 4x_3$
Subject to $3x_1 + x_2 + 4x_3 \leq 600$
$2x_1 + 4x_2 + 2x_3 \geq 480$
$2x_1 + 3x_2 + 3x_2 = 540$
$x_1, x_2, x_3 \geq 0.$

OR

2. A firm owns facilities at three places. It has manufacturing plants at four places A, B, C and D with daily output of 5, 8, 7 and 14 units of an item respectively. It has warehouses at places P, Q, and R with daily requirements of 7, 9 and 18 units respectively. Per unit shipping charges for different routes are given below :

To	P	Q	R
From A	2	7	4
From B	3	3	1
From C	5	4	7
From D	1	6	2

The firm wants to send the outputs from various plants to warehouses involving minimum transportation cost. How should it route the product so as to achieve the objective ?

a) Use minimum cost method for initial solution **7**

b) Test the optimality using MODI method. **7**

3. Solve the integer Programming Problem using cutting planes. **13**
Maximise $Z = X_1 + X_2$
Subjected to $2X_1 + 5X_2 \leq 16$
$6X_1 + 5X_2 \leq 30$
$X_1, X_2 \geq 0$ and integer.

4. Explain EOQ, Reorder level, annual total variable Inventory cost, Inventory cycle, no. of orders, Rupee value of EOQ and Rupee value of average inventory. Write their formula with usual notations. **13**

Set S

5. Find the optimal strategies of A and B in the following game. Also obtain the value of the game. **13**

		B's strategies		
		B1	**B2**	**B3**
A's	A1	3	–1	–3
Strategies	A2	–3	3	–1
	A3	–4	–3	3

SECTION – II

6. a) Write notes on : **8**
   i) Dynamic programming
   ii) Simulation

   b) Maximize $F(x) = 20x - 3x^2 - x^4$ and Minimize $f(x) = x^4 + x^3 - x^2 - x + 1$. **8**

7. Dakota furniture makes desks, tables and chairs, Each product needs the limited resources of lumber, carpentry and finishing ; as described in the table. At most 5 tables can be sold per week. Maximize weekly revenue. **12**

Resource	**Desk**	**Table**	**Chair**	**Max. Avail.**
Lumber (Board ft.)	8	6	1	48
Finishing hours	4	2	1.5	20
Carpentry hours	2	1.5	.5	8
Max Demand	unlimited	5	unlimited	
Price ($)	60	30	20	

8. Bevco manufactures an orange flavored soft drink called Oranj by combining orange soda and orange juice. Each ounce of orange soda contains 0.5 oz of sugar and 1 mg of Vitamin C. Each ounce of orange juice contains 0.25 oz of sugar and 3 mg of Vitamin C. It costs Bevco 2$ to produce an ounce of orange soda and 3$ to produce an ounce of orange juice. Marketing department has decided that each 10 oz bottle of Oranj must contain at least 20 mg of Vitamin C and at most 4 oz of sugar. Use LP to determine how Bevco can meet marketing dept.'s requirements at minimum cost. **12**

9. Convert the primal to its dual.
   Max $z = 40x_1 + 50x_2$
   S.t $2x_1 + 3x_2 \leq 3$
   $8x_1 + 4x_2 \leq 5$
   $x_1, x_2 \geq 0$

   Prove that the optimal solution to primal is same as the optimal solution to dual. **12**

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Set **P**

B.E. (Civil) (Part – II) (Old) Examination, 2016
DISASTER MANAGEMENT (Elective – III)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) Assume suitable data ***wherever*** *needed but mention it clearly.*
4) Use of non-programmable calculators is ***allowed.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) An earlier definition of disaster places disaster as an event that caused
   a) More than 10,000 deaths b) Between 8,000 and 10,000 deaths
   c) 10,000 to 20,000 deaths d) More than 1,000 deaths

2) The first step of risk analysis is
   a) Hazard characterisation b) Hazard attributions
   c) Hazard identification d) Hazard quantification

3) The storm that has the potential to quickly grow into hurricanes and generate more rain is
   a) Convective storm b) Tropical storm
   c) An extra-tropical storm d) Desert storm

4) Which of the following about an earthquake is true ?
   a) The deeper the origin of the earthquake higher is the impact on the surface
   b) The epicentre is the place of origin below the surface of the earth
   c) The deeper the origin lower is the impact on the surface
   d) The higher the reading on the Richter scale the lower is the impact of the earthquake

5) Which of the following is untrue ?
   a) Transport accident is an industrial as well as human disaster
   b) Massacre and war fall within the political type of disaster
   c) Poisoning is a human error of judgement
   d) Floods are hydrological disasters

6) Tsunami results from
   a) An earthquake b) A volcanic eruption
   c) A tropical disturbance d) A tropical depression

7) Impending exogenous events whose possible characteristics and frequency of occurrence can be approximated are
   a) risks b) emergency c) accidents d) hazards

8) Weapons that can be widely dispersed in gas liquid and solid forms are
   a) Biological weapon b) Nuclear weapon
   c) Radiological weapon d) Chemical weapons

9) Risk analysis, risk reduction and risk insurance are primary activities of
   a) Preparedness b) Mitigation
   c) Response d) Recovery

10) The first phase of disaster management cycle is
   a) Preparedness b) Mitigation c) Response d) Recovery

11) Transmission of the impact of hazard away from a susceptible location is the following systematic activity
   a) Amending b) Averting c) Adjusting d) Circumventing

12) Cyclone shelters are specialised buildings designed to endure
   a) Wind speed upto 300 kmph b) Wind speed upto 180 kmph
   c) Wave height upto 30 m d) Wave height upto 80 m

13) Highest level of seismicity is in
   a) Zone 4 b) Zone 5 c) Zone 6 d) Zone 7

14) Forming, storming, norming and performing are stages of
   a) Preparedness planning b) Contingency planning
   c) Preparedness monitoring d) Team building

15) The second emotional phase of disaster affected people is
   a) Acute phase b) Reaction phase
   c) Recovery phase d) Reorientation phase

16) Taking into accountable possible hazards irrespective of the probability of damage is a component of the principle of
   a) Time bound implementation b) Motivation
   c) Inclusiveness d) Collaboration and coordination

17) Moving a plan from a general perspective to specific aspects is involved in
   a) Vulnerability evaluation b) Developing the preparedness plan
   c) Implementation of the preparedness plan d) Coordination and control of plans

18) No matter how well defined the preparedness plans are they are doomed to fail in the absence of
   a) Vulnerability evaluation b) Public education and rehearsal
   c) Organizational structure d) Contingency plans

19) The phase emotional impact where the disaster management teams swing into action to take control is
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20) EOP is
   a) Emergency Operation Procedure b) Emergency Operation Plan
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Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
DISASTER MANAGEMENT (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Assume suitable data* ***wherever*** *needed but mention it clearly.*
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SECTION – I

2. a) Write the meaning of environmental hazards and environmental disasters and distinguish between them by giving suitable examples. **4**
   b) Define Ecosystem Approach. Write the twelve principles of Ecosystem approach. **8**
   c) What are the advantages of Landscape approach over the ecosystem approach ? **4**

3. a) Explain the corrective measures of Erosion and Sedimentation. **4**
   b) What are the causes of earthquake ? What are hazardous effects of earthquake ? **8**

4. a) Explain the flood control measures (Human adjustment, perception and mitigation). **4**
   b) Explain the disaster mitigation strategies through land use planning and zoning. **4**
   c) Write note on ‘disaster resistant house construction’. **4**

5. a) Explain the ‘Rescue training for search and operation’. **4**
   b) Discuss Rehabilitation with administrative, social, economic and environmental aspects. **8**

Set P

SECTION – II

6. a) What are the methods for Prediction of Hazards and Disasters ? **8**

   b) Explain the role of following institutions in mitigation of disasters. Meteorological observatory – Seismological observatory. **8**

7. a) Explain the role of International Council for Scientific Unions and International Geosphere Biosphere Programme in the research relevant to disaster management. **8**

   b) Explain briefly about findings of regional survey of cyclonic disaster with particular reference to India. **4**

8. a) Explain about contingency management preparedness for disaster management. **4**

   b) Provision of immediate relief measures to disaster affected people. **4**

   c) The adjustment of human population to natural hazards and disasters. **4**

9. a) Explain the role of Panchayats in disaster mitigations. **4**

   b) Write in detail about a regional survey of land subsidence, coastal disaster with reference to India. **8**

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Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (Old) Examination, 2016
DISASTER MANAGEMENT (Elective – III)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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12) Impending exogenous events whose possible characteristics and frequency of occurrence can be approximated are
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Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
DISASTER MANAGEMENT (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Assume suitable data* ***wherever*** *needed but mention it clearly.*
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   b) Explain the disaster mitigation strategies through land use planning and zoning. **4**
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Set Q

SECTION – II

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Seat No.	

Set R

B.E. (Civil) (Part – II) (Old) Examination, 2016
DISASTER MANAGEMENT (Elective – III)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

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SLR-EP – 420

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
DISASTER MANAGEMENT (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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SECTION – I

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   b) Explain the disaster mitigation strategies through land use planning and zoning. **4**
   c) Write note on ‘disaster resistant house construction’. **4**

5. a) Explain the ‘Rescue training for search and operation’. **4**
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Set R

SECTION – II

6. a) What are the methods for Prediction of Hazards and Disasters ? **8**

   b) Explain the role of following institutions in mitigation of disasters. Meteorological observatory – Seismological observatory. **8**

7. a) Explain the role of International Council for Scientific Unions and International Geosphere Biosphere Programme in the research relevant to disaster management. **8**

   b) Explain briefly about findings of regional survey of cyclonic disaster with particular reference to India. **4**

8. a) Explain about contingency management preparedness for disaster management. **4**

   b) Provision of immediate relief measures to disaster affected people. **4**

   c) The adjustment of human population to natural hazards and disasters. **4**

9. a) Explain the role of Panchayats in disaster mitigations. **4**

   b) Write in detail about a regional survey of land subsidence, coastal disaster with reference to India. **8**

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SLR-EP – 420

Seat No.	

Set **S**

B.E. (Civil) (Part – II) (Old) Examination, 2016
DISASTER MANAGEMENT (Elective – III)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) *Assume suitable data* ***wherever*** *needed but mention it clearly.*
4) *Use of non-programmable calculators is* ***allowed.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Tsunami results from
   a) An earthquake b) A volcanic eruption
   c) A tropical disturbance d) A tropical depression

2) Impending exogenous events whose possible characteristics and frequency of occurrence can be approximated are
   a) risks b) emergency c) accidents d) hazards

3) Weapons that can be widely dispersed in gas liquid and solid forms are
   a) Biological weapon b) Nuclear weapon
   c) Radiological weapon d) Chemical weapons

4) Risk analysis, risk reduction and risk insurance are primary activities of
   a) Preparedness b) Mitigation
   c) Response d) Recovery

5) The first phase of disaster management cycle is
   a) Preparedness b) Mitigation c) Response d) Recovery

6) Transmission of the impact of hazard away from a susceptible location is the following systematic activity
   a) Amending b) Averting c) Adjusting d) Circumventing

7) Cyclone shelters are specialised buildings designed to endure
   a) Wind speed upto 300 kmph b) Wind speed upto 180 kmph
   c) Wave height upto 30 m d) Wave height upto 80 m

8) Highest level of seismicity is in
   a) Zone 4 b) Zone 5 c) Zone 6 d) Zone 7

9) Forming, storming, norming and performing are stages of
   a) Preparedness planning b) Contingency planning
   c) Preparedness monitoring d) Team building

P.T.O.

10) The second emotional phase of disaster affected people is
a) Acute phase b) Reaction phase
c) Recovery phase d) Reorientation phase

11) Taking into accountable possible hazards irrespective of the probability of damage is a component of the principle of
a) Time bound implementation b) Motivation
c) Inclusiveness d) Collaboration and coordination

12) Moving a plan from a general perspective to specific aspects is involved in
a) Vulnerability evaluation b) Developing the preparedness plan
c) Implementation of the preparedness plan d) Coordination and control of plans

13) No matter how well defined the preparedness plans are they are doomed to fail in the absence of
a) Vulnerability evaluation b) Public education and rehearsal
c) Organizational structure d) Contingency plans

14) The phase emotional impact where the disaster management teams swing into action to take control is
a) Acute phase b) Reaction phase
c) Recovery phase d) Reorientation phase

15) EOP is
a) Emergency Operation Procedure b) Emergency Operation Plan
c) Elementary Operation Procedure d) Elementary Operation Plan

16) An earlier definition of disaster places disaster as an event that caused
a) More than 10,000 deaths b) Between 8,000 and 10,000 deaths
c) 10,000 to 20,000 deaths d) More than 1,000 deaths

17) The first step of risk analysis is
a) Hazard characterisation b) Hazard attributions
c) Hazard identification d) Hazard quantification

18) The storm that has the potential to quickly grow into hurricanes and generate more rain is
a) Convective storm b) Tropical storm
c) An extra-tropical storm d) Desert storm

19) Which of the following about an earthquake is true ?
a) The deeper the origin of the earthquake higher is the impact on the surface
b) The epicentre is the place of origin below the surface of the earth
c) The deeper the origin lower is the impact on the surface
d) The higher the reading on the Richter scale the lower is the impact of the earthquake

20) Which of the following is untrue ?
a) Transport accident is an industrial as well as human disaster
b) Massacre and war fall within the political type of disaster
c) Poisoning is a human error of judgement
d) Floods are hydrological disasters

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SLR-EP – 420

Seat No.	

B.E. (Civil) (Part – II) (Old) Examination, 2016
DISASTER MANAGEMENT (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Assume suitable data* ***wherever*** *needed but mention it clearly.*
2) *Use of nonprogrammable calculators is* ***allowed****.*
3) *Q.* ***2*** *and Q.* ***6*** *are* ***compulsory****. Answer* ***any two*** *questions* ***each*** *out of Q.* ***3*** *Q.* ***4*** *and Q.* ***5*** *from Section* ***I*** *and Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *from Section* ***II****.*

SECTION – I

2. a) Write the meaning of environmental hazards and environmental disasters and distinguish between them by giving suitable examples. **4**

   b) Define Ecosystem Approach. Write the twelve principles of Ecosystem approach. **8**

   c) What are the advantages of Landscape approach over the ecosystem approach ? **4**

3. a) Explain the corrective measures of Erosion and Sedimentation. **4**

   b) What are the causes of earthquake ? What are hazardous effects of earthquake ? **8**

4. a) Explain the flood control measures (Human adjustment, perception and mitigation). **4**

   b) Explain the disaster mitigation strategies through land use planning and zoning. **4**

   c) Write note on ‘disaster resistant house construction’. **4**

5. a) Explain the ‘Rescue training for search and operation’. **4**

   b) Discuss Rehabilitation with administrative, social, economic and environmental aspects. **8**

Set S

SECTION – II

6. a) What are the methods for Prediction of Hazards and Disasters ? **8**

   b) Explain the role of following institutions in mitigation of disasters. Meteorological observatory – Seismological observatory. **8**

7. a) Explain the role of International Council for Scientific Unions and International Geosphere Biosphere Programme in the research relevant to disaster management. **8**

   b) Explain briefly about findings of regional survey of cyclonic disaster with particular reference to India. **4**

8. a) Explain about contingency management preparedness for disaster management. **4**

   b) Provision of immediate relief measures to disaster affected people. **4**

   c) The adjustment of human population to natural hazards and disasters. **4**

9. a) Explain the role of Panchayats in disaster mitigations. **4**

   b) Write in detail about a regional survey of land subsidence, coastal disaster with reference to India. **8**

SLR-EP – 422

Seat No.	

Set P

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : GROUND IMPROVEMENT TECHNIQUES

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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 : 20

1. Choose the correct answer : **(20×1=20)**

1) In mechanical modification of soil
   a) Density of soil is decreased b) Volume of the soil is increased
   c) Density is increased d) None

2) Which method of improvement is not suitable in populated areas ?
   a) RIC b) DDC c) VC d) Blasting

3) Which methods of dewatering do you suggest when soil is consisting of large boulders and depth of water table is less ?
   a) well point b) shallow bored well
   c) sump pumping d) vacuum method

4) Length of vibroflot is
   a) 1 m b) 2 m c) 10 m d) none

5) In case of vibroflotation eccentric mass rotates about _____ to vibrate vibroflot.
   a) vertical b) horizontal c) inclined d) none

6) In case of uniformly graded sand due to vibroflotation its volume approximately reduce by
   a) 5% b) 10% c) 15% d) 20%

7) Backfill material in case of vibroflotation will be rejected when suitability number is
   a) 0 – 10 b) 10 – 20 c) 20 – 30 d) > 50

8) Which is not the method of construction of stone column ?
   a) Dry top feed b) Dry bottom feed
   c) Wet top feed d) Wet bottom feed

P.T.O.

9) Ultimate bearing capacity of stone column is given by

a) $q_a = K_p\{\sigma_r - 0.4C_u\}$ b) $q_a = K_p\{\sigma_r - 4C_u\}$

c) $q_a = K_a\{\sigma_r - 4C_u\}$ d) none

10) Which parameter is required to compute reduction in settlement using stone column by Greenwoods method ?

a) angle of internal friction of column material
b) stress ratio
c) undrained strength of soil surrounding the column
d) all above parameters

11) Geotextile improves _____ properly of the soil.

a) permeability b) drainage c) hydraulic conductivity d) all of these

12) Vibratory method of compaction is suitable for

a) All types of soils b) Cohesive soils
c) Cohesionless soils d) None of these

13) Growing vegetation on the slope for its stabilization provides _____ to the slope.

a) more water b) hydrostatic pressure c) more weight d) more anchoring

14) Preloading method

a) increases differential settlement b) reduces differential settlement
c) increases hydraulic conductivity d) none of these

15) _____ is (are) used as earth reinforcement material.

a) Geotextile b) Geogrid c) Geomembrane d) All of these

16) Compaction grouting

a) reduces pores b) increases density of the surrounding ground
c) is usually used for loose soils d) all of these

17) Usual grout materials are

a) cement b) bentonite c) sodium silicate gels d) all of these

18) For external stability of soil nailed structures one of the failure modes considered is

a) tension breakage of nails b) compression breakage of nails
c) overall stability of the slope structure d) none of these

19) Smooth wheel rollers are more suitable for

a) silts b) well graded sands c) clays d) none of these

20) Lime stabilization is mostly used for

a) all types of soils b) coarse grained soils
c) fine grained soils d) none of these

SLR-EP – 422

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : GROUND IMPROVEMENT TECHNIQUES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

Answer **any three** : **(4×3=12)**

2. Write a note on **any three** :
   a) Prefabricated vertical drain
   b) Vacuum method of dewatering
   c) Dewatering
   d) Types of dynamic compaction method
   e) Equipments used for shallow foundation.

3. a) What are the factors affecting selection of ground improvement ? Write in detail. **6**
   b) What are the different types of specifications for compaction control ? **4**
   c) How does grain size distribution help in deciding about compatibility for vibrocompaction ? **4**

4. a) What are the common methods of dewatering ? Discuss applicability of dewatering system in different soil. **6**
   b) How do you decide the filter material for PVD system ? **4**
   c) Derive the relationship between spacing and equivalent diameter for square grid and triangular grid. **4**

5. a) Why do we install sand drains along with preload ? Explain with a neat sketch. **6**
   b) Write in detail about dewatering techniques in cohesive soil. **4**
   c) How do you decide the filter material for PVD system. **4**

SECTION – II

Answer **any three** :

6. a) What are the different methods of earth reinforcement techniques ? **5**

   b) Describe the benefits of geosynthetics in pavements. **8**

7. a) Explain the concept of micropiling and soil nailing in slope stabilization. **6**

   b) Describe different composition techniques available and their suitability for different types of soils. **8**

8. a) List the different admixtures/chemicals/materials used for chemical modification of soils. **6**

   b) Briefly discuss the cement stabilization method of ground improvement. **7**

9. a) What are the basic requirements of grouts ? **5**

   b) Briefly explain the grouting methods used in the field. **8**

SLR-EP – 422

Seat No.	

Set Q

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : GROUND IMPROVEMENT TECHNIQUES

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Compaction grouting
   a) reduces pores b) increases density of the surrounding ground
   c) is usually used for loose soils d) all of these

2) Usual grout materials are
   a) cement b) bentonite c) sodium silicate gels d) all of these

3) For external stability of soil nailed structures one of the failure modes considered is
   a) tension breakage of nails b) compression breakage of nails
   c) overall stability of the slope structure d) none of these

4) Smooth wheel rollers are more suitable for
   a) silts b) well graded sands c) clays d) none of these

5) Lime stabilization is mostly used for
   a) all types of soils b) coarse grained soils
   c) fine grained soils d) none of these

6) In mechanical modification of soil
   a) Density of soil is decreased b) Volume of the soil is increased
   c) Density is increased d) None

7) Which method of improvement is not suitable in populated areas ?
   a) RIC b) DDC c) VC d) Blasting

8) Which methods of dewatering do you suggest when soil is consisting of large boulders and depth of water table is less ?
   a) well point b) shallow bored well
   c) sump pumping d) vacuum method

P.T.O.

9) Length of vibroflot is
   a) 1 m b) 2 m c) 10 m d) none

10) In case of vibroflotation eccentric mass rotates about _____ to vibrate vibroflot.
   a) vertical b) horizontal c) inclined d) none

11) In case of uniformly graded sand due to vibroflotation its volume approximately reduce by
   a) 5% b) 10% c) 15% d) 20%

12) Backfill material in case of vibroflotation will be rejected when suitability number is
   a) 0 – 10 b) 10 – 20 c) 20 – 30 d) > 50

13) Which is not the method of construction of stone column ?
   a) Dry top feed b) Dry bottom feed
   c) Wet top feed d) Wet bottom feed

14) Ultimate bearing capacity of stone column is given by
   a) $q_a = K_p\{\sigma_r - 0.4C_u\}$ b) $q_a = K_p\{\sigma_r - 4C_u\}$
   c) $q_a = K_a\{\sigma_r - 4C_u\}$ d) none

15) Which parameter is required to compute reduction in settlement using stone column by Greenwoods method ?
   a) angle of internal friction of column material
   b) stress ratio
   c) undrained strength of soil surrounding the column
   d) all above parameters

16) Geotextile improves _____ properly of the soil.
   a) permeability b) drainage c) hydraulic conductivity d) all of these

17) Vibratory method of compaction is suitable for
   a) All types of soils b) Cohesive soils
   c) Cohesionless soils d) None of these

18) Growing vegetation on the slope for its stabilization provides _____ to the slope.
   a) more water b) hydrostatic pressure c) more weight d) more anchoring

19) Preloading method
   a) increases differential settlement b) reduces differential settlement
   c) increases hydraulic conductivity d) none of these

20) _____ is (are) used as earth reinforcement material.
   a) Geotextile b) Geogrid c) Geomembrane d) All of these

SLR-EP – 422

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : GROUND IMPROVEMENT TECHNIQUES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

Answer **any three** : **(4×3=12)**

2. Write a note on **any three** :
   a) Prefabricated vertical drain
   b) Vacuum method of dewatering
   c) Dewatering
   d) Types of dynamic compaction method
   e) Equipments used for shallow foundation.

3. a) What are the factors affecting selection of ground improvement ? Write in detail. **6**
   b) What are the different types of specifications for compaction control ? **4**
   c) How does grain size distribution help in deciding about compatibility for vibrocompaction ? **4**

4. a) What are the common methods of dewatering ? Discuss applicability of dewatering system in different soil. **6**
   b) How do you decide the filter material for PVD system ? **4**
   c) Derive the relationship between spacing and equivalent diameter for square grid and triangular grid. **4**

5. a) Why do we install sand drains along with preload ? Explain with a neat sketch. **6**
   b) Write in detail about dewatering techniques in cohesive soil. **4**
   c) How do you decide the filter material for PVD system. **4**

Set Q

SECTION – II

Answer **any three** :

6. a) What are the different methods of earth reinforcement techniques ? **5**

   b) Describe the benefits of geosynthetics in pavements. **8**

7. a) Explain the concept of micropiling and soil nailing in slope stabilization. **6**

   b) Describe different composition techniques available and their suitability for different types of soils. **8**

8. a) List the different admixtures/chemicals/materials used for chemical modification of soils. **6**

   b) Briefly discuss the cement stabilization method of ground improvement. **7**

9. a) What are the basic requirements of grouts ? **5**

   b) Briefly explain the grouting methods used in the field. **8**

SLR-EP – 422

Seat No.	

Set R

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : GROUND IMPROVEMENT TECHNIQUES

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Geotextile improves _____ properly of the soil.
a) permeability b) drainage c) hydraulic conductivity d) all of these

2) Vibratory method of compaction is suitable for
a) All types of soils b) Cohesive soils
c) Cohesionless soils d) None of these

3) Growing vegetation on the slope for its stabilization provides _____ to the slope.
a) more water b) hydrostatic pressure c) more weight d) more anchoring

4) Preloading method
a) increases differential settlement b) reduces differential settlement
c) increases hydraulic conductivity d) none of these

5) _____ is (are) used as earth reinforcement material.
a) Geotextile b) Geogrid c) Geomembrane d) All of these

6) Compaction grouting
a) reduces pores b) increases density of the surrounding ground
c) is usually used for loose soils d) all of these

7) Usual grout materials are
a) cement b) bentonite c) sodium silicate gels d) all of these

8) For external stability of soil nailed structures one of the failure modes considered is
a) tension breakage of nails b) compression breakage of nails
c) overall stability of the slope structure d) none of these

P.T.O.

9) Smooth wheel rollers are more suitable for
a) silts b) well graded sands c) clays d) none of these

10) Lime stabilization is mostly used for
a) all types of soils b) coarse grained soils
c) fine grained soils d) none of these

11) In mechanical modification of soil
a) Density of soil is decreased b) Volume of the soil is increased
c) Density is increased d) None

12) Which method of improvement is not suitable in populated areas ?
a) RIC b) DDC c) VC d) Blasting

13) Which methods of dewatering do you suggest when soil is consisting of large boulders and depth of water table is less ?
a) well point b) shallow bored well
c) sump pumping d) vacuum method

14) Length of vibroflot is
a) 1 m b) 2 m c) 10 m d) none

15) In case of vibroflotation eccentric mass rotates about _____ to vibrate vibroflot.
a) vertical b) horizontal c) inclined d) none

16) In case of uniformly graded sand due to vibroflotation its volume approximately reduce by
a) 5% b) 10% c) 15% d) 20%

17) Backfill material in case of vibroflotation will be rejected when suitability number is
a) 0 – 10 b) 10 – 20 c) 20 – 30 d) > 50

18) Which is not the method of construction of stone column ?
a) Dry top feed b) Dry bottom feed
c) Wet top feed d) Wet bottom feed

19) Ultimate bearing capacity of stone column is given by
a) $q_a = K_p\{\sigma_r - 0.4C_u\}$ b) $q_a = K_p\{\sigma_r - 4C_u\}$
c) $q_a = K_a\{\sigma_r - 4C_u\}$ d) none

20) Which parameter is required to compute reduction in settlement using stone column by Greenwoods method ?
a) angle of internal friction of column material
b) stress ratio
c) undrained strength of soil surrounding the column
d) all above parameters

_____

SLR-EP – 422

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : GROUND IMPROVEMENT TECHNIQUES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

Answer **any three** : **(4×3=12)**

2. Write a note on **any three** :
   a) Prefabricated vertical drain
   b) Vacuum method of dewatering
   c) Dewatering
   d) Types of dynamic compaction method
   e) Equipments used for shallow foundation.

3. a) What are the factors affecting selection of ground improvement ? Write in detail. **6**
   b) What are the different types of specifications for compaction control ? **4**
   c) How does grain size distribution help in deciding about compatibility for vibrocompaction ? **4**

4. a) What are the common methods of dewatering ? Discuss applicability of dewatering system in different soil. **6**
   b) How do you decide the filter material for PVD system ? **4**
   c) Derive the relationship between spacing and equivalent diameter for square grid and triangular grid. **4**

5. a) Why do we install sand drains along with preload ? Explain with a neat sketch. **6**
   b) Write in detail about dewatering techniques in cohesive soil. **4**
   c) How do you decide the filter material for PVD system. **4**

Set R

SECTION – II

Answer **any three** :

6. a) What are the different methods of earth reinforcement techniques ? **5**

   b) Describe the benefits of geosynthetics in pavements. **8**

7. a) Explain the concept of micropiling and soil nailing in slope stabilization. **6**

   b) Describe different composition techniques available and their suitability for different types of soils. **8**

8. a) List the different admixtures/chemicals/materials used for chemical modification of soils. **6**

   b) Briefly discuss the cement stabilization method of ground improvement. **7**

9. a) What are the basic requirements of grouts ? **5**

   b) Briefly explain the grouting methods used in the field. **8**

SLR-EP – 422

Seat No.	

Set S

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : GROUND IMPROVEMENT TECHNIQUES

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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 : 20

1. Choose the correct answer : **(20×1=20)**

1) In case of uniformly graded sand due to vibroflotation its volume approximately reduce by
   a) 5% b) 10% c) 15% d) 20%

2) Backfill material in case of vibroflotation will be rejected when suitability number is
   a) 0 – 10 b) 10 – 20 c) 20 – 30 d) > 50

3) Which is not the method of construction of stone column ?
   a) Dry top feed b) Dry bottom feed
   c) Wet top feed d) Wet bottom feed

4) Ultimate bearing capacity of stone column is given by
   a) $q_a = K_p\{\sigma_r - 0.4C_u\}$ b) $q_a = K_p\{\sigma_r - 4C_u\}$
   c) $q_a = K_a\{\sigma_r - 4C_u\}$ d) none

5) Which parameter is required to compute reduction in settlement using stone column by Greenwoods method ?
   a) angle of internal friction of column material
   b) stress ratio
   c) undrained strength of soil surrounding the column
   d) all above parameters

6) Geotextile improves _____ properly of the soil.
   a) permeability b) drainage
   c) hydraulic conductivity d) all of these

P.T.O.

7) Vibratory method of compaction is suitable for
   a) All types of soils b) Cohesive soils
   c) Cohesionless soils d) None of these

8) Growing vegetation on the slope for its stabilization provides _____ to the slope.
   a) more water b) hydrostatic pressure c) more weight d) more anchoring

9) Preloading method
   a) increases differential settlement b) reduces differential settlement
   c) increases hydraulic conductivity d) none of these

10) _____ is (are) used as earth reinforcement material.
   a) Geotextile b) Geogrid c) Geomembrane d) All of these

11) Compaction grouting
   a) reduces pores b) increases density of the surrounding ground
   c) is usually used for loose soils d) all of these

12) Usual grout materials are
   a) cement b) bentonite c) sodium silicate gels d) all of these

13) For external stability of soil nailed structures one of the failure modes considered is
   a) tension breakage of nails b) compression breakage of nails
   c) overall stability of the slope structure d) none of these

14) Smooth wheel rollers are more suitable for
   a) silts b) well graded sands c) clays d) none of these

15) Lime stabilization is mostly used for
   a) all types of soils b) coarse grained soils
   c) fine grained soils d) none of these

16) In mechanical modification of soil
   a) Density of soil is decreased b) Volume of the soil is increased
   c) Density is increased d) None

17) Which method of improvement is not suitable in populated areas ?
   a) RIC b) DDC c) VC d) Blasting

18) Which methods of dewatering do you suggest when soil is consisting of large boulders and depth of water table is less ?
   a) well point b) shallow bored well
   c) sump pumping d) vacuum method

19) Length of vibroflot is
   a) 1 m b) 2 m c) 10 m d) none

20) In case of vibroflotation eccentric mass rotates about _____ to vibrate vibroflot.
   a) vertical b) horizontal c) inclined d) none

_____

SLR-EP – 422

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : GROUND IMPROVEMENT TECHNIQUES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

Answer **any three** : **(4×3=12)**

2. Write a note on **any three** :
   a) Prefabricated vertical drain
   b) Vacuum method of dewatering
   c) Dewatering
   d) Types of dynamic compaction method
   e) Equipments used for shallow foundation.

3. a) What are the factors affecting selection of ground improvement ? Write in detail. **6**
   b) What are the different types of specifications for compaction control ? **4**
   c) How does grain size distribution help in deciding about compatibility for vibrocompaction ? **4**

4. a) What are the common methods of dewatering ? Discuss applicability of dewatering system in different soil. **6**
   b) How do you decide the filter material for PVD system ? **4**
   c) Derive the relationship between spacing and equivalent diameter for square grid and triangular grid. **4**

5. a) Why do we install sand drains along with preload ? Explain with a neat sketch. **6**
   b) Write in detail about dewatering techniques in cohesive soil. **4**
   c) How do you decide the filter material for PVD system. **4**

SECTION – II

Answer **any three** :

6. a) What are the different methods of earth reinforcement techniques ? **5**

   b) Describe the benefits of geosynthetics in pavements. **8**

7. a) Explain the concept of micropiling and soil nailing in slope stabilization. **6**

   b) Describe different composition techniques available and their suitability for different types of soils. **8**

8. a) List the different admixtures/chemicals/materials used for chemical modification of soils. **6**

   b) Briefly discuss the cement stabilization method of ground improvement. **7**

9. a) What are the basic requirements of grouts ? **5**

   b) Briefly explain the grouting methods used in the field. **8**

SLR-EP – 423

Seat No.	

Set **P**

B.E. (Civil) (Part – II) Examination, 2016

TRAFFIC ENGINEERING AND CONTROL (Elective – II) (New)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Figure on **right** indicates **full** marks.*

*4) Assume **any** missing data suitably.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The prime idea of drawing the condition diagram is
   a) To interpret the cause of accident
   b) To find out the cost of accident
   c) To decrease the rate of accident
   d) To locate the accident spot

2) When speed of the traffic flow becomes zero, then
   a) Traffic density attains maximum value whereas traffic volume becomes zero
   b) Traffic density and traffic volume both attains maximum value
   c) Traffic density and traffic volume both becomes zero
   d) Traffic density becomes zero whereas traffic volume attains maximum value

3) On a right angled road intersection with two way traffic, the total number of conflict point is
   a) 6 b) 11 c) 18 d) 24

4) The number of vehicles parking in a particular area over a given period of time is called
   a) Parking Load b) Parking Index
   c) Parking Volume d) Parking Turn-over

5) The maximum length allowed for tractor and trailer combination vehicle is
   a) 18 m b) 20 m c) 16 m d) 12 m

6) Enoscope technique is used to find out
   a) Spot speed of the vehicle b) Delay of the vehicle
   c) Traffic numbers d) All the above

7) The area under the parking accumulation curve during a specified period is called
   a) Parking Load b) Parking Index
   c) Parking Volume d) Parking Turn-over

P.T.O.

8) The bending plates are used in
   a) Traffic volume count survey
   b) Measuring the weight of the vehicle in motion
   c) Measuring speed of the vehicle
   d) Measuring width of vehicle

9) Unevenness of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump Integrator
   c) Photometer d) Pedometer

10) In no-intrusive technology, the equipment's are placed at
   a) At or below the ground surface b) At or above the road surface
   c) Both a) and b) d) None of these

11) The period of time required for one complete sequence of signal indications is called
   a) Phase b) Cycle c) Amber d) Green

12) Two solid 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

13) The traffic manoeuvre means
   a) Diverging b) Merging c) Crossing d) All of these

14) _____ signs are intended to guide the driver about intersecting routes, cities, facilities, towns and other important destinations.
   a) Mandatory b) Informatory c) Cautionary d) Warning

15) Length of the vehicle affects
   a) Width of the traffic lane
   b) Extra width of pavement and minimum turning radius
   c) Width of shoulder and parking facilities
   d) Clearances to be provided under structures such as under bridges, etc.

16) Level crossing is a,
   a) Regulatory sign b) Warning sign
   c) Informatory sign d) None of these

17) Equivalent factor of Passenger Car Unit (PCU) for a passenger car is
   a) 1.0 b) 2.0 c) 0.5 d) 10

18) Desire lines are plotted in
   a) Traffic volume studies b) Speed studies
   c) Accident studies d) Origin and destination studies

19) Traffic volume data are presented in the form of
   a) ADT and AADT b) Trend charts showing volume trends
   c) Thirtieth highest hourly volume d) All the above

20) Delineators are placed at,
   a) Horizontal curves b) On straight road
   c) Intersections d) Footpath

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SLR-EP – 423

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II) (New)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume **any** missing data suitably.*

PART – A

2. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**

a) Briefly discuss the scope of the traffic engineering.

b) Briefly explain how road side interview nethod of O and D studies is carried out. What are the advantages and limitations of this method ?

c) What are the different causes of traffic accidents ? Discuss briefly.

d) 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.

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

3. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**

   a) Explain the relationship between speed, travel time, volume, density and capacity.

   b) Explain the level of service concept in deciding the design capacity of a road.

   c) Explain with neat sketches, condition and collision diagram.

PART – B

4. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**

   a) With neat sketch explain the different types of mandatory signs.

   b) Explain the various types of traffic signals and their functions.

   c) Write a short note on ITS applications in urban transport system.

   d) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrian crossing is 12 sec. Design the two phase traffic signal pedestrian crossing by Webster's method.

5. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**

   a) Write a short note on applications of :

      i) Weigh In Motion (WIM) detector system

      ii) Pneumatic tube detectors.

   b) List the different methods of measuring spot speed and explain any one in detail also sketch the presentation of data.

   c) Write a note on regulations concerning to the drivers.

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Seat No.	

Set **Q**

B.E. (Civil) (Part – II) Examination, 2016

TRAFFIC ENGINEERING AND CONTROL (Elective – II) (New)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Figure on **right** indicates **full** marks.*

*4) Assume **any** missing data suitably.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Level crossing is a
   a) Regulatory sign b) Warning sign
   c) Informatory sign d) None of these

2) Equivalent factor of Passenger Car Unit (PCU) for a passenger car is
   a) 1.0 b) 2.0 c) 0.5 d) 10

3) Desire lines are plotted in
   a) Traffic volume studies b) Speed studies
   c) Accident studies d) Origin and destination studies

4) Traffic volume data are presented in the form of
   a) ADT and AADT b) Trend charts showing volume trends
   c) Thirtieth highest hourly volume d) All the above

5) Delineators are placed at
   a) Horizontal curves b) On straight road
   c) Intersections d) Footpath

6) The prime idea of drawing the condition diagram is
   a) To interpret the cause of accident
   b) To find out the cost of accident
   c) To decrease the rate of accident
   d) To locate the accident spot

7) When speed of the traffic flow becomes zero, then
   a) Traffic density attains maximum value whereas traffic volume becomes zero
   b) Traffic density and traffic volume both attains maximum value
   c) Traffic density and traffic volume both becomes zero
   d) Traffic density becomes zero whereas traffic volume attains maximum value

P.T.O.

8) On a right angled road intersection with two way traffic, the total number of conflict point is
   a) 6 b) 11 c) 18 d) 24

9) The number of vehicles parking in a particular area over a given period of time is called
   a) Parking Load b) Parking Index
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12) The area under the parking accumulation curve during a specified period is called
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13) The bending plates are used in
   a) Traffic volume count survey
   b) Measuring the weight of the vehicle in motion
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   d) Measuring width of vehicle

14) Unevenness of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump Integrator
   c) Photometer d) Pedometer

15) In no-intrusive technology, the equipment's are placed at
   a) At or below the ground surface b) At or above the road surface
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16) The period of time required for one complete sequence of signal indications is called
   a) Phase b) Cycle c) Amber d) Green

17) Two solid 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

18) The traffic manoeuvre means
   a) Diverging b) Merging c) Crossing d) All of these

19) _____ signs are intended to guide the driver about intersecting routes, cities, facilities, towns and other important destinations.
   a) Mandatory b) Informatory c) Cautionary d) Warning

20) Length of the vehicle affects
   a) Width of the traffic lane
   b) Extra width of pavement and minimum turning radius
   c) Width of shoulder and parking facilities
   d) Clearances to be provided under structures such as under bridges, etc.

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II) (New)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume **any** missing data suitably.*

PART – A

2. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**

a) Briefly discuss the scope of the traffic engineering.

b) Briefly explain how road side interview nethod of O and D studies is carried out. What are the advantages and limitations of this method ?

c) What are the different causes of traffic accidents ? Discuss briefly.

d) 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.

Table – 1 – In-Out Survey data

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Time	**In**	**Out**
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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

3. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**

   a) Explain the relationship between speed, travel time, volume, density and capacity.

   b) Explain the level of service concept in deciding the design capacity of a road.

   c) Explain with neat sketches, condition and collision diagram.

PART – B

4. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**

   a) With neat sketch explain the different types of mandatory signs.

   b) Explain the various types of traffic signals and their functions.

   c) Write a short note on ITS applications in urban transport system.

   d) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrian crossing is 12 sec. Design the two phase traffic signal pedestrian crossing by Webster's method.

5. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**

   a) Write a short note on applications of :

      i) Weigh In Motion (WIM) detector system

      ii) Pneumatic tube detectors.

   b) List the different methods of measuring spot speed and explain any one in detail also sketch the presentation of data.

   c) Write a note on regulations concerning to the drivers.

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Seat No.	

Set **R**

B.E. (Civil) (Part – II) Examination, 2016

TRAFFIC ENGINEERING AND CONTROL (Elective – II) (New)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Figure on **right** indicates **full** marks.*

*4) Assume **any** missing data suitably.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The period of time required for one complete sequence of signal indications is called
   a) Phase b) Cycle c) Amber d) Green

2) Two solid 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

3) The traffic manoeuvre means
   a) Diverging b) Merging c) Crossing d) All of these

4) _____ signs are intended to guide the driver about intersecting routes, cities, facilities, towns and other important destinations.
   a) Mandatory b) Informatory c) Cautionary d) Warning

5) Length of the vehicle affects
   a) Width of the traffic lane
   b) Extra width of pavement and minimum turning radius
   c) Width of shoulder and parking facilities
   d) Clearances to be provided under structures such as under bridges, etc.

6) Level crossing is a
   a) Regulatory sign b) Warning sign
   c) Informatory sign d) None of these

7) Equivalent factor of Passenger Car Unit (PCU) for a passenger car is,
   a) 1.0 b) 2.0 c) 0.5 d) 10

8) Desire lines are plotted in
   a) Traffic volume studies b) Speed studies
   c) Accident studies d) Origin and destination studies

P.T.O.

9) Traffic volume data are presented in the form of
   a) ADT and AADT
   b) Trend charts showing volume trends
   c) Thirtieth highest hourly volume
   d) All the above

10) Delineators are placed at,
   a) Horizontal curves
   b) On straight road
   c) Intersections
   d) Footpath

11) The prime idea of drawing the condition diagram is
   a) To interpret the cause of accident
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12) When speed of the traffic flow becomes zero, then
   a) Traffic density attains maximum value whereas traffic volume becomes zero
   b) Traffic density and traffic volume both attains maximum value
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13) On a right angled road intersection with two way traffic, the total number of conflict point is
   a) 6 b) 11 c) 18 d) 24

14) The number of vehicles parking in a particular area over a given period of time is called,
   a) Parking Load
   b) Parking Index
   c) Parking Volume
   d) Parking Turn-over

15) The maximum length allowed for tractor and trailer combination vehicle is
   a) 18 m b) 20 m c) 16 m d) 12 m

16) Enoscope technique is used to find out,
   a) Spot speed of the vehicle
   b) Delay of the vehicle
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17) The area under the parking accumulation curve during a specified period is called
   a) Parking Load
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18) The bending plates are used in
   a) Traffic volume count survey
   b) Measuring the weight of the vehicle in motion
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19) Unevenness of the pavement surface is measured by
   a) Portable skid resistance tester
   b) Bump Integrator
   c) Photometer
   d) Pedometer

20) In no-intrusive technology, the equipment's are placed at
   a) At or below the ground surface
   b) At or above the road surface
   c) Both a) and b)
   d) None of these

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II) (New)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume **any** missing data suitably.*

PART – A

2. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**

a) Briefly discuss the scope of the traffic engineering.

b) Briefly explain how road side interview nethod of O and D studies is carried out. What are the advantages and limitations of this method ?

c) What are the different causes of traffic accidents ? Discuss briefly.

d) 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.

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

3. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**

   a) Explain the relationship between speed, travel time, volume, density and capacity.

   b) Explain the level of service concept in deciding the design capacity of a road.

   c) Explain with neat sketches, condition and collision diagram.

PART – B

4. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**

   a) With neat sketch explain the different types of mandatory signs.

   b) Explain the various types of traffic signals and their functions.

   c) Write a short note on ITS applications in urban transport system.

   d) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrian crossing is 12 sec. Design the two phase traffic signal pedestrian crossing by Webster's method.

5. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**

   a) Write a short note on applications of :

      i) Weigh In Motion (WIM) detector system

      ii) Pneumatic tube detectors.

   b) List the different methods of measuring spot speed and explain any one in detail also sketch the presentation of data.

   c) Write a note on regulations concerning to the drivers.

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Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2016

TRAFFIC ENGINEERING AND CONTROL (Elective – II) (New)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*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.***

*3) Figure on **right** indicates **full** marks.*

*4) Assume **any** missing data suitably.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Enoscope technique is used to find out
   a) Spot speed of the vehicle b) Delay of the vehicle
   c) Traffic numbers d) All the above

2) The area under the parking accumulation curve during a specified period is called
   a) Parking Load b) Parking Index
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3) The bending plates are used in
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   a) Portable skid resistance tester b) Bump Integrator
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5) In no-intrusive technology, the equipment's are placed at
   a) At or below the ground surface b) At or above the road surface
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6) The period of time required for one complete sequence of signal indications is called
   a) Phase b) Cycle c) Amber d) Green

7) Two solid 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

8) The traffic manoeuvre means
   a) Diverging b) Merging c) Crossing d) All of these

P.T.O.

9) _____ signs are intended to guide the driver about intersecting routes, cities, facilities, towns and other important destinations.
   a) Mandatory b) Informatory c) Cautionary d) Warning

10) Length of the vehicle affects
   a) Width of the traffic lane
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12) Equivalent factor of Passenger Car Unit (PCU) for a passenger car is,
   a) 1.0 b) 2.0 c) 0.5 d) 10

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14) Traffic volume data are presented in the form of
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15) Delineators are placed at
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16) The prime idea of drawing the condition diagram is
   a) To interpret the cause of accident
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17) When speed of the traffic flow becomes zero, then
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18) On a right angled road intersection with two way traffic, the total number of conflict point is
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20) The maximum length allowed for tractor and trailer combination vehicle is
   a) 18 m b) 20 m c) 16 m d) 12 m

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SLR-EP – 423

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
TRAFFIC ENGINEERING AND CONTROL (Elective – II) (New)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume **any** missing data suitably.*

PART – A

2. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**

a) Briefly discuss the scope of the traffic engineering.

b) Briefly explain how road side interview nethod of O and D studies is carried out. What are the advantages and limitations of this method ?

c) What are the different causes of traffic accidents ? Discuss briefly.

d) 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.

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Time	**In**	**Out**
35	2	7
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50	4	1
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3. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**

   a) Explain the relationship between speed, travel time, volume, density and capacity.

   b) Explain the level of service concept in deciding the design capacity of a road.

   c) Explain with neat sketches, condition and collision diagram.

PART – B

4. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**

   a) With neat sketch explain the different types of mandatory signs.

   b) Explain the various types of traffic signals and their functions.

   c) Write a short note on ITS applications in urban transport system.

   d) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrian crossing is 12 sec. Design the two phase traffic signal pedestrian crossing by Webster's method.

5. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**

   a) Write a short note on applications of :

      i) Weigh In Motion (WIM) detector system

      ii) Pneumatic tube detectors.

   b) List the different methods of measuring spot speed and explain any one in detail also sketch the presentation of data.

   c) Write a note on regulations concerning to the drivers.

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SLR-EP – 424

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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 : 20

1. Choose the correct answer : **(10×2=20)**

1) Which of the following is not role of government in Public Private Partnership ?
   a) Ensure transparency
   b) Ensure value for money
   c) Expertise and innovation
   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) Sufficient return to investors
   c) Providing the facility and service
   d) All of the above

3) What is meant by the term BOO ?
   a) Build Operate Own b) Build Own Operate
   c) Build Opt Operate d) Building Own Operate

4) Which of the following is benefit for Public sector of Public Private Partnership ?
   a) Lifecycle cost management b) Business opportunities
   c) Export d) None of the above

5) Which of the following is benefit for Private sector of Public Private Partnership ?
   a) Innovative solutions b) Export opportunities
   c) Construction management d) Sharing the assets

P.T.O.

6) Which of the following is not type of contract ?
   a) Service contracts
   b) Lease-develop-operate or buy
   c) Design build
   d) Lease-develop-operate and buy

7) Which of the following is suitable as VGF scheme ?
   a) Viability Gap Funding Scheme
   b) Viability Gap Finance Scheme
   c) Volatile Gap Funding Scheme
   d) Volatile Growth Funding Scheme

8) What is meant by the term OBA contract ?
   a) Output Based Assistance
   b) Output Build Aid
   c) Operate Build Assistance
   d) Output Based Aid

9) How many contributing factors are considered for Risk Emergence ?
   a) 9 b) 10 c) 11 d) 12

10) Which of the following is principle aspect of sustainable development ?
   a) Energy b) Environmental
   c) Simplicity d) Amenity

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SLR-EP – 424

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section* ***I*** *and* ***any three*** *questions from Section* ***II****.*

2) ***Assume*** *necessary data* ***if required*** *and mention* ***it clearly****.*

3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. a) Explain the term Net Present Value (NPV). **4**

   b) Explain the major constraints in the delivery mechanism and infrastructure of water supply sector. **10**

3. a) What is meant by Public Private Partnership ? **4**

   b) What is the role and responsibilities of Government in Public Private Partnership ? **9**

4. a) Draw a neat diagram for model of public private partnership. **4**

   b) Explain the Viability Gap Funding (VGF) scheme with respect to Public Private Partnership projects. **9**

5. a) Enlist the project planning activities. **4**

   b) Explain in detail the management contracts. **9**

SECTION – II

6. a) Draw a schematic diagram of four phases of the project life cycle. **4**

   b) What activities are considered in project initiation ? **10**

7. a) Explain risk identification in detail. **4**

   b) Explain risk allocation in Public Private Partnership project to private sector. **9**

8. a) Write a short note on risk mitigation. **4**

   b) Explain Quantitative and Qualitative techniques of risk assessment. **9**

9. a) State and discuss five key sustainability challenges. **4**

   b) State the strengths and weaknesses of developing commercially viable infrastructure projects. **9**

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Seat No.	

Set Q

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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 : 20

1. Choose the correct answer : **(10×2=20)**

1) How many contributing factors are considered for Risk Emergence ?
   a) 9 b) 10 c) 11 d) 12

2) Which of the following is principle aspect of sustainable development ?
   a) Energy b) Environmental
   c) Simplicity d) Amenity

3) Which of the following is suitable as VGF scheme ?
   a) Viability Gap Funding Scheme
   b) Viability Gap Finance Scheme
   c) Volatile Gap Funding Scheme
   d) Volatile Growth Funding Scheme

4) What is meant by the term OBA contract ?
   a) Output Based Assistance
   b) Output Build Aid
   c) Operate Build Assistance
   d) Output Based Aid

5) Which of the following is not role of government in Public Private Partnership ?
   a) Ensure transparency
   b) Ensure value for money
   c) Expertise and innovation
   d) Identify needs in terms of output

P.T.O.

6) Which of the following is role of private sector in Public Private Partnership ?
   a) Access to private finance
   b) Sufficient return to investors
   c) Providing the facility and service
   d) All of the above

7) What is meant by the term BOO ?
   a) Build Operate Own
   b) Build Own Operate
   c) Build Opt Operate
   d) Building Own Operate

8) Which of the following is benefit for Public sector of Public Private Partnership ?
   a) Lifecycle cost management
   b) Business opportunities
   c) Export
   d) None of the above

9) Which of the following is benefit for Private sector of Public Private Partnership ?
   a) Innovative solutions
   b) Export opportunities
   c) Construction management
   d) Sharing the assets

10) Which of the following is not type of contract ?
   a) Service contracts
   b) Lease-develop-operate or buy
   c) Design build
   d) Lease-develop-operate and buy

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SLR-EP – 424

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from Section **I** and **any three** questions from Section **II**.*

*2) **Assume** necessary data **if required** and mention **it clearly**.*

*3) Figures to the **right** indicate **full** marks.*

SECTION – I

2. a) Explain the term Net Present Value (NPV). **4**

   b) Explain the major constraints in the delivery mechanism and infrastructure of water supply sector. **10**

3. a) What is meant by Public Private Partnership ? **4**

   b) What is the role and responsibilities of Government in Public Private Partnership ? **9**

4. a) Draw a neat diagram for model of public private partnership. **4**

   b) Explain the Viability Gap Funding (VGF) scheme with respect to Public Private Partnership projects. **9**

5. a) Enlist the project planning activities. **4**

   b) Explain in detail the management contracts. **9**

Set Q

SECTION – II

6. a) Draw a schematic diagram of four phases of the project life cycle. **4**

   b) What activities are considered in project initiation ? **10**

7. a) Explain risk identification in detail. **4**

   b) Explain risk allocation in Public Private Partnership project to private sector. **9**

8. a) Write a short note on risk mitigation. **4**

   b) Explain Quantitative and Qualitative techniques of risk assessment. **9**

9. a) State and discuss five key sustainability challenges. **4**

   b) State the strengths and weaknesses of developing commercially viable infrastructure projects. **9**

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Seat No.	

Set R

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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 : 20

1. Choose the correct answer : **(10×2=20)**

1) Which of the following is benefit for Private sector of Public Private Partnership ?
   a) Innovative solutions b) Export opportunities
   c) Construction management d) Sharing the assets

2) Which of the following is not type of contract ?
   a) Service contracts
   b) Lease-develop-operate or buy
   c) Design build
   d) Lease-develop-operate and buy

3) How many contributing factors are considered for Risk Emergence ?
   a) 9 b) 10 c) 11 d) 12

4) Which of the following is principle aspect of sustainable development ?
   a) Energy b) Environmental
   c) Simplicity d) Amenity

5) What is meant by the term BOO ?
   a) Build Operate Own b) Build Own Operate
   c) Build Opt Operate d) Building Own Operate

6) Which of the following is benefit for Public sector of Public Private Partnership ?
   a) Lifecycle cost management b) Business opportunities
   c) Export d) None of the above

P.T.O.

7) Which of the following is not role of government in Public Private Partnership ?
   a) Ensure transparency
   b) Ensure value for money
   c) Expertise and innovation
   d) Identify needs in terms of output

8) Which of the following is role of private sector in Public Private Partnership ?
   a) Access to private finance
   b) Sufficient return to investors
   c) Providing the facility and service
   d) All of the above

9) Which of the following is suitable as VGF scheme ?
   a) Viability Gap Funding Scheme
   b) Viability Gap Finance Scheme
   c) Volatile Gap Funding Scheme
   d) Volatile Growth Funding Scheme

10) What is meant by the term OBA contract ?
   a) Output Based Assistance
   b) Output Build Aid
   c) Operate Build Assistance
   d) Output Based Aid

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Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section* ***I*** *and* ***any three*** *questions from Section* ***II****.*

2) ***Assume*** *necessary data* ***if required*** *and mention* ***it clearly****.*

3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. a) Explain the term Net Present Value (NPV). **4**

   b) Explain the major constraints in the delivery mechanism and infrastructure of water supply sector. **10**

3. a) What is meant by Public Private Partnership ? **4**

   b) What is the role and responsibilities of Government in Public Private Partnership ? **9**

4. a) Draw a neat diagram for model of public private partnership. **4**

   b) Explain the Viability Gap Funding (VGF) scheme with respect to Public Private Partnership projects. **9**

5. a) Enlist the project planning activities. **4**

   b) Explain in detail the management contracts. **9**

SECTION – II

6. a) Draw a schematic diagram of four phases of the project life cycle. **4**

   b) What activities are considered in project initiation ? **10**

7. a) Explain risk identification in detail. **4**

   b) Explain risk allocation in Public Private Partnership project to private sector. **9**

8. a) Write a short note on risk mitigation. **4**

   b) Explain Quantitative and Qualitative techniques of risk assessment. **9**

9. a) State and discuss five key sustainability challenges. **4**

   b) State the strengths and weaknesses of developing commercially viable infrastructure projects. **9**

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Seat No.	

Set **S**

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** 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 : 20

1. Choose the correct answer : **(10×2=20)**

1) What is meant by the term BOO ?
   a) Build Operate Own
   b) Build Own Operate
   c) Build Opt Operate
   d) Building Own Operate

2) Which of the following is benefit for Public sector of Public Private Partnership ?
   a) Lifecycle cost management
   b) Business opportunities
   c) Export
   d) None of the above

3) Which of the following is benefit for Private sector of Public Private Partnership ?
   a) Innovative solutions
   b) Export opportunities
   c) Construction management
   d) Sharing the assets

4) Which of the following is not type of contract ?
   a) Service contracts
   b) Lease-develop-operate or buy
   c) Design build
   d) Lease-develop-operate and buy

5) Which of the following is suitable as VGF scheme ?
   a) Viability Gap Funding Scheme
   b) Viability Gap Finance Scheme
   c) Volatile Gap Funding Scheme
   d) Volatile Growth Funding Scheme

P.T.O.

6) What is meant by the term OBA contract ?
   a) Output Based Assistance
   b) Output Build Aid
   c) Operate Build Assistance
   d) Output Based Aid

7) How many contributing factors are considered for Risk Emergence ?
   a) 9 b) 10 c) 11 d) 12

8) Which of the following is principle aspect of sustainable development ?
   a) Energy b) Environmental
   c) Simplicity d) Amenity

9) Which of the following is not role of government in Public Private Partnership ?
   a) Ensure transparency
   b) Ensure value for money
   c) Expertise and innovation
   d) Identify needs in terms of output

10) Which of the following is role of private sector in Public Private Partnership ?
   a) Access to private finance
   b) Sufficient return to investors
   c) Providing the facility and service
   d) All of the above

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SLR-EP – 424

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Wednesday, 23-11-2016 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section* ***I*** *and* ***any three*** *questions from Section* ***II****.*

2) ***Assume*** *necessary data* ***if required*** *and mention* ***it clearly****.*

3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. a) Explain the term Net Present Value (NPV). **4**

   b) Explain the major constraints in the delivery mechanism and infrastructure of water supply sector. **10**

3. a) What is meant by Public Private Partnership ? **4**

   b) What is the role and responsibilities of Government in Public Private Partnership ? **9**

4. a) Draw a neat diagram for model of public private partnership. **4**

   b) Explain the Viability Gap Funding (VGF) scheme with respect to Public Private Partnership projects. **9**

5. a) Enlist the project planning activities. **4**

   b) Explain in detail the management contracts. **9**

SECTION – II

6. a) Draw a schematic diagram of four phases of the project life cycle. **4**

   b) What activities are considered in project initiation ? **10**

7. a) Explain risk identification in detail. **4**

   b) Explain risk allocation in Public Private Partnership project to private sector. **9**

8. a) Write a short note on risk mitigation. **4**

   b) Explain Quantitative and Qualitative techniques of risk assessment. **9**

9. a) State and discuss five key sustainability challenges. **4**

   b) State the strengths and weaknesses of developing commercially viable infrastructure projects. **9**

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SLR-EP – 426

Seat No.	

Set P

B.E. (Civil) Part – II (New) Examination, 2016
Elective – II
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section –**II** and solve **any two** questions from the remaining.*
*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**.*
*5) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** marks.*
*6) **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 : 20

1. Choose the correct option : **20**

1) The volume of municipal wastes can be reduced by more than 90 percent by
a) Incineration b) Landfilling c) Composting d) None of these

2) The anaerobic method of mechanical composting is
a) Indore method b) Mangalore method
c) Bangalore method d) None of these

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) Mechanical size reduction operation includes
a) Shredding b) Grinding c) Milling d) All of above

5) M R F's term in SWM is used for
a) Material recovery facilities b) Major relief funds
c) Minimum raw food d) None of these

P.T.O.

6) Substances that emit ionizing radiation are defined as
   a) Hazardous waste
   b) Biological wastes
   c) Flammable wastes
   d) Radioactive wastes

7) Leachate is coloured liquid that comes out of
   a) Septic tank
   b) Sanitary landfills
   c) Aerated lagoons
   d) None of these

8) Composting process is affected due to
   a) Temperature
   b) Moisture content
   c) C/N ratio
   d) All of above

9) Characteristics of hazardous waste includes
   a) Ignitibility and corrosivity
   b) Reactivity and toxicity
   c) Both (a) and (b)
   d) None of above

10) Hazardous biomedical wastes are generated in
   a) Hospitals
   b) Biological research facilities
   c) Industrial biological conversion process
   d) All of above

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SLR-EP – 426

Seat No.	

B.E. (Civil) Part – II (New) Examination, 2016
Elective – II
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section – **I**, i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. A) Estimate the moisture content of solid waste sample of 100 kg using the following data. **8**

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

B) Explain in detail municipal solid waste collection methods. **6**

3. A) Explain the factors affecting the composting process. **6**
   B) Distinguish between Indore method and Bangalore method of composting. **7**

4. A) Explain different factors affecting incineration. **5**
   B) Write advantages and disadvantages of incineration treatment. **4**
   C) Write short note on Pyrolysis and its products. **4**

5. A) Enlist different magnetic separation methods and explain any one with neat sketch. **7**
   B) Write the use of different industrial waste. **6**

SECTION – II

6. A) Define Hazardous waste. Explain in brief characteristics of Hazardous waste. **8**
   B) Write a note on 'Risk management'. **6**

7. A) Draw a cross section of sanitary landfill and explain its essential component. **7**
   B) Write site selection criteria for sanitary landfilling. **6**

8. A) Write a note on waste minimization and resource recovery. **7**
   B) Explain the different techniques used to control contamination of ground water. **6**

9. A) Explain in detail any one case study of hazards. **7**
   B) Write a note on transportation of hazardous waste. **6**

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Seat No.	

Set Q

B.E. (Civil) Part – II (New) Examination, 2016
Elective – II
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*
*5) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** marks.*
*6) **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 : 20

1. Choose the correct option : **20**

1) Characteristics of hazardous waste includes
   a) Ignitibility and corrosivity b) Reactivity and toxicity
   c) Both (a) and (b) d) None of above

2) Hazardous biomedical wastes are generated in
   a) Hospitals
   b) Biological research facilities
   c) Industrial biological conversion process
   d) All of above

3) Leachate is coloured liquid that comes out of
   a) Septic tank b) Sanitary landfills
   c) Aerated lagoons d) None of these

4) Composting process is affected due to
   a) Temperature b) Moisture content
   c) C/N ratio d) All of above

P.T.O.

5) The volume of municipal wastes can be reduced by more than 90 percent by
   a) Incineration b) Landfilling c) Composting d) None of these

6) The anaerobic method of mechanical composting is
   a) Indore method b) Mangalore method
   c) Bangalore method d) None of these

7) 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

8) Mechanical size reduction operation includes
   a) Shredding b) Grinding c) Milling d) All of above

9) M R F's term in SWM is used for
   a) Material recovery facilities b) Major relief funds
   c) Minimum raw food d) None of these

10) Substances that emit ionizing radiation are defined as
   a) Hazardous waste b) Biological wastes
   c) Flammable wastes d) Radioactive wastes

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Seat No.	

B.E. (Civil) Part – II (New) Examination, 2016
Elective – II
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section – **I**, i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. A) Estimate the moisture content of solid waste sample of 100 kg using the following data. **8**

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

B) Explain in detail municipal solid waste collection methods. **6**

3. A) Explain the factors affecting the composting process. **6**
   B) Distinguish between Indore method and Bangalore method of composting. **7**

4. A) Explain different factors affecting incineration. **5**
   B) Write advantages and disadvantages of incineration treatment. **4**
   C) Write short note on Pyrolysis and its products. **4**

5. A) Enlist different magnetic separation methods and explain any one with neat sketch. **7**
   B) Write the use of different industrial waste. **6**

SECTION – II

6. A) Define Hazardous waste. Explain in brief characteristics of Hazardous waste. **8**
   B) Write a note on 'Risk management'. **6**

7. A) Draw a cross section of sanitary landfill and explain its essential component. **7**
   B) Write site selection criteria for sanitary landfilling. **6**

8. A) Write a note on waste minimization and resource recovery. **7**
   B) Explain the different techniques used to control contamination of ground water. **6**

9. A) Explain in detail any one case study of hazards. **7**
   B) Write a note on transportation of hazardous waste. **6**

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Seat No.	

Set R

B.E. (Civil) Part – II (New) Examination, 2016
Elective – II
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*
*5) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **two** marks.*
*6) **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 : 20

1. Choose the correct option : **20**

1) M R F's term in SWM is used for
   a) Material recovery facilities b) Major relief funds
   c) Minimum raw food d) None of these

2) Substances that emit ionizing radiation are defined as
   a) Hazardous waste b) Biological wastes
   c) Flammable wastes d) Radioactive wastes

3) Characteristics of hazardous waste includes
   a) Ignitibility and corrosivity b) Reactivity and toxicity
   c) Both (a) and (b) d) None of above

4) Hazardous biomedical wastes are generated in
   a) Hospitals
   b) Biological research facilities
   c) Industrial biological conversion process
   d) All of above

P.T.O.

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) Mechanical size reduction operation includes
   a) Shredding b) Grinding c) Milling d) All of above

7) The volume of municipal wastes can be reduced by more than 90 percent by
   a) Incineration b) Landfilling c) Composting d) None of these

8) The anaerobic method of mechanical composting is
   a) Indore method b) Mangalore method
   c) Bangalore method d) None of these

9) Leachate is coloured liquid that comes out of
   a) Septic tank b) Sanitary landfills
   c) Aerated lagoons d) None of these

10) Composting process is affected due to
   a) Temperature b) Moisture content
   c) C/N ratio d) All of above

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SLR-EP – 426

Seat No.	

B.E. (Civil) Part – II (New) Examination, 2016
Elective – II
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section – **I**, i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. A) Estimate the moisture content of solid waste sample of 100 kg using the following data. **8**

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

B) Explain in detail municipal solid waste collection methods. **6**

3. A) Explain the factors affecting the composting process. **6**
   B) Distinguish between Indore method and Bangalore method of composting. **7**

4. A) Explain different factors affecting incineration. **5**
   B) Write advantages and disadvantages of incineration treatment. **4**
   C) Write short note on Pyrolysis and its products. **4**

5. A) Enlist different magnetic separation methods and explain any one with neat sketch. **7**
   B) Write the use of different industrial waste. **6**

SECTION – II

6. A) Define Hazardous waste. Explain in brief characteristics of Hazardous waste. **8**
   B) Write a note on 'Risk management'. **6**

7. A) Draw a cross section of sanitary landfill and explain its essential component. **7**
   B) Write site selection criteria for sanitary landfilling. **6**

8. A) Write a note on waste minimization and resource recovery. **7**
   B) Explain the different techniques used to control contamination of ground water. **6**

9. A) Explain in detail any one case study of hazards. **7**
   B) Write a note on transportation of hazardous waste. **6**

SLR-EP – 426

Seat No.	

Set S

B.E. (Civil) Part – II (New) Examination, 2016
Elective – II
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from Section –* ***I*** *i.e. Question no.* ***2*** *to Question no.* ***5****. Question no.* ***6*** *is* ***compulsory*** *in Section –* ***II*** *and solve* ***any two*** *questions from the remaining.*
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****.*
5) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***two*** *marks.*
6) ***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 : 20

1. Choose the correct option : **20**

1) 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

2) Mechanical size reduction operation includes
   a) Shredding b) Grinding c) Milling d) All of above

3) M R F's term in SWM is used for
   a) Material recovery facilities b) Major relief funds
   c) Minimum raw food d) None of these

4) Substances that emit ionizing radiation are defined as
   a) Hazardous waste b) Biological wastes
   c) Flammable wastes d) Radioactive wastes

5) Leachate is coloured liquid that comes out of
   a) Septic tank b) Sanitary landfills
   c) Aerated lagoons d) None of these

P.T.O.

6) Composting process is affected due to
   a) Temperature b) Moisture content
   c) C/N ratio d) All of above

7) Characteristics of hazardous waste includes
   a) Ignitibility and corrosivity b) Reactivity and toxicity
   c) Both (a) and (b) d) None of above

8) Hazardous biomedical wastes are generated in
   a) Hospitals
   b) Biological research facilities
   c) Industrial biological conversion process
   d) All of above

9) The volume of municipal wastes can be reduced by more than 90 percent by
   a) Incineration b) Landfilling c) Composting d) None of these

10) The anaerobic method of mechanical composting is
   a) Indore method b) Mangalore method
   c) Bangalore method d) None of these

———————

SLR-EP – 426

Seat No.	

B.E. (Civil) Part – II (New) Examination, 2016
Elective – II
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Solve **any three** questions from Section – **I**, i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. A) Estimate the moisture content of solid waste sample of 100 kg using the following data. **8**

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

B) Explain in detail municipal solid waste collection methods. **6**

3. A) Explain the factors affecting the composting process. **6**
   B) Distinguish between Indore method and Bangalore method of composting. **7**

4. A) Explain different factors affecting incineration. **5**
   B) Write advantages and disadvantages of incineration treatment. **4**
   C) Write short note on Pyrolysis and its products. **4**

5. A) Enlist different magnetic separation methods and explain any one with neat sketch. **7**
   B) Write the use of different industrial waste. **6**

SECTION – II

6. A) Define Hazardous waste. Explain in brief characteristics of Hazardous waste. **8**
   B) Write a note on 'Risk management'. **6**

7. A) Draw a cross section of sanitary landfill and explain its essential component. **7**
   B) Write site selection criteria for sanitary landfilling. **6**

8. A) Write a note on waste minimization and resource recovery. **7**
   B) Explain the different techniques used to control contamination of ground water. **6**

9. A) Explain in detail any one case study of hazards. **7**
   B) Write a note on transportation of hazardous waste. **6**

SLR-EP – 429

Seat No.	

Set P

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Figures to the **right** indicates full marks.*
*4) Assume suitable data if **necessary** and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) For spans greater than 9 m, impact factor for wheeled vehicle is
a) 10% b) 20% c) 25% d) 15%

2) _____ is the minimum grade of concrete for prestressed concrete bridges.
a) M – 30 b) M – 20 c) M – 40 d) M – 25

3) The minimum width of carriage way for a single lane bridge is
a) 4.25 m b) 6 m c) 10 m d) 7.5 m

4) The ground contact length of the track of IRC class AA loading is
a) 3.6 m b) 4.57 m c) 3.5 m d) None of these

5) Impact force for IRC class A and B is given by
a) $I_f = \frac{AB}{B+L}$ b) $I_f = \frac{B+L}{A}$ c) $I_f = \frac{A}{B+L}$ d) None of these

6) To provide for the possible variation of the direction of the water current, allowance for an extra variation of water current direction is
a) 15^o b) 20^o c) 25^o d) 35^o

7) The minimum clearance for class AA loading is
a) 0.15 m b) 1.0 m c) 1.1 m d) None of these

P.T.O.

8) Total load of class AA wheeled is
   a) 700 kN b) 400 kN c) 554 kN d) 332 kN
9) Braking force is assumed to act along the line parallel to roadway and _____ above it.
   a) 1.2 m b) 1.5 m c) 1.8 m d) 2.0 m
10) Solid deck slab is adopted for spans
   a) More than 8 m b) More than 20 m
   c) Less than 8 m d) Between 10 – 25 m
11) As per IRC – 21, minimum clear cover to any reinforcement bar is
   a) 40 mm b) 25 mm c) 50 mm d) 30 mm
12) Two span girder requires
   a) Fixed bearing at central support and expansion bearing at the two abutment
   b) Fixed bearing at all supports
   c) Expansion bearing on all supports
   d) Expansion bearing at central supports and Fixed bearing at the two abutment
13) In case of curved bridges, suitable bearing is
   a) Fixed bearing b) Expansion bearing
   c) Rocker bearing d) Steel hinge
14) Following is not type of Expansion bearing
   a) Sliding plate beam b) Steel roller-cum-rocker bearing
   c) Elastomeric bearing d) Rocker bearing
15) Maximum allowable percentage elongation of elastomeric bearing is
   a) 300 b) 200 c) 400 d) 500
16) According to bridge code, all abutments to be designed for a live load surcharge of height of earth fill is
   a) 1 m b) 1.2 m c) 1.4 m d) 1.6 m
17) Braking force is taken as _____ of the design vehicle load.
   a) 0.2 b) 0.4 c) 0.6 d) 0.8
18) 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
19) The adhesion strength of the elastomer to steel plates shall not be less than
   a) 6 kN/m b) 5 kN/m c) 7 kN/m d) 5.5 kN/m
20) Guideline for the design of bridge foundation are available in IRC bridge code section _____
   a) I b) III c) V d) VII

_____

SLR-EP – 429

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions each from Section **I** and Section **II**.*
*2) Figures to the **right** indicates full marks.*
*3) Assume suitable data if **necessary** and mention it **clearly**.*

SECTION – I

2. Design a slab panel of 'T' beam bridge for following data : **(13)**
   1) Panel dimension 3.0×3.5 m
   2) Live load – IRC Class AA tracked
   3) Thickness of slab panel = 0.23 m
   4) Thickness of wearing coat = 0.1 m
   5) For $\frac{U}{B}=1$, $\frac{V}{L}=1$ and $\frac{B}{L}=0.8$, $m_1 = 0.35$, $m_2 = 0.030$
   6) For $\frac{U}{B}=0.35$, $\frac{V}{L}=1$ and $\frac{B}{L}=0.8$, $m_1 = 0.085$, $m_2 = 0.060$

3. Design a solid deck slab for two lane bridge with following data : **(13)**
   a) Effective span – 7.5 m
   b) Carriage way width – 9 m
   c) Kerb-600×280 on both side
   d) Live load-IRC Class A (Two lane)
   e) Wearing coat – 100 mm thick
   f) Use M-30 concrete and Fe-415 steel
   g) Use $\alpha = 2.64$

4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Design longitudinal girders for following additional data.
   a) Carriage way width – 9 m
   b) Span of bridge – 18 m

c) Live Load – IRC class A Two Lane

d) Kerb-600 mm wide, 400 mm deep

e) Web thickness for Longitudinal and cross girder-300 mm

f) Longitudinal Girder spacing – 3.0 m

g) Use M-30 concrete and Fe – 415 steel **(13)**

5. Answer the following :

A) Explain the Piguad's theory for the analysis of slab panels. What are the limitations of this theory ? **(7)**

B) What is Economic span ? How it is calculated ? Derive the equation for the same. **(7)**

SECTION – II

6. Verify the adequacy of pier for the following data :

Top width of pier – 1.7 m, Height of pier upto springing level – 12 m, C/C distance of bearing – 1 m, Side batter 1:15, HFL – 1.3 m below the bearing level, Span of bridge – 15 m, Reaction due to D.L. from each span = 2200 kN, Reaction due to L.L.from each span = 1200 kN, Live load – IRC class AA tracked
Material of pier = M20 concrete. **13**

7. Verify the suitability of abutment as shown in the fig.1. Use following data Density of soil – 18.7 kN/m^3, Friction angle of soil $(\varnothing) = 30°$.

Coefficient of friction – 0.58, Live load IRC class AA tracked. **13**

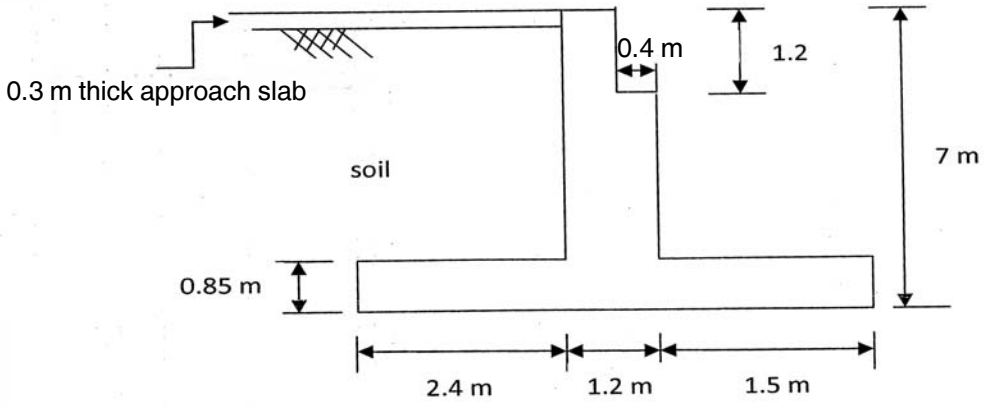

Fig no. 1

8. A) Design a elastomeric unreinforced bearing pad for following data :

Vertical load (sustained) = 190 kN,

Vertical load (dynamic) = 40 kN,

Horizontal force = 60 kN

Modulus of rigidity of elastomer – 1 N/mm^2

Coefficient of friction = 0.3 **8**

B) Write a note on Inspection of bridges. **5**

9. Write a note on following (**Any four**). **(3.5×4=14)**

a) Erection methods for bridges

b) Well foundation

c) Expansion joints

d) Types of bearing

e) Forces on piers.

Set P

SLR-EP – 429

Seat No.	

Set Q

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Figures to the **right** indicates full marks.*
*4) Assume suitable data if **necessary** and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) According to bridge code, all abutments to be designed for a live load surcharge of height of earth fill is
a) 1 m b) 1.2 m c) 1.4 m d) 1.6 m

2) Braking force is taken as _____ of the design vehicle load.
a) 0.2 b) 0.4 c) 0.6 d) 0.8

3) 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

4) The adhesion strength of the elastomer to steel plates shall not be less than
a) 6 kN/m b) 5 kN/m c) 7 kN/m d) 5.5 kN/m

5) Guideline for the design of bridge foundation are available in IRC bridge code section _____
a) I b) III c) V d) VII

6) For spans greater than 9 m, impact factor for wheeled vehicle is
a) 10% b) 20% c) 25% d) 15%

7) _____ is the minimum grade of concrete for prestressed concrete bridges.
a) M – 30 b) M – 20 c) M – 40 d) M – 25

P.T.O.

8) The minimum width of carriage way for a single lane bridge is
   a) 4.25 m b) 6 m c) 10 m d) 7.5 m
9) The ground contact length of the track of IRC class AA loading is
   a) 3.6 m b) 4.57 m c) 3.5 m d) None of these
10) Impact force for IRC class A and B is given by
   a) $I_f = \frac{AB}{B+L}$ b) $I_f = \frac{B+L}{A}$ c) $I_f = \frac{A}{B+L}$ d) None of these
11) To provide for the possible variation of the direction of the water current, allowance for an extra variation of water current direction is
   a) 15^o b) 20^o c) 25^o d) 35^o
12) The minimum clearance for class AA loading is
   a) 0.15 m b) 1.0 m c) 1.1 m d) None of these
13) Total load of class AA wheeled is
   a) 700 kN b) 400 kN c) 554 kN d) 332 kN
14) Braking force is assumed to act along the line parallel to roadway and _____ above it.
   a) 1.2 m b) 1.5 m c) 1.8 m d) 2.0 m
15) Solid deck slab is adopted for spans
   a) More than 8 m b) More than 20 m
   c) Less than 8 m d) Between 10 – 25 m
16) As per IRC – 21, minimum clear cover to any reinforcement bar is
   a) 40 mm b) 25 mm c) 50 mm d) 30 mm
17) Two span girder requires
   a) Fixed bearing at central support and expansion bearing at the two abutment
   b) Fixed bearing at all supports
   c) Expansion bearing on all supports
   d) Expansion bearing at central supports and Fixed bearing at the two abutment
18) In case of curved bridges, suitable bearing is
   a) Fixed bearing b) Expansion bearing
   c) Rocker bearing d) Steel hinge
19) Following is not type of Expansion bearing
   a) Sliding plate beam b) Steel roller-cum-rocker bearing
   c) Elastomeric bearing d) Rocker bearing
20) Maximum allowable percentage elongation of elastomeric bearing is
   a) 300 b) 200 c) 400 d) 500

_____

SLR-EP – 429

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions each from Section* ***I*** *and Section* ***II****.*
2) Figures to the ***right*** *indicates full marks.*
3) Assume suitable data if ***necessary*** *and mention it* ***clearly****.*

SECTION – I

2. Design a slab panel of 'T' beam bridge for following data : **(13)**
   1) Panel dimension 3.0×3.5 m
   2) Live load – IRC Class AA tracked
   3) Thickness of slab panel = 0.23 m
   4) Thickness of wearing coat = 0.1 m
   5) For $\frac{U}{B}=1$, $\frac{V}{L}=1$ and $\frac{B}{L}=0.8$, $m_1 = 0.35$, $m_2 = 0.030$
   6) For $\frac{U}{B}=0.35$, $\frac{V}{L}=1$ and $\frac{B}{L}=0.8$, $m_1 = 0.085$, $m_2 = 0.060$

3. Design a solid deck slab for two lane bridge with following data : **(13)**
   a) Effective span – 7.5 m
   b) Carriage way width – 9 m
   c) Kerb-600×280 on both side
   d) Live load-IRC Class A (Two lane)
   e) Wearing coat – 100 mm thick
   f) Use M-30 concrete and Fe-415 steel
   g) Use $\alpha = 2.64$

4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Design longitudinal girders for following additional data.
   a) Carriage way width – 9 m
   b) Span of bridge – 18 m

c) Live Load – IRC class A Two Lane

d) Kerb-600 mm wide, 400 mm deep

e) Web thickness for Longitudinal and cross girder-300 mm

f) Longitudinal Girder spacing – 3.0 m

g) Use M-30 concrete and Fe – 415 steel **(13)**

5. Answer the following :

A) Explain the Piguad's theory for the analysis of slab panels. What are the limitations of this theory ? **(7)**

B) What is Economic span ? How it is calculated ? Derive the equation for the same. **(7)**

SECTION – II

6. Verify the adequacy of pier for the following data :

Top width of pier – 1.7 m, Height of pier upto springing level – 12 m, C/C distance of bearing – 1 m, Side batter 1:15, HFL – 1.3 m below the bearing level, Span of bridge – 15 m, Reaction due to D.L. from each span = 2200 kN, Reaction due to L.L.from each span = 1200 kN, Live load – IRC class AA tracked
Material of pier = M20 concrete. **13**

7. Verify the suitability of abutment as shown in the fig.1. Use following data Density of soil – 18.7 kN/m^3, Friction angle of soil $(\varnothing) = 30°$.

Coefficient of friction – 0.58, Live load IRC class AA tracked. **13**

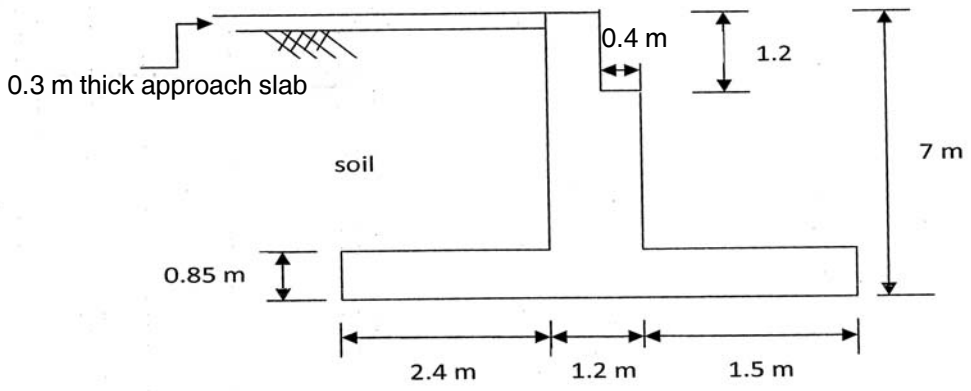

Fig no. 1

8. A) Design a elastomeric unreinforced bearing pad for following data :

Vertical load (sustained) = 190 kN,

Vertical load (dynamic) = 40 kN,

Horizontal force = 60 kN

Modulus of rigidity of elastomer – 1 N/mm^2

Coefficient of friction = 0.3 **8**

B) Write a note on Inspection of bridges. **5**

9. Write a note on following (**Any four**). **(3.5×4=14)**

a) Erection methods for bridges

b) Well foundation

c) Expansion joints

d) Types of bearing

e) Forces on piers.

Set Q

SLR-EP – 429

Seat No.	

Set **R**

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Figures to the **right** indicates full marks.*
*4) Assume suitable data if **necessary** and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) As per IRC – 21, minimum clear cover to any reinforcement bar is
a) 40 mm b) 25 mm c) 50 mm d) 30 mm

2) Two span girder requires
a) Fixed bearing at central support and expansion bearing at the two abutment
b) Fixed bearing at all supports
c) Expansion bearing on all supports
d) Expansion bearing at central supports and Fixed bearing at the two abutment

3) In case of curved bridges, suitable bearing is
a) Fixed bearing b) Expansion bearing
c) Rocker bearing d) Steel hinge

4) Following is not type of Expansion bearing
a) Sliding plate beam b) Steel roller-cum-rocker bearing
c) Elastomeric bearing d) Rocker bearing

5) Maximum allowable percentage elongation of elastomeric bearing is
a) 300 b) 200 c) 400 d) 500

6) According to bridge code, all abutments to be designed for a live load surcharge of height of earth fill is
a) 1 m b) 1.2 m c) 1.4 m d) 1.6 m

7) Braking force is taken as _____ of the design vehicle load.
   a) 0.2 b) 0.4 c) 0.6 d) 0.8

8) 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

9) The adhesion strength of the elastomer to steel plates shall not be less than
   a) 6 kN/m b) 5 kN/m c) 7 kN/m d) 5.5 kN/m

10) Guideline for the design of bridge foundation are available in IRC bridge code section _____
   a) I b) III c) V d) VII

11) For spans greater than 9 m, impact factor for wheeled vehicle is
   a) 10% b) 20% c) 25% d) 15%

12) _____ is the minimum grade of concrete for prestressed concrete bridges.
   a) M – 30 b) M – 20 c) M – 40 d) M – 25

13) The minimum width of carriage way for a single lane bridge is
   a) 4.25 m b) 6 m c) 10 m d) 7.5 m

14) The ground contact length of the track of IRC class AA loading is
   a) 3.6 m b) 4.57 m c) 3.5 m d) None of these

15) Impact force for IRC class A and B is given by
   a) $I_f = \frac{AB}{B+L}$ b) $I_f = \frac{B+L}{A}$ c) $I_f = \frac{A}{B+L}$ d) None of these

16) To provide for the possible variation of the direction of the water current, allowance for an extra variation of water current direction is
   a) 15° b) 20° c) 25° d) 35°

17) The minimum clearance for class AA loading is
   a) 0.15 m b) 1.0 m c) 1.1 m d) None of these

18) Total load of class AA wheeled is
   a) 700 kN b) 400 kN c) 554 kN d) 332 kN

19) Braking force is assumed to act along the line parallel to roadway and _____ above it.
   a) 1.2 m b) 1.5 m c) 1.8 m d) 2.0 m

20) Solid deck slab is adopted for spans
   a) More than 8 m b) More than 20 m
   c) Less than 8 m d) Between 10 – 25 m

_____

SLR-EP – 429

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions each from Section* ***I*** *and Section* ***II****.*
2) Figures to the ***right*** *indicates full marks.*
3) Assume suitable data if ***necessary*** *and mention it* ***clearly****.*

SECTION – I

2. Design a slab panel of 'T' beam bridge for following data : **(13)**
   1) Panel dimension 3.0×3.5 m
   2) Live load – IRC Class AA tracked
   3) Thickness of slab panel = 0.23 m
   4) Thickness of wearing coat = 0.1 m
   5) For $\frac{U}{B}=1$, $\frac{V}{L}=1$ and $\frac{B}{L}=0.8$, $m_1 = 0.35$, $m_2 = 0.030$
   6) For $\frac{U}{B}=0.35$, $\frac{V}{L}=1$ and $\frac{B}{L}=0.8$, $m_1 = 0.085$, $m_2 = 0.060$

3. Design a solid deck slab for two lane bridge with following data : **(13)**
   a) Effective span – 7.5 m
   b) Carriage way width – 9 m
   c) Kerb-600×280 on both side
   d) Live load-IRC Class A (Two lane)
   e) Wearing coat – 100 mm thick
   f) Use M-30 concrete and Fe-415 steel
   g) Use $\alpha = 2.64$

4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Design longitudinal girders for following additional data.
   a) Carriage way width – 9 m
   b) Span of bridge – 18 m

c) Live Load – IRC class A Two Lane

d) Kerb-600 mm wide, 400 mm deep

e) Web thickness for Longitudinal and cross girder-300 mm

f) Longitudinal Girder spacing – 3.0 m

g) Use M-30 concrete and Fe – 415 steel **(13)**

5. Answer the following :

A) Explain the Piguad's theory for the analysis of slab panels. What are the limitations of this theory ? **(7)**

B) What is Economic span ? How it is calculated ? Derive the equation for the same. **(7)**

SECTION – II

6. Verify the adequacy of pier for the following data :

Top width of pier – 1.7 m, Height of pier upto springing level – 12 m, C/C distance of bearing – 1 m, Side batter 1:15, HFL – 1.3 m below the bearing level, Span of bridge – 15 m, Reaction due to D.L. from each span = 2200 kN, Reaction due to L.L.from each span = 1200 kN, Live load – IRC class AA tracked
Material of pier = M20 concrete. **13**

7. Verify the suitability of abutment as shown in the fig.1. Use following data Density of soil – 18.7 kN/m^3, Friction angle of soil $(\varnothing) = 30°$.

Coefficient of friction – 0.58, Live load IRC class AA tracked. **13**

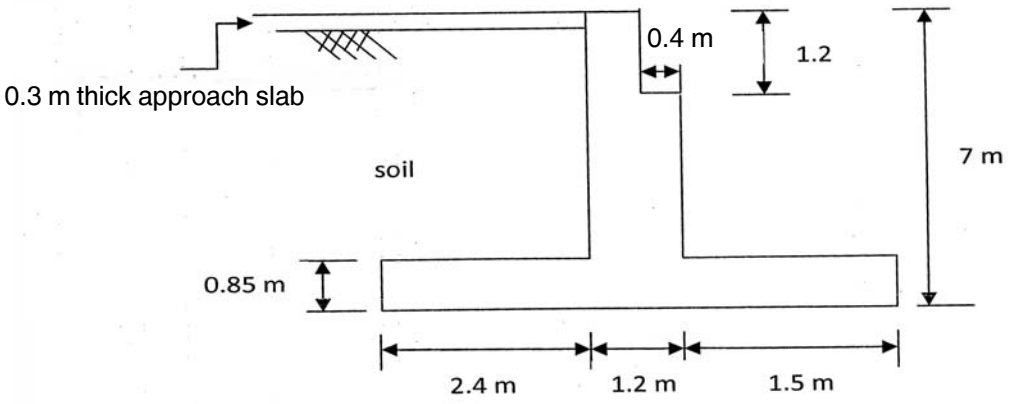

Fig no. 1

8. A) Design a elastomeric unreinforced bearing pad for following data :

Vertical load (sustained) = 190 kN,

Vertical load (dynamic) = 40 kN,

Horizontal force = 60 kN

Modulus of rigidity of elastomer – 1 N/mm^2

Coefficient of friction = 0.3 **8**

B) Write a note on Inspection of bridges. **5**

9. Write a note on following (**Any four**). **(3.5×4=14)**

a) Erection methods for bridges

b) Well foundation

c) Expansion joints

d) Types of bearing

e) Forces on piers.

Set R

SLR-EP – 429

Seat No.	

Set **S**

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*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.***
*3) Figures to the **right** indicates full marks.*
*4) Assume suitable data if **necessary** and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) To provide for the possible variation of the direction of the water current, allowance for an extra variation of water current direction is
a) 15^{o} b) 20^{o} c) 25^{o} d) 35^{o}

2) The minimum clearance for class AA loading is
a) 0.15 m b) 1.0 m c) 1.1 m d) None of these

3) Total load of class AA wheeled is
a) 700 kN b) 400 kN c) 554 kN d) 332 kN

4) Braking force is assumed to act along the line parallel to roadway and _____ above it.
a) 1.2 m b) 1.5 m c) 1.8 m d) 2.0 m

5) Solid deck slab is adopted for spans
a) More than 8 m b) More than 20 m
c) Less than 8 m d) Between 10 – 25 m

6) As per IRC – 21, minimum clear cover to any reinforcement bar is
a) 40 mm b) 25 mm c) 50 mm d) 30 mm

7) Two span girder requires
a) Fixed bearing at central support and expansion bearing at the two abutment
b) Fixed bearing at all supports
c) Expansion bearing on all supports
d) Expansion bearing at central supports and Fixed bearing at the two abutment

P.T.O.

8) In case of curved bridges, suitable bearing is
   a) Fixed bearing b) Expansion bearing
   c) Rocker bearing d) Steel hinge

9) Following is not type of Expansion bearing
   a) Sliding plate beam b) Steel roller-cum-rocker bearing
   c) Elastomeric bearing d) Rocker bearing

10) Maximum allowable percentage elongation of elastomeric bearing is
   a) 300 b) 200 c) 400 d) 500

11) According to bridge code, all abutments to be designed for a live load surcharge of height of earth fill is
   a) 1 m b) 1.2 m c) 1.4 m d) 1.6 m

12) Braking force is taken as _____ of the design vehicle load.
   a) 0.2 b) 0.4 c) 0.6 d) 0.8

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 adhesion strength of the elastomer to steel plates shall not be less than
   a) 6 kN/m b) 5 kN/m c) 7 kN/m d) 5.5 kN/m

15) Guideline for the design of bridge foundation are available in IRC bridge code section _____
   a) I b) III c) V d) VII

16) For spans greater than 9 m, impact factor for wheeled vehicle is
   a) 10% b) 20% c) 25% d) 15%

17) _____ is the minimum grade of concrete for prestressed concrete bridges.
   a) M – 30 b) M – 20 c) M – 40 d) M – 25

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_____

SLR-EP – 429

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
Elective – II : DESIGN OF BRIDGES

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions each from Section **I** and Section **II**.*
*2) Figures to the **right** indicates full marks.*
*3) Assume suitable data if **necessary** and mention it **clearly**.*

SECTION – I

2. Design a slab panel of 'T' beam bridge for following data : **(13)**
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   4) Thickness of wearing coat = 0.1 m
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   6) For $\frac{U}{B}=0.35$, $\frac{V}{L}=1$ and $\frac{B}{L}=0.8$, $m_1 = 0.085$, $m_2 = 0.060$

3. Design a solid deck slab for two lane bridge with following data : **(13)**
   a) Effective span – 7.5 m
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   d) Live load-IRC Class A (Two lane)
   e) Wearing coat – 100 mm thick
   f) Use M-30 concrete and Fe-415 steel
   g) Use $\alpha = 2.64$

4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Design longitudinal girders for following additional data.
   a) Carriage way width – 9 m
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c) Live Load – IRC class A Two Lane

d) Kerb-600 mm wide, 400 mm deep

e) Web thickness for Longitudinal and cross girder-300 mm

f) Longitudinal Girder spacing – 3.0 m

g) Use M-30 concrete and Fe – 415 steel **(13)**

5. Answer the following :

A) Explain the Piguad's theory for the analysis of slab panels. What are the limitations of this theory ? **(7)**

B) What is Economic span ? How it is calculated ? Derive the equation for the same. **(7)**

SECTION – II

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Top width of pier – 1.7 m, Height of pier upto springing level – 12 m, C/C distance of bearing – 1 m, Side batter 1:15, HFL – 1.3 m below the bearing level, Span of bridge – 15 m, Reaction due to D.L. from each span = 2200 kN, Reaction due to L.L.from each span = 1200 kN, Live load – IRC class AA tracked
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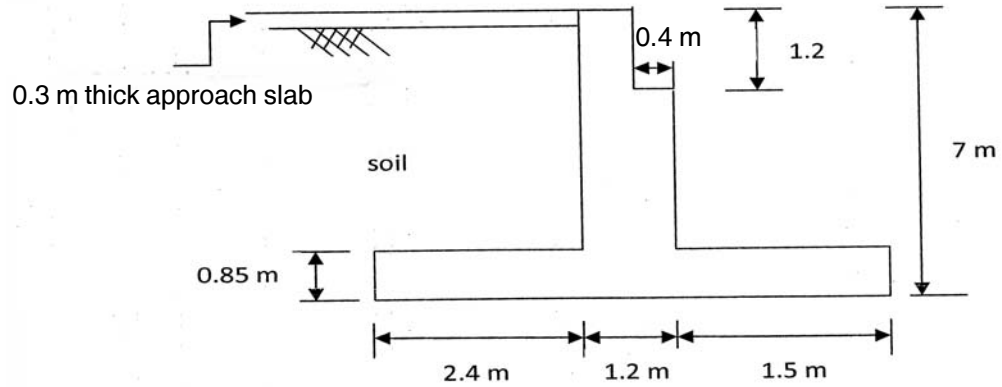

Fig no. 1

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Vertical load (dynamic) = 40 kN,

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Modulus of rigidity of elastomer – 1 N/mm^2

Coefficient of friction = 0.3 **8**

B) Write a note on Inspection of bridges. **5**

9. Write a note on following (**Any four**). **(3.5×4=14)**

a) Erection methods for bridges

b) Well foundation

c) Expansion joints

d) Types of bearing

e) Forces on piers.

Set S

SLR-EP – 430

Seat No.	

Set **P**

B.E. Civil (Part – II) (New) Examination, 2016
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1) Figures to the **right** indicates the **full** marks.*
*2) **Use** of non programmable scientific calculator is **allowed**.*
*3) **Assume** suitable data if necessary and **clearly** mention it.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*5) **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 : 20

1. Choose the correct answer :

i) The ratio of plastic moment capacity to yield moment of a section is **1**
   a) Less than one b) Equal to one
   c) More than one d) None of the above

ii) The shape factor of a circular section is **1**
   a) 1.15 b) 1.5 c) 2.34 d) 1.7

iii) The design criterion for plastic design of beams is **1**
   a) Mp $\geq$ Mu b) Mp $\geq$ (load factor X Mu)
   c) $Z \cdot Fyp \leq Mu$ d) None of the above

iv) The moment curvature relation of plastic hinge is **1**
   a) Linear with inclination
   b) Bilinear
   c) Constant curvature for all moments
   d) Constant moment with increasing curvatures

v) The number of plastic hinges necessary to convert a framed structure in to a mechanism is **1**
   a) (r – 1) b) (r + 1) c) (2r – 1) d) (2r + 1)

P.T.O.

vi) The bending moment at a plastic hinge is **1**

a) Equal to zero
b) Equal to yield moment of the section
c) Equal to plastic moment of the section
d) Greater than the plastic moment of the section

vii) The maximum bearing stress in light gauge steel section is given by **2**

a) 1.0 Fy b) 1.2 Fy c) 2.1 Fy d) 3.1 Fy

viii) The limit state design of steel structures makes use of **1**

a) Plastic analysis of structures
b) Elastic structural analysis
c) Ultimate analysis
d) Elastic and plastic analysis

ix) The approximate shape factor of thin rectangular section is **1**

a) 1.12 b) 1.5 c) 1.7 d) 1.52

x) The shape factor for triangular section is **1**

a) 1.5 b) 1.7 c) 2.34 d) 1.27

xi) The collapse load for simply supported beam subjected to central point load is **2**

a) Wc = [4Mp/L] b) Wc = [6Mp/L]
c) Wc = [8Mp/L] d) Wc = [5.5Mp/L]
e) None of the above

xii) The collapse load for fixed beam subjected to uniformly distributed load is **2**

a) Wc = [4Mp/L] b) Wc = [16Mp/L] c) Wc = [8Mp/L] d) Wc = [5.5Mp/L]

xiii) Determine the shape factor of T section having flanges 140 mm×16 mm and web thickness 8.9 mm. The overall depth is 400 mm. **3**

a) 1.1488 b) 1.8844 c) 1.4848 d) 1.4188
e) None of the above

xiv) The effective width 'b' for a light gauge steel plate is given by **2**

a) $b = 0.9\ t(E/Fy)^{1/2}$ b) $b = 1.9\ t(E/Fy)^{1/2}$
c) $b = 2.9\ t(E/Fy)^{1/2}$ d) $b = 3.9\ t(E/Fy)^{1/2}$

SLR-EP – 430

Seat No.	

B.E. Civil (Part – II) (New) Examination, 2016
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

N.B. *:1) Solve **any two** questions from **each** Section.*
*2) Figures to the **right** indicates the **full** marks.*
*3) **Use** of non programmable scientific calculator is **allowed**.*
*4) **Assume** suitable data if necessary and **clearly** mention it.*

SECTION – I

2. An open web girder bridge consists of two pratt trusses of type shown in fig. 1. The span of truss is 24m c/c of bearings. The bridge supports an equivalent uniformly distributed live load of 175 KN/m. The dead load transmitted to each truss is 15 KN/m. Draw the influence line diagrams for members U2U3, U2L3, and U3L4. And design U4L4 by assuming impact factor to be 15%. **20**

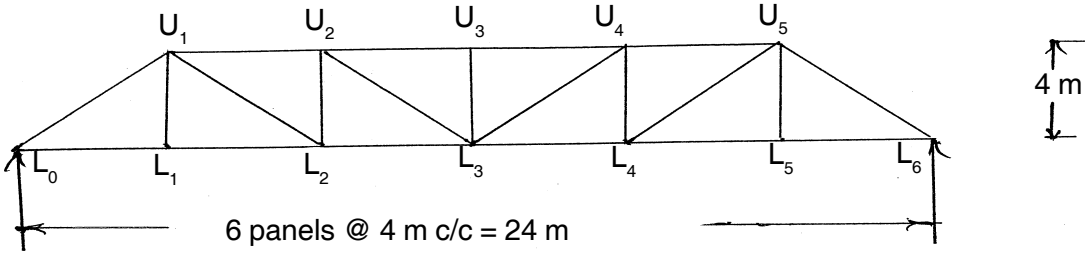

Figure 1

3. Determine the end moments in the columns and beams of the building frame with moment resistant joint as shown in fig. 2. By cantilever method. Also determine the axial forces in the columns and end shear forces in the beams. **20**

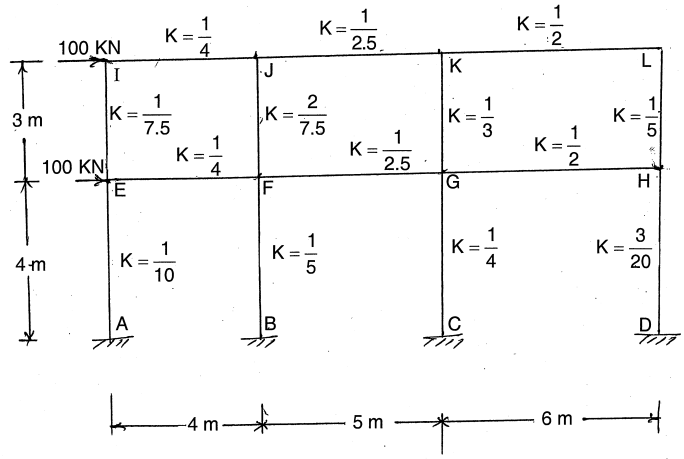

Figure 2

Set P

4. Two channels 200 mm × 80 mm run with bent lips are connected with webs to act as column as shown in fig. 3. The thickness of plate is 2.5 mm and depth of lips is 25 mm. Determine the safe load carrying capacity if the effective length of the column is 6 m. Take Fy = 235 N/mm^2 and E = 2×10^5 N/mm^2. **20**

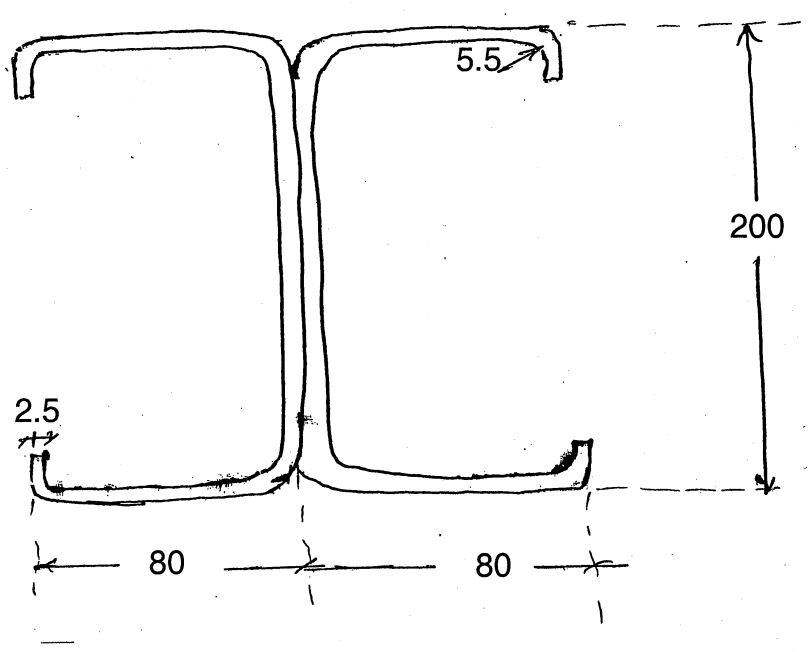

Figure 3

SECTION – II

5. A continuous beam ABC carrying working loads as shown in fig. 4. Assuming load factor 2.0. Design suitable section for span AB and BC. Shape factor is 1.12. Yield stress of steel is 250 N/mm^2. **20**

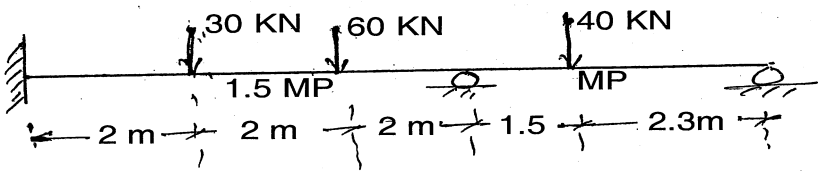

Figure 4

6. Find the value of Mp for the portal frame and loaded up to collapse as shown in fig. 5. Also plot the bending moment diagram. **20**

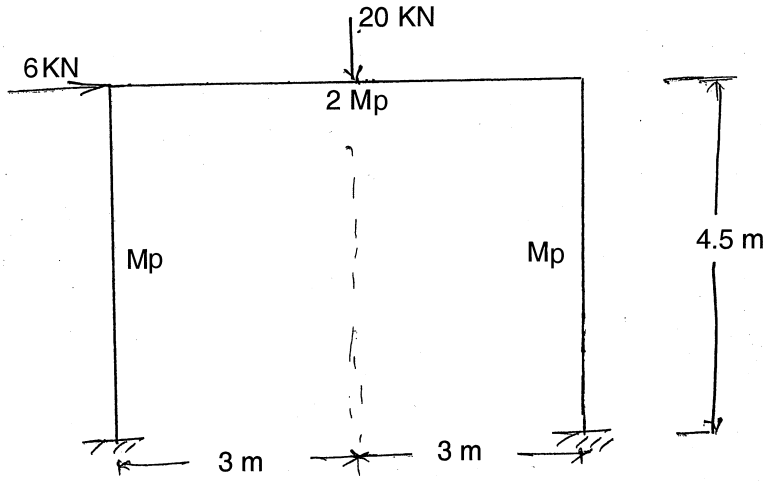

Figure 5

7. a) A column 4.5 m in height and effectively retrained in position as well as in direction at both the end carries an axial load of 1200 KN. Design a suitable I section, if the column is to be encased in concrete. Take Fy = 250 N/mm^2. **10**

   b) Calculate the moment carrying capacity if the beam ISMB 400 is encased in concrete of grade M15 as shown in fig. 6. **10**

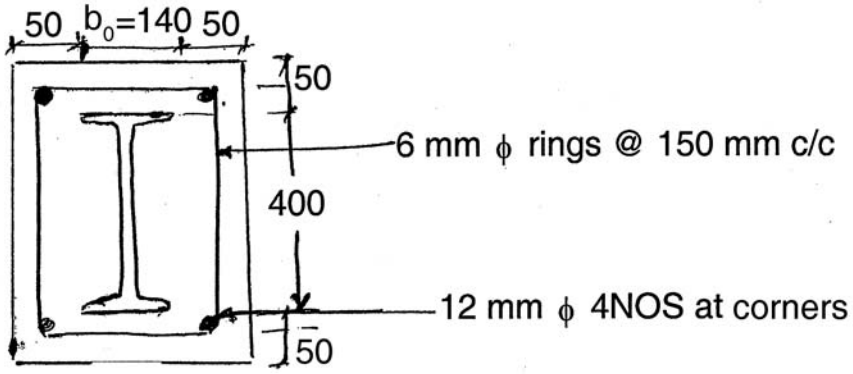

Figure 6

Set P

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Seat No.	

Set **Q**

B.E. Civil (Part – II) (New) Examination, 2016
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1) Figures to the **right** indicates the **full** marks.*
*2) **Use** of non programmable scientific calculator is **allowed**.*
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*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*5) **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 : 20

1. Choose the correct answer :

i) The limit state design of steel structures makes use of **1**
   a) Plastic analysis of structures
   b) Elastic structural analysis
   c) Ultimate analysis
   d) Elastic and plastic analysis

ii) The approximate shape factor of thin rectangular section is **1**
   a) 1.12 b) 1.5 c) 1.7 d) 1.52

iii) The shape factor for triangular section is **1**
   a) 1.5 b) 1.7 c) 2.34 d) 1.27

iv) The collapse load for simply supported beam subjected to central point load is **2**
   a) Wc = [4Mp/L] b) Wc = [6Mp/L]
   c) Wc = [8Mp/L] d) Wc = [5.5Mp/L]
   e) None of the above

v) The collapse load for fixed beam subjected to uniformly distributed load is **2**
   a) Wc = [4Mp/L] b) Wc = [16Mp/L] c) Wc = [8Mp/L] d) Wc = [5.5Mp/L]

vi) Determine the shape factor of T section having flanges 140 mm×16 mm and web thickness 8.9 mm. The overall depth is 400 mm. **3**
   a) 1.1488 b) 1.8844 c) 1.4848 d) 1.4188
   e) None of the above

P.T.O.

vii) The effective width 'b' for a light gauge steel plate is given by **2**

a) $b = 0.9\ t(E/Fy)^{1/2}$ b) $b = 1.9\ t(E/Fy)^{1/2}$

c) $b = 2.9\ t(E/Fy)^{1/2}$ d) $b = 3.9\ t(E/Fy)^{1/2}$

viii) The ratio of plastic moment capacity to yield moment of a section is **1**

a) Less than one b) Equal to one

c) More than one d) None of the above

ix) The shape factor of a circular section is **1**

a) 1.15 b) 1.5 c) 2.34 d) 1.7

x) The design criterion for plastic design of beams is **1**

a) $Mp \geq Mu$ b) $Mp \geq$ (load factor X Mu)

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xi) The moment curvature relation of plastic hinge is **1**

a) Linear with inclination

b) Bilinear

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xii) The number of plastic hinges necessary to convert a framed structure in to a mechanism is **1**

a) $(r - 1)$ b) $(r + 1)$ c) $(2r - 1)$ d) $(2r + 1)$

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a) Equal to zero

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xiv) The maximum bearing stress in light gauge steel section is given by **2**

a) 1.0 Fy b) 1.2 Fy c) 2.1 Fy d) 3.1 Fy

SLR-EP – 430

Seat No.	

B.E. Civil (Part – II) (New) Examination, 2016
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
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SECTION – I

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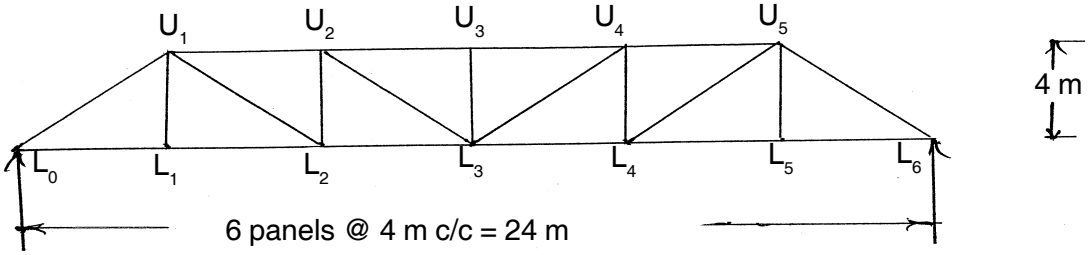

Figure 1

3. Determine the end moments in the columns and beams of the building frame with moment resistant joint as shown in fig. 2. By cantilever method. Also determine the axial forces in the columns and end shear forces in the beams. **20**

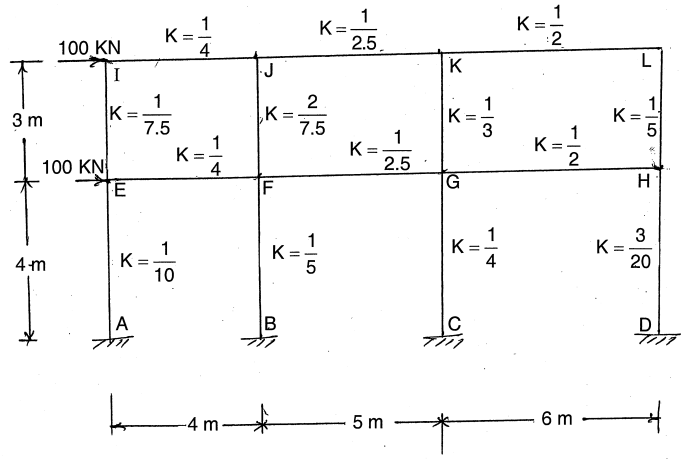

Figure 2

Set Q

4. Two channels 200 mm × 80 mm run with bent lips are connected with webs to act as column as shown in fig. 3. The thickness of plate is 2.5 mm and depth of lips is 25 mm. Determine the safe load carrying capacity if the effective length of the column is 6 m. Take Fy = 235 N/mm^2 and E = 2×10^5 N/mm^2. **20**

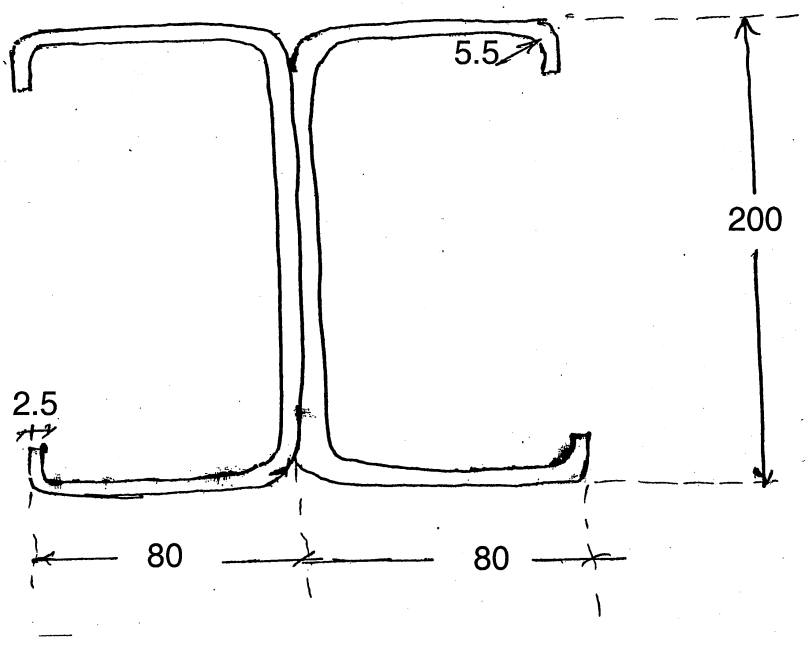

Figure 3

SECTION – II

5. A continuous beam ABC carrying working loads as shown in fig. 4. Assuming load factor 2.0. Design suitable section for span AB and BC. Shape factor is 1.12. Yield stress of steel is 250 N/mm^2. **20**

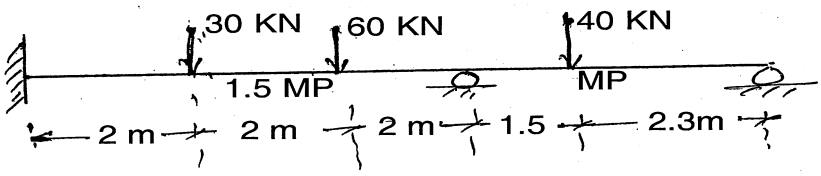

Figure 4

Set Q

6. Find the value of Mp for the portal frame and loaded up to collapse as shown in fig. 5. Also plot the bending moment diagram. **20**

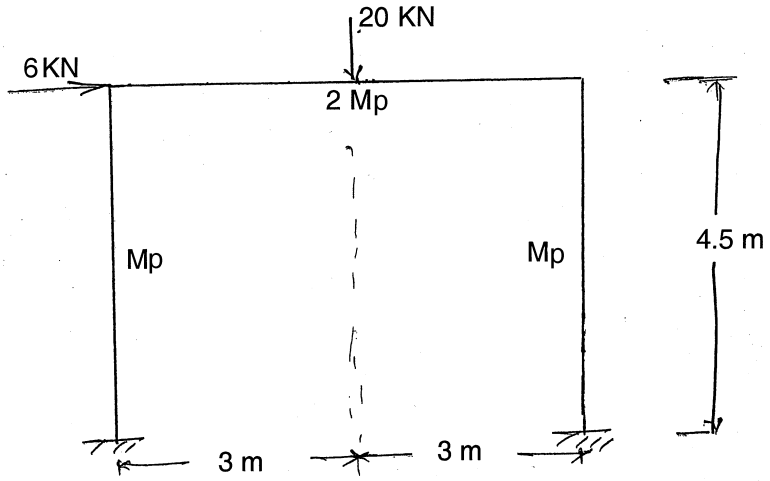

Figure 5

7. a) A column 4.5 m in height and effectively retrained in position as well as in direction at both the end carries an axial load of 1200 KN. Design a suitable I section, if the column is to be encased in concrete. Take Fy = 250 N/mm^2. **10**

   b) Calculate the moment carrying capacity if the beam ISMB 400 is encased in concrete of grade M15 as shown in fig. 6. **10**

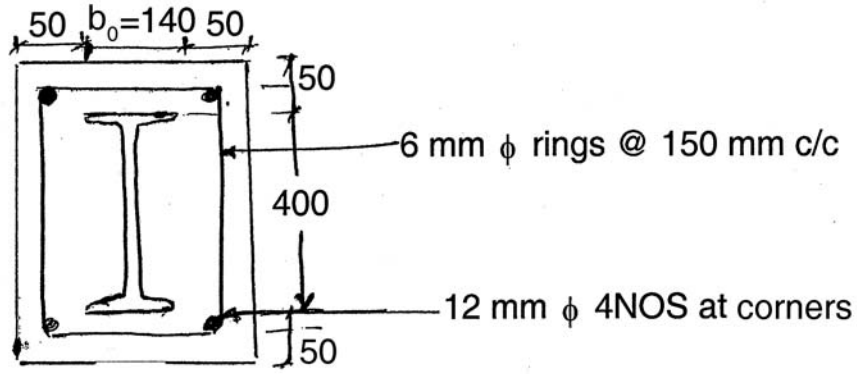

Figure 6

Set Q

SLR-EP – 430

Seat No.	

Set **R**

B.E. Civil (Part – II) (New) Examination, 2016
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1) Figures to the **right** indicates the **full** marks.*
*2) **Use** of non programmable scientific calculator is **allowed**.*
*3) **Assume** suitable data if necessary and **clearly** mention it.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*5) **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 : 20

1. Choose the correct answer :

i) The number of plastic hinges necessary to convert a framed structure in to a mechanism is **1**

a) (r – 1) b) (r + 1) c) (2r – 1) d) (2r + 1)

ii) The bending moment at a plastic hinge is **1**

a) Equal to zero
b) Equal to yield moment of the section
c) Equal to plastic moment of the section
d) Greater than the plastic moment of the section

iii) The maximum bearing stress in light gauge steel section is given by **2**

a) 1.0 Fy b) 1.2 Fy c) 2.1 Fy d) 3.1 Fy

iv) The limit state design of steel structures makes use of **1**

a) Plastic analysis of structures
b) Elastic structural analysis
c) Ultimate analysis
d) Elastic and plastic analysis

v) The approximate shape factor of thin rectangular section is **1**

a) 1.12 b) 1.5 c) 1.7 d) 1.52

P.T.O.

vi) The shape factor for triangular section is **1**

a) 1.5 b) 1.7 c) 2.34 d) 1.27

vii) The collapse load for simply supported beam subjected to central point load is **2**

a) Wc = [4Mp/L] b) Wc = [6Mp/L]

c) Wc = [8Mp/L] d) Wc = [5.5Mp/L]

e) None of the above

viii) The collapse load for fixed beam subjected to uniformly distributed load is **2**

a) Wc = [4Mp/L] b) Wc = [16Mp/L] c) Wc = [8Mp/L] d) Wc = [5.5Mp/L]

ix) Determine the shape factor of T section having flanges 140 mm×16 mm and web thickness 8.9 mm. The overall depth is 400 mm. **3**

a) 1.1488 b) 1.8844 c) 1.4848 d) 1.4188

e) None of the above

x) The effective width 'b' for a light gauge steel plate is given by **2**

a) $b = 0.9\ t(E/Fy)^{1/2}$ b) $b = 1.9\ t(E/Fy)^{1/2}$

c) $b = 2.9\ t(E/Fy)^{1/2}$ d) $b = 3.9\ t(E/Fy)^{1/2}$

xi) The ratio of plastic moment capacity to yield moment of a section is **1**

a) Less than one b) Equal to one

c) More than one d) None of the above

xii) The shape factor of a circular section is **1**

a) 1.15 b) 1.5 c) 2.34 d) 1.7

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a) $Mp \geq Mu$ b) Mp ≥ (load factor X Mu)

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a) Linear with inclination

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SLR-EP – 430

Seat No.	

B.E. Civil (Part – II) (New) Examination, 2016
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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SECTION – I

2. An open web girder bridge consists of two pratt trusses of type shown in fig. 1. The span of truss is 24m c/c of bearings. The bridge supports an equivalent uniformly distributed live load of 175 KN/m. The dead load transmitted to each truss is 15 KN/m. Draw the influence line diagrams for members U2U3, U2L3, and U3L4. And design U4L4 by assuming impact factor to be 15%. **20**

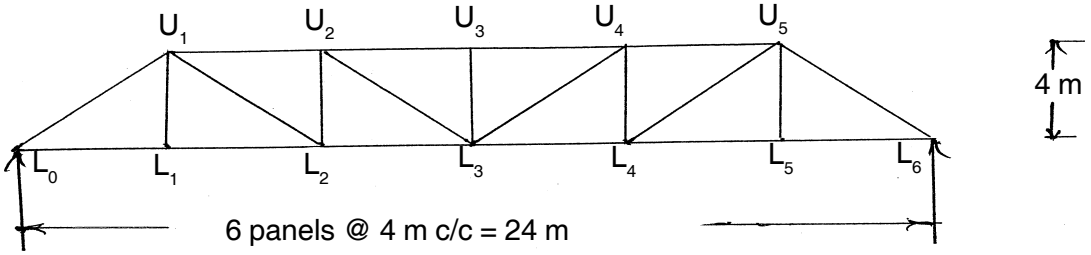

Figure 1

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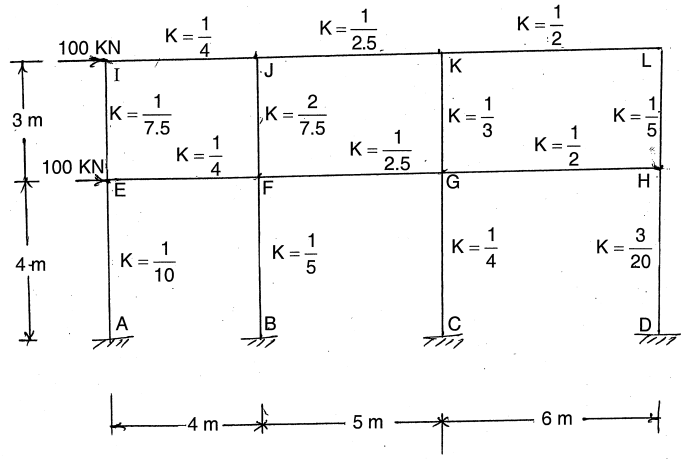
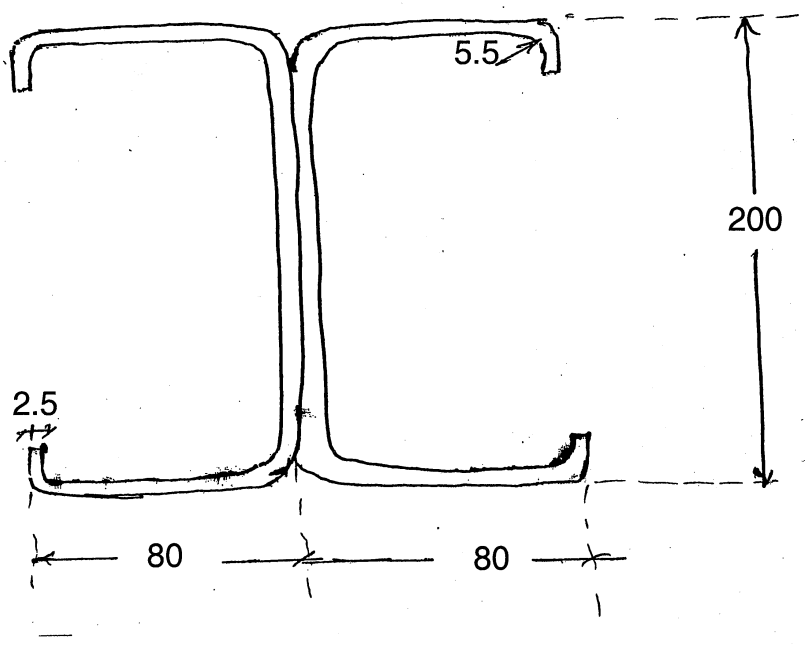


Figure 2

Set R

4. Two channels 200 mm × 80 mm run with bent lips are connected with webs to act as column as shown in fig. 3. The thickness of plate is 2.5 mm and depth of lips is 25 mm. Determine the safe load carrying capacity if the effective length of the column is 6 m. Take Fy = 235 N/mm^2 and E = 2×10^5 N/mm^2. **20**



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SECTION – II

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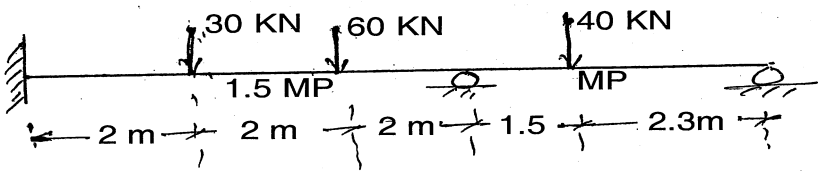

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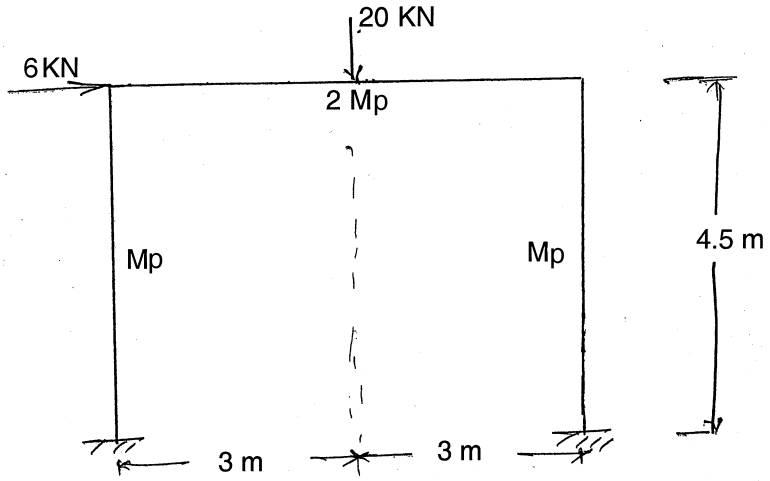

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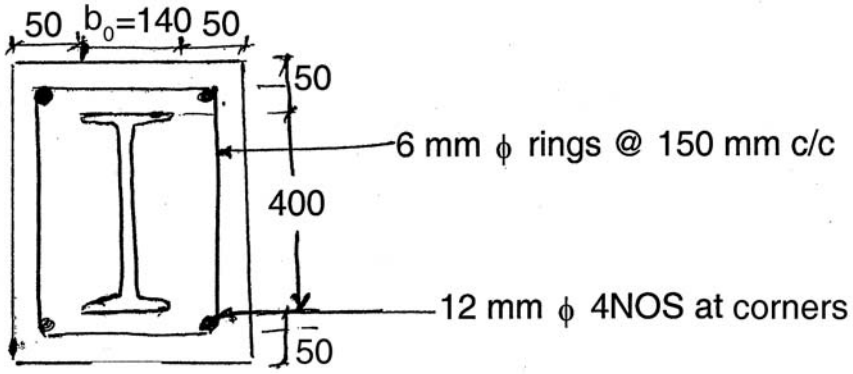

Figure 6

Set R

SLR-EP – 430

Seat No.	

Set **S**

B.E. Civil (Part – II) (New) Examination, 2016
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

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a) 1.5 b) 1.7 c) 2.34 d) 1.27

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SLR-EP – 430

Seat No.	

B.E. Civil (Part – II) (New) Examination, 2016
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
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SECTION – I

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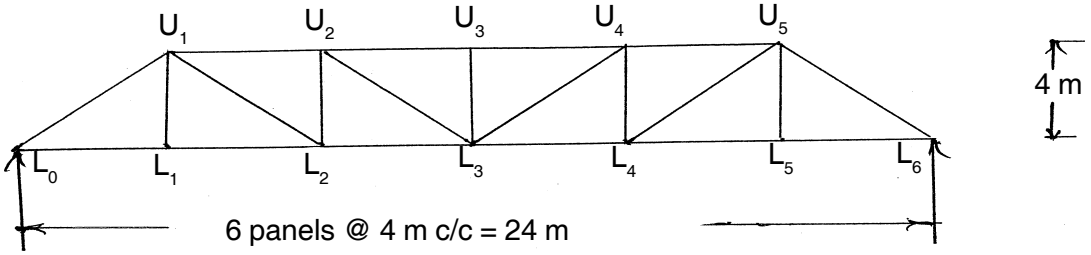

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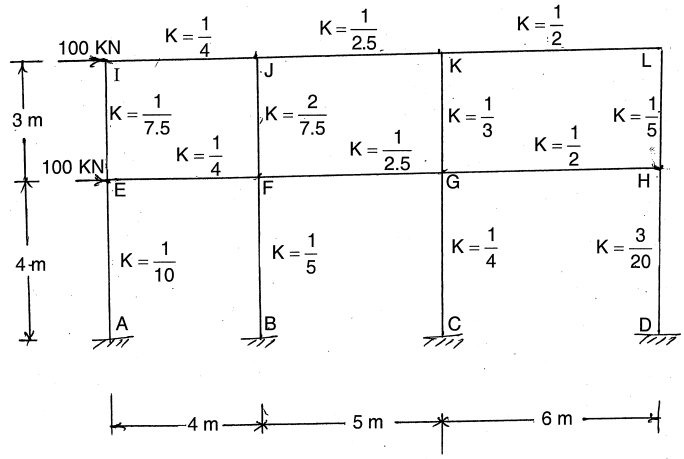

Figure 2

Set S

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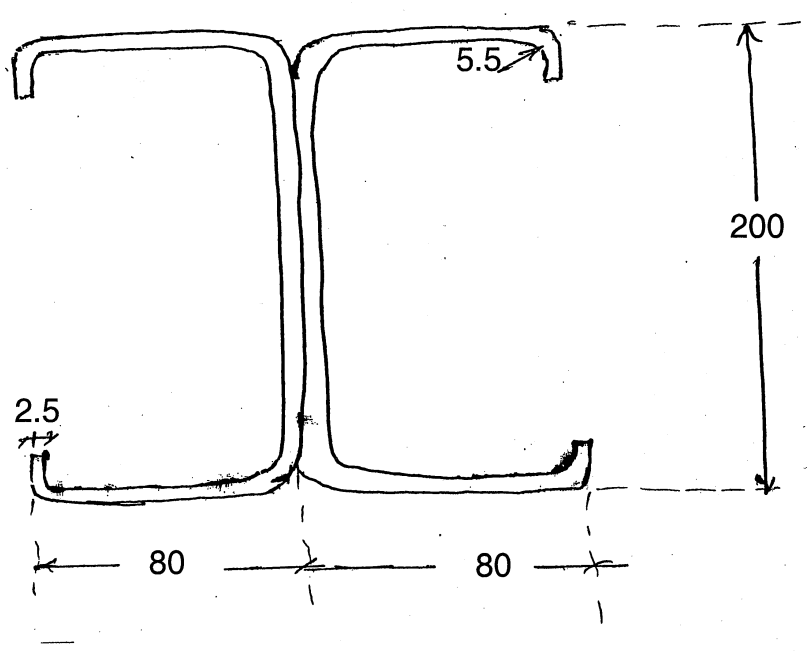

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SECTION – II

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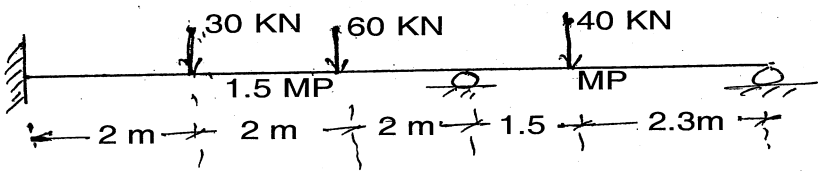

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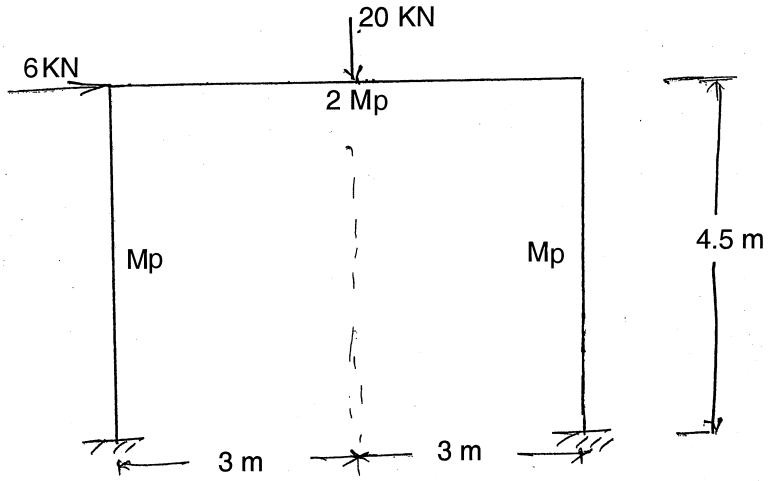

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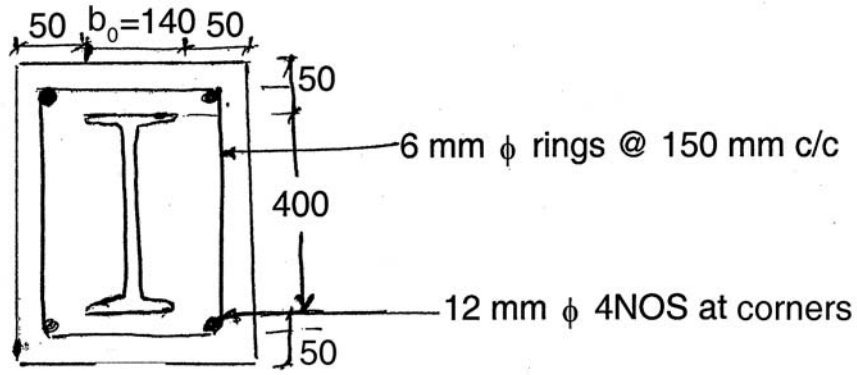

Figure 6

Set S

SLR-EP – 431

Seat No.	

Set **P**

B.E. (Civil) Part – II (New) Examination, 2016
Elective – III
INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:*
1) *Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
2) *Figures to the **right** indicate **full** marks.*
3) ***Assume** suitable data **wherever** necessary and mention it **clearly**.*
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5) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
6) ***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 : 20

1. Choose the correct option : **20**

1) In a complete mix process volumetric loading is approximately _____ that of conventional process.
a) Ten times b) Five times c) Seven times d) Three times

2) _____ reduces the volume of organic content of sludge.
a) Incineration b) Conditioning c) Digestion d) Thickening

3) The intensity of microbial activities is reflected by
a) chemical oxygen demand b) biological oxygen demand
c) dissolved oxygen d) nitrogenous oxygen demand

4) The substrate removal in trickling filters is directly related to the surface area of
a) organic loading b) recirculation
c) filter media d) effluent characteristics

5) 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

6) For the survival of fish in a river stream, the minimum dissolved oxygen is prescribed.
a) 5 ppm b) 4 ppm c) 2 ppm d) 3 ppm

7) _____ removal in aeration tank is accomplished by Chemical precipitation.
a) Phosphates b) Nitrates c) Sulphates d) Chlorides

P.T.O.

8) Addition of _____ to concentrated black liquor result in formation of green liquor.
   a) Potassium sulphate b) Calcium sulphate
   c) Chromium d) Sodium sulphate

9) The minimum recommended diameter of sewers, is
   a) 10 cm b) 20 cm c) 5 cm d) 15 cm

10) In _____ process the flow of ionic substances is initiated by providing electrical potential between two electrodes.
   a) chemical oxidation b) electrodialysis
   c) adsorption d) ion exchange

11) Addition of _____ to Kraft process results information of white liquor.
   a) Ferric chloride b) Polyelectrolyte c) Alum d) Lime

12) _____ operation is of Textile industry.
   a) Brewing b) Beater and Jordan
   c) Desizing and scouring d) Defleshing and dehairing

13) _____ is a process in which yarn is strengthened by loading starch.
   a) mercerizing b) slashing c) weaving d) carding

14) The end products of anaerobic digestion are
   a) methane and oxygen b) methane and ammonia
   c) methane and carbon dioxide d) carbon dioxide and ammonia

15) In a sugar mill the clarified juice is bleached by _____ process.
   a) Sulphitation b) Dechlorination c) Aeration d) Coagulation

16) Malt making and Brewing is one of the process of _____ Industry.
   a) pulp and paper b) distillery industry
   c) sugar industry d) dairy industry

17) In a tannery industry hides are limed with a paste of lime and
   a) hydrogen sulphide b) calcium sulphide
   c) nitrogen sulphide d) sodium sulphide

18) _____ substance deplete the oxygen content of the receiving streams.
   a) Inorganic b) Color producing
   c) Organic d) Toxic

19) Parshall flume is a convenient device for measuring _____ in sewer.
   a) velocity b) flow c) depth d) temperature

20) _____ treatment of effluent using digesters in sugar industry is effective and economical.
   a) Aerobic b) Anaerobic c) Stabilisation d) Anoxic

_____

SLR-EP – 431

Seat No.	

B.E. (Civil) Part – II (New) Examination, 2016
Elective – III
INDUSTRIAL WASTE TREATMENT

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SECTION – I

2. a) Explain in detail constituents of industrial wastewater flow. **8**

   b) Explain Theoretical oxygen demand. **6**

3. a) The wastewater flow of 75000 m^3/day with BOD_5 is 150 mg/l is discharged into river. DO of flow is 1 mg/l and the river is 90% saturated with minimum flow of 6 m^3/s and BOD_5 is 2 mg/l. Temperature of river and wastewater is 20°C. Find critical DO deficit, velocity of river water is 2.4 kmph. Given K_1 is 0.25/day and K_2 is 0.4/day and DO saturation at 20°C is 9.2 mg/l. **9**

   b) Explain in short various action involved in self purification of natural streams. **5**

4. a) Enlist the various methods of waste volume reduction. **7**

   b) Explain any one method for removal of dissolved inorganic material in wastewater. **6**

5. Write short note on :

   I) Relative stability. **6**

   II) Treatment of color removal. **7**

SECTION – II

Instruction :- Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.

6. a) Suggest the Treatment Methods for any five industries. **5**

   b) Explain with flow diagram "Massive Lime Treatment" in pulp and paper industry. **7**

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

   a) Distillery industry. **7**

   b) Dairy industry. **7**

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

   a) Pulp and paper. **7**

   b) Tannery industry. **7**

9. Write short note on : **14**

   I) Water Pollution Control Act.

   II) Effects of tannery waste on receiving stream.

SLR-EP – 431

Seat No.	

Set **Q**

B.E. (Civil) Part – II (New) Examination, 2016
Elective – III
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6) ***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 : 20

1. Choose the correct option : **20**

1) Malt making and Brewing is one of the process of _____ Industry.
   a) pulp and paper b) distillery industry
   c) sugar industry d) dairy industry

2) In a tannery industry hides are limed with a paste of lime and
   a) hydrogen sulphide b) calcium sulphide
   c) nitrogen sulphide d) sodium sulphide

3) _____ substance deplete the oxygen content of the receiving streams.
   a) Inorganic b) Color producing
   c) Organic d) Toxic

4) Parshall flume is a convenient device for measuring _____ in sewer.
   a) velocity b) flow c) depth d) temperature

5) _____ treatment of effluent using digesters in sugar industry is effective and economical.
   a) Aerobic b) Anaerobic c) Stabilisation d) Anoxic

6) In a complete mix process volumetric loading is approximately _____ that of conventional process.
   a) Ten times b) Five times c) Seven times d) Three times

7) _____ reduces the volume of organic content of sludge.
   a) Incineration b) Conditioning c) Digestion d) Thickening

P.T.O.

8) The intensity of microbial activities is reflected by
   a) chemical oxygen demand b) biological oxygen demand
   c) dissolved oxygen d) nitrogenous oxygen demand

9) The substrate removal in trickling filters is directly related to the surface area of
   a) organic loading b) recirculation
   c) filter media d) effluent characteristics

10) 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

11) For the survival of fish in a river stream, the minimum dissolved oxygen is prescribed
   a) 5 ppm b) 4 ppm c) 2 ppm d) 3 ppm

12) _____ removal in aeration tank is accomplished by Chemical precipitation.
   a) Phosphates b) Nitrates c) Sulphates d) Chlorides

13) Addition of _____ to concentrated black liquor result in formation of green liquor.
   a) Potassium sulphate b) Calcium sulphate
   c) Chromium d) Sodium sulphate

14) The minimum recommended diameter of sewers, is
   a) 10 cm b) 20 cm c) 5 cm d) 15 cm

15) In _____ process the flow of ionic substances is initiated by providing electrical potential between two electrodes.
   a) chemical oxidation b) electrodialysis
   c) adsorption d) ion exchange

16) Addition of _____ to Kraft process results information of white liquor.
   a) Ferric chloride b) Polyelectrolyte c) Alum d) Lime

17) _____ operation is of Textile industry.
   a) Brewing b) Beater and Jordan
   c) Desizing and scouring d) Defleshing and dehairing

18) _____ is a process in which yarn is strengthened by loading starch.
   a) mercerizing b) slashing c) weaving d) carding

19) The end products of anaerobic digestion are
   a) methane and oxygen b) methane and ammonia
   c) methane and carbon dioxide d) carbon dioxide and ammonia

20) In a sugar mill the clarified juice is bleached by _____ process.
   a) Sulphitation b) Dechlorination c) Aeration d) Coagulation

_____

SLR-EP – 431

Seat No.	

B.E. (Civil) Part – II (New) Examination, 2016
Elective – III
INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
*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**.*

SECTION – I

2. a) Explain in detail constituents of industrial wastewater flow. **8**

   b) Explain Theoretical oxygen demand. **6**

3. a) The wastewater flow of 75000 m^3/day with BOD_5 is 150 mg/l is discharged into river. DO of flow is 1 mg/l and the river is 90% saturated with minimum flow of 6 m^3/s and BOD_5 is 2 mg/l. Temperature of river and wastewater is 20°C. Find critical DO deficit, velocity of river water is 2.4 kmph. Given K_1 is 0.25/day and K_2 is 0.4/day and DO saturation at 20°C is 9.2 mg/l. **9**

   b) Explain in short various action involved in self purification of natural streams. **5**

4. a) Enlist the various methods of waste volume reduction. **7**

   b) Explain any one method for removal of dissolved inorganic material in wastewater. **6**

5. Write short note on :

   I) Relative stability. **6**

   II) Treatment of color removal. **7**

SECTION – II

Instruction :- Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.

6. a) Suggest the Treatment Methods for any five industries. **5**

   b) Explain with flow diagram "Massive Lime Treatment" in pulp and paper industry. **7**

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

   a) Distillery industry. **7**

   b) Dairy industry. **7**

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

   a) Pulp and paper. **7**

   b) Tannery industry. **7**

9. Write short note on : **14**

   I) Water Pollution Control Act.

   II) Effects of tannery waste on receiving stream.

SLR-EP – 431

Seat No.	

Set **R**

B.E. (Civil) Part – II (New) Examination, 2016
Elective – III
INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:*
1) *Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
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3) ***Assume** suitable data **wherever** necessary and mention it **clearly**.*
4) *Use of non programmable calculator is **allowed**.*
5) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
6) ***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 : 20

1. Choose the correct option : **20**

1) Addition of _____ to Kraft process results information of white liquor.
a) Ferric chloride b) Polyelectrolyte c) Alum d) Lime

2) _____ operation is of Textile industry.
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c) Desizing and scouring d) Defleshing and dehairing

3) _____ is a process in which yarn is strengthened by loading starch.
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4) The end products of anaerobic digestion are
a) methane and oxygen b) methane and ammonia
c) methane and carbon dioxide d) carbon dioxide and ammonia

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7) In a tannery industry hides are limed with a paste of lime and
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P.T.O.

8) _____ substance deplete the oxygen content of the receiving streams.
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   c) Organic d) Toxic

9) Parshall flume is a convenient device for measuring _____ in sewer.
   a) velocity b) flow c) depth d) temperature

10) _____ treatment of effluent using digesters in sugar industry is effective and economical.
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11) In a complete mix process volumetric loading is approximately _____ that of conventional process.
   a) Ten times b) Five times c) Seven times d) Three times

12) _____ reduces the volume of organic content of sludge.
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13) The intensity of microbial activities is reflected by
   a) chemical oxygen demand b) biological oxygen demand
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14) The substrate removal in trickling filters is directly related to the surface area of
   a) organic loading b) recirculation
   c) filter media d) effluent characteristics

15) For a conventional sludge digesters detention period of _____ is provided.
   a) 20 to 30 minutes b) 30 to 90 days
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16) For the survival of fish in a river stream, the minimum dissolved oxygen is prescribed
   a) 5 ppm b) 4 ppm c) 2 ppm d) 3 ppm

17) _____ removal in aeration tank is accomplished by Chemical precipitation.
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18) Addition of _____ to concentrated black liquor result in formation of green liquor.
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19) The minimum recommended diameter of sewers, is
   a) 10 cm b) 20 cm c) 5 cm d) 15 cm

20) In _____ process the flow of ionic substances is initiated by providing electrical potential between two electrodes.
   a) chemical oxidation b) electrodialysis
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_____

SLR-EP – 431

Seat No.	

B.E. (Civil) Part – II (New) Examination, 2016
Elective – III
INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
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SECTION – I

2. a) Explain in detail constituents of industrial wastewater flow. **8**

   b) Explain Theoretical oxygen demand. **6**

3. a) The wastewater flow of 75000 m^3/day with BOD_5 is 150 mg/l is discharged into river. DO of flow is 1 mg/l and the river is 90% saturated with minimum flow of 6 m^3/s and BOD_5 is 2 mg/l. Temperature of river and wastewater is 20°C. Find critical DO deficit, velocity of river water is 2.4 kmph. Given K_1 is 0.25/day and K_2 is 0.4/day and DO saturation at 20°C is 9.2 mg/l. **9**

   b) Explain in short various action involved in self purification of natural streams. **5**

4. a) Enlist the various methods of waste volume reduction. **7**

   b) Explain any one method for removal of dissolved inorganic material in wastewater. **6**

5. Write short note on :

   I) Relative stability. **6**

   II) Treatment of color removal. **7**

SECTION – II

Instruction :- Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.

6. a) Suggest the Treatment Methods for any five industries. **5**

   b) Explain with flow diagram "Massive Lime Treatment" in pulp and paper industry. **7**

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

   a) Distillery industry. **7**

   b) Dairy industry. **7**

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

   a) Pulp and paper. **7**

   b) Tannery industry. **7**

9. Write short note on : **14**

   I) Water Pollution Control Act.

   II) Effects of tannery waste on receiving stream.

SLR-EP – 431

Seat No.	

Set **S**

B.E. (Civil) Part – II (New) Examination, 2016
Elective – III
INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:*
1) *Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct option : **20**

1) For the survival of fish in a river stream, the minimum dissolved oxygen is prescribed
a) 5 ppm b) 4 ppm c) 2 ppm d) 3 ppm

2) _____ removal in aeration tank is accomplished by Chemical precipitation.
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P.T.O.

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20) For a conventional sludge digesters detention period of _____ is provided.
a) 20 to 30 minutes b) 30 to 90 days
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_____

SLR-EP – 431

Seat No.	

B.E. (Civil) Part – II (New) Examination, 2016
Elective – III
INDUSTRIAL WASTE TREATMENT

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Solve **any three** questions from Section – **I** i.e. Question no. **2** to Question no. **5**. Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.*
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*3) **Assume** suitable data **wherever** necessary and mention it **clearly**.*
*4) Use of non programmable calculator is **allowed**.*

SECTION – I

2. a) Explain in detail constituents of industrial wastewater flow. **8**

   b) Explain Theoretical oxygen demand. **6**

3. a) The wastewater flow of 75000 m^3/day with BOD_5 is 150 mg/l is discharged into river. DO of flow is 1 mg/l and the river is 90% saturated with minimum flow of 6 m^3/s and BOD_5 is 2 mg/l. Temperature of river and wastewater is 20°C. Find critical DO deficit, velocity of river water is 2.4 kmph. Given K_1 is 0.25/day and K_2 is 0.4/day and DO saturation at 20°C is 9.2 mg/l. **9**

   b) Explain in short various action involved in self purification of natural streams. **5**

4. a) Enlist the various methods of waste volume reduction. **7**

   b) Explain any one method for removal of dissolved inorganic material in wastewater. **6**

5. Write short note on :

   I) Relative stability. **6**

   II) Treatment of color removal. **7**

SECTION – II

Instruction :- Question no. **6** is **compulsory** in Section – **II** and solve **any two** questions from the remaining.

6. a) Suggest the Treatment Methods for any five industries. **5**

   b) Explain with flow diagram "Massive Lime Treatment" in pulp and paper industry. **7**

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

   a) Distillery industry. **7**

   b) Dairy industry. **7**

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

   a) Pulp and paper. **7**

   b) Tannery industry. **7**

9. Write short note on : **14**

   I) Water Pollution Control Act.

   II) Effects of tannery waste on receiving stream.

SLR-EP – 432

Seat No.	

Set **P**

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : WATER POWER ENGINEERING (New)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) *Draw neat sketches* ***wherever*** *necessary.*
4) *Assume suitable data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Power plant having maximum demand more than the installed rated cpacity will have utilisation factor
   a) equal to unity b) more than unity c) less than unity d) none
2) Demand factor is defined as
   a) average load/maximum load b) connected load/maximum demand
   c) maximum demand/connected load d) average load and maximum load
3) Load factor for a power system serving highly industrial area Vis-a-vis residential area is
   a) High b) Low c) Equal d) None
4) A nuclear power plant is invariably used as a
   a) Base load plant b) Peak load plant
   c) Stand by plant d) None
5) Pelton wheel turbine is a
   a) Low head turbine b) Medium head turbine
   c) High head turbine d) None
6) Minimum pressure occurs in full flowing power tunnel at the time of
   a) load rejection b) load acceptance
   c) head race d) tail race
7) With reference to a power station which of the following cost is not a fixed cost
   a) Insurance charges b) Interest on capital
   c) Fuel cost d) Depreciation
8) 'Water Hammer' process in penstock results in
   a) pressure decreases
   b) noise decreases
   c) noise increases, pressure increases, velocity decreases
   d) none

P.T.O.

9) Surge tank necessarily provided in
   a) long penstocks b) short length penstocks
   c) surface penstocks d) embedded penstocks

10) Pump storage schemes are used to improve
   a) load factor
   b) power factor
   c) plant capacity factor as well as load factor
   d) delivery factor

11) Which turbine is suited for pumped storage plant ?
   a) Francis b) Pelton c) Kaplan d) Impeller

12) Deflections are provided in
   a) Kaplan turbine b) Pelton wheel
   c) Propeller turbine d) Francis turbine

13) Alternate formation and breakage of bubbles called
   a) Cavitation b) Water hammering
   c) Surgification d) All

14) Storage requirement can be determined from
   a) Flow duration curve b) Hydrograph
   c) Mass-curve d) None

15) 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

16) In High head hydroelectric power plant, the velocity of water flow in penstock is around
   a) 2 m/s b) 4 m/s c) 8 m/s d) 10 m/s

17) The capacity of small hydro power plants are in order of
   a) 20 – 50 mw b) 15 – 100 mw
   c) 1 – 15 mw d) 15 – 20 mw

18) Unit of power in a turbine is
   a) $P/\sqrt{H}$ b) $P/H^{3/2}$ c) P/H d) $P/H^{3/4}$

19) Gross head minus Head loss in penstock is
   a) Effective Head b) Reduced Head
   c) Alternative Head d) None

20) When a gate valve, installed in a pressure pipe is suddenly closed, water hammer pressure is caused on the pipe shell in the portion
   a) down stream of the valve b) up stream of the valve
   c) both a) & b) d) none

———————

SLR-EP – 432

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : WATER POWER ENGINEERING (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any three** question from Section **I** (Que. No. **2** to Que. No. **5**).*
*2) Solve **any three** question from Section **II** (Que. No. **6** to Que. No. **9**).*
*3) Draw neat sketches **wherever** necessary.*
*4) Assume suitable data **wherever** necessary.*

SECTION – I

2. a) What are the principal components of a 'Hydro-electric' scheme ? Discuss the utility of each component. **7**

   b) What do you understand by non-conventional sources of power generation ? What is the scope of these sources in India ? **7**

3. a) Define hydrograph and explain its importance in the design of storage tupe hydroelectric power plant also explain the effect of time unit on the storage capacity of the catchment area required. **6**

   b) When a run of river plant operates as a peak load station with a weekly load factor of 20%, 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 station. It is given that,

   Installed capacity of generator = 10,000 kW.

   Operating head = 15 m

   Plant efficiency = 80%, estimate the daily load factor of the plant if the stream flow is 20 cumecs. **7**

4. a) What do you understand by 'Water Hammer' in pipe line ? Derive an expression for the water hammer pressure in case of rigid pipe. **6**

   b) A closed cycle P-S plant, with gross head of 350 m has a head race tunnel 4 m diameter and 700 m long. The flow velocity is 6.5 m/s and friction factor f = 0.018. If the overall efficiencies of pumping and generations are 85% and 88% respectively. Calculate the plant efficiency. **7**

5. a) What is meant by economic diameter of penstock ? How it can be found ? **6**

   b) What are the functions of 'surge tank' ? Describe with neat sketches, the various tupes of surge tank. **7**

SECTION – II

6. a) Discuss the differences between Pelton wheel, Francis turbine and Kaplan turbines and state tupes of power plants they are suitable for. **7**

   b) The following data refers to a proposed hydroelectric power plant, available head = 27 m, catchment area = 440 km^2.

   Rainfall = 150 cm/yr, % of total rainfall utilized = 65%, turbine efficiency 80%, penstock efficiency 86%, generator efficiency 84% load factor 0.45. Calculate the power that can be developed suggest suitable turbine for the plant. **7**

7. a) How will you classify 'pumped storage power development' ? How does it differ from conventional hydropower development ? **6**

   b) A pelton wheel has to be designed for the following specifications power to be developed = 6000 kW, Net head available = 300 m speed = 550 rpm, ratio of Jet diameter to wheel diameter = $\frac{1}{10}$ Hydraulic efficiency = 0.85, assume CV = 0.98, speed ratio = 0.46 find ,

   I) no. of Jet

   II) diameter of wheel

   III) diameter of Jet

   IV) quantity of water required. **7**

8. a) What do you understand by tail race channel ? Discuss the position and working of tail race channel with respect to draft tube. **6**

   b) What topographical features are in favour of adopting underground power plant ? What are the different tupes of underground power stations ? Draw neat layout. **7**

9. a) What are the different types of draft tubes ? Sketch the different types of draft tubes and state which one of them gives maximum efficiency. **6**

   b) Describe how ocean tides are generated ? With tidal cycle in view describe how hydropower can be generated ? Also state the limitations of tidal power generation. **7**

SLR-EP – 432

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : WATER POWER ENGINEERING (New)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) In High head hydroelectric power plant, the velocity of water flow in penstock is around
   a) 2 m/s b) 4 m/s c) 8 m/s d) 10 m/s
2) The capacity of small hydro power plants are in order of
   a) 20 – 50 mw b) 15 – 100 mw
   c) 1 – 15 mw d) 15 – 20 mw
3) Unit of power in a turbine is
   a) $P/\sqrt{H}$ b) $P/H^{3/2}$ c) P/H d) $P/H^{3/4}$
4) Gross head minus Head loss in penstock is
   a) Effective Head b) Reduced Head
   c) Alternative Head d) None
5) When a gate valve, installed in a pressure pipe is suddenly closed, water hammer pressure is caused on the pipe shell in the portion
   a) down stream of the valve b) up stream of the valve
   c) both a) & b) d) none
6) Power plant having maximum demand more than the installed rated cpacity will have utilisation factor
   a) equal to unity b) more than unity c) less than unity d) none
7) Demand factor is defined as
   a) average load/maximum load b) connected load/maximum demand
   c) maximum demand/connected load d) average load and maximum load
8) Load factor for a power system serving highly industrial area Vis-a-vis residential area is
   a) High b) Low c) Equal d) None

P.T.O.

9) A nuclear power plant is invariably used as a
   a) Base load plant b) Peak load plant
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10) Pelton wheel turbine is a
   a) Low head turbine b) Medium head turbine
   c) High head turbine d) None

11) Minimum pressure occurs in full flowing power tunnel at the time of
   a) load rejection b) load acceptance
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12) With reference to a power station which of the following cost is not a fixed cost
   a) Insurance charges b) Interest on capital
   c) Fuel cost d) Depreciation

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   a) pressure decreases
   b) noise decreases
   c) noise increases, pressure increases, velocity decreases
   d) none

14) Surge tank necessarily provided in
   a) long penstocks b) short length penstocks
   c) surface penstocks d) embedded penstocks

15) Pump storage schemes are used to improve
   a) load factor
   b) power factor
   c) plant capacity factor as well as load factor
   d) delivery factor

16) Which turbine is suited for pumped storage plant ?
   a) Francis b) Pelton c) Kaplan d) Impeller

17) Deflections are provided in
   a) Kaplan turbine b) Pelton wheel
   c) Propeller turbine d) Francis turbine

18) Alternate formation and breakage of bubbles called
   a) Cavitation b) Water hammering
   c) Surgification d) All

19) Storage requirement can be determined from
   a) Flow duration curve b) Hydrograph
   c) Mass-curve d) None

20) 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

SLR-EP – 432

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : WATER POWER ENGINEERING (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:* 1) *Solve* ***any three*** *question from Section* ***I*** *(Que. No.* ***2*** *to Que. No.* ***5****).*
2) *Solve* ***any three*** *question from Section* ***II*** *(Que. No.* ***6*** *to Que. No.* ***9****).*
3) *Draw neat sketches* ***wherever*** *necessary.*
4) *Assume suitable data* ***wherever*** *necessary.*

SECTION – I

2. a) What are the principal components of a 'Hydro-electric' scheme ? Discuss the utility of each component. **7**

   b) What do you understand by non-conventional sources of power generation ? What is the scope of these sources in India ? **7**

3. a) Define hydrograph and explain its importance in the design of storage tupe hydroelectric power plant also explain the effect of time unit on the storage capacity of the catchment area required. **6**

   b) When a run of river plant operates as a peak load station with a weekly load factor of 20%, 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 station. It is given that,

   Installed capacity of generator = 10,000 kW.

   Operating head = 15 m

   Plant efficiency = 80%, estimate the daily load factor of the plant if the stream flow is 20 cumecs. **7**

4. a) What do you understand by 'Water Hammer' in pipe line ? Derive an expression for the water hammer pressure in case of rigid pipe. **6**

   b) A closed cycle P-S plant, with gross head of 350 m has a head race tunnel 4 m diameter and 700 m long. The flow velocity is 6.5 m/s and friction factor f = 0.018. If the overall efficiencies of pumping and generations are 85% and 88% respectively. Calculate the plant efficiency. **7**

5. a) What is meant by economic diameter of penstock ? How it can be found ? **6**

   b) What are the functions of 'surge tank' ? Describe with neat sketches, the various tupes of surge tank. **7**

Set Q

SECTION – II

6. a) Discuss the differences between Pelton wheel, Francis turbine and Kaplan turbines and state tupes of power plants they are suitable for. **7**

   b) The following data refers to a proposed hydroelectric power plant, available head = 27 m, catchment area = 440 km^2.

   Rainfall = 150 cm/yr, % of total rainfall utilized = 65%, turbine efficiency 80%, penstock efficiency 86%, generator efficiency 84% load factor 0.45. Calculate the power that can be developed suggest suitable turbine for the plant. **7**

7. a) How will you classify 'pumped storage power development' ? How does it differ from conventional hydropower development ? **6**

   b) A pelton wheel has to be designed for the following specifications power to be developed = 6000 kW, Net head available = 300 m speed = 550 rpm, ratio of Jet diameter to wheel diameter = $\frac{1}{10}$ Hydraulic efficiency = 0.85, assume CV = 0.98, speed ratio = 0.46 find ,

   I) no. of Jet

   II) diameter of wheel

   III) diameter of Jet

   IV) quantity of water required. **7**

8. a) What do you understand by tail race channel ? Discuss the position and working of tail race channel with respect to draft tube. **6**

   b) What topographical features are in favour of adopting underground power plant ? What are the different tupes of underground power stations ? Draw neat layout. **7**

9. a) What are the different types of draft tubes ? Sketch the different types of draft tubes and state which one of them gives maximum efficiency. **6**

   b) Describe how ocean tides are generated ? With tidal cycle in view describe how hydropower can be generated ? Also state the limitations of tidal power generation. **7**

SLR-EP – 432

Seat No.	

Set **R**

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : WATER POWER ENGINEERING (New)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) *Draw neat sketches* ***wherever*** *necessary.*
4) *Assume suitable data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Which turbine is suited for pumped storage plant ?
   a) Francis b) Pelton c) Kaplan d) Impeller

2) Deflections are provided in
   a) Kaplan turbine b) Pelton wheel
   c) Propeller turbine d) Francis turbine

3) Alternate formation and breakage of bubbles called
   a) Cavitation b) Water hammering
   c) Surgification d) All

4) Storage requirement can be determined from
   a) Flow duration curve b) Hydrograph
   c) Mass-curve d) None

5) 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

6) In High head hydroelectric power plant, the velocity of water flow in penstock is around
   a) 2 m/s b) 4 m/s c) 8 m/s d) 10 m/s

7) The capacity of small hydro power plants are in order of
   a) 20 – 50 mw b) 15 – 100 mw
   c) 1 – 15 mw d) 15 – 20 mw

8) Unit of power in a turbine is
   a) $P/\sqrt{H}$ b) $P/H^{3/2}$ c) P/H d) $P/H^{3/4}$

P.T.O.

9) Gross head minus Head loss in penstock is
   a) Effective Head b) Reduced Head
   c) Alternative Head d) None

10) When a gate valve, installed in a pressure pipe is suddenly closed, water hammer pressure is caused on the pipe shell in the portion
   a) down stream of the valve b) up stream of the valve
   c) both a) & b) d) none

11) Power plant having maximum demand more than the installed rated cpacity will have utilisation factor
   a) equal to unity b) more than unity c) less than unity d) none

12) Demand factor is defined as
   a) average load/maximum load b) connected load/maximum demand
   c) maximum demand/connected load d) average load and maximum load

13) Load factor for a power system serving highly industrial area Vis-a-vis residential area is
   a) High b) Low c) Equal d) None

14) A nuclear power plant is invariably used as a
   a) Base load plant b) Peak load plant
   c) Stand by plant d) None

15) Pelton wheel turbine is a
   a) Low head turbine b) Medium head turbine
   c) High head turbine d) None

16) Minimum pressure occurs in full flowing power tunnel at the time of
   a) load rejection b) load acceptance
   c) head race d) tail race

17) With reference to a power station which of the following cost is not a fixed cost
   a) Insurance charges b) Interest on capital
   c) Fuel cost d) Depreciation

18) 'Water Hammer' process in penstock results in
   a) pressure decreases
   b) noise decreases
   c) noise increases, pressure increases, velocity decreases
   d) none

19) Surge tank necessarily provided in
   a) long penstocks b) short length penstocks
   c) surface penstocks d) embedded penstocks

20) Pump storage schemes are used to improve
   a) load factor
   b) power factor
   c) plant capacity factor as well as load factor
   d) delivery factor

SLR-EP – 432

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : WATER POWER ENGINEERING (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any three** question from Section **I** (Que. No. **2** to Que. No. **5**).*
*2) Solve **any three** question from Section **II** (Que. No. **6** to Que. No. **9**).*
*3) Draw neat sketches **wherever** necessary.*
*4) Assume suitable data **wherever** necessary.*

SECTION – I

2. a) What are the principal components of a 'Hydro-electric' scheme ? Discuss the utility of each component. **7**

   b) What do you understand by non-conventional sources of power generation ? What is the scope of these sources in India ? **7**

3. a) Define hydrograph and explain its importance in the design of storage tupe hydroelectric power plant also explain the effect of time unit on the storage capacity of the catchment area required. **6**

   b) When a run of river plant operates as a peak load station with a weekly load factor of 20%, 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 station. It is given that,

   Installed capacity of generator = 10,000 kW.

   Operating head = 15 m

   Plant efficiency = 80%, estimate the daily load factor of the plant if the stream flow is 20 cumecs. **7**

4. a) What do you understand by 'Water Hammer' in pipe line ? Derive an expression for the water hammer pressure in case of rigid pipe. **6**

   b) A closed cycle P-S plant, with gross head of 350 m has a head race tunnel 4 m diameter and 700 m long. The flow velocity is 6.5 m/s and friction factor f = 0.018. If the overall efficiencies of pumping and generations are 85% and 88% respectively. Calculate the plant efficiency. **7**

5. a) What is meant by economic diameter of penstock ? How it can be found ? **6**

   b) What are the functions of 'surge tank' ? Describe with neat sketches, the various tupes of surge tank. **7**

SECTION – II

6. a) Discuss the differences between Pelton wheel, Francis turbine and Kaplan turbines and state tupes of power plants they are suitable for. **7**

   b) The following data refers to a proposed hydroelectric power plant, available head = 27 m, catchment area = 440 km^2.

   Rainfall = 150 cm/yr, % of total rainfall utilized = 65%, turbine efficiency 80%, penstock efficiency 86%, generator efficiency 84% load factor 0.45. Calculate the power that can be developed suggest suitable turbine for the plant. **7**

7. a) How will you classify 'pumped storage power development' ? How does it differ from conventional hydropower development ? **6**

   b) A pelton wheel has to be designed for the following specifications power to be developed = 6000 kW, Net head available = 300 m speed = 550 rpm, ratio of Jet diameter to wheel diameter = $\frac{1}{10}$ Hydraulic efficiency = 0.85, assume CV = 0.98, speed ratio = 0.46 find ,

   I) no. of Jet

   II) diameter of wheel

   III) diameter of Jet

   IV) quantity of water required. **7**

8. a) What do you understand by tail race channel ? Discuss the position and working of tail race channel with respect to draft tube. **6**

   b) What topographical features are in favour of adopting underground power plant ? What are the different tupes of underground power stations ? Draw neat layout. **7**

9. a) What are the different types of draft tubes ? Sketch the different types of draft tubes and state which one of them gives maximum efficiency. **6**

   b) Describe how ocean tides are generated ? With tidal cycle in view describe how hydropower can be generated ? Also state the limitations of tidal power generation. **7**

SLR-EP – 432

Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : WATER POWER ENGINEERING (New)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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.***
3) *Draw neat sketches* ***wherever*** *necessary.*
4) *Assume suitable data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Minimum pressure occurs in full flowing power tunnel at the time of
   a) load rejection b) load acceptance
   c) head race d) tail race

2) With reference to a power station which of the following cost is not a fixed cost
   a) Insurance charges b) Interest on capital
   c) Fuel cost d) Depreciation

3) 'Water Hammer' process in penstock results in
   a) pressure decreases
   b) noise decreases
   c) noise increases, pressure increases, velocity decreases
   d) none

4) Surge tank necessarily provided in
   a) long penstocks b) short length penstocks
   c) surface penstocks d) embedded penstocks

5) Pump storage schemes are used to improve
   a) load factor
   b) power factor
   c) plant capacity factor as well as load factor
   d) delivery factor

6) Which turbine is suited for pumped storage plant ?
   a) Francis b) Pelton c) Kaplan d) Impeller

7) Deflections are provided in
   a) Kaplan turbine b) Pelton wheel
   c) Propeller turbine d) Francis turbine

P.T.O.

8) Alternate formation and breakage of bubbles called
   a) Cavitation b) Water hammering
   c) Surgification d) All

9) Storage requirement can be determined from
   a) Flow duration curve b) Hydrograph
   c) Mass-curve d) None

10) 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

11) In High head hydroelectric power plant, the velocity of water flow in penstock is around
   a) 2 m/s b) 4 m/s c) 8 m/s d) 10 m/s

12) The capacity of small hydro power plants are in order of
   a) 20 – 50 mw b) 15 – 100 mw
   c) 1 – 15 mw d) 15 – 20 mw

13) Unit of power in a turbine is
   a) $P/\sqrt{H}$ b) $P/H^{3/2}$ c) P/H d) $P/H^{3/4}$

14) Gross head minus Head loss in penstock is
   a) Effective Head b) Reduced Head
   c) Alternative Head d) None

15) When a gate valve, installed in a pressure pipe is suddenly closed, water hammer pressure is caused on the pipe shell in the portion
   a) down stream of the valve b) up stream of the valve
   c) both a) & b) d) none

16) Power plant having maximum demand more than the installed rated cpacity will have utilisation factor
   a) equal to unity b) more than unity c) less than unity d) none

17) Demand factor is defined as
   a) average load/maximum load b) connected load/maximum demand
   c) maximum demand/connected load d) average load and maximum load

18) Load factor for a power system serving highly industrial area Vis-a-vis residential area is
   a) High b) Low c) Equal d) None

19) A nuclear power plant is invariably used as a
   a) Base load plant b) Peak load plant
   c) Stand by plant d) None

20) Pelton wheel turbine is a
   a) Low head turbine b) Medium head turbine
   c) High head turbine d) None

SLR-EP – 432

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : WATER POWER ENGINEERING (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any three** question from Section **I** (Que. No. **2** to Que. No. **5**).*
*2) Solve **any three** question from Section **II** (Que. No. **6** to Que. No. **9**).*
*3) Draw neat sketches **wherever** necessary.*
*4) Assume suitable data **wherever** necessary.*

SECTION – I

2. a) What are the principal components of a 'Hydro-electric' scheme ? Discuss the utility of each component. **7**

   b) What do you understand by non-conventional sources of power generation ? What is the scope of these sources in India ? **7**

3. a) Define hydrograph and explain its importance in the design of storage tupe hydroelectric power plant also explain the effect of time unit on the storage capacity of the catchment area required. **6**

   b) When a run of river plant operates as a peak load station with a weekly load factor of 20%, 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 station. It is given that,

   Installed capacity of generator = 10,000 kW.

   Operating head = 15 m

   Plant efficiency = 80%, estimate the daily load factor of the plant if the stream flow is 20 cumecs. **7**

4. a) What do you understand by 'Water Hammer' in pipe line ? Derive an expression for the water hammer pressure in case of rigid pipe. **6**

   b) A closed cycle P-S plant, with gross head of 350 m has a head race tunnel 4 m diameter and 700 m long. The flow velocity is 6.5 m/s and friction factor f = 0.018. If the overall efficiencies of pumping and generations are 85% and 88% respectively. Calculate the plant efficiency. **7**

5. a) What is meant by economic diameter of penstock ? How it can be found ? **6**

   b) What are the functions of 'surge tank' ? Describe with neat sketches, the various tupes of surge tank. **7**

SECTION – II

6. a) Discuss the differences between Pelton wheel, Francis turbine and Kaplan turbines and state tupes of power plants they are suitable for. **7**

   b) The following data refers to a proposed hydroelectric power plant, available head = 27 m, catchment area = 440 km^2.

   Rainfall = 150 cm/yr, % of total rainfall utilized = 65%, turbine efficiency 80%, penstock efficiency 86%, generator efficiency 84% load factor 0.45. Calculate the power that can be developed suggest suitable turbine for the plant. **7**

7. a) How will you classify 'pumped storage power development' ? How does it differ from conventional hydropower development ? **6**

   b) A pelton wheel has to be designed for the following specifications power to be developed = 6000 kW, Net head available = 300 m speed = 550 rpm, ratio of Jet diameter to wheel diameter = $\frac{1}{10}$ Hydraulic efficiency = 0.85, assume CV = 0.98, speed ratio = 0.46 find ,

   I) no. of Jet

   II) diameter of wheel

   III) diameter of Jet

   IV) quantity of water required. **7**

8. a) What do you understand by tail race channel ? Discuss the position and working of tail race channel with respect to draft tube. **6**

   b) What topographical features are in favour of adopting underground power plant ? What are the different tupes of underground power stations ? Draw neat layout. **7**

9. a) What are the different types of draft tubes ? Sketch the different types of draft tubes and state which one of them gives maximum efficiency. **6**

   b) Describe how ocean tides are generated ? With tidal cycle in view describe how hydropower can be generated ? Also state the limitations of tidal power generation. **7**

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Seat No.	

Set P

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : ADVANCED CONCRETE TECHNOLOGY (New)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **2** 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 : 20

1. Choose the correct answer : **(10×2=20)**

1) The fineness modulus
   a) Is a numerical index of fineness
   b) Give some idea of the mean size of particles present in the entire body of the aggregate
   c) Is a sum of the cumulative percentage retained on the set of specified sieves divided by 100
   d) Is regarded as weighted average size of sieve on which material is retained

2) Grading of aggregate
   a) Affects the workability
   b) Affects the strength of concrete
   c) Affects the w/c ratio
   d) All the above is true

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

4) A compacting factor of 0.88 for a fresh concrete sample indicates a mix of
   a) High workability b) Medium workability
   c) Low workability d) Very low workability

P.T.O.

5) The porosity of concrete depends largely upon
   a) Cement content
   b) Grading of aggregate
   c) Quantity of mixing water
   d) Degree of compaction

6) The compressive strength of OPC after three days is expected to be more than
   a) 16 Mpa
   b) 22 Mpa
   c) 27.5 Mpa
   d) 33 Mpa

7) The cement from the ware house is taken out on the basis of
   a) First in, first out
   b) First in, last out
   c) Last in, first out
   d) Last in, last out

8) Finer the cement
   a) Higher is the rate of hydration
   b) More is the surface area
   c) Lesser the amount of water required for constant slump
   d) All of the above

9) Modulus of elasticity of concrete can be assumed as
   a) $5000\sqrt{fck}$
   b) $0.7\sqrt{fck}$
   c) $200\ KN/mm^2$
   d) $0.27\sqrt{fck}$

10) To calculate tensile strength of concrete from the compressive strength, the following formula may be used
   a) $5000\sqrt{fck}$
   b) $0.7\sqrt{fck}$
   c) $200\ KN/mm^2$
   d) $0.27\sqrt{fck}$

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SLR-EP – 433

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : ADVANCED CONCRETE TECHNOLOGY (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) **Assume** suitable data if necessary and mention it **clearly**.*

SECTION – I

2. a) Explain application oriented difference between initial set and final set ? **4**
   b) How does the variation in moisture content of the aggregate affect the workability of fresh concrete and the strength of hardened concrete ? **10**

3. a) Give the examples of mineral additives. **4**
   b) Explain the mechanism of action of retarders. **9**

4. a) What causes blowholes in concrete ? **4**
   b) What are the effects of re-tempering on the properties of resulting concrete ? **9**

5. Compare the high density and radiation shielding concrete and high volume fly ash concrete. **13**

SECTION – II

6. a) What is meant by the special process of concrete ? **4**
   b) Which are the special processes employed for mass concrete and sprayed concrete ? **10**

7. a) What are the particular problems in pumping lightweight aggregate concrete ? **5**
   b) What are the disadvantages of using ready-mixed concrete ? **8**

8. Explain step by step procedure for Concrete Mix design. What are simple changes in mix design for standard grade and high grade concrete. **13**

9. a) Distinguish between quality management system and quality control. **4**
   b) Describe in detail the damage assessment procedure. **9**

Set P

Set P

SLR-EP – 433

Seat No.	

Set Q

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : ADVANCED CONCRETE TECHNOLOGY (New)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **2** 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 : 20

1. Choose the correct answer : **(10×2=20)**

1) Modulus of elasticity of concrete can be assumed as
   a) $5000\sqrt{fck}$ b) $0.7\sqrt{fck}$
   c) $200\ KN/mm^2$ d) $0.27\sqrt{fck}$

2) To calculate tensile strength of concrete from the compressive strength, the following formula may be used
   a) $5000\sqrt{fck}$ b) $0.7\sqrt{fck}$
   c) $200\ KN/mm^2$ d) $0.27\sqrt{fck}$

3) The cement from the ware house is taken out on the basis of
   a) First in, first out b) First in, last out
   c) Last in, first out d) Last in, last out

4) Finer the cement
   a) Higher is the rate of hydration
   b) More is the surface area
   c) Lesser the amount of water required for constant slump
   d) All of the above

5) The fineness modulus
   a) Is a numerical index of fineness
   b) Give some idea of the mean size of particles present in the entire body of the aggregate
   c) Is a sum of the cumulative percentage retained on the set of specified sieves divided by 100
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6) Grading of aggregate
   a) Affects the workability
   b) Affects the strength of concrete
   c) Affects the w/c ratio
   d) All the above is true

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

8) A compacting factor of 0.88 for a fresh concrete sample indicates a mix of
   a) High workability
   b) Medium workability
   c) Low workability
   d) Very low workability

9) The porosity of concrete depends largely upon
   a) Cement content
   b) Grading of aggregate
   c) Quantity of mixing water
   d) Degree of compaction

10) The compressive strength of OPC after three days is expected to be more than
   a) 16 Mpa
   b) 22 Mpa
   c) 27.5 Mpa
   d) 33 Mpa

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SLR-EP – 433

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : ADVANCED CONCRETE TECHNOLOGY (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) **Assume** suitable data if necessary and mention it **clearly**.*

SECTION – I

2. a) Explain application oriented difference between initial set and final set ? **4**
   b) How does the variation in moisture content of the aggregate affect the workability of fresh concrete and the strength of hardened concrete ? **10**

3. a) Give the examples of mineral additives. **4**
   b) Explain the mechanism of action of retarders. **9**

4. a) What causes blowholes in concrete ? **4**
   b) What are the effects of re-tempering on the properties of resulting concrete ? **9**

5. Compare the high density and radiation shielding concrete and high volume fly ash concrete. **13**

SECTION – II

6. a) What is meant by the special process of concrete ? **4**
   b) Which are the special processes employed for mass concrete and sprayed concrete ? **10**

7. a) What are the particular problems in pumping lightweight aggregate concrete ? **5**
   b) What are the disadvantages of using ready-mixed concrete ? **8**

8. Explain step by step procedure for Concrete Mix design. What are simple changes in mix design for standard grade and high grade concrete. **13**

9. a) Distinguish between quality management system and quality control. **4**
   b) Describe in detail the damage assessment procedure. **9**

Set Q

Set Q

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Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : ADVANCED CONCRETE TECHNOLOGY (New)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **2** 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 : 20

1. Choose the correct answer : **(10×2=20)**

1) The porosity of concrete depends largely upon
   a) Cement content
   b) Grading of aggregate
   c) Quantity of mixing water
   d) Degree of compaction

2) The compressive strength of OPC after three days is expected to be more than
   a) 16 Mpa b) 22 Mpa
   c) 27.5 Mpa d) 33 Mpa

3) Modulus of elasticity of concrete can be assumed as
   a) $5000\sqrt{fck}$ b) $0.7\sqrt{fck}$
   c) $200\ KN/mm^2$ d) $0.27\sqrt{fck}$

4) To calculate tensile strength of concrete from the compressive strength, the following formula may be used
   a) $5000\sqrt{fck}$ b) $0.7\sqrt{fck}$
   c) $200\ KN/mm^2$ d) $0.27\sqrt{fck}$

P.T.O.

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

6) A compacting factor of 0.88 for a fresh concrete sample indicates a mix of
   a) High workability
   b) Medium workability
   c) Low workability
   d) Very low workability

7) The fineness modulus
   a) Is a numerical index of fineness
   b) Give some idea of the mean size of particles present in the entire body of the aggregate
   c) Is a sum of the cumulative percentage retained on the set of specified sieves divided by 100
   d) Is regarded as weighted average size of sieve on which material is retained

8) Grading of aggregate
   a) Affects the workability
   b) Affects the strength of concrete
   c) Affects the w/c ratio
   d) All the above is true

9) The cement from the ware house is taken out on the basis of
   a) First in, first out
   b) First in, last out
   c) Last in, first out
   d) Last in, last out

10) Finer the cement
   a) Higher is the rate of hydration
   b) More is the surface area
   c) Lesser the amount of water required for constant slump
   d) All of the above

———————

SLR-EP – 433

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : ADVANCED CONCRETE TECHNOLOGY (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) **Assume** suitable data if necessary and mention it **clearly**.*

SECTION – I

2. a) Explain application oriented difference between initial set and final set ? **4**
   b) How does the variation in moisture content of the aggregate affect the workability of fresh concrete and the strength of hardened concrete ? **10**

3. a) Give the examples of mineral additives. **4**
   b) Explain the mechanism of action of retarders. **9**

4. a) What causes blowholes in concrete ? **4**
   b) What are the effects of re-tempering on the properties of resulting concrete ? **9**

5. Compare the high density and radiation shielding concrete and high volume fly ash concrete. **13**

SECTION – II

6. a) What is meant by the special process of concrete ? **4**
   b) Which are the special processes employed for mass concrete and sprayed concrete ? **10**

7. a) What are the particular problems in pumping lightweight aggregate concrete ? **5**
   b) What are the disadvantages of using ready-mixed concrete ? **8**

8. Explain step by step procedure for Concrete Mix design. What are simple changes in mix design for standard grade and high grade concrete. **13**

9. a) Distinguish between quality management system and quality control. **4**
   b) Describe in detail the damage assessment procedure. **9**

Set R

Set R

SLR-EP – 433

Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : ADVANCED CONCRETE TECHNOLOGY (New)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(10×2=20)**

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

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4) The compressive strength of OPC after three days is expected to be more than
   a) 16 Mpa
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5) The cement from the ware house is taken out on the basis of
   a) First in, first out
   b) First in, last out
   c) Last in, first out
   d) Last in, last out

P.T.O.

6) Finer the cement
   a) Higher is the rate of hydration
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   c) Is a sum of the cumulative percentage retained on the set of specified sieves divided by 100
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10) Grading of aggregate
   a) Affects the workability
   b) Affects the strength of concrete
   c) Affects the w/c ratio
   d) All the above is true

SLR-EP – 433

Seat No.	

B.E. (Civil) (Part – II) Examination, 2016
Elective – III : ADVANCED CONCRETE TECHNOLOGY (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
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SECTION – I

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5. Compare the high density and radiation shielding concrete and high volume fly ash concrete. **13**

SECTION – II

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8. Explain step by step procedure for Concrete Mix design. What are simple changes in mix design for standard grade and high grade concrete. **13**

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   b) Describe in detail the damage assessment procedure. **9**

Set S

Set S

SLR-EP – 437

Seat No.	

Set **P**

B.E. (Civil) (Part – II) (New) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever needed*** *but mention* ***it clearly****.*
2) ***Use*** *of nonprogrammable calculators is* ***allowed****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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 : 20

1. Choose the correct answers : **(20×1=20)**

1) The failures of decision based on optimization techniques modeling to managerial problem is attributes to
   a) Model maker's ignorance
   b) Manager's inefficiency
   c) Decision makers fault
   d) Understanding between decision makers and model makers

2) Games and Strategies without saddle points' can be categorized under
   a) Static model b) Dynamic model
   c) Deterministic model d) Probabilistic model

3) If primal is maximize $40X_1 + 35X_2$, subjected to $2X_1 + 3X_2 \leq 60$ and $4X_1 + 3X_2 \leq 96$. $X_1, X_2 \geq 0$ the dual will have objective function as _____
   a) $3y_1 + 3y_2$ (minimize) b) $60y_1 + 96y_2$ (minimize)
   c) $3y_1 - 3y_2$ (maximize) d) none

4) One disadvantage of using N-W-C rule to find initial solution to the transportation problem is that
   a) It is complicated to use
   b) It does not take into account the cost of transportation
   c) It leads to a degenerate initial solution
   d) All of the above

5) The Monte-Carlo simulation used
   a) Sampling technique b) Decision technique
   c) Mathematical technique d) Both a) and b)

6) The Vogel's approximation method is also called as
   a) Row minima method b) Least cost method
   c) Penalty method d) None

P.T.O.

7) In simplex method, the elimination of all infeasible basic solutions are achieved by starting with a basic solution which is _____
   a) Negative b) Non-Negative c) Less than –1 d) All of above

8) In simplex tableau we neglect value for minimum ratio
   a) Unity b) Zero c) Infinity d) Positive

9) The Inventory Carrying costs are also called as
   a) procurement costs b) set-up costs c) storage costs d) none of above

10) _____ of a function is a value which is higher than all the values of the function.
   a) global minimum b) Global maximum c) Both a) and b) d) None

11) If there are more than one local minimum or local maximum then they
   a) Need not have same value b) Same value is compulsory
   c) First is necessarily less than second d) First is necessarily greater than second

12) Which of the following is not strength of optimization techniques ?
   a) Objective orientation b) Distinct decision making
   c) Team approach d) Gap between the user and optimality designer

13) Dynamic programming problem can be applied to
   a) Constrained optimization b) Unconstrained optimization with single variable
   c) Unconstrained with liner d) Unconstrained with multi variable

14) In an LPP : Max 5x + 6y. Subject to $2x + 3y \geq 50$, $4x + 3y \geq 100$, 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) $0x + 0y - A_1 - A_2$

15) Simulation is _____ of real life problem.
   a) Opposite b) Imitation
   c) Computer Software d) Computer hardware

16) If a dual has unrestricted variable, its primal will have
   a) Corresponding variable unrestricted
   b) Corresponding constant is requirement type
   c) Corresponding constraint is exact type
   d) The constraint is written by splitting the corresponding variable into 2 parts

17) Simulation is widely used to solve
   a) Queuing problem b) Inventory problem
   c) Real life complex problems d) All

18) A L.P.P. in which some or all of the variables must take non-negative integer values is commonly referred to as _____
   a) Mathematical model b) Simulation model
   c) Integer model d) None

19) The unconstrained optimization is a type of _____
   a) Non-linear program problem b) Linear program problem
   c) Simulation model d) None of above

20) _____ is a representation of reality through the use of a model or other device which will react in the same manner as reality under a given set of conditions.
   a) Queuing model b) Inventory model
   c) Simulation model d) None of above

SLR-EP – 437

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever needed*** *but mention* ***it clearly****.*
2) ***Use*** *of nonprogrammable calculators is* ***allowed****.*
3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Attempt* ***any two*** *from Q.* ***3*** *to Q.* ***5*** *from Section –* ***I****. Attempt* ***any two*** *from Q.* ***7*** *to Q.* ***9*** *from Section –* ***II****.*
4) A graph paper may be ***used*** *for the graphical method. Use of non programmable calculator is* ***allowed****.*
5) Make ***suitable*** *assumptions* ***only if*** *needed but mention them* ***clearly****.*

SECTION – I

2. a) Summarize the general procedure used to formulate and solve optimization problems. **4**

   b) A firm manufactures two types of products A and B and sells them at a profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines G and H, Type A requires 1 minute of processing time on G and 2 minutes on H; type B requires 1 minute on G and 1 minute on H. The machine G is available for not more than 6 hours 40 minutes while machine H is available for 10 hours during any working day. Formulate the problem as a linear programming problem. **8**

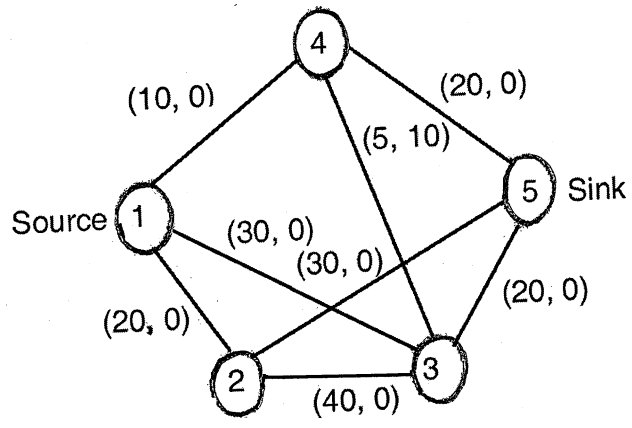
   c) Explain the classification of optimization problems. **4**

3. Use Big M method to solve the following Linear programming problem. **12**
   Max $Z = -2x_1 - x_2$
   Subject to $3x_1 + x_2 = 3$, $4x_1 + 3x_2 \geq 6$, $x_1 + 2x_2 \leq 4$, and $x_1 \geq 0$, $x_2 \geq 0$.

4. Use VAM for IBFS and find an optimal solution for the following transportation matrix. **12**

	W1	W2	W3	W4	Availability
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Requirement	5	8	7	14	

5. Consider the following network and determine the amount of flow between the networks. **12**



SECTION – II

6. a) Solve the following game by graphical method. **8**

Players	B1	B2
A1	1	2
A2	5	4
A3	–7	9
A4	– 4	–3
A5	2	1

b) The investor Mic Risky has just purchased a textile factory and now he is considering three possible decisions :

1) Expand the factory to produce army uniforms.
2) Still produce the same cotton textiles (Status Quo), but there are a lot of competitors.
3) Sell the factory immediately.

In the case of the first and second alternatives the factory will be sold after one year.

The profit will depend on the conditions on the market, which are either good (state of nature $\theta 1$) or poor (state of nature $\theta 2$). Mic estimates that the probabilities of good and poor market conditions are 0.7 and 0.3 respectively. Payoff table summarizes the data for Mic's decision problem. Prepare a decision tree and state the optimal decision. **8**

State of nature–>	Good conditions in the market	Poor conditions in the market
Actions		
Expand	$800000	$500000
Status quo	$1300000	$–150000
Sell	$320000	$320000
Prior probability	0.7	0.3

7. a) The annual demand for an item is 3,200 units. The unit cost is Rs. 6 and inventory carrying charges 25% p.a. If the cost of one procurement is Rs. 150, determine :

i) EOQ
ii) Number of orders p.a.
iii) Time between two consecutive order. **8**

b) Explain optimization process for replacement model. **4**

8. Write note on : **12**

a) Integer programming
b) Dynamic programming

9. Write note on : **12**

a) Artificial neural network
b) Genetic programming.

SLR-EP – 437

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) (New) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

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_____

SLR-EP – 437

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever needed*** *but mention* ***it clearly****.*
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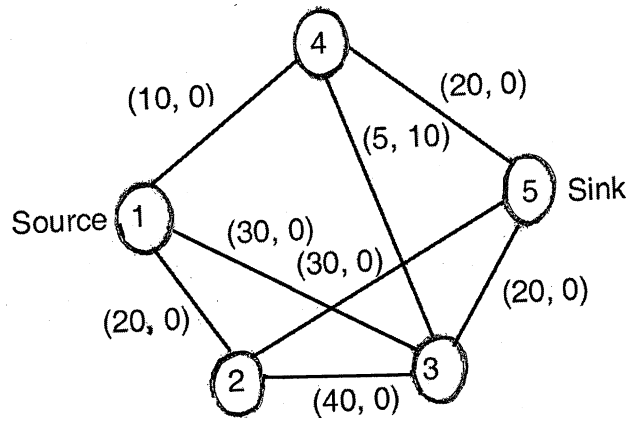

Set Q

SECTION – II

6. a) Solve the following game by graphical method. **8**

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b) Genetic programming.

SLR-EP – 437

Seat No.	

Set **R**

B.E. (Civil) (Part – II) (New) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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   a) Need not have same value b) Same value is compulsory
   c) First is necessarily less than second d) First is necessarily greater than second

2) Which of the following is not strength of optimization techniques ?
   a) Objective orientation b) Distinct decision making
   c) Team approach d) Gap between the user and optimality designer

3) Dynamic programming problem can be applied to
   a) Constrained optimization b) Unconstrained optimization with single variable
   c) Unconstrained with liner d) Unconstrained with multi variable

4) In an LPP : Max 5x + 6y. Subject to $2x + 3y \geq 50$, $4x + 3y \geq 100$, 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) $0x + 0y - A_1 - A_2$

5) Simulation is _____ of real life problem.
   a) Opposite b) Imitation
   c) Computer Software d) Computer hardware

6) If a dual has unrestricted variable, its primal will have
   a) Corresponding variable unrestricted
   b) Corresponding constant is requirement type
   c) Corresponding constraint is exact type
   d) The constraint is written by splitting the corresponding variable into 2 parts

7) Simulation is widely used to solve
   a) Queuing problem b) Inventory problem
   c) Real life complex problems d) All

8) A L.P.P. in which some or all of the variables must take non-negative integer values is commonly referred to as _____
   a) Mathematical model b) Simulation model
   c) Integer model d) None

P.T.O.

9) The unconstrained optimization is a type of _____
   a) Non-linear program problem b) Linear program problem
   c) Simulation model d) None of above

10) _____ is a representation of reality through the use of a model or other device which will react in the same manner as reality under a given set of conditions.
   a) Queuing model b) Inventory model
   c) Simulation model d) None of above

11) The failures of decision based on optimization techniques modeling to managerial problem is attributes to
   a) Model maker's ignorance
   b) Manager's inefficiency
   c) Decision makers fault
   d) Understanding between decision makers and model makers

12) Games and Strategies without saddle points' can be categorized under
   a) Static model b) Dynamic model
   c) Deterministic model d) Probabilistic model

13) If primal is maximize $40X_1 + 35X_2$, subjected to $2X_1 + 3X_2 \leq 60$ and $4X_1 + 3X_2 \leq 96$. $X_1, X_2 \geq 0$ the dual will have objective function as _____
   a) $3y_1 + 3y_2$ (minimize) b) $60y_1 + 96y_2$ (minimize)
   c) $3y_1 - 3y_2$ (maximize) d) none

14) One disadvantage of using N-W-C rule to find initial solution to the transportation problem is that
   a) It is complicated to use
   b) It does not take into account the cost of transportation
   c) It leads to a degenerate initial solution
   d) All of the above

15) The Monte-Carlo simulation used
   a) Sampling technique b) Decision technique
   c) Mathematical technique d) Both a) and b)

16) The Vogel's approximation method is also called as
   a) Row minima method b) Least cost method
   c) Penalty method d) None

17) In simplex method, the elimination of all infeasible basic solutions are achieved by starting with a basic solution which is _____
   a) Negative b) Non-Negative c) Less than –1 d) All of above

18) In simplex tableau we neglect value for minimum ratio
   a) Unity b) Zero c) Infinity d) Positive

19) The Inventory Carrying costs are also called as
   a) procurement costs b) set-up costs c) storage costs d) none of above

20) _____ of a function is a value which is higher than all the values of the function.
   a) global minimum b) Global maximum c) Both a) and b) d) None

_____

SLR-EP – 437

Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever needed*** *but mention* ***it clearly****.*
2) ***Use*** *of nonprogrammable calculators is* ***allowed****.*
3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Attempt* ***any two*** *from Q.* ***3*** *to Q.* ***5*** *from Section –* ***I****. Attempt* ***any two*** *from Q.* ***7*** *to Q.* ***9*** *from Section –* ***II****.*
4) A graph paper may be ***used*** *for the graphical method. Use of non programmable calculator is* ***allowed****.*
5) Make ***suitable*** *assumptions* ***only if*** *needed but mention them* ***clearly****.*

SECTION – I

2. a) Summarize the general procedure used to formulate and solve optimization problems. **4**

   b) A firm manufactures two types of products A and B and sells them at a profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines G and H, Type A requires 1 minute of processing time on G and 2 minutes on H; type B requires 1 minute on G and 1 minute on H. The machine G is available for not more than 6 hours 40 minutes while machine H is available for 10 hours during any working day. Formulate the problem as a linear programming problem. **8**

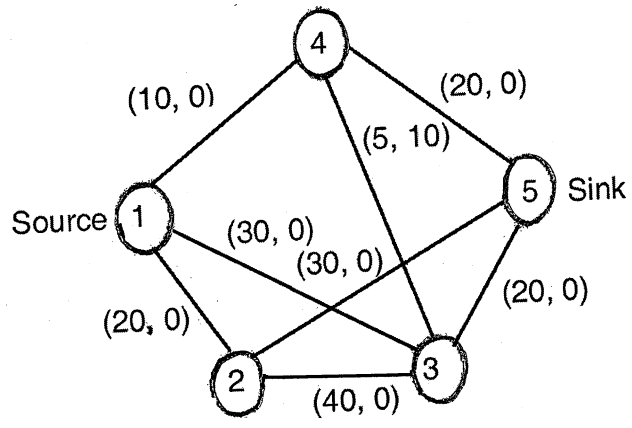
   c) Explain the classification of optimization problems. **4**

3. Use Big M method to solve the following Linear programming problem. **12**
   Max $Z = -2x_1 - x_2$
   Subject to $3x_1 + x_2 = 3$, $4x_1 + 3x_2 \geq 6$, $x_1 + 2x_2 \leq 4$, and $x_1 \geq 0$, $x_2 \geq 0$.

4. Use VAM for IBFS and find an optimal solution for the following transportation matrix. **12**

	W1	W2	W3	W4	Availability
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Requirement	5	8	7	14	

5. Consider the following network and determine the amount of flow between the networks. **12**



SECTION – II

6. a) Solve the following game by graphical method. **8**

Players	B1	B2
A1	1	2
A2	5	4
A3	–7	9
A4	– 4	–3
A5	2	1

b) The investor Mic Risky has just purchased a textile factory and now he is considering three possible decisions :

1) Expand the factory to produce army uniforms.
2) Still produce the same cotton textiles (Status Quo), but there are a lot of competitors.
3) Sell the factory immediately.

In the case of the first and second alternatives the factory will be sold after one year.

The profit will depend on the conditions on the market, which are either good (state of nature $\theta 1$) or poor (state of nature $\theta 2$). Mic estimates that the probabilities of good and poor market conditions are 0.7 and 0.3 respectively. Payoff table summarizes the data for Mic's decision problem. Prepare a decision tree and state the optimal decision. **8**

State of nature–>	Good conditions in the market	Poor conditions in the market
Actions		
Expand	$800000	$500000
Status quo	$1300000	$–150000
Sell	$320000	$320000
Prior probability	0.7	0.3

7. a) The annual demand for an item is 3,200 units. The unit cost is Rs. 6 and inventory carrying charges 25% p.a. If the cost of one procurement is Rs. 150, determine :

i) EOQ
ii) Number of orders p.a.
iii) Time between two consecutive order. **8**

b) Explain optimization process for replacement model. **4**

8. Write note on : **12**

a) Integer programming
b) Dynamic programming

9. Write note on : **12**

a) Artificial neural network
b) Genetic programming.

Set R

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Seat No.	

Set S

B.E. (Civil) (Part – II) (New) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever needed*** *but mention* ***it clearly****.*
2) ***Use*** *of nonprogrammable calculators is* ***allowed****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***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 : 20

1. Choose the correct answers : **(20×1=20)**

1) The Vogel's approximation method is also called as
   a) Row minima method b) Least cost method
   c) Penalty method d) None

2) In simplex method, the elimination of all infeasible basic solutions are achieved by starting with a basic solution which is _____
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4) The Inventory Carrying costs are also called as
   a) procurement costs b) set-up costs c) storage costs d) none of above

5) _____ of a function is a value which is higher than all the values of the function.
   a) global minimum b) Global maximum c) Both a) and b) d) None

6) If there are more than one local minimum or local maximum then they
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P.T.O.

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20) The Monte-Carlo simulation used
a) Sampling technique b) Decision technique
c) Mathematical technique d) Both a) and b)

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Seat No.	

B.E. (Civil) (Part – II) (New) Examination, 2016
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever needed*** *but mention* ***it clearly****.*
2) ***Use*** *of nonprogrammable calculators is* ***allowed****.*
3) Q. ***2*** *and Q.* ***6*** *are* ***compulsory****. Attempt* ***any two*** *from Q.* ***3*** *to Q.* ***5*** *from Section –* ***I****. Attempt* ***any two*** *from Q.* ***7*** *to Q.* ***9*** *from Section –* ***II****.*
4) A graph paper may be ***used*** *for the graphical method. Use of non programmable calculator is* ***allowed****.*
5) Make ***suitable*** *assumptions* ***only if*** *needed but mention them* ***clearly****.*

SECTION – I

2. a) Summarize the general procedure used to formulate and solve optimization problems. **4**

   b) A firm manufactures two types of products A and B and sells them at a profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines G and H, Type A requires 1 minute of processing time on G and 2 minutes on H; type B requires 1 minute on G and 1 minute on H. The machine G is available for not more than 6 hours 40 minutes while machine H is available for 10 hours during any working day. Formulate the problem as a linear programming problem. **8**

   c) Explain the classification of optimization problems. **4**

3. Use Big M method to solve the following Linear programming problem. **12**
   Max $Z = -2x_1 - x_2$
   Subject to $3x_1 + x_2 = 3$, $4x_1 + 3x_2 \geq 6$, $x_1 + 2x_2 \leq 4$, and $x_1 \geq 0$, $x_2 \geq 0$.

4. Use VAM for IBFS and find an optimal solution for the following transportation matrix. **12**

	W1	W2	W3	W4	Availability
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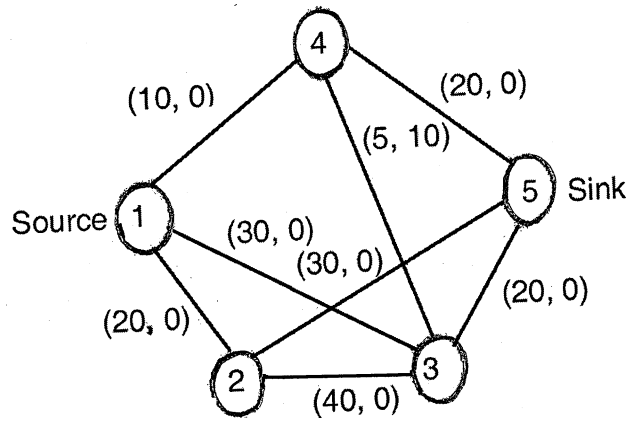
F3	40	8	70	20	18
Requirement	5	8	7	14	

5. Consider the following network and determine the amount of flow between the networks. **12**



SECTION – II

6. a) Solve the following game by graphical method. **8**

Players	B1	B2
A1	1	2
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A4	– 4	–3
A5	2	1

b) The investor Mic Risky has just purchased a textile factory and now he is considering three possible decisions :

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State of nature–>	Good conditions in the market	Poor conditions in the market
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Expand	$800000	$500000
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7. a) The annual demand for an item is 3,200 units. The unit cost is Rs. 6 and inventory carrying charges 25% p.a. If the cost of one procurement is Rs. 150, determine :

i) EOQ
ii) Number of orders p.a.
iii) Time between two consecutive order. **8**

b) Explain optimization process for replacement model. **4**

8. Write note on : **12**

a) Integer programming
b) Dynamic programming

9. Write note on : **12**

a) Artificial neural network
b) Genetic programming.

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Seat No.	

Set **P**

B.E. (Civil) Part – II Examination, 2016
DISASTER MANAGEMENT (Elective – III) (New)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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 : 20

1. Choose the correct alternatives : **(20×1=20)**

1) Disasters can be categorised into various types on the basis of
   a) Its speed b) Its previous history
   c) Loss of property they result d) Loss of human life they result

2) Disaster management covers
   a) Maintaining control over disasters
   b) Reducing the effects of disasters
   c) Briefing the top officials of govt. on the effect of disasters
   d) All the above

3) Which of the following is a disaster mitigation strategy ?
   a) Constructing cyclone shelters b) Giving loans from banks
   c) Providing cheap electricity d) Providing school uniforms to children

4) Which of the following activities is covered by Disaster Management before, during or after a disaster ?
   a) Reconstruction and rehabilitation b) Mitigation
   c) Emergency response d) All the above

5) Landslides occur because of
   a) Intensity of rainfall b) Steep slopes
   c) Deforestation leading it to soil erosion d) All the above

6) For coordinating disaster management activities for all natural hazards, the Nodal Agency at the Central Govt. is the
   a) Ministry of Home Affair b) Ministry of Rural Development
   c) Ministry of Communication d) Ministry of Urban Affair

7) National Disaster Management Division of the Govt. of India wherever necessary, sends to disaster affected areas
   a) Coordination its containing satellite phones b) Medicines for affected people
   c) Provides relief measures d) All the above

8) Of the following, which is a natural hazard ?
   a) Earthquake b) Cyclone c) Landslide d) All the above

9) The ground movements caused by earthquakes can have a damaging effects such as
   a) Ground shaking b) Landslides c) Surface rupters d) All the above

P.T.O.

10) The Chairman of the National Disaster Management Authority is
a) Home Minister b) Vice President
c) Minister, Human Resource Development d) Prime Minister

11) By what measures can we significantly reduce the impact of disasters on our people ?
a) Better planning b) Preparedness awareness
c) Mitigation measures d) All the above

12) Mechanisms established under Disaster Management Act, 2005 include
a) National Disaster Management Authority b) State Disaster Management Authority
c) District Disaster Management Authority d) All the above

13) Disaster Management Team should include
a) Awareness generation team b) First aid team
c) Search and rescue team d) All of the above

14) With reference to the Classification of Natural Disasters, consider the following statements
1) Broadly, natural disasters can be classified under four categories : Atmospheric, Terrestrial, Aquatic and Biological
2) Bird flu, dengue are example of Aquatic Disaster
3) India has experienced all the four kind of natural disaster
Select the correct answer using the code given below :
a) 1) only b) 1) and 2) only c) 1), 2) and 3) d) 1) and 3) only

15) Which of these is/are flood prevention and mitigation strategy ?
a) Construction of flood protection embankments
b) Depopulating the flood plains
c) Afforestation
d) Decongesting river channels

16) With reference to flood, consider the following statements
1) National Programme of Flood Management was launched in 1954
2) Disturbances along the natural drainage channels and colonisation of flood-plains and river-beds are some of the human activities that play an important role in increasing the intensity, magnitude and gravity of flood
Which of the statements given above is/are correct ?
a) 1) only b) 2) only c) Both 1) and 2) d) Neither 1) nor 2)

17) Which of the following is not a natural disaster ?
a) Tsunami b) Hurricane c) Terrorism d) Earthquake

18) What are the three phases of disaster management planning ?
a) Evacuating, Rebuilding and Re-branding b) Preparation, Response and Recovery
c) Preparation, Planning and Perception d) Planning, Evacuating and Recovery

19) All of the following are true about disasters except
a) A disaster may be domestic or international
b) A disaster may be caused by nature or have human origins
c) A disaster always receives widespread media coverage
d) A disaster may have a known and gradual onset

20) Disasters frequently result in all of the following except
a) Damage to the ecological environment
b) Displacement of population
c) Destruction of a population's homeland
d) Sustained public attention during the recovery phase

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SLR-EP – 438

Seat No.	

B.E. (Civil) Part – II Examination, 2016
DISASTER MANAGEMENT (Elective – III) (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. **2** is **compulsory**. Attempt **any two** out of Q. **3** to Q.**5**.*
*2) Assume suitable data **if** necessary but mention it **clearly**.*

SECTION – I

2. Write notes on : **16**

   a) Explain the Landscape approach.

   b) What are the causes of earthquake ?

   c) What are the hazardous impact of volcanic eruptions ?

   d) What are environmental stresses ?

3. Write notes on (**any three**) : **12**

   a) What are different draught control measures ?

   b) What are various conservation measures against soil erosion ?

   c) Global sedimentation problems.

   d) Population explosion.

4. Write notes on (**any three**) : **12**

   a) What are the causes of deforestation ?

   b) Mined land reclaimation.

   c) Steps in disaster preparedness.

   d) Disaster resistant house construction.

5. Write notes on : **12**

   a) Socio-economic rehabilitation.

   b) Preparedness through IEC.

   c) Disaster mitigation.

SECTION – II

6. Write notes on : **16**
   a) Prediction of hazards and disasters.
   b) GPS application in disaster mitigation.
   c) Role of media in disaster research.
   d) Disaster management cell.

7. Write notes on (**any three**) : **12**
   a) Role and responsibility of District Magistrate in prevention of disaster.
   b) What are national agencies involved in disaster management ?
   c) United Nations Disaster Management Cell.
   d) Education on disaster management.

8. Write notes on (**any three**) : **12**
   a) Military and Paramilitary forces in disaster management.
   b) SCOPE and its role.
   c) Disaster mitigation strategies.
   d) Adjustment of human population to natural hazards.

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Seat No.	

Set **Q**

B.E. (Civil) Part – II Examination, 2016
DISASTER MANAGEMENT (Elective – III) (New)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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 : 20

1. Choose the correct alternatives : **(20×1=20)**

1) With reference to flood, consider the following statements
   1) National Programme of Flood Management was launched in 1954
   2) Disturbances along the natural drainage channels and colonisation of flood-plains and river-beds are some of the human activities that play an important role in increasing the intensity, magnitude and gravity of flood

   Which of the statements given above is/are correct ?
   a) 1) only b) 2) only c) Both 1) and 2) d) Neither 1) nor 2)

2) Which of the following is not a natural disaster ?
   a) Tsunami b) Hurricane c) Terrorism d) Earthquake

3) What are the three phases of disaster management planning ?
   a) Evacuating, Rebuilding and Re-branding b) Preparation, Response and Recovery
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4) All of the following are true about disasters except
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P.T.O.

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Seat No.	

B.E. (Civil) Part – II Examination, 2016
DISASTER MANAGEMENT (Elective – III) (New)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *is* ***compulsory****. Attempt* ***any two*** *out of Q.* ***3*** *to Q.****5****.*
2) Assume suitable data ***if*** *necessary but mention it* ***clearly****.*

SECTION – I

2. Write notes on : **16**

   a) Explain the Landscape approach.

   b) What are the causes of earthquake ?

   c) What are the hazardous impact of volcanic eruptions ?

   d) What are environmental stresses ?

3. Write notes on (**any three**) : **12**

   a) What are different draught control measures ?

   b) What are various conservation measures against soil erosion ?

   c) Global sedimentation problems.

   d) Population explosion.

4. Write notes on (**any three**) : **12**

   a) What are the causes of deforestation ?

   b) Mined land reclaimation.

   c) Steps in disaster preparedness.

   d) Disaster resistant house construction.

5. Write notes on : **12**

   a) Socio-economic rehabilitation.

   b) Preparedness through IEC.

   c) Disaster mitigation.

Set Q

SECTION – II

6. Write notes on : **16**
   a) Prediction of hazards and disasters.
   b) GPS application in disaster mitigation.
   c) Role of media in disaster research.
   d) Disaster management cell.

7. Write notes on (**any three**) : **12**
   a) Role and responsibility of District Magistrate in prevention of disaster.
   b) What are national agencies involved in disaster management ?
   c) United Nations Disaster Management Cell.
   d) Education on disaster management.

8. Write notes on (**any three**) : **12**
   a) Military and Paramilitary forces in disaster management.
   b) SCOPE and its role.
   c) Disaster mitigation strategies.
   d) Adjustment of human population to natural hazards.

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Seat No.	

Set **R**

B.E. (Civil) Part – II Examination, 2016
DISASTER MANAGEMENT (Elective – III) (New)

Day and Date : Thursday, 24-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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 : 20

1. Choose the correct alternatives : **(20×1=20)**

1) By what measures can we significantly reduce the impact of disasters on our people ?
   a) Better planning b) Preparedness awareness
   c) Mitigation measures d) All the above

2) Mechanisms established under Disaster Management Act, 2005 include
   a) National Disaster Management Authority b) State Disaster Management Authority
   c) District Disaster Management Authority d) All the above

3) Disaster Management Team should include
   a) Awareness generation team b) First aid team
   c) Search and Rescue team d) All of the above

4) With reference to the Classification of Natural Disasters, consider the following statements
   1) Broadly, natural disasters can be classified under four categories : Atmospheric, Terrestrial, Aquatic and Biological
   2) Bird flu, dengue are example of Aquatic Disaster
   3) India has experienced all the four kind of natural disaster
   Select the correct answer using the code given below :
   a) 1) only b) 1) and 2) only c) 1), 2) and 3) d) 1) and 3) only

5) Which of these is/are flood prevention and mitigation strategy ?
   a) Construction of flood protection embankments
   b) Depopulating the flood plains
   c) Afforestation
   d) Decongesting river channels

6) With reference to flood, consider the following statements
   1) National Programme of Flood Management was launched in 1954
   2) Disturbances along the natural drainage channels and colonisation of flood-plains and river-beds are some of the human activities that play an important role in increasing the intensity, magnitude and gravity of flood
   Which of the statements given above is/are correct ?
   a) 1) only b) 2) only c) Both 1) and 2) d) Neither 1) nor 2)

7) Which of the following is not a natural disaster ?
   a) Tsunami b) Hurricane c) Terrorism d) Earthquake

P.T.O.

8) What are the three phases of disaster management planning ?
   a) Evacuating, Rebuilding and Re-branding b) Preparation, Response and Recovery
   c) Preparation, Planning and Perception d) Planning, Evacuating and Recovery

9) All of the following are true about disasters except
   a) A disaster may be domestic or international
   b) A disaster may be caused by nature or have human origins
   c) A disaster always receives widespread media coverage
   d) A disaster may have a known and gradual onset

10) Disasters frequently result in all of the following except
   a) Damage to the ecological environment
   b) Displacement of population
   c) Destruction of a population's homeland
   d) Sustained public attention during the recovery phase

11) Disasters can be categorised into various types on the basis of
   a) Its speed b) Its previous history
   c) Loss of property they result d) Loss of human life they result

12) Disaster management covers
   a) Maintaining control over disasters
   b) Reducing the effects of disasters
   c) Briefing the top officials of govt. on the effect of disasters
   d) All the above

13) Which of the following is a disaster mitigation strategy ?
   a) Constructing cyclone shelters b) Giving loans from banks
   c) Providing cheap electricity d) Providing school uniforms to children

14) Which of the following activities is covered by Disaster Management before, during or after a disaster ?
   a) Reconstruction and rehabilitation b) Mitigation
   c) Emergency response d) All the above

15) Landslides occur because of
   a) Intensity of rainfall b) Steep slopes
   c) Deforestation leading it to soil erosion d) All the above

16) For coordinating disaster management activities for all natural hazards, the Nodal Agency at the Central Govt. is the
   a) Ministry of Home Affair b) Ministry of Rural Development
   c) Ministry of Communication d) Ministry of Urban Affair

17) National Disaster Management Division of the Govt. of India wherever necessary, sends to disaster affected areas
   a) Coordination its containing satellite phones b) Medicines for affected people
   c) Provides relief measures d) All the above

18) Of the following, which is a natural hazard ?
   a) Earthquake b) Cyclone c) Landslide d) All the above

19) The ground movements caused by earthquakes can have a damaging effects such as
   a) Ground shaking b) Landslides c) Surface rupters d) All the above

20) The Chairman of the National Disaster Management Authority is
   a) Home Minister b) Vice President
   c) Minister, Human Resource Development d) Prime Minister

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Seat No.	

B.E. (Civil) Part – II Examination, 2016
DISASTER MANAGEMENT (Elective – III) (New)

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SECTION – I

2. Write notes on : **16**

   a) Explain the Landscape approach.

   b) What are the causes of earthquake ?

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3. Write notes on (**any three**) : **12**

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   a) What are the causes of deforestation ?

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   d) Disaster resistant house construction.

5. Write notes on : **12**

   a) Socio-economic rehabilitation.

   b) Preparedness through IEC.

   c) Disaster mitigation.

SECTION – II

6. Write notes on : **16**
   a) Prediction of hazards and disasters.
   b) GPS application in disaster mitigation.
   c) Role of media in disaster research.
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7. Write notes on (**any three**) : **12**
   a) Role and responsibility of District Magistrate in prevention of disaster.
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8. Write notes on (**any three**) : **12**
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Seat No.	

Set **S**

B.E. (Civil) Part – II Examination, 2016
DISASTER MANAGEMENT (Elective – III) (New)

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) For coordinating disaster management activities for all natural hazards, the Nodal Agency at the Central Govt. is the
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SECTION – I

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   b) Preparedness through IEC.

   c) Disaster mitigation.

SECTION – II

6. Write notes on : **16**
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