SLR-VB – 21

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
CONCRETE TECHNOLOGY

Day and Date : Thursday, 4-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Assume **suitable** data if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) Q. No. **1** is **compulsory**. 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 and rewrite in answer book : **(14×1=14)**

1) The percentage of gypsum added during manufacturing process is
   a) 0.2 b) 0.25 to 0.35 c) 2.5 to 3.5 d) 5 to 10

2) Bulking of sand is the
   a) Rodding of the sand so that it occupies minimum volume
   b) Compacting of the sand
   c) False increase in the volume of sand due to moisture
   d) Segregating sand of particular size

3) 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

4) Which of the following statement is incorrect ?
   a) Water is the most important and least expensive ingredient of concrete
   b) Mixing water is utilized in the hydration of cement and provides lubrication between fine and coarse aggregates
   c) Excess water forms a scum or laitance at the surface
   d) None of the above

P.T.O.

5) An accelerator shortens all of the following except
   a) Setting time b) Period of curing
   c) Period of removal of formwork d) Strength of concrete
6) If the slump of concrete is 75 mm its workability is considered to be
   a) Very high b) High c) Medium d) Low
7) The stress and strain curve of concrete in compression is obtained by testing the cylindrical specimen under
   a) Uniform rate of strain b) Uniform rate of stress
   c) Constant stress condition d) Constant strain condition
8) The choice of mix proportion of a concrete is independent of
   a) Grade designation
   b) Maximum size of aggregate
   c) Minimum water-cement ratio
   d) Batching, mixing, placing and compaction techniques
9) For water-cement ratio of 0.6 the water content per bag of cement is
   a) 10 kg b) 20 kg c) 30 kg d) 40 kg
10) The minimum water content for complete hydration of cement is
   a) 0.65 b) 0.5 c) 0.35 d) 0.27
11) Under water concreting is done by
   a) Dripping method b) Tremie method
   c) Cofferdam method d) All of the above
12) IS provision for concrete mix design is given by
   a) IS 4031-1968 b) IS 383-1970
   c) IS 456-2000 d) IS 10262-2009
13) A mixer designated 400NT indicates that
   a) It is non-tilting type mixer
   b) Its nominal mix batch capacity is 400 liters
   c) Both a) and b)
   d) It is non-tilting type mixer requiring 400 revolutions for proper mix
14) The strength of light weight concrete depends upon
   a) Density of concrete b) Size of aggregates
   c) Type of cement d) Mix proportion

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SLR-VB – 21

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
CONCRETE TECHNOLOGY

Day and Date : Thursday, 4-5-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any seven** of the following : **(7×4=28)**

1) Enlist types of cement. Write in brief on P.P.C.

2) Write a brief note on bulking of the sand.

3) Explain workability of concrete and enlist the methods to measure the same. Also mention the unit.

4) Write in brief on admixtures and additives in concrete.

5) Write a short note on transportation of concrete.

6) Explain sieve analysis of aggregates.

7) Enlist factors affecting strength of concrete and explain any one.

8) Draw detailed flowchart of cement manufacturing by dry process.

9) Define Bulk density and Specific gravity. If Bulk density of CA is 1700 kg/m^3 and specific gravity of the same is 2.80, workout the volume of CA if weight of CA in particular mixes was 1200 kg/m^3 using bulk density and specific gravity.

10) Explain mechanism of super plasticizer in concrete.

SECTION – II

3. Design a concrete mix of grade M20 as per IS 10262-2009. Use following data : **16**

   1) Concrete is to be used for R.C.C. work.

   2) Exposure condition – Mild.

   3) Cement to be used – OPC 53 grade.

   4) Workability required – 100 mm Slump.

   5) Method of concrete placing – Pumping.

   6) Mineral Admixture – Nil.

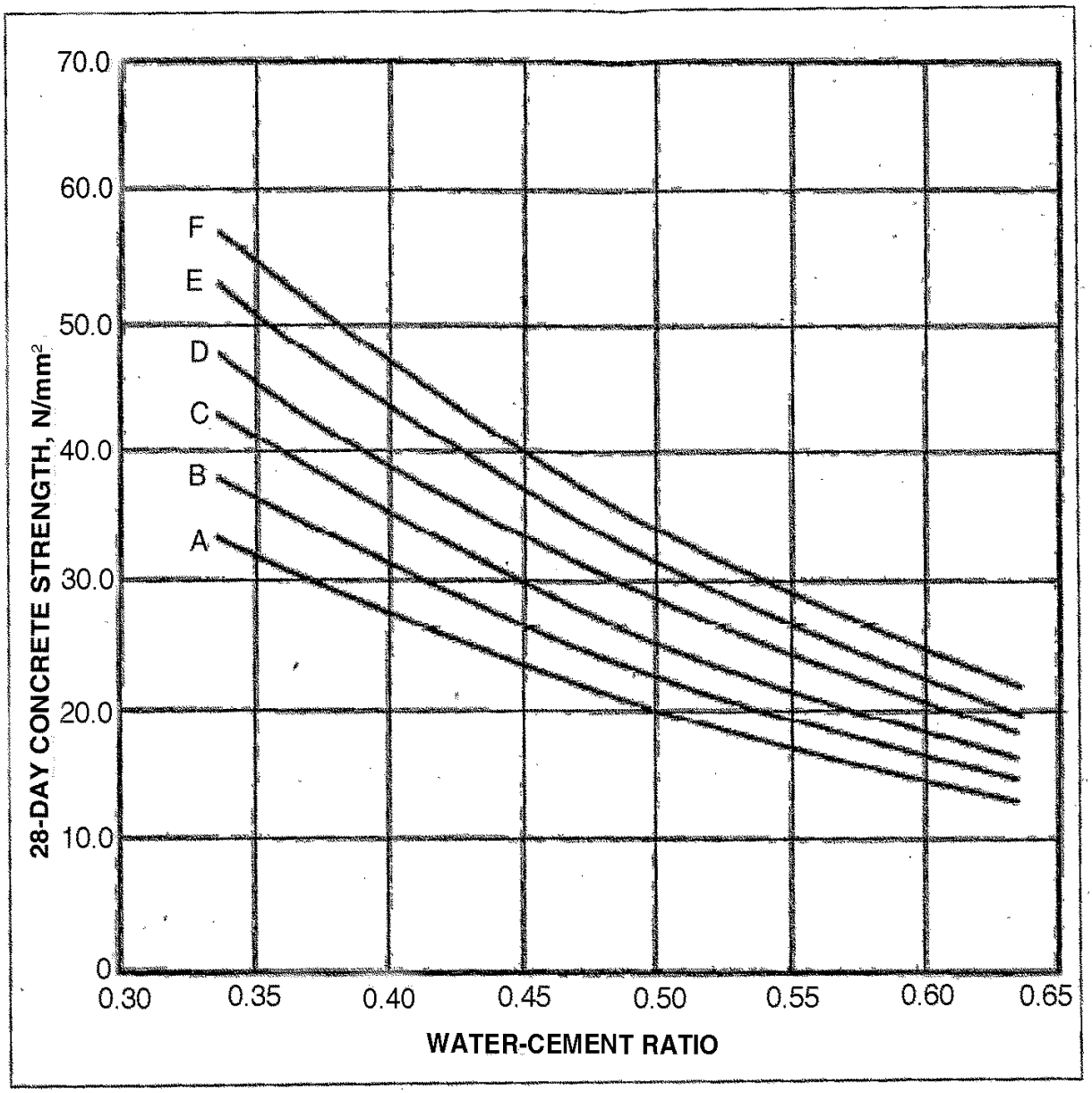
   7) Superplasticizer – Nil.

   8) Max. size of aggregate – 20 mm (crushed angular)

   9) Test data for material –
      a) Specific gravity of cement = 3.15, FA = 2.60 and CA = 2.90.
      b) Water absorption of FA = 1.4% and CA = 1%.
      c) Moisture content of FA = 2% and CA = Nil.

   10) 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 = 3.68 – 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 1 Assumed Standard Deviation (Ref : IS 456-2002)										
Sl. No.	1	2	3	4	5	6	7	8	9	10
Grade of Concrete	M10	M15	M20	M25	M30	M35	M40	M45	M50	M55
Assumed Standard Deviation (N/mm^2)	3.50		4.00		5.00					

Table 2 Maximum Water Content per Cubic Meter of Concrete for Nominal Maximum Size of Aggregate (Ref : IS 10262 – 2009)		
Sl. No.	**Nominal Maximum Size of Aggregate (mm)**	**Maximum Water Content***
1	10	208
2	20	186
3	40	165
Note : The quantities of mixing water are for use in computing cementitious material content for trial batches *Water content corresponding to saturated surface dry aggregate		

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate* (Ref : IS 10262 – 2009)					
Sl. No.	**Nominal Maximum Size of Aggregate (mm)**	**Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Fine Aggregate***			
		Zone IV	**Zone III**	**Zone II**	**Zone I**
1	10	0.50	0.48	0.46	0.44
2	20	0.66	0.64	0.62	0.60
3	40	0.75	0.73	0.71	0.69
*Volumes are based on aggregate in saturated surface dry condition					

Table 4 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregate of 20 mm Nominal Maximum Size (Ref : IS 456-2002)

Sl. No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m^2	Maximum Free Water Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m^2	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
i)	Mild	220	0.60	-	300	0.55	M20
ii)	Moderate	240	0.60	M15	300	0.50	M25
iii)	Severe	250	0.50	M20	320	0.45	M30
iv)	Very Severe	260	0.45	M20	340	0.45	M35
v)	Extreme	280	0.40	M25	360	0.40	M40

Notes - 1) Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2 of IS 456 additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of Pozzolana and slag specified in IS 1489 (Part– 1) and IS : 455 respectively. 2) Minimum grade for plain concrete under mild exposure condition is not specified.

Table 5 Grading of Fine Aggregate (Ref : IS 383)

IS Sieve Designations	Percentage Passing			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	90-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30 -70	55-90	75-100	90-100
600 Microns	15-34	35-59	60-79	80-100
300 Microns	5-20	8-30	12-40	15-50
150 Microns	0-10	0-10	0-10	0-10

OR

3. Write down the step by step procedure of concrete mix design by ACI method. **16**

4. Attempt **any three** of the following : **(3×4=12)**

   1) Write a short note on creep and enlist factors affecting it.

   2) Write a short note on shrinkage and enlist factors affecting it.

   3) Explain alkali aggregate reaction and sulphate attack on concrete.

   4) Write significance of permeability of concrete and factors affecting permeability.

   5) Write a short note on gap and graded concrete.

   6) Write a short note on quality control of concrete.

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SLR-VB – 21

Seat No.	

Set Q

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
CONCRETE TECHNOLOGY

Day and Date : Thursday, 4-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Assume **suitable** data if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) Q. No. **1** is **compulsory**. 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 and rewrite in answer book : **(14×1=14)**

1) The choice of mix proportion of a concrete is independent of
   a) Grade designation
   b) Maximum size of aggregate
   c) Minimum water-cement ratio
   d) Batching, mixing, placing and compaction techniques

2) For water-cement ratio of 0.6 the water content per bag of cement is
   a) 10 kg b) 20 kg c) 30 kg d) 40 kg

3) The minimum water content for complete hydration of cement is
   a) 0.65 b) 0.5 c) 0.35 d) 0.27

4) Under water concreting is done by
   a) Dripping method b) Tremie method
   c) Cofferdam method d) All of the above

5) IS provision for concrete mix design is given by
   a) IS 4031-1968 b) IS 383-1970
   c) IS 456-2000 d) IS 10262-2009

P.T.O.

6) A mixer designated 400NT indicates that
   a) It is non-tilting type mixer
   b) Its nominal mix batch capacity is 400 liters
   c) Both a) and b)
   d) It is non-tilting type mixer requiring 400 revolutions for proper mix
7) The strength of light weight concrete depends upon
   a) Density of concrete b) Size of aggregates
   c) Type of cement d) Mix proportion
8) The percentage of gypsum added during manufacturing process is
   a) 0.2 b) 0.25 to 0.35 c) 2.5 to 3.5 d) 5 to 10
9) Bulking of sand is the
   a) Rodding of the sand so that it occupies minimum volume
   b) Compacting of the sand
   c) False increase in the volume of sand due to moisture
   d) Segregating sand of particular size
10) 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
11) Which of the following statement is incorrect ?
   a) Water is the most important and least expensive ingredient of concrete
   b) Mixing water is utilized in the hydration of cement and provides lubrication between fine and coarse aggregates
   c) Excess water forms a scum or laitance at the surface
   d) None of the above
12) An accelerator shortens all of the following except
   a) Setting time b) Period of curing
   c) Period of removal of formwork d) Strength of concrete
13) If the slump of concrete is 75 mm its workability is considered to be
   a) Very high b) High c) Medium d) Low
14) The stress and strain curve of concrete in compression is obtained by testing the cylindrical specimen under
   a) Uniform rate of strain b) Uniform rate of stress
   c) Constant stress condition d) Constant strain condition

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SLR-VB – 21

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
CONCRETE TECHNOLOGY

Day and Date : Thursday, 4-5-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any seven** of the following : **(7×4=28)**

1) Enlist types of cement. Write in brief on P.P.C.

2) Write a brief note on bulking of the sand.

3) Explain workability of concrete and enlist the methods to measure the same. Also mention the unit.

4) Write in brief on admixtures and additives in concrete.

5) Write a short note on transportation of concrete.

6) Explain sieve analysis of aggregates.

7) Enlist factors affecting strength of concrete and explain any one.

8) Draw detailed flowchart of cement manufacturing by dry process.

9) Define Bulk density and Specific gravity. If Bulk density of CA is 1700 kg/m^3 and specific gravity of the same is 2.80, workout the volume of CA if weight of CA in particular mixes was 1200 kg/m^3 using bulk density and specific gravity.

10) Explain mechanism of super plasticizer in concrete.

SECTION – II

3. Design a concrete mix of grade M20 as per IS 10262-2009. Use following data : **16**

   1) Concrete is to be used for R.C.C. work.

   2) Exposure condition – Mild.

   3) Cement to be used – OPC 53 grade.

   4) Workability required – 100 mm Slump.

   5) Method of concrete placing – Pumping.

   6) Mineral Admixture – Nil.

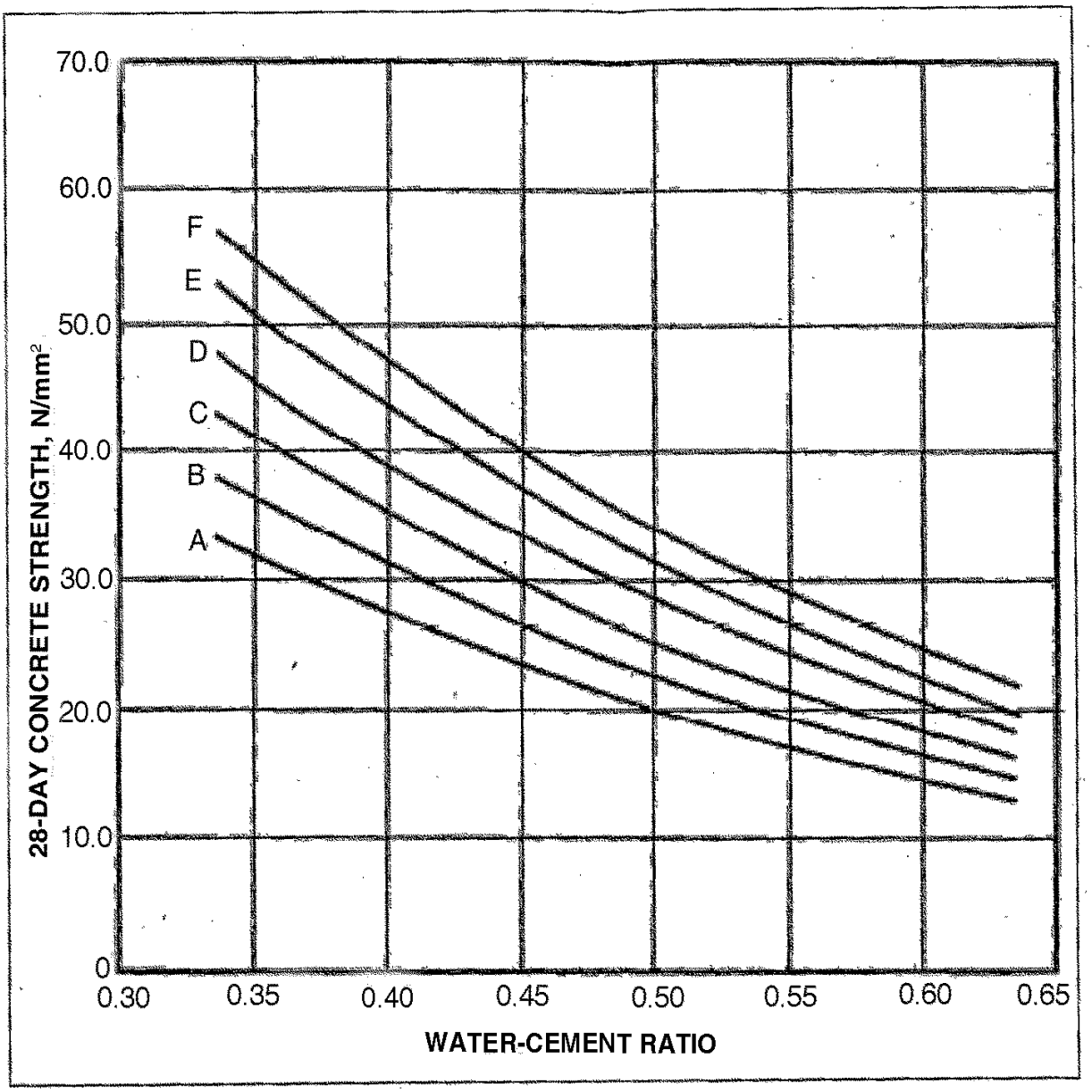
   7) Superplasticizer – Nil.

   8) Max. size of aggregate – 20 mm (crushed angular)

   9) Test data for material –
      a) Specific gravity of cement = 3.15, FA = 2.60 and CA = 2.90.
      b) Water absorption of FA = 1.4% and CA = 1%.
      c) Moisture content of FA = 2% and CA = Nil.

   10) 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 = 3.68 – 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 1 Assumed Standard Deviation (Ref : IS 456-2002)										
Sl. No.	1	2	3	4	5	6	7	8	9	10
Grade of Concrete	M10	M15	M20	M25	M30	M35	M40	M45	M50	M55
Assumed Standard Deviation (N/mm^2)	3.50		4.00		5.00					

Table 2 Maximum Water Content per Cubic Meter of Concrete for Nominal Maximum Size of Aggregate (Ref : IS 10262 – 2009)		
Sl. No.	**Nominal Maximum Size of Aggregate (mm)**	**Maximum Water Content***
1	10	208
2	20	186
3	40	165
Note : The quantities of mixing water are for use in computing cementitious material content for trial batches *Water content corresponding to saturated surface dry aggregate		

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate* (Ref : IS 10262 – 2009)					
Sl. No.	**Nominal Maximum Size of Aggregate (mm)**	**Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Fine Aggregate***			
		Zone IV	**Zone III**	**Zone II**	**Zone I**
1	10	0.50	0.48	0.46	0.44
2	20	0.66	0.64	0.62	0.60
3	40	0.75	0.73	0.71	0.69
*Volumes are based on aggregate in saturated surface dry condition					

Table 4 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregate of 20 mm Nominal Maximum Size (Ref : IS 456-2002)

Sl. No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m^2	Maximum Free Water Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m^2	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
i)	Mild	220	0.60	-	300	0.55	M20
ii)	Moderate	240	0.60	M15	300	0.50	M25
iii)	Severe	250	0.50	M20	320	0.45	M30
iv)	Very Severe	260	0.45	M20	340	0.45	M35
v)	Extreme	280	0.40	M25	360	0.40	M40

Notes - 1) Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2 of IS 456 additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of Pozzolana and slag specified in IS 1489 (Part– 1) and IS : 455 respectively. 2) Minimum grade for plain concrete under mild exposure condition is not specified.

Table 5 Grading of Fine Aggregate (Ref : IS 383)

IS Sieve Designations	Percentage Passing			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	90-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30 -70	55-90	75-100	90-100
600 Microns	15-34	35-59	60-79	80-100
300 Microns	5-20	8-30	12-40	15-50
150 Microns	0-10	0-10	0-10	0-10

OR

3. Write down the step by step procedure of concrete mix design by ACI method. **16**

4. Attempt **any three** of the following : **(3×4=12)**

   1) Write a short note on creep and enlist factors affecting it.

   2) Write a short note on shrinkage and enlist factors affecting it.

   3) Explain alkali aggregate reaction and sulphate attack on concrete.

   4) Write significance of permeability of concrete and factors affecting permeability.

   5) Write a short note on gap and graded concrete.

   6) Write a short note on quality control of concrete.

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SLR-VB – 21

Seat No.	

Set **R**

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
CONCRETE TECHNOLOGY

Day and Date : Thursday, 4-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Assume **suitable** data if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) Q. No. **1** is **compulsory**. 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 and rewrite in answer book : **(14×1=14)**

1) An accelerator shortens all of the following except
   a) Setting time b) Period of curing
   c) Period of removal of formwork d) Strength of concrete

2) If the slump of concrete is 75 mm its workability is considered to be
   a) Very high b) High c) Medium d) Low

3) The stress and strain curve of concrete in compression is obtained by testing the cylindrical specimen under
   a) Uniform rate of strain b) Uniform rate of stress
   c) Constant stress condition d) Constant strain condition

4) The choice of mix proportion of a concrete is independent of
   a) Grade designation
   b) Maximum size of aggregate
   c) Minimum water-cement ratio
   d) Batching, mixing, placing and compaction techniques

5) For water-cement ratio of 0.6 the water content per bag of cement is
   a) 10 kg b) 20 kg c) 30 kg d) 40 kg

6) The minimum water content for complete hydration of cement is
   a) 0.65 b) 0.5 c) 0.35 d) 0.27

7) Under water concreting is done by
   a) Dripping method
   b) Tremie method
   c) Cofferdam method
   d) All of the above
8) IS provision for concrete mix design is given by
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9) A mixer designated 400NT indicates that
   a) It is non-tilting type mixer
   b) Its nominal mix batch capacity is 400 liters
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10) The strength of light weight concrete depends upon
   a) Density of concrete
   b) Size of aggregates
   c) Type of cement
   d) Mix proportion
11) The percentage of gypsum added during manufacturing process is
   a) 0.2 b) 0.25 to 0.35 c) 2.5 to 3.5 d) 5 to 10
12) Bulking of sand is the
   a) Rodding of the sand so that it occupies minimum volume
   b) Compacting of the sand
   c) False increase in the volume of sand due to moisture
   d) Segregating sand of particular size
13) 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
14) Which of the following statement is incorrect ?
   a) Water is the most important and least expensive ingredient of concrete
   b) Mixing water is utilized in the hydration of cement and provides lubrication between fine and coarse aggregates
   c) Excess water forms a scum or laitance at the surface
   d) None of the above

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SLR-VB – 21

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
CONCRETE TECHNOLOGY

Day and Date : Thursday, 4-5-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Assume **suitable** data if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
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SECTION – I

2. Solve **any seven** of the following : **(7×4=28)**

1) Enlist types of cement. Write in brief on P.P.C.

2) Write a brief note on bulking of the sand.

3) Explain workability of concrete and enlist the methods to measure the same. Also mention the unit.

4) Write in brief on admixtures and additives in concrete.

5) Write a short note on transportation of concrete.

6) Explain sieve analysis of aggregates.

7) Enlist factors affecting strength of concrete and explain any one.

8) Draw detailed flowchart of cement manufacturing by dry process.

9) Define Bulk density and Specific gravity. If Bulk density of CA is 1700 kg/m^3 and specific gravity of the same is 2.80, workout the volume of CA if weight of CA in particular mixes was 1200 kg/m^3 using bulk density and specific gravity.

10) Explain mechanism of super plasticizer in concrete.

SECTION – II

3. Design a concrete mix of grade M20 as per IS 10262-2009. Use following data : **16**

   1) Concrete is to be used for R.C.C. work.

   2) Exposure condition – Mild.

   3) Cement to be used – OPC 53 grade.

   4) Workability required – 100 mm Slump.

   5) Method of concrete placing – Pumping.

   6) Mineral Admixture – Nil.

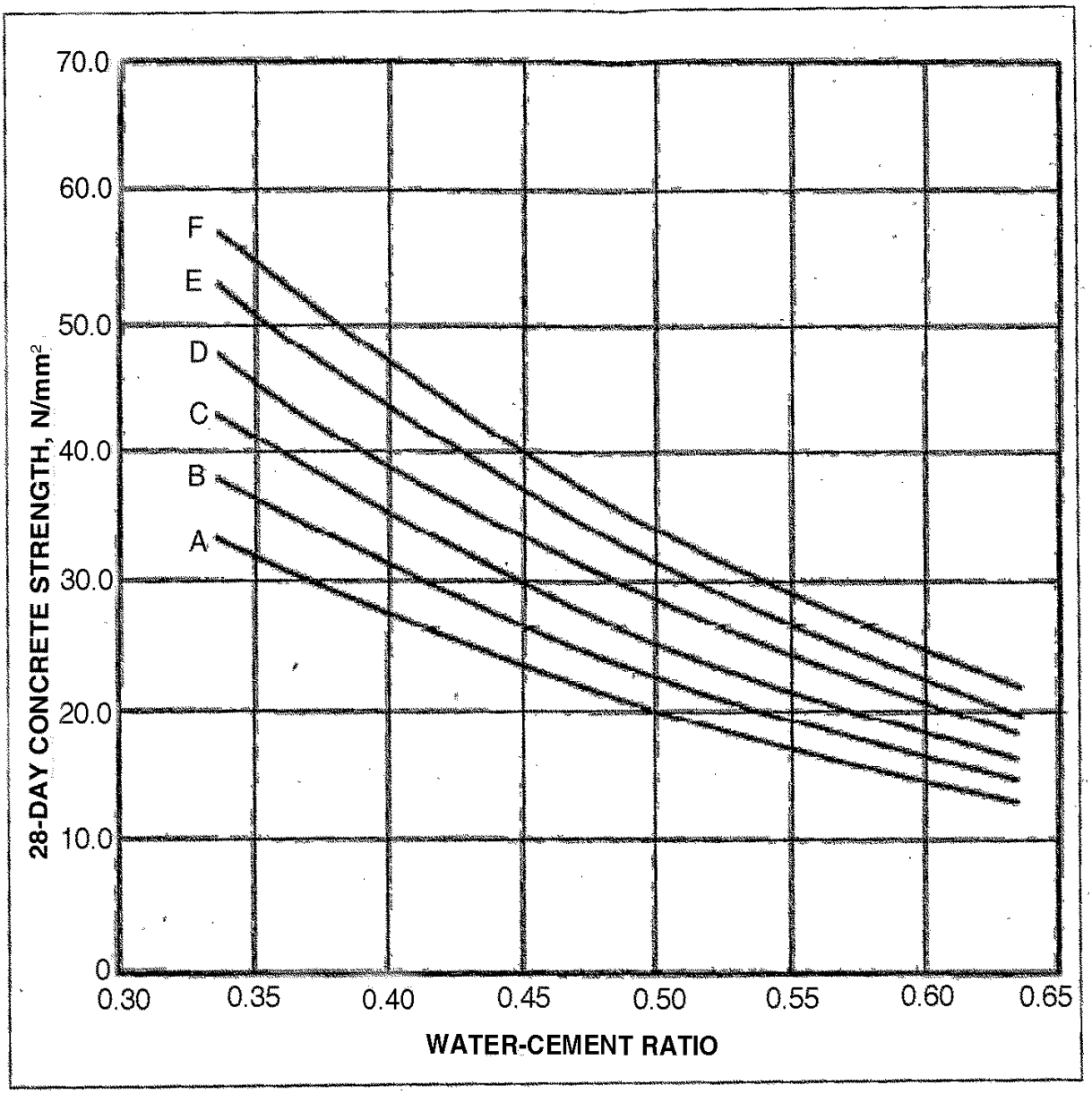
   7) Superplasticizer – Nil.

   8) Max. size of aggregate – 20 mm (crushed angular)

   9) Test data for material –
      a) Specific gravity of cement = 3.15, FA = 2.60 and CA = 2.90.
      b) Water absorption of FA = 1.4% and CA = 1%.
      c) Moisture content of FA = 2% and CA = Nil.

   10) 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 = 3.68 – 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 1 Assumed Standard Deviation (Ref : IS 456-2002)										
Sl. No.	1	2	3	4	5	6	7	8	9	10
Grade of Concrete	M10	M15	M20	M25	M30	M35	M40	M45	M50	M55
Assumed Standard Deviation (N/mm^2)	3.50		4.00		5.00					

Table 2 Maximum Water Content per Cubic Meter of Concrete for Nominal Maximum Size of Aggregate (Ref : IS 10262 – 2009)		
Sl. No.	**Nominal Maximum Size of Aggregate (mm)**	**Maximum Water Content***
1	10	208
2	20	186
3	40	165
Note : The quantities of mixing water are for use in computing cementitious material content for trial batches *Water content corresponding to saturated surface dry aggregate		

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate* (Ref : IS 10262 – 2009)					
Sl. No.	**Nominal Maximum Size of Aggregate (mm)**	**Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Fine Aggregate***			
		Zone IV	**Zone III**	**Zone II**	**Zone I**
1	10	0.50	0.48	0.46	0.44
2	20	0.66	0.64	0.62	0.60
3	40	0.75	0.73	0.71	0.69
*Volumes are based on aggregate in saturated surface dry condition					

Table 4 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregate of 20 mm Nominal Maximum Size (Ref : IS 456-2002)

Sl. No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m^2	Maximum Free Water Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m^2	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
i)	Mild	220	0.60	-	300	0.55	M20
ii)	Moderate	240	0.60	M15	300	0.50	M25
iii)	Severe	250	0.50	M20	320	0.45	M30
iv)	Very Severe	260	0.45	M20	340	0.45	M35
v)	Extreme	280	0.40	M25	360	0.40	M40

Notes - 1) Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2 of IS 456 additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of Pozzolana and slag specified in IS 1489 (Part– 1) and IS : 455 respectively. 2) Minimum grade for plain concrete under mild exposure condition is not specified.

Table 5 Grading of Fine Aggregate (Ref : IS 383)

IS Sieve Designations	Percentage Passing			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	90-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30 -70	55-90	75-100	90-100
600 Microns	15-34	35-59	60-79	80-100
300 Microns	5-20	8-30	12-40	15-50
150 Microns	0-10	0-10	0-10	0-10

OR

3. Write down the step by step procedure of concrete mix design by ACI method. **16**

4. Attempt **any three** of the following : **(3×4=12)**

   1) Write a short note on creep and enlist factors affecting it.

   2) Write a short note on shrinkage and enlist factors affecting it.

   3) Explain alkali aggregate reaction and sulphate attack on concrete.

   4) Write significance of permeability of concrete and factors affecting permeability.

   5) Write a short note on gap and graded concrete.

   6) Write a short note on quality control of concrete.

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SLR-VB – 21

Seat No.	

Set **S**

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
CONCRETE TECHNOLOGY

Day and Date : Thursday, 4-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Assume **suitable** data if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) Q. No. **1** is **compulsory**. 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 and rewrite in answer book : **(14×1=14)**

1) The minimum water content for complete hydration of cement is
   a) 0.65 b) 0.5 c) 0.35 d) 0.27
2) Under water concreting is done by
   a) Dripping method b) Tremie method
   c) Cofferdam method d) All of the above
3) IS provision for concrete mix design is given by
   a) IS 4031-1968 b) IS 383-1970
   c) IS 456-2000 d) IS 10262-2009
4) A mixer designated 400NT indicates that
   a) It is non-tilting type mixer
   b) Its nominal mix batch capacity is 400 liters
   c) Both a) and b)
   d) It is non-tilting type mixer requiring 400 revolutions for proper mix
5) The strength of light weight concrete depends upon
   a) Density of concrete b) Size of aggregates
   c) Type of cement d) Mix proportion
6) The percentage of gypsum added during manufacturing process is
   a) 0.2 b) 0.25 to 0.35 c) 2.5 to 3.5 d) 5 to 10

P.T.O.

7) Bulking of sand is the
   a) Rodding of the sand so that it occupies minimum volume
   b) Compacting of the sand
   c) False increase in the volume of sand due to moisture
   d) Segregating sand of particular size
8) 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
9) Which of the following statement is incorrect ?
   a) Water is the most important and least expensive ingredient of concrete
   b) Mixing water is utilized in the hydration of cement and provides lubrication between fine and coarse aggregates
   c) Excess water forms a scum or laitance at the surface
   d) None of the above
10) An accelerator shortens all of the following except
   a) Setting time b) Period of curing
   c) Period of removal of formwork d) Strength of concrete
11) If the slump of concrete is 75 mm its workability is considered to be
   a) Very high b) High c) Medium d) Low
12) The stress and strain curve of concrete in compression is obtained by testing the cylindrical specimen under
   a) Uniform rate of strain b) Uniform rate of stress
   c) Constant stress condition d) Constant strain condition
13) The choice of mix proportion of a concrete is independent of
   a) Grade designation
   b) Maximum size of aggregate
   c) Minimum water-cement ratio
   d) Batching, mixing, placing and compaction techniques
14) For water-cement ratio of 0.6 the water content per bag of cement is
   a) 10 kg b) 20 kg c) 30 kg d) 40 kg

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SLR-VB – 21

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
CONCRETE TECHNOLOGY

Day and Date : Thursday, 4-5-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any seven** of the following : **(7×4=28)**

1) Enlist types of cement. Write in brief on P.P.C.

2) Write a brief note on bulking of the sand.

3) Explain workability of concrete and enlist the methods to measure the same. Also mention the unit.

4) Write in brief on admixtures and additives in concrete.

5) Write a short note on transportation of concrete.

6) Explain sieve analysis of aggregates.

7) Enlist factors affecting strength of concrete and explain any one.

8) Draw detailed flowchart of cement manufacturing by dry process.

9) Define Bulk density and Specific gravity. If Bulk density of CA is 1700 kg/m^3 and specific gravity of the same is 2.80, workout the volume of CA if weight of CA in particular mixes was 1200 kg/m^3 using bulk density and specific gravity.

10) Explain mechanism of super plasticizer in concrete.

SECTION – II

3. Design a concrete mix of grade M20 as per IS 10262-2009. Use following data : **16**

1) Concrete is to be used for R.C.C. work.

2) Exposure condition – Mild.

3) Cement to be used – OPC 53 grade.

4) Workability required – 100 mm Slump.

5) Method of concrete placing – Pumping.

6) Mineral Admixture – Nil.

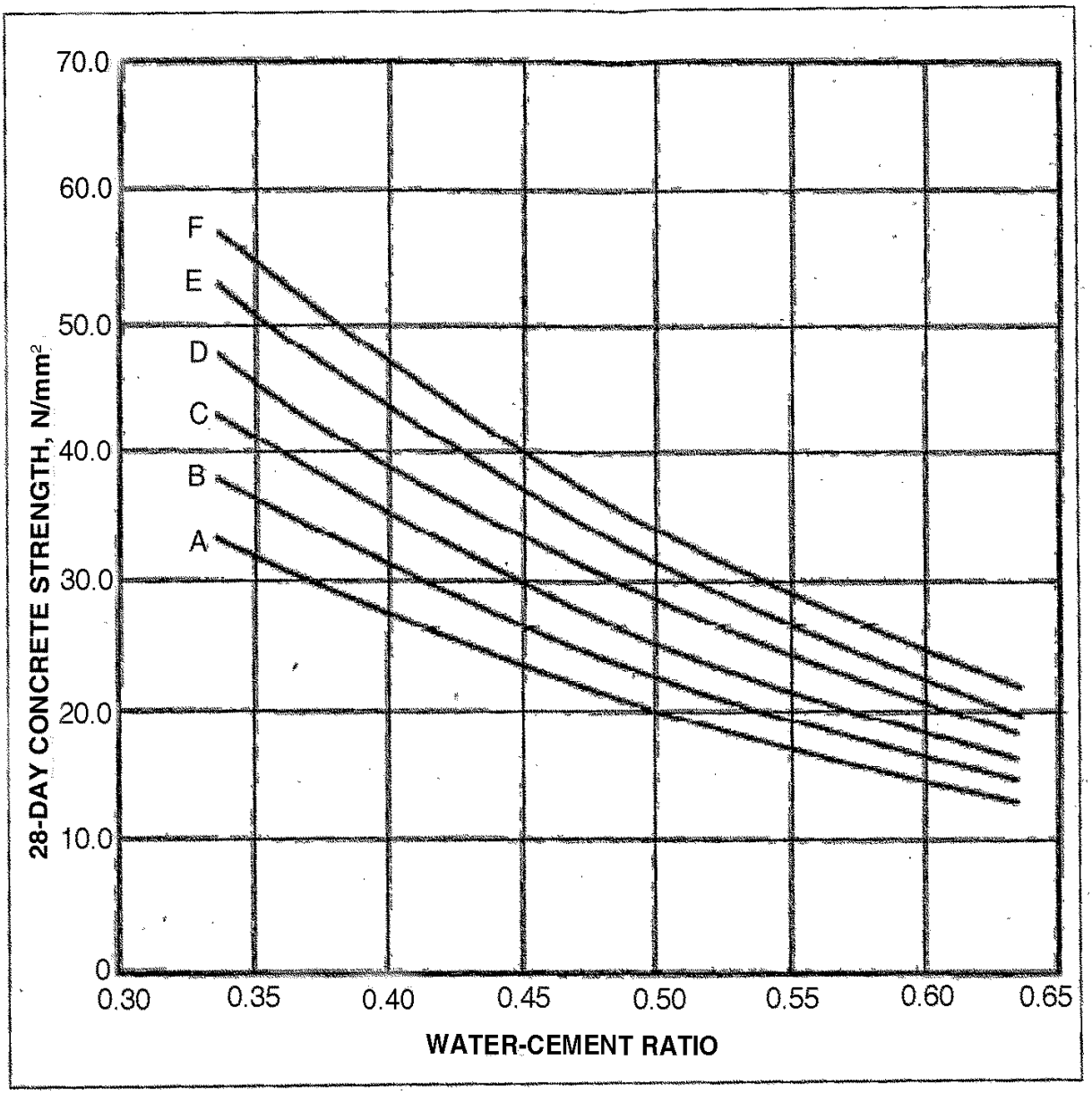
7) Superplasticizer – Nil.

8) Max. size of aggregate – 20 mm (crushed angular)

9) Test data for material –
   a) Specific gravity of cement = 3.15, FA = 2.60 and CA = 2.90.
   b) Water absorption of FA = 1.4% and CA = 1%.
   c) Moisture content of FA = 2% and CA = Nil.

10) 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 = 3.68 – 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 1 Assumed Standard Deviation (Ref : IS 456-2002)										
Sl. No.	1	2	3	4	5	6	7	8	9	10
Grade of Concrete	M10	M15	M20	M25	M30	M35	M40	M45	M50	M55
Assumed Standard Deviation (N/mm^2)	3.50		4.00		5.00					

Table 2 Maximum Water Content per Cubic Meter of Concrete for Nominal Maximum Size of Aggregate (Ref : IS 10262 – 2009)		
Sl. No.	**Nominal Maximum Size of Aggregate (mm)**	**Maximum Water Content***
1	10	208
2	20	186
3	40	165
Note : The quantities of mixing water are for use in computing cementitious material content for trial batches *Water content corresponding to saturated surface dry aggregate		

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate* (Ref : IS 10262 – 2009)					
Sl. No.	**Nominal Maximum Size of Aggregate (mm)**	**Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Fine Aggregate***			
		Zone IV	**Zone III**	**Zone II**	**Zone I**
1	10	0.50	0.48	0.46	0.44
2	20	0.66	0.64	0.62	0.60
3	40	0.75	0.73	0.71	0.69
*Volumes are based on aggregate in saturated surface dry condition					

Table 4 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregate of 20 mm Nominal Maximum Size (Ref : IS 456-2002)

Sl. No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m^2	Maximum Free Water Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m^2	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
i)	Mild	220	0.60	-	300	0.55	M20
ii)	Moderate	240	0.60	M15	300	0.50	M25
iii)	Severe	250	0.50	M20	320	0.45	M30
iv)	Very Severe	260	0.45	M20	340	0.45	M35
v)	Extreme	280	0.40	M25	360	0.40	M40

Notes - 1) Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2 of IS 456 additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of Pozzolana and slag specified in IS 1489 (Part– 1) and IS : 455 respectively. 2) Minimum grade for plain concrete under mild exposure condition is not specified.

Table 5 Grading of Fine Aggregate (Ref : IS 383)

IS Sieve Designations	Percentage Passing			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	90-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30 -70	55-90	75-100	90-100
600 Microns	15-34	35-59	60-79	80-100
300 Microns	5-20	8-30	12-40	15-50
150 Microns	0-10	0-10	0-10	0-10

OR

3. Write down the step by step procedure of concrete mix design by ACI method. **16**

4. Attempt **any three** of the following : **(3×4=12)**

   1) Write a short note on creep and enlist factors affecting it.

   2) Write a short note on shrinkage and enlist factors affecting it.

   3) Explain alkali aggregate reaction and sulphate attack on concrete.

   4) Write significance of permeability of concrete and factors affecting permeability.

   5) Write a short note on gap and graded concrete.

   6) Write a short note on quality control of concrete.

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SLR-VB – 22

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
STRUCTURAL MECHANICS – I

Day and Date : Friday, 5-5-2017 Max. Marks : 70
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, **if** necessary and mention **it clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers :

1) For a cantilever, the shear force at the free end is
   a) Maximum b) Minimum c) Zero d) None

2) The point of contraflexure is a point where
   a) The SF is maximum b) The SF is zero
   c) The BM is maximum d) The BM is zero

3) Section modulus of a rectangular section of breadth b and depth d is
   a) $db^2/4$ b) $db^2/6$ c) $bd^2/4$ d) $bd^2/6$

4) Strength of a beam is more if its section modulus is
   a) Decreased b) Zero
   c) Increased d) None

5) For the span of a beam in pure bending, following condition exists.
   a) Zero BM b) Zero SF
   c) Varying BM d) Varying SF

P.T.O.

6) Maximum stress in foundations of a dam/retaining wall is at
   a) Toe b) Heel c) Mid point d) Top

7) Coefficient of wind resistance for circular shape chimney is
   a) 1/3 b) 2/3 c) 1.5 d) 1

8) For a beam of rectangular cross section, the ratio τ_{max}/τ_{av} is
   a) 2 b) 1 c) 1.5 d) None

9) Shear stress is zero at the
   a) Outermost fiber
   b) Central fiber
   c) Neither outermost nor central fiber
   d) None

10) 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

11) A shaft of length L is subjected to a constant twisting moment T along its length L, then angle θ through which one end of the bar will twist relative to other will be
   a) T/γ b) T/GJ c) GJ/TL d) TL/GJ b

12) In power transmission equation, $P = 2\pi NT/60 \times 1000$
   a) P is in kW and T is maximum torque
   b) P is in NM/sec and T is maximum torque
   c) P is in NM/sec and T is mean torque
   d) P is in kW and T is mean torque

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

14) 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

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SLR-VB – 22

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
STRUCTURAL MECHANICS – I

Day and Date : Friday, 5-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 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) Obtain relationship between, Modulus of Elasticity and Modulus of Rigidity.

2) Obtain relationship between, Modulus of Elasticity and Bulk Modulus.

3) Explain stress strain curve for brittle materials. Draw neat sketch.

4) Derive relationship between S.F. and B.M. at a section of a beam.

5) Draw kern of a section for (i) Rectangular and (ii) I Sections.

6) Draw typical Shear force and Bending moment diagrams for a simply supported beam of span L subjected to central point load P.

3. Draw SFD and BMD for the beam loaded as shown in fig. 1. **9**

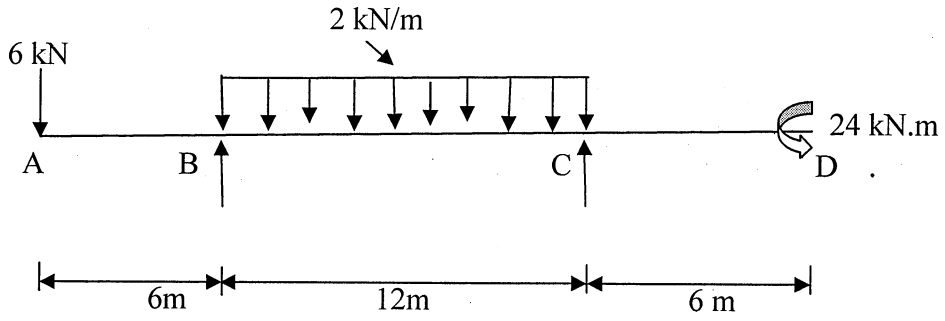

Fig. 1

4. a) Compare the weights of two equally strong beams of circular section made up of same material, one being of solid section and the other of hollow section with inside diameter being 2/5 of the external diameter. **7**

   b) Define flitched beam. Give examples. **2**

5. a) A 6 m high trapezoidal retaining wall is 1.5 m wide at top and 3.5 m wide at the base. The earth retaining face is vertical and the retained earth is level and flush with its top. Determine the maximum and minimum stress intensities at its base section. The earth weighs 16 kN/m^3 and its angle of repose is 30°. Take weight of masonry as 22 kN/m^3. **7**

   b) Draw typical stress variation diagram for a rectangular column cross section loaded with load P. **2**

SECTION – II

6. A beam of span L = 3 meters simply supported at the ends, carries a central point load the beam section has an overall depth 300 mm and width 200 mm. If the maximum shear stress is to be 50 N/mm^2 calculate the value of centrally applied point load. **10**

7. A timber beam 150 mm wide and 200 mm. deep is to be reinforced by bolting on two steel flitches each 150 mm by 12.5 mm in section. Find the moment of resistance when the flitches are attached symmetrically at top and bottom. Allowable stress in timber is 6 N/mm^2 what is the maximum stress in steel. Take $E_{steel} = 20\ E_{wood}$. **9**

8. a) Write torsion equation and also mention meaning of each term. **2**

   b) A hollow shaft of 20 mm outside diameter and 16 mm inside diameter is subjected to torque of 40 N/m. Find shear stress at outside and inside of the shaft. **7**

9. a) Define strain energy and write expression for strain energy due to suddenly applied load. **2**

   b) A cylindrical vessel for a compressor is 2.5 m in internal diameter and made of plates 12 mm thick. If hoop stress is not to exceed 100 N/mm^2 and axial stress is not to exceed 50 N/mm^2 find maximum safe air pressure. **7**

SLR-VB – 22

Seat No.	

Set Q

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
STRUCTURAL MECHANICS – I

Day and Date : Friday, 5-5-2017 Max. Marks : 70
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, **if** necessary and mention **it clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers :

1) For a beam of rectangular cross section, the ratio τ_{max}/τ_{av} is
   a) 2 b) 1 c) 1.5 d) None

2) Shear stress is zero at the
   a) Outermost fiber
   b) Central fiber
   c) Neither outermost nor central fiber
   d) None

3) 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

4) A shaft of length L is subjected to a constant twisting moment T along its length L, then angle θ through which one end of the bar will twist relative to other will be
   a) T/γ b) T/GJ c) GJ/TL d) TL/GJ b

P.T.O.

5) In power transmission equation, $P = 2\pi NT/60 \times 1000$
   a) P is in kW and T is maximum torque
   b) P is in NM/sec and T is maximum torque
   c) P is in NM/sec and T is mean torque
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6) The unit of Torque in SI units
   a) kg-m b) kg-cm c) N-m d) N/m^2

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   a) strain energy b) resilience
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8) For a cantilever, the shear force at the free end is
   a) Maximum b) Minimum c) Zero d) None

9) The point of contraflexure is a point where
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10) Section modulus of a rectangular section of breadth b and depth d is
   a) $db^2/4$ b) $db^2/6$ c) $bd^2/4$ d) $bd^2/6$

11) Strength of a beam is more if its section modulus is
   a) Decreased b) Zero
   c) Increased d) None

12) For the span of a beam in pure bending, following condition exists.
   a) Zero BM b) Zero SF
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13) Maximum stress in foundations of a dam/retaining wall is at
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14) Coefficient of wind resistance for circular shape chimney is
   a) 1/3 b) 2/3 c) 1.5 d) 1

———————

SLR-VB – 22

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
STRUCTURAL MECHANICS – I

Day and Date : Friday, 5-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 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) Explain stress strain curve for brittle materials. Draw neat sketch.

4) Derive relationship between S.F. and B.M. at a section of a beam.

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3. Draw SFD and BMD for the beam loaded as shown in fig. 1. **9**

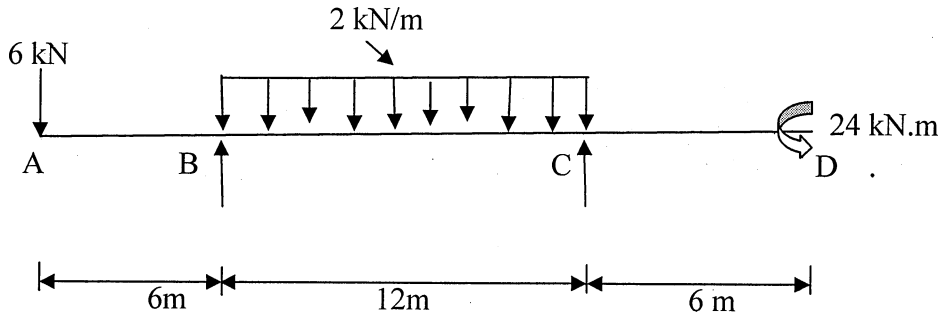

Fig. 1

4. a) Compare the weights of two equally strong beams of circular section made up of same material, one being of solid section and the other of hollow section with inside diameter being 2/5 of the external diameter. **7**

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SECTION – II

6. A beam of span L = 3 meters simply supported at the ends, carries a central point load the beam section has an overall depth 300 mm and width 200 mm. If the maximum shear stress is to be 50 N/mm^2 calculate the value of centrally applied point load. **10**

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8. a) Write torsion equation and also mention meaning of each term. **2**

   b) A hollow shaft of 20 mm outside diameter and 16 mm inside diameter is subjected to torque of 40 N/m. Find shear stress at outside and inside of the shaft. **7**

9. a) Define strain energy and write expression for strain energy due to suddenly applied load. **2**

   b) A cylindrical vessel for a compressor is 2.5 m in internal diameter and made of plates 12 mm thick. If hoop stress is not to exceed 100 N/mm^2 and axial stress is not to exceed 50 N/mm^2 find maximum safe air pressure. **7**

SLR-VB – 22

Seat No.	

Set R

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
STRUCTURAL MECHANICS – I

Day and Date : Friday, 5-5-2017 Max. Marks : 70
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, **if** necessary and mention **it clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers :

1) For the span of a beam in pure bending, following condition exists.
   a) Zero BM b) Zero SF
   c) Varying BM d) Varying SF

2) Maximum stress in foundations of a dam/retaining wall is at
   a) Toe b) Heel c) Mid point d) Top

3) Coefficient of wind resistance for circular shape chimney is
   a) 1/3 b) 2/3 c) 1.5 d) 1

4) For a beam of rectangular cross section, the ratio τ_{max}/τ_{av} is
   a) 2 b) 1 c) 1.5 d) None

5) Shear stress is zero at the
   a) Outermost fiber
   b) Central fiber
   c) Neither outermost nor central fiber
   d) None

6) 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

7) A shaft of length L is subjected to a constant twisting moment T along its length L, then angle θ through which one end of the bar will twist relative to other will be
   a) T/γ b) T/GJ c) GJ/TL d) TL/GJ b

8) In power transmission equation, $P = 2\pi NT/60 \times 1000$
   a) P is in kW and T is maximum torque
   b) P is in NM/sec and T is maximum torque
   c) P is in NM/sec and T is mean torque
   d) P is in kW and T is mean torque

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

10) 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

11) For a cantilever, the shear force at the free end is
   a) Maximum b) Minimum c) Zero d) None

12) The point of contraflexure is a point where
   a) The SF is maximum b) The SF is zero
   c) The BM is maximum d) The BM is zero

13) Section modulus of a rectangular section of breadth b and depth d is
   a) $db^2/4$ b) $db^2/6$ c) $bd^2/4$ d) $bd^2/6$

14) Strength of a beam is more if its section modulus is
   a) Decreased b) Zero
   c) Increased d) None

SLR-VB – 22

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
STRUCTURAL MECHANICS – I

Day and Date : Friday, 5-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 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) Obtain relationship between, Modulus of Elasticity and Modulus of Rigidity.

2) Obtain relationship between, Modulus of Elasticity and Bulk Modulus.

3) Explain stress strain curve for brittle materials. Draw neat sketch.

4) Derive relationship between S.F. and B.M. at a section of a beam.

5) Draw kern of a section for (i) Rectangular and (ii) I Sections.

6) Draw typical Shear force and Bending moment diagrams for a simply supported beam of span L subjected to central point load P.

3. Draw SFD and BMD for the beam loaded as shown in fig. 1. **9**

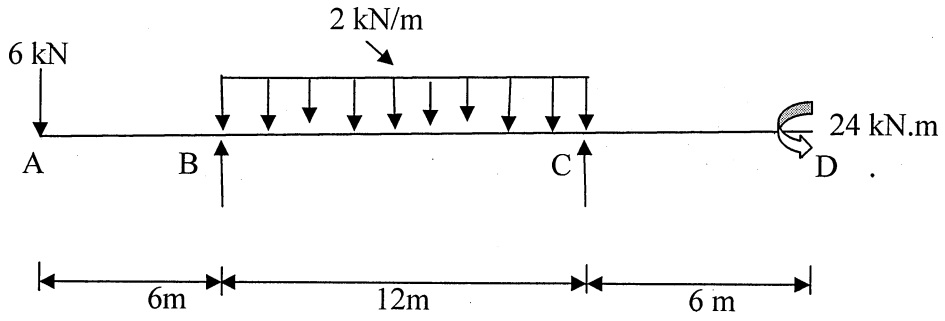

Fig. 1

4. a) Compare the weights of two equally strong beams of circular section made up of same material, one being of solid section and the other of hollow section with inside diameter being 2/5 of the external diameter. **7**

   b) Define flitched beam. Give examples. **2**

5. a) A 6 m high trapezoidal retaining wall is 1.5 m wide at top and 3.5 m wide at the base. The earth retaining face is vertical and the retained earth is level and flush with its top. Determine the maximum and minimum stress intensities at its base section. The earth weighs 16 kN/m^3 and its angle of repose is 30°. Take weight of masonry as 22 kN/m^3. **7**

   b) Draw typical stress variation diagram for a rectangular column cross section loaded with load P. **2**

SECTION – II

6. A beam of span L = 3 meters simply supported at the ends, carries a central point load the beam section has an overall depth 300 mm and width 200 mm. If the maximum shear stress is to be 50 N/mm^2 calculate the value of centrally applied point load. **10**

7. A timber beam 150 mm wide and 200 mm. deep is to be reinforced by bolting on two steel flitches each 150 mm by 12.5 mm in section. Find the moment of resistance when the flitches are attached symmetrically at top and bottom. Allowable stress in timber is 6 N/mm^2 what is the maximum stress in steel. Take $E_{steel} = 20\ E_{wood}$. **9**

8. a) Write torsion equation and also mention meaning of each term. **2**

   b) A hollow shaft of 20 mm outside diameter and 16 mm inside diameter is subjected to torque of 40 N/m. Find shear stress at outside and inside of the shaft. **7**

9. a) Define strain energy and write expression for strain energy due to suddenly applied load. **2**

   b) A cylindrical vessel for a compressor is 2.5 m in internal diameter and made of plates 12 mm thick. If hoop stress is not to exceed 100 N/mm^2 and axial stress is not to exceed 50 N/mm^2 find maximum safe air pressure. **7**

SLR-VB – 22

Seat No.	

Set **S**

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
STRUCTURAL MECHANICS – I

Day and Date : Friday, 5-5-2017 Max. Marks : 70
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, **if** necessary and mention **it clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers :

1) 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

2) A shaft of length L is subjected to a constant twisting moment T along its length L, then angle θ through which one end of the bar will twist relative to other will be
   a) T/γ b) T/GJ c) GJ/TL d) TL/GJ b

3) In power transmission equation, $P = 2\pi NT/60 \times 1000$
   a) P is in kW and T is maximum torque
   b) P is in NM/sec and T is maximum torque
   c) P is in NM/sec and T is mean torque
   d) P is in kW and T is mean torque

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

P.T.O.

5) 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

6) For a cantilever, the shear force at the free end is
   a) Maximum b) Minimum c) Zero d) None

7) The point of contraflexure is a point where
   a) The SF is maximum b) The SF is zero
   c) The BM is maximum d) The BM is zero

8) Section modulus of a rectangular section of breadth b and depth d is
   a) $db^2/4$ b) $db^2/6$ c) $bd^2/4$ d) $bd^2/6$

9) Strength of a beam is more if its section modulus is
   a) Decreased b) Zero
   c) Increased d) None

10) For the span of a beam in pure bending, following condition exists.
   a) Zero BM b) Zero SF
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11) Maximum stress in foundations of a dam/retaining wall is at
   a) Toe b) Heel c) Mid point d) Top

12) Coefficient of wind resistance for circular shape chimney is
   a) 1/3 b) 2/3 c) 1.5 d) 1

13) For a beam of rectangular cross section, the ratio τ_{max}/τ_{av} is
   a) 2 b) 1 c) 1.5 d) None

14) Shear stress is zero at the
   a) Outermost fiber
   b) Central fiber
   c) Neither outermost nor central fiber
   d) None

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SLR-VB – 22

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
STRUCTURAL MECHANICS – I

Day and Date : Friday, 5-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 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) Obtain relationship between, Modulus of Elasticity and Modulus of Rigidity.

2) Obtain relationship between, Modulus of Elasticity and Bulk Modulus.

3) Explain stress strain curve for brittle materials. Draw neat sketch.

4) Derive relationship between S.F. and B.M. at a section of a beam.

5) Draw kern of a section for (i) Rectangular and (ii) I Sections.

6) Draw typical Shear force and Bending moment diagrams for a simply supported beam of span L subjected to central point load P.

3. Draw SFD and BMD for the beam loaded as shown in fig. 1. **9**

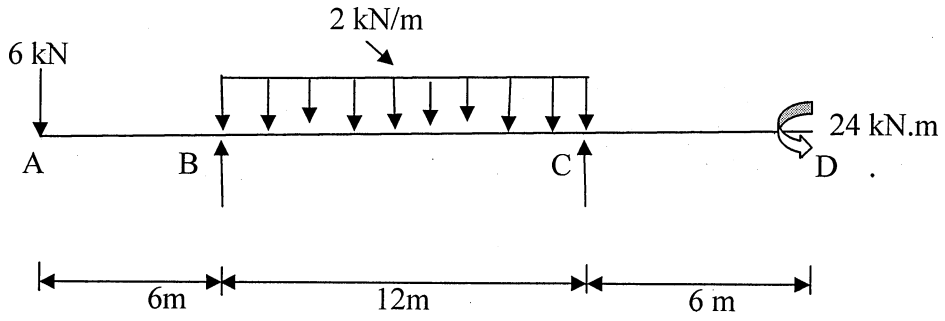

Fig. 1

4. a) Compare the weights of two equally strong beams of circular section made up of same material, one being of solid section and the other of hollow section with inside diameter being 2/5 of the external diameter. **7**

   b) Define flitched beam. Give examples. **2**

5. a) A 6 m high trapezoidal retaining wall is 1.5 m wide at top and 3.5 m wide at the base. The earth retaining face is vertical and the retained earth is level and flush with its top. Determine the maximum and minimum stress intensities at its base section. The earth weighs 16 kN/m^3 and its angle of repose is 30°. Take weight of masonry as 22 kN/m^3. **7**

   b) Draw typical stress variation diagram for a rectangular column cross section loaded with load P. **2**

SECTION – II

6. A beam of span L = 3 meters simply supported at the ends, carries a central point load the beam section has an overall depth 300 mm and width 200 mm. If the maximum shear stress is to be 50 N/mm^2 calculate the value of centrally applied point load. **10**

7. A timber beam 150 mm wide and 200 mm. deep is to be reinforced by bolting on two steel flitches each 150 mm by 12.5 mm in section. Find the moment of resistance when the flitches are attached symmetrically at top and bottom. Allowable stress in timber is 6 N/mm^2 what is the maximum stress in steel. Take $E_{steel} = 20\ E_{wood}$. **9**

8. a) Write torsion equation and also mention meaning of each term. **2**

   b) A hollow shaft of 20 mm outside diameter and 16 mm inside diameter is subjected to torque of 40 N/m. Find shear stress at outside and inside of the shaft. **7**

9. a) Define strain energy and write expression for strain energy due to suddenly applied load. **2**

   b) A cylindrical vessel for a compressor is 2.5 m in internal diameter and made of plates 12 mm thick. If hoop stress is not to exceed 100 N/mm^2 and axial stress is not to exceed 50 N/mm^2 find maximum safe air pressure. **7**

SLR-VB – 23

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
SURVEYING – I

Day and Date : Saturday, 6-5-2017 Total Marks : 70
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 : 14

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

1) Which one of the following methods of levelling eliminates the error due to curvature and refraction ?
   a) Fly levelling
   b) Levelling by equalizing the distances of back sight and foresight
   c) Check levelling
   d) Precise levelling

2) Which one of the following statement is correct ?
   a) The axis of plate level should be parallel to the vertical axis
   b) The axis of telescope must be parallel to the horizontal axis
   c) The line of collimation must be perpendicular to horizontal axis
   d) The line of collimation must be perpendicular to the plate level axis

3) The following type of a levelling cannot be done with a dumpy level
   a) Differential levelling b) Reciprocal levelling
   c) Trigonometric levelling d) Profile levelling

4) If the declination is 5°40'W, which one of the following magnetic bearings would represent the true bearing of S25°20'E ?
   a) S19°40'E b) S31°0'E
   c) S20°0'E d) S19°20'W

P.T.O.

5) Consider the following steps :
   1. Calculation of ΣL and ΣD
   2. Correction to L and D
   3. Calculation of bearings
   4. Calculation of interior angles
   5. Calculation of independent co-ordinates

   The correction sequence of these steps in Gales traverse table calculations is
   a) 3, 4, 5, 2, 1 b) 4, 3, 1, 2, 5 c) 2, 1, 3, 4, 5 d) 4, 3, 5, 2, 1

6) If the whole circle bearing is 315°20', its quadrant bearing would be
   a) S 36°30'W b) N 44°40'W c) N 57°24'W d) S 60°40'W

7) In the ghat tracer if the bevelled edge of the sliding weight is against the center of the scale, the line of sight becomes
   a) Horizontal b) Vertical c) Inclined d) None of these

8) Abney level is used for measurement of
   a) Horizontal angle
   b) Vertical angle of slope
   c) Difference in level
   d) Horizontal distance

9) Tellurometer is an electronic distance measuring device that employs the propagation of
   a) Visible light wave
   b) Radio wave
   c) Both
   d) None of these

10) Total station can be used for
   a) Missing line measurement
   b) Remote elevation measurement
   c) Stake out
   d) All of these

11) For locating inaccessible point with the help of only a plane table, one should use
   a) Traversing b) Resection c) Radiation d) Intersection

12) The method of orientation a plane table with two already plotted points is known as
   a) Intersection
   b) Traversing
   c) Back sighting
   d) Two-point problem

13) What is angle of intersection of a contour and ridge line ?
   a) 30° b) 0° c) 180° d) 90°

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

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SLR-VB – 23

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
SURVEYING – I

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **2** and Q. No. **6** is **compulsory**.*
*2) Answer **any two** questions out of Q. No. **3**, **4**, **5**.*
*3) Answer **any two** questions out of Q. No. **7**, **8**, **9**.*
*4) 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
A	1.155	2.595	A and B = 500 m
B	0.985	2.415	RL of A = 525.500

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

b) Explain optical system in automatic level with the neat sketch. **4**

3. a) The table below gives the lengths and bearings of the lines of a traverse ABCDA. The length and bearing of DA having been missing. Calculate the length and bearing of the line DA. **5**

Line	Length (m)	Bearing
AB	100.0	N 45°30'W
BC	605.00	N 5°30'E
CD	95.00	N 88°20'E
DA	?	?

b) State what are the different check in closed theodolite traverse. **4**

4. a) Explain methods of theodolite traversing in detail. **5**

   b) Write a short note on : Balancing of theodolite traverse. **4**

5. a) What is sounding ? Explain any one method of soundings. **5**

   b) Write a short note on : **4**

      i) Ghat tracer

      OR

      ii) Box sextant.

SECTION – II

6. a) Explain the construction and working of geodimeter. **5**

   b) From the contour map of reservoir, the following contour areas were Planimetered.

Colours (m) :	200	195	190	185	180
Area (m^2) :	3850	3450	2600	800	450

   Top of water level is 200 m and the lowest point in the reservoirs 180 m. Find the quantity of water intake by Trapezoidal and Prismoidal rule. **5**

7. a) Explain the procedure of two point problem with suitable sketch. **5**

   b) Write a note on orientation of plane table. **4**

8. a) Explain characteristics of contour lines with neat sketch. **5**

   b) Describe indirect methods of contouring. **4**

9. a) The following perpendiculars offsets were taken from a chain line to an irregular boundary :

Chainage (m) :	0	30	60	90	120	150	180	210
Offsets length (m) :	0	2.65	3.80	3.75	4.65	3.60	5.00	5.80

   Calculate the area between the chain line and irregular boundary by

      i) Trapezoidal rule

      ii) Simpson's rule. **6**

   b) What are constants of planimeter ? How to find their values ? **3**

SLR-VB – 23

Seat No.	

Set **Q**

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
SURVEYING – I

Day and Date : Saturday, 6-5-2017 Total Marks : 70
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 : 14

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

1) Abney level is used for measurement of
   a) Horizontal angle b) Vertical angle of slope
   c) Difference in level d) Horizontal distance

2) Tellurometer is an electronic distance measuring device that employs the propagation of
   a) Visible light wave b) Radio wave
   c) Both d) None of these

3) Total station can be used for
   a) Missing line measurement b) Remote elevation measurement
   c) Stake out d) All of these

4) For locating inaccessible point with the help of only a plane table, one should use
   a) Traversing b) Resection c) Radiation d) Intersection

5) The method of orientation a plane table with two already plotted points is known as
   a) Intersection b) Traversing
   c) Back sighting d) Two-point problem

6) What is angle of intersection of a contour and ridge line ?
   a) 30° b) 0° c) 180° d) 90°

P.T.O.

7) Most accurate estimate of volume, is given by
   a) Mean area formula
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11) If the declination is 5°40'W, which one of the following magnetic bearings would represent the true bearing of S25°20'E ?
   a) S19°40'E
   b) S31°0'E
   c) S20°0'E
   d) S19°20'W

12) Consider the following steps :
   1. Calculation of ΣL and ΣD
   2. Correction to L and D
   3. Calculation of bearings
   4. Calculation of interior angles
   5. Calculation of independent co-ordinates

   The correction sequence of these steps in Gales traverse table calculations is
   a) 3, 4, 5, 2, 1 b) 4, 3, 1, 2, 5 c) 2, 1, 3, 4, 5 d) 4, 3, 5, 2, 1

13) If the whole circle bearing is 315°20', its quadrant bearing would be
   a) S 36°30'W b) N 44°40'W c) N 57°24'W d) S 60°40'W

14) In the ghat tracer if the bevelled edge of the sliding weight is against the center of the scale, the line of sight becomes
   a) Horizontal b) Vertical c) Inclined d) None of these

SLR-VB – 23

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
SURVEYING – I

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **2** and Q. No. **6** is **compulsory**.*
*2) Answer **any two** questions out of Q. No. **3**, **4**, **5**.*
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SECTION – I

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

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

b) Explain optical system in automatic level with the neat sketch. **4**

3. a) The table below gives the lengths and bearings of the lines of a traverse ABCDA. The length and bearing of DA having been missing. Calculate the length and bearing of the line DA. **5**

Line	Length (m)	Bearing
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   b) From the contour map of reservoir, the following contour areas were Planimetered.

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   Calculate the area between the chain line and irregular boundary by

      i) Trapezoidal rule

      ii) Simpson's rule. **6**

   b) What are constants of planimeter ? How to find their values ? **3**

SLR-VB – 23

Seat No.	

Set R

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
SURVEYING – I

Day and Date : Saturday, 6-5-2017 Total Marks : 70
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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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)**

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1. Calculation of ΣL and ΣD
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a) 3, 4, 5, 2, 1 b) 4, 3, 1, 2, 5 c) 2, 1, 3, 4, 5 d) 4, 3, 5, 2, 1

2) If the whole circle bearing is 315°20', its quadrant bearing would be
a) S 36°30'W b) N 44°40'W c) N 57°24'W d) S 60°40'W

3) In the ghat tracer if the bevelled edge of the sliding weight is against the center of the scale, the line of sight becomes
a) Horizontal b) Vertical c) Inclined d) None of these

4) Abney level is used for measurement of
a) Horizontal angle
b) Vertical angle of slope
c) Difference in level
d) Horizontal distance

5) Tellurometer is an electronic distance measuring device that employs the propagation of
a) Visible light wave
b) Radio wave
c) Both
d) None of these

P.T.O.

6) Total station can be used for
   a) Missing line measurement
   b) Remote elevation measurement
   c) Stake out
   d) All of these

7) For locating inaccessible point with the help of only a plane table, one should use
   a) Traversing b) Resection c) Radiation d) Intersection

8) The method of orientation a plane table with two already plotted points is known as
   a) Intersection
   b) Traversing
   c) Back sighting
   d) Two-point problem

9) What is angle of intersection of a contour and ridge line ?
   a) 30° b) 0° c) 180° d) 90°

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

11) Which one of the following methods of levelling eliminates the error due to curvature and refraction ?
   a) Fly levelling
   b) Levelling by equalizing the distances of back sight and foresight
   c) Check levelling
   d) Precise levelling

12) Which one of the following statement is correct ?
   a) The axis of plate level should be parallel to the vertical axis
   b) The axis of telescope must be parallel to the horizontal axis
   c) The line of collimation must be perpendicular to horizontal axis
   d) The line of collimation must be perpendicular to the plate level axis

13) The following type of a levelling cannot be done with a dumpy level
   a) Differential levelling
   b) Reciprocal levelling
   c) Trigonometric levelling
   d) Profile levelling

14) If the declination is 5°40'W, which one of the following magnetic bearings would represent the true bearing of S25°20'E ?
   a) S19°40'E
   b) S31°0'E
   c) S20°0'E
   d) S19°20'W

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SLR-VB – 23

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
SURVEYING – I

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **2** and Q. No. **6** is **compulsory**.*
*2) Answer **any two** questions out of Q. No. **3**, **4**, **5**.*
*3) Answer **any two** questions out of Q. No. **7**, **8**, **9**.*
*4) 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
A	1.155	2.595	A and B = 500 m
B	0.985	2.415	RL of A = 525.500

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

b) Explain optical system in automatic level with the neat sketch. **4**

3. a) The table below gives the lengths and bearings of the lines of a traverse ABCDA. The length and bearing of DA having been missing. Calculate the length and bearing of the line DA. **5**

Line	Length (m)	Bearing
AB	100.0	N 45°30'W
BC	605.00	N 5°30'E
CD	95.00	N 88°20'E
DA	?	?

b) State what are the different check in closed theodolite traverse. **4**

4. a) Explain methods of theodolite traversing in detail. **5**

   b) Write a short note on : Balancing of theodolite traverse. **4**

5. a) What is sounding ? Explain any one method of soundings. **5**

   b) Write a short note on : **4**

      i) Ghat tracer

      OR

      ii) Box sextant.

SECTION – II

6. a) Explain the construction and working of geodimeter. **5**

   b) From the contour map of reservoir, the following contour areas were Planimetered.

Colours (m) :	200	195	190	185	180
Area (m^2) :	3850	3450	2600	800	450

   Top of water level is 200 m and the lowest point in the reservoirs 180 m. Find the quantity of water intake by Trapezoidal and Prismoidal rule. **5**

7. a) Explain the procedure of two point problem with suitable sketch. **5**

   b) Write a note on orientation of plane table. **4**

8. a) Explain characteristics of contour lines with neat sketch. **5**

   b) Describe indirect methods of contouring. **4**

9. a) The following perpendiculars offsets were taken from a chain line to an irregular boundary :

Chainage (m) :	0	30	60	90	120	150	180	210
Offsets length (m) :	0	2.65	3.80	3.75	4.65	3.60	5.00	5.80

   Calculate the area between the chain line and irregular boundary by

      i) Trapezoidal rule

      ii) Simpson's rule. **6**

   b) What are constants of planimeter ? How to find their values ? **3**

Set R

SLR-VB – 23

Seat No.	

Set S

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
SURVEYING – I

Day and Date : Saturday, 6-5-2017 Total Marks : 70
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 : 14

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

1) Total station can be used for
   a) Missing line measurement b) Remote elevation measurement
   c) Stake out d) All of these

2) For locating inaccessible point with the help of only a plane table, one should use
   a) Traversing b) Resection c) Radiation d) Intersection

3) The method of orientation a plane table with two already plotted points is known as
   a) Intersection b) Traversing
   c) Back sighting d) Two-point problem

4) What is angle of intersection of a contour and ridge line ?
   a) 30° b) 0° c) 180° d) 90°

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

6) Which one of the following methods of levelling eliminates the error due to curvature and refraction ?
   a) Fly levelling
   b) Levelling by equalizing the distances of back sight and foresight
   c) Check levelling
   d) Precise levelling

P.T.O.

7) Which one of the following statement is correct ?
   a) The axis of plate level should be parallel to the vertical axis
   b) The axis of telescope must be parallel to the horizontal axis
   c) The line of collimation must be perpendicular to horizontal axis
   d) The line of collimation must be perpendicular to the plate level axis

8) The following type of a levelling cannot be done with a dumpy level
   a) Differential levelling b) Reciprocal levelling
   c) Trigonometric levelling d) Profile levelling

9) If the declination is 5°40'W, which one of the following magnetic bearings would represent the true bearing of S25°20'E ?
   a) S19°40'E b) S31°0'E
   c) S20°0'E d) S19°20'W

10) Consider the following steps :
   1. Calculation of ΣL and ΣD 2. Correction to L and D
   3. Calculation of bearings 4. Calculation of interior angles
   5. Calculation of independent co-ordinates

   The correction sequence of these steps in Gales traverse table calculations is
   a) 3, 4, 5, 2, 1 b) 4, 3, 1, 2, 5 c) 2, 1, 3, 4, 5 d) 4, 3, 5, 2, 1

11) If the whole circle bearing is 315°20', its quadrant bearing would be
   a) S 36°30'W b) N 44°40'W c) N 57°24'W d) S 60°40'W

12) In the ghat tracer if the bevelled edge of the sliding weight is against the center of the scale, the line of sight becomes
   a) Horizontal b) Vertical c) Inclined d) None of these

13) Abney level is used for measurement of
   a) Horizontal angle b) Vertical angle of slope
   c) Difference in level d) Horizontal distance

14) Tellurometer is an electronic distance measuring device that employs the propagation of
   a) Visible light wave b) Radio wave
   c) Both d) None of these

SLR-VB – 23

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
SURVEYING – I

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **2** and Q. No. **6** is **compulsory**.*
*2) Answer **any two** questions out of Q. No. **3**, **4**, **5**.*
*3) Answer **any two** questions out of Q. No. **7**, **8**, **9**.*
*4) 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
A	1.155	2.595	A and B = 500 m
B	0.985	2.415	RL of A = 525.500

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

b) Explain optical system in automatic level with the neat sketch. **4**

3. a) The table below gives the lengths and bearings of the lines of a traverse ABCDA. The length and bearing of DA having been missing. Calculate the length and bearing of the line DA. **5**

Line	Length (m)	Bearing
AB	100.0	N 45°30'W
BC	605.00	N 5°30'E
CD	95.00	N 88°20'E
DA	?	?

b) State what are the different check in closed theodolite traverse. **4**

4. a) Explain methods of theodolite traversing in detail. **5**

   b) Write a short note on : Balancing of theodolite traverse. **4**

5. a) What is sounding ? Explain any one method of soundings. **5**

   b) Write a short note on : **4**

      i) Ghat tracer

      OR

      ii) Box sextant.

SECTION – II

6. a) Explain the construction and working of geodimeter. **5**

   b) From the contour map of reservoir, the following contour areas were Planimetered.

Colours (m) :	200	195	190	185	180
Area (m^2) :	3850	3450	2600	800	450

   Top of water level is 200 m and the lowest point in the reservoirs 180 m. Find the quantity of water intake by Trapezoidal and Prismoidal rule. **5**

7. a) Explain the procedure of two point problem with suitable sketch. **5**

   b) Write a note on orientation of plane table. **4**

8. a) Explain characteristics of contour lines with neat sketch. **5**

   b) Describe indirect methods of contouring. **4**

9. a) The following perpendiculars offsets were taken from a chain line to an irregular boundary :

Chainage (m) :	0	30	60	90	120	150	180	210
Offsets length (m) :	0	2.65	3.80	3.75	4.65	3.60	5.00	5.80

   Calculate the area between the chain line and irregular boundary by

      i) Trapezoidal rule

      ii) Simpson's rule. **6**

   b) What are constants of planimeter ? How to find their values ? **3**

SLR-VB – 24

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Monday, 8-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*

2) Section ***I*** *to be written in answer book.*

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) ISMC100 mean Indian Standard Medium Channel having deth 100 unit.

   2) Silica is common element in glass and sand used for plastering work.

   3) Mosquito and fungus breeds in damp area of a building.

   4) Isolated footing is an element of load bearing structure.

   5) If depth of footing is less than or equal to width of footing then it is called as shallow foundation.

   6) Ashlar facing and brick backing is an example of ashlar stone masonry.

7) Style of part of door frame.
8) 6V6 is designation used for door shutter.
9) Landing width of stair can be more than flight width.
10) Lintel is provided to carry load of wall above opening provided in wall.
11) Flagstones are manufactured at factory artificially.
12) Sloping roofs are provided in hot arid rigions.
13) Waterproofing is provided to avoid passage of water under hydrostatic pressure.
14) Before fixing floor tiles *thiyas* should be fixed.

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SLR-VB – 24

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Section ***I*** *to be written in answer book.*
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) Write in detail requirements of good building stone.

b) Enlist functional requirements of building. Explain any one in detail.

c) Draw proportionate isometric view of (i) Half Bat (ii) Queen closure (iii) King Closure (iv) Quarter Queen Closure.

d) Enlist types of shallow foundations. Draw plan and section of any two.

e) Write a note on hollow concrete blocks.

f) Design and draw a plan of spiral staircase to climb a height of 3 m. Steps are fixed on central steel pole of diameter 10 cm.

g) Why continuous vertical joints should not be formed in brick wall ?

h) Write requirements of good staircase. Draw sketch of dog-legged staircase.

i) Enlist types of sloping roof. Draw isometric view of any 4 types.

j) Explain step-by-step procedure of providing BB Coba terrace water-proofing.

SECTION – II

3. A) Draw to a scale of 1 : 10, detailed section, front elevation and sectional elevation of framed T.W. double leaf, half paneled and half glazed window. Use following data (All dimensions are in mm) **14**
   a) Clear operating = 1200 × 1200
   b) Wood section for frame = 100 × 60
   c) Wood section for styles and rails = 100 × 40
   d) 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 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.

   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 = 3000 mm
      2) Width of flight = 1000 mm
      3) Railing – 25 mm thick RCC Pardi
      4) Reinforcement details not necessary.
      5) Write step by step calculation on sheet with pencil only.

      OR

      Design and draw to scale 1 : 30, plan and vertical section for double flight straight R.C.C. Stair for a shopping complex. Use following data :
      1) Height to be climbed = 3300 mm
      2) Width of flight = 2000 mm
      3) Landing is roof slab of a room of size 2000 × 2000 × 1650 mm
      4) Railing – 80 mm S.S. Pipe railing
      5) Reinforcement details not necessary
      6) Write step by step calculation on sheet with pencil only.

SLR-VB – 24

Seat No.	

Set Q

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Monday, 8-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*

2) Section ***I*** *to be written in answer book.*

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) 6V6 is designation used for door shutter.

   2) Landing width of stair can be more than flight width.

   3) Lintel is provided to carry load of wall above opening provided in wall.

   4) Flagstones are manufactured at factory artificially.

   5) Sloping roofs are provided in hot arid rigions.

   6) Waterproofing is provided to avoid passage of water under hydrostatic pressure.

P.T.O.

7) Before fixing floor tiles *thiyas* should be fixed.
8) ISMC100 mean Indian Standard Medium Channel having deth 100 unit.
9) Silica is common element in glass and sand used for plastering work.
10) Mosquito and fungus breeds in damp area of a building.
11) Isolated footing is an element of load bearing structure.
12) If depth of footing is less than or equal to width of footing then it is called as shallow foundation.
13) Ashlar facing and brick backing is an example of ashlar stone masonry.
14) Style of part of door frame.

SLR-VB – 24

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Section ***I*** *to be written in answer book.*
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) Write in detail requirements of good building stone.

b) Enlist functional requirements of building. Explain any one in detail.

c) Draw proportionate isometric view of (i) Half Bat (ii) Queen closure (iii) King Closure (iv) Quarter Queen Closure.

d) Enlist types of shallow foundations. Draw plan and section of any two.

e) Write a note on hollow concrete blocks.

f) Design and draw a plan of spiral staircase to climb a height of 3 m. Steps are fixed on central steel pole of diameter 10 cm.

g) Why continuous vertical joints should not be formed in brick wall ?

h) Write requirements of good staircase. Draw sketch of dog-legged staircase.

i) Enlist types of sloping roof. Draw isometric view of any 4 types.

j) Explain step-by-step procedure of providing BB Coba terrace water-proofing.

SECTION – II

3. A) Draw to a scale of 1 : 10, detailed section, front elevation and sectional elevation of framed T.W. double leaf, half paneled and half glazed window. Use following data (All dimensions are in mm) **14**
   a) Clear operating = 1200 × 1200
   b) Wood section for frame = 100 × 60
   c) Wood section for styles and rails = 100 × 40
   d) 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 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.

   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 = 3000 mm
      2) Width of flight = 1000 mm
      3) Railing – 25 mm thick RCC Pardi
      4) Reinforcement details not necessary.
      5) Write step by step calculation on sheet with pencil only.

      OR

      Design and draw to scale 1 : 30, plan and vertical section for double flight straight R.C.C. Stair for a shopping complex. Use following data :
      1) Height to be climbed = 3300 mm
      2) Width of flight = 2000 mm
      3) Landing is roof slab of a room of size 2000 × 2000 × 1650 mm
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      5) Reinforcement details not necessary
      6) Write step by step calculation on sheet with pencil only.

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SLR-VB – 24

Seat No.	

Set R

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Monday, 8-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*

2) Section ***I*** *to be written in answer book.*

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) If depth of footing is less than or equal to width of footing then it is called as shallow foundation.

   2) Ashlar facing and brick backing is an example of ashlar stone masonry.

   3) Style of part of door frame.

   4) 6V6 is designation used for door shutter.

   5) Landing width of stair can be more than flight width.

   6) Lintel is provided to carry load of wall above opening provided in wall.

P.T.O.

7) Flagstones are manufactured at factory artificially.
8) Sloping roofs are provided in hot arid rigions.
9) Waterproofing is provided to avoid passage of water under hydrostatic pressure.
10) Before fixing floor tiles *thiyas* should be fixed.
11) ISMC100 mean Indian Standard Medium Channel having deth 100 unit.
12) Silica is common element in glass and sand used for plastering work.
13) Mosquito and fungus breeds in damp area of a building.
14) Isolated footing is an element of load bearing structure.

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SLR-VB – 24

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
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3) Section ***II*** *to be drawn on* ***half imperial drawing sheet****. Use* ***both*** *sides of the sheet.*
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5) ***Assume*** *suitable data* ***wherever*** *necessary and mention it clearly.*
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SECTION – I

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

a) Write in detail requirements of good building stone.

b) Enlist functional requirements of building. Explain any one in detail.

c) Draw proportionate isometric view of (i) Half Bat (ii) Queen closure (iii) King Closure (iv) Quarter Queen Closure.

d) Enlist types of shallow foundations. Draw plan and section of any two.

e) Write a note on hollow concrete blocks.

f) Design and draw a plan of spiral staircase to climb a height of 3 m. Steps are fixed on central steel pole of diameter 10 cm.

g) Why continuous vertical joints should not be formed in brick wall ?

h) Write requirements of good staircase. Draw sketch of dog-legged staircase.

i) Enlist types of sloping roof. Draw isometric view of any 4 types.

j) Explain step-by-step procedure of providing BB Coba terrace water-proofing.

SECTION – II

3. A) Draw to a scale of 1 : 10, detailed section, front elevation and sectional elevation of framed T.W. double leaf, half paneled and half glazed window. Use following data (All dimensions are in mm) **14**
   a) Clear operating = 1200 × 1200
   b) Wood section for frame = 100 × 60
   c) Wood section for styles and rails = 100 × 40
   d) 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 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
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      4) Size ceramic tile = 450 mm × 450 mm × 15 mm
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   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 = 3000 mm
      2) Width of flight = 1000 mm
      3) Railing – 25 mm thick RCC Pardi
      4) Reinforcement details not necessary.
      5) Write step by step calculation on sheet with pencil only.

      OR

      Design and draw to scale 1 : 30, plan and vertical section for double flight straight R.C.C. Stair for a shopping complex. Use following data :
      1) Height to be climbed = 3300 mm
      2) Width of flight = 2000 mm
      3) Landing is roof slab of a room of size 2000 × 2000 × 1650 mm
      4) Railing – 80 mm S.S. Pipe railing
      5) Reinforcement details not necessary
      6) Write step by step calculation on sheet with pencil only.

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SLR-VB – 24

Seat No.	

Set S

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Monday, 8-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 7.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*

*2) Section **I** to be written in answer book.*

*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) Lintel is provided to carry load of wall above opening provided in wall.

   2) Flagstones are manufactured at factory artificially.

   3) Sloping roofs are provided in hot arid rigions.

   4) Waterproofing is provided to avoid passage of water under hydrostatic pressure.

   5) Before fixing floor tiles *thiyas* should be fixed.

   6) ISMC100 mean Indian Standard Medium Channel having deth 100 unit.

P.T.O.

7) Silica is common element in glass and sand used for plastering work.
8) Mosquito and fungus breeds in damp area of a building.
9) Isolated footing is an element of load bearing structure.
10) If depth of footing is less than or equal to width of footing then it is called as shallow foundation.
11) Ashlar facing and brick backing is an example of ashlar stone masonry.
12) Style of part of door frame.
13) 6V6 is designation used for door shutter.
14) Landing width of stair can be more than flight width.

SLR-VB – 24

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DRAWING

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 3.00 p.m. to 7.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Section ***I*** *to be written in answer book.*
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) Write in detail requirements of good building stone.

b) Enlist functional requirements of building. Explain any one in detail.

c) Draw proportionate isometric view of (i) Half Bat (ii) Queen closure (iii) King Closure (iv) Quarter Queen Closure.

d) Enlist types of shallow foundations. Draw plan and section of any two.

e) Write a note on hollow concrete blocks.

f) Design and draw a plan of spiral staircase to climb a height of 3 m. Steps are fixed on central steel pole of diameter 10 cm.

g) Why continuous vertical joints should not be formed in brick wall ?

h) Write requirements of good staircase. Draw sketch of dog-legged staircase.

i) Enlist types of sloping roof. Draw isometric view of any 4 types.

j) Explain step-by-step procedure of providing BB Coba terrace water-proofing.

SECTION – II

3. A) Draw to a scale of 1 : 10, detailed section, front elevation and sectional elevation of framed T.W. double leaf, half paneled and half glazed window. Use following data (All dimensions are in mm) **14**
   a) Clear operating = 1200 × 1200
   b) Wood section for frame = 100 × 60
   c) Wood section for styles and rails = 100 × 40
   d) 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 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.

   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 = 3000 mm
      2) Width of flight = 1000 mm
      3) Railing – 25 mm thick RCC Pardi
      4) Reinforcement details not necessary.
      5) Write step by step calculation on sheet with pencil only.

      OR

      Design and draw to scale 1 : 30, plan and vertical section for double flight straight R.C.C. Stair for a shopping complex. Use following data :
      1) Height to be climbed = 3300 mm
      2) Width of flight = 2000 mm
      3) Landing is roof slab of a room of size 2000 × 2000 × 1650 mm
      4) Railing – 80 mm S.S. Pipe railing
      5) Reinforcement details not necessary
      6) Write step by step calculation on sheet with pencil only.

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SLR-VB – 25

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
FLUID MECHANICS – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
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** figures **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Unit of dynamic viscosity is
   a) Nm/S^2 b) NS/m^2 c) NS^2/m^2 d) NS/m

2) Capillary rise or fall of a liquid is given by h =
   a) 46 cos/wd b) 46 sin/wd c) 46 tan/w d) 46 cos/d

3) Surface tension is caused by the force of _____ at the free surface.
   a) Cohesion b) Adhesion c) Both d) None

4) The pressure of liquid on surface will always act _____ to the surface.
   a) Parallel b) 45° c) 60° d) Normal

5) Any pressure which is measured above absolute zero is called as
   a) Absolute pressure b) Atmospheric pressure
   c) Vacuum pressure d) None

6) Piezometer measures _____ pressure only.
   a) Gauge b) Absolute c) Atmospheric d) None

7) Centre of pressure ($\bar{h}$) in case of vertically immersed surface is given by
   a) IG/AX b) $I^2G/Ax + x$
   c) IG/AX + x d) IG $Sin^2/Ax + x$

P.T.O.

8) Due to which of the following phenomena water hammer is caused
   a) In compressibility of fluid
   b) Sudden opening of valve in a pipeline
   c) Material of pipe being elastic
   d) Sudden closure of valve in pipe flow

9) On account of which of the following boundary layer exists
   a) Surface tension b) Gravitational effect
   c) Viscosity d) None of the above

10) Darcy Weisbach equation gives
   a) Slop b) Head loss c) Velocity d) Pressure

11) The maximum velocity in a circular pipe when flow is laminar occurs at
   a) at the top of pipe b) at the bottom of pipe
   c) the centre of pipe d) not necessarily at centre

12) Pitot tube is used for measuring
   a) pressure b) flow rate c) total energy d) velocity of flow

13) For the pipe flow if the Reynold's no. is 2700, then the flow is
   a) Turbulent b) Laminar c) Transitional d) Steady

14) In which of the following, Bernoulli's equation is used ?
   a) Venturimeter b) Pitot tube c) Orificemeter d) All the above

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Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
FLUID MECHANICS – I

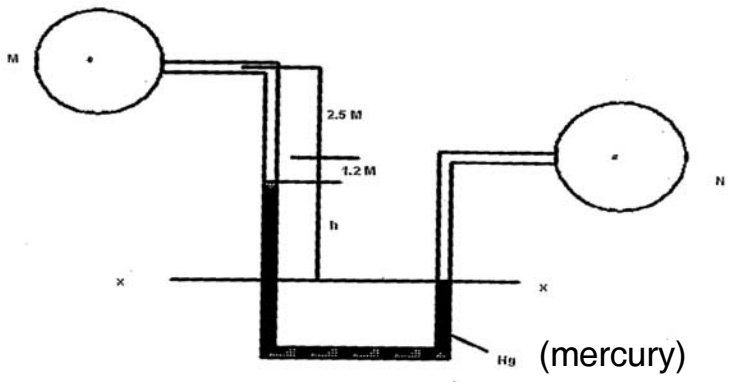
Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. a) Explain briefly the following terms : **8**
   1) Surface tension 2) Viscosity
   3) Metacentre 4) Flow net.
   b) The space between two square flat parallel plates is filled with oil. Each side of the plate is 750 mm. The thickness of oil film is 18 mm. The upper plate moves with speed of 4 m/s which requires a force of 150 N to maintain the speed. Calculate dynamic and kinematic viscosities of oil of Sp. Gr. 0.9.
3. Solve **any two** : **10**
   a) Derive expression for total pressure and centre of pressure for vertically immured surface. (Draw neat figure).
   b) A circular plate 1.5 M. diameter is submerged in water, its greatest and least depth below the surface being 2.5 M and 1.25 M. Determine total pressure on one face of the plate and position of centre pressure.
   c) Define and classify monometers.

   Fig. shows U tube differential manometer connecting two pressure pipes at M and N. The pipe M contain a liquid of specific gravity 1.8 under pressure of 100 KN/m^2. The pipe N contains oil of specific gravity 0.85 under a pressure of 180 K/m^2. Find the difference of pressure measured by mercury as a manometer liquid in U-tube.



(mercury)

4. Solve **any two** : **10**

   a) Define

      1) Buoyancy

      2) Metacentric height

      3) Types of equilibrium with figure.

   b) A stream function is given by $\psi = 5x - 6y$, calculate the velocity components and also magnitude and direction of resultant velocity at any point.

   c) Define Pascal's law and derive expression for it with neat figure.

SECTION – II

5. a) Derive the Bernoulli's theorem for steady flow of an in compressible fluid. **5**

   b) Explain the hydraulic coefficients of orifice. **3**

   c) A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of oil of sp.gr. 0.8. The discharge of oil through venturimeter is 60 litres/s. Find the reading of the oil-mercury differential manometer. Take $C_d = 0.98$. **6**

6. a) Explain water hammer and syphon with neat sketch. **4**

   b) A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter for the first parallel pipe are 2000m and 1.0m respectively, while the length and diameter of 2^{nd} parallel pipe are 2000 m and 0.8m. Find the rate of flow in each parallel pipe, if total flow in the main is $3.0 m^3/s$. The co-efficient of friction for each parallel pipe is same and equal to 0.005. **6**

   c) Obtain the expression for friction factor in terms of Reynolds's number. **4**

7. a) In a pipe of diameter 100 mm carrying water, the velocities at the pipe centre and 30 mm from the centre are found to be 2.5m/s and 2.2 m/s. Find the wall sharing stress. **4**

   b) Explain different types of losses through the pipes. **4**

   c) The velocity distribution in boundary layer is given by $\frac{u}{U} = \left(\frac{y}{\delta}\right)^{1/7}$ calculate, **6**

      i) Displacement Thickness

      ii) Momentum Thickness.

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SLR-VB – 25

Seat No.	

Set Q

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
FLUID MECHANICS – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
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** figures **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Due to which of the following phenomena water hammer is caused
   a) In compressibility of fluid
   b) Sudden opening of valve in a pipeline
   c) Material of pipe being elastic
   d) Sudden closure of valve in pipe flow

2) On account of which of the following boundary layer exists
   a) Surface tension b) Gravitational effect
   c) Viscosity d) None of the above

3) Darcy Weisbach equation gives
   a) Slop b) Head loss c) Velocity d) Pressure

4) The maximum velocity in a circular pipe when flow is laminar occurs at
   a) at the top of pipe b) at the bottom of pipe
   c) the centre of pipe d) not necessarily at centre

5) Pitot tube is used for measuring
   a) pressure b) flow rate c) total energy d) velocity of flow

6) For the pipe flow if the Reynold's no. is 2700, then the flow is
   a) Turbulent b) Laminar c) Transitional d) Steady
7) In which of the following, Bernoulli's equation is used ?
   a) Venturimeter b) Pitot tube c) Orificemeter d) All the above
8) Unit of dynamic viscosity is
   a) Nm/S^2 b) NS/m^2 c) NS^2/m^2 d) NS/m
9) Capillary rise or fall of a liquid is given by h =
   a) 46 cos/wd b) 46 sin/wd c) 46 tan/w d) 46 cos/d
10) Surface tension is caused by the force of _____ at the free surface.
   a) Cohesion b) Adhesion c) Both d) None
11) The pressure of liquid on surface will always act _____ to the surface.
   a) Parallel b) 45° c) 60° d) Normal
12) Any pressure which is measured above absolute zero is called as
   a) Absolute pressure b) Atmospheric pressure
   c) Vacuum pressure d) None
13) Piezometer measures _____ pressure only.
   a) Gauge b) Absolute c) Atmospheric d) None
14) Centre of pressure ($\bar{h}$) in case of vertically immersed surface is given by
   a) IG/AX b) $I^2G/Ax + x$
   c) IG/AX + x d) IG $Sin^2/Ax + x$

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SLR-VB – 25

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
FLUID MECHANICS – I

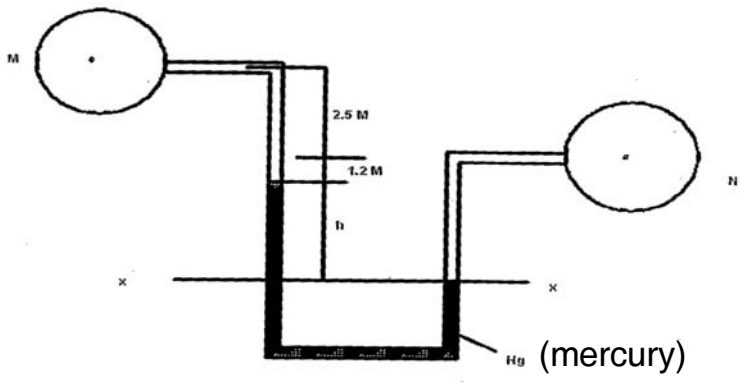
Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. a) Explain briefly the following terms : **8**
   1) Surface tension 2) Viscosity
   3) Metacentre 4) Flow net.
   b) The space between two square flat parallel plates is filled with oil. Each side of the plate is 750 mm. The thickness of oil film is 18 mm. The upper plate moves with speed of 4 m/s which requires a force of 150 N to maintain the speed. Calculate dynamic and kinematic viscosities of oil of Sp. Gr. 0.9.
3. Solve **any two** : **10**
   a) Derive expression for total pressure and centre of pressure for vertically immured surface. (Draw neat figure).
   b) A circular plate 1.5 M. diameter is submerged in water, its greatest and least depth below the surface being 2.5 M and 1.25 M. Determine total pressure on one face of the plate and position of centre pressure.
   c) Define and classify monometers.

   Fig. shows U tube differential manometer connecting two pressure pipes at M and N. The pipe M contain a liquid of specific gravity 1.8 under pressure of 100 KN/m^2. The pipe N contains oil of specific gravity 0.85 under a pressure of 180 K/m^2. Find the difference of pressure measured by mercury as a manometer liquid in U-tube.



4. Solve **any two** : **10**

   a) Define

      1) Buoyancy

      2) Metacentric height

      3) Types of equilibrium with figure.

   b) A stream function is given by $\psi = 5x - 6y$, calculate the velocity components and also magnitude and direction of resultant velocity at any point.

   c) Define Pascal's law and derive expression for it with neat figure.

SECTION – II

5. a) Derive the Bernoulli's theorem for steady flow of an in compressible fluid. **5**

   b) Explain the hydraulic coefficients of orifice. **3**

   c) A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of oil of sp.gr. 0.8. The discharge of oil through venturimeter is 60 litres/s. Find the reading of the oil-mercury differential manometer. Take $C_d = 0.98$. **6**

6. a) Explain water hammer and syphon with neat sketch. **4**

   b) A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter for the first parallel pipe are 2000m and 1.0m respectively, while the length and diameter of 2^{nd} parallel pipe are 2000 m and 0.8m. Find the rate of flow in each parallel pipe, if total flow in the main is $3.0 m^3/s$. The co-efficient of friction for each parallel pipe is same and equal to 0.005. **6**

   c) Obtain the expression for friction factor in terms of Reynolds's number. **4**

7. a) In a pipe of diameter 100 mm carrying water, the velocities at the pipe centre and 30 mm from the centre are found to be 2.5m/s and 2.2 m/s. Find the wall sharing stress. **4**

   b) Explain different types of losses through the pipes. **4**

   c) The velocity distribution in boundary layer is given by $\frac{u}{U} = \left(\frac{y}{\delta}\right)^{1/7}$ calculate, **6**

      i) Displacement Thickness

      ii) Momentum Thickness.

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Set Q

SLR-VB – 25

Seat No.	

Set **R**

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
FLUID MECHANICS – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
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** figures **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Any pressure which is measured above absolute zero is called as
   a) Absolute pressure b) Atmospheric pressure
   c) Vacuum pressure d) None

2) Piezometer measures _____ pressure only.
   a) Gauge b) Absolute c) Atmospheric d) None

3) Centre of pressure ($\bar{h}$) in case of vertically immersed surface is given by
   a) IG/AX b) $I^2G/Ax + x$
   c) IG/AX + x d) IG $Sin^2/Ax + x$

4) Due to which of the following phenomena water hammer is caused
   a) In compressibility of fluid
   b) Sudden opening of valve in a pipeline
   c) Material of pipe being elastic
   d) Sudden closure of valve in pipe flow

5) On account of which of the following boundary layer exists
   a) Surface tension b) Gravitational effect
   c) Viscosity d) None of the above

P.T.O.

6) Darcy Weisbach equation gives
   a) Slop b) Head loss c) Velocity d) Pressure
7) The maximum velocity in a circular pipe when flow is laminar occurs at
   a) at the top of pipe b) at the bottom of pipe
   c) the centre of pipe d) not necessarily at centre
8) Pitot tube is used for measuring
   a) pressure b) flow rate c) total energy d) velocity of flow
9) For the pipe flow if the Reynold's no. is 2700, then the flow is
   a) Turbulent b) Laminar c) Transitional d) Steady
10) In which of the following, Bernoulli's equation is used ?
   a) Venturimeter b) Pitot tube c) Orificemeter d) All the above

11) Unit of dynamic viscosity is
   a) Nm/S^2 b) NS/m^2 c) NS^2/m^2 d) NS/m
12) Capillary rise or fall of a liquid is given by h =
   a) 46 cos/wd b) 46 sin/wd c) 46 tan/w d) 46 cos/d
13) Surface tension is caused by the force of _____ at the free surface.
   a) Cohesion b) Adhesion c) Both d) None
14) The pressure of liquid on surface will always act _____ to the surface.
   a) Parallel b) 45° c) 60° d) Normal

_____

SLR-VB – 25

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
FLUID MECHANICS – I

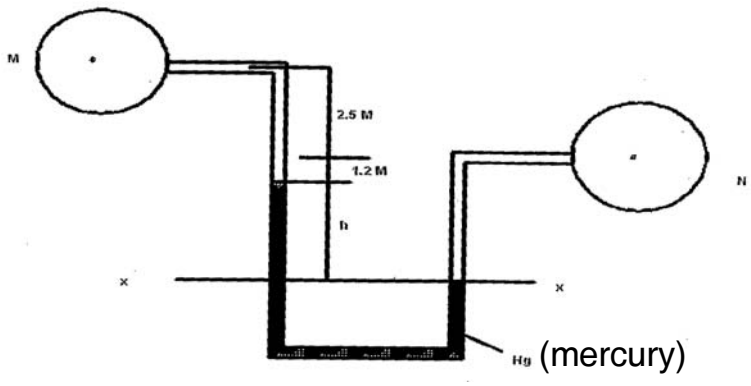
Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. a) Explain briefly the following terms : **8**
   1) Surface tension 2) Viscosity
   3) Metacentre 4) Flow net.
   b) The space between two square flat parallel plates is filled with oil. Each side of the plate is 750 mm. The thickness of oil film is 18 mm. The upper plate moves with speed of 4 m/s which requires a force of 150 N to maintain the speed. Calculate dynamic and kinematic viscosities of oil of Sp. Gr. 0.9.
3. Solve **any two** : **10**
   a) Derive expression for total pressure and centre of pressure for vertically immured surface. (Draw neat figure).
   b) A circular plate 1.5 M. diameter is submerged in water, its greatest and least depth below the surface being 2.5 M and 1.25 M. Determine total pressure on one face of the plate and position of centre pressure.
   c) Define and classify monometers.

   Fig. shows U tube differential manometer connecting two pressure pipes at M and N. The pipe M contain a liquid of specific gravity 1.8 under pressure of 100 KN/m^2. The pipe N contains oil of specific gravity 0.85 under a pressure of 180 K/m^2. Find the difference of pressure measured by mercury as a manometer liquid in U-tube.



4. Solve **any two** : **10**

   a) Define

      1) Buoyancy

      2) Metacentric height

      3) Types of equilibrium with figure.

   b) A stream function is given by $\psi = 5x - 6y$, calculate the velocity components and also magnitude and direction of resultant velocity at any point.

   c) Define Pascal's law and derive expression for it with neat figure.

SECTION – II

5. a) Derive the Bernoulli's theorem for steady flow of an in compressible fluid. **5**

   b) Explain the hydraulic coefficients of orifice. **3**

   c) A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of oil of sp.gr. 0.8. The discharge of oil through venturimeter is 60 litres/s. Find the reading of the oil-mercury differential manometer. Take $C_d = 0.98$. **6**

6. a) Explain water hammer and syphon with neat sketch. **4**

   b) A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter for the first parallel pipe are 2000m and 1.0m respectively, while the length and diameter of 2^{nd} parallel pipe are 2000 m and 0.8m. Find the rate of flow in each parallel pipe, if total flow in the main is $3.0 m^3/s$. The co-efficient of friction for each parallel pipe is same and equal to 0.005. **6**

   c) Obtain the expression for friction factor in terms of Reynolds's number. **4**

7. a) In a pipe of diameter 100 mm carrying water, the velocities at the pipe centre and 30 mm from the centre are found to be 2.5m/s and 2.2 m/s. Find the wall sharing stress. **4**

   b) Explain different types of losses through the pipes. **4**

   c) The velocity distribution in boundary layer is given by $\frac{u}{U} = \left(\frac{y}{\delta}\right)^{1/7}$ calculate, **6**

      i) Displacement Thickness

      ii) Momentum Thickness.

———————

Set R

SLR-VB – 25

Seat No.	

Set S

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
FLUID MECHANICS – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
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** figures **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Darcy Weisbach equation gives
   a) Slop b) Head loss c) Velocity d) Pressure

2) The maximum velocity in a circular pipe when flow is laminar occurs at
   a) at the top of pipe b) at the bottom of pipe
   c) the centre of pipe d) not necessarily at centre

3) Pitot tube is used for measuring
   a) pressure b) flow rate c) total energy d) velocity of flow

4) For the pipe flow if the Reynold's no. is 2700, then the flow is
   a) Turbulent b) Laminar c) Transitional d) Steady

5) In which of the following, Bernoulli's equation is used ?
   a) Venturimeter b) Pitot tube c) Orificemeter d) All the above

6) Unit of dynamic viscosity is
   a) Nm/S^2 b) NS/m^2 c) NS^2/m^2 d) NS/m

7) Capillary rise or fall of a liquid is given by h =
   a) 46 cos/wd b) 46 sin/wd c) 46 tan/w d) 46 cos/d

P.T.O.

8) Surface tension is caused by the force of _____ at the free surface.
   a) Cohesion b) Adhesion c) Both d) None

9) The pressure of liquid on surface will always act _____ to the surface.
   a) Parallel b) 45° c) 60° d) Normal

10) Any pressure which is measured above absolute zero is called as
   a) Absolute pressure b) Atmospheric pressure
   c) Vacuum pressure d) None

11) Piezometer measures _____ pressure only.
   a) Gauge b) Absolute c) Atmospheric d) None

12) Centre of pressure ($\bar{h}$) in case of vertically immersed surface is given by
   a) IG/AX b) $I^2G/Ax + x$
   c) IG/AX + x d) IG $Sin^2/Ax + x$

13) Due to which of the following phenomena water hammer is caused
   a) In compressibility of fluid
   b) Sudden opening of valve in a pipeline
   c) Material of pipe being elastic
   d) Sudden closure of valve in pipe flow

14) On account of which of the following boundary layer exists
   a) Surface tension b) Gravitational effect
   c) Viscosity d) None of the above

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SLR-VB – 25

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
FLUID MECHANICS – I

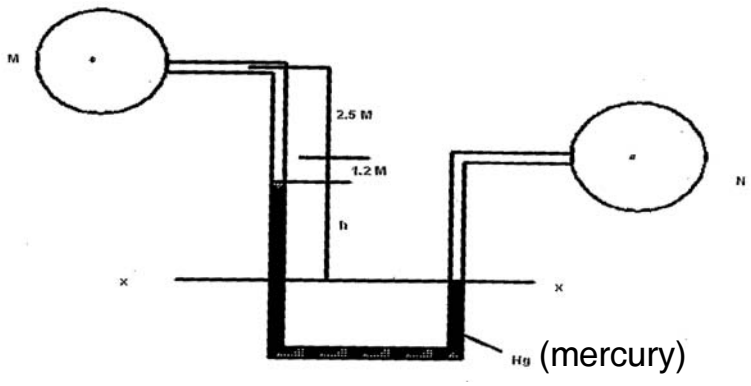
Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. a) Explain briefly the following terms : **8**
   1) Surface tension 2) Viscosity
   3) Metacentre 4) Flow net.
   b) The space between two square flat parallel plates is filled with oil. Each side of the plate is 750 mm. The thickness of oil film is 18 mm. The upper plate moves with speed of 4 m/s which requires a force of 150 N to maintain the speed. Calculate dynamic and kinematic viscosities of oil of Sp. Gr. 0.9.
3. Solve **any two** : **10**
   a) Derive expression for total pressure and centre of pressure for vertically immured surface. (Draw neat figure).
   b) A circular plate 1.5 M. diameter is submerged in water, its greatest and least depth below the surface being 2.5 M and 1.25 M. Determine total pressure on one face of the plate and position of centre pressure.
   c) Define and classify monometers.

   Fig. shows U tube differential manometer connecting two pressure pipes at M and N. The pipe M contain a liquid of specific gravity 1.8 under pressure of 100 KN/m^2. The pipe N contains oil of specific gravity 0.85 under a pressure of 180 K/m^2. Find the difference of pressure measured by mercury as a manometer liquid in U-tube.



4. Solve **any two** : **10**

   a) Define

      1) Buoyancy

      2) Metacentric height

      3) Types of equilibrium with figure.

   b) A stream function is given by $\psi = 5x - 6y$, calculate the velocity components and also magnitude and direction of resultant velocity at any point.

   c) Define Pascal's law and derive expression for it with neat figure.

SECTION – II

5. a) Derive the Bernoulli's theorem for steady flow of an in compressible fluid. **5**

   b) Explain the hydraulic coefficients of orifice. **3**

   c) A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of oil of sp.gr. 0.8. The discharge of oil through venturimeter is 60 litres/s. Find the reading of the oil-mercury differential manometer. Take $C_d = 0.98$. **6**

6. a) Explain water hammer and syphon with neat sketch. **4**

   b) A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter for the first parallel pipe are 2000m and 1.0m respectively, while the length and diameter of 2^{nd} parallel pipe are 2000 m and 0.8m. Find the rate of flow in each parallel pipe, if total flow in the main is $3.0 m^3/s$. The co-efficient of friction for each parallel pipe is same and equal to 0.005. **6**

   c) Obtain the expression for friction factor in terms of Reynolds's number. **4**

7. a) In a pipe of diameter 100 mm carrying water, the velocities at the pipe centre and 30 mm from the centre are found to be 2.5m/s and 2.2 m/s. Find the wall sharing stress. **4**

   b) Explain different types of losses through the pipes. **4**

   c) The velocity distribution in boundary layer is given by $\frac{u}{U} = \left(\frac{y}{\delta}\right)^{1/7}$ calculate, **6**

      i) Displacement Thickness

      ii) Momentum Thickness.

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Set S

SLR-VB – 26

Seat No.	

Set P

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENGINEERING GEOLOGY

Day and Date : Friday, 12-5-2017 Max. Marks : 70
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 : 14

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

1) The Basin shaped igneous intrusion in unfolded region is called
   a) Laccolith b) Lopoliths c) Phacolith d) Sill

2) _____ is the rudaceous sedimentary rock.
   a) Laterite b) Bauxite c) Sandstone d) Conglomerate

3) Major breaks in sedimentation are called
   a) Confirmable b) Unconformities
   c) Stratification d) None of these

4) The highest point on the arch of an anticline is called the
   a) Trough b) Crest c) Limb d) None of these

5) The hardness of fluorite mineral is
   a) Six b) Five c) Four d) Eight

6) Zone between Mohorovisic and Gutenberg discontinuity is known as
   a) Core b) Lower mantle
   c) Upper mantle d) Mantle

7) The falling of stream water from a height is called a
   a) Pot holes b) Water falls c) Gorge d) Meander

P.T.O.

8) The intensity of the earthquake is measured on the
   a) Richter scale b) Time scale
   c) Mercalli scale d) Seismic scale

9) The portion of a dam that touches the ground on the upstream side, is called the
   a) Spillway b) Heel of dam c) Toe of dam d) Axis of dam

10) The most of the dams failure because of
   a) Dams on shell b) Dams on soluble-rock
   c) Dams on permeable rock d) All of these

11) The stability of bridge depend upon
   a) Lateral forces b) Scouring action of river
   c) Earthquake forces d) All of these

12) The factors which promote landslide
   a) Water b) Slope
   c) Structure of rock d) All of these

13) Granite rock is commonly used for construction work because of
   a) High porosity b) Good permeability
   c) High crushing strength d) None of these

14) The aquifer depend upon
   a) Porosity b) Permeability c) Both a and b d) None of these

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SLR-VB – 26

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENGINEERING GEOLOGY

Day and Date : Friday, 12-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Attempt **any two** questions from Q.no. **03** to **05** and Q. no. **07** to **09**.*
*2) Draw **neat** and labeled diagram **wherever** necessary.*

SECTION – I

2. Write short notes **any five** : **10**
   1) Crust of earth
   2) Oxbow lake
   3) Gaseous products of volcano
   4) Himalaya mountain
   5) Bauxite
   6) Marble.

3. a) Explain mica group of mineral. **5**
   b) Explain sill and dyke igneous intrusion. **4**

4. a) Explain any two sedimentary structures. **5**
   b) Explain any two types of metamorphic rocks. **4**

5. a) Explain any two types of unconformity. **5**
   b) Explain civil engineering significance of fold. **4**

SECTION – II

6. Write short notes **any five** : **10**
   1) Porosity of rock.
   2) What is R.Q.D. ?

3) Durability of rock.

4) Buttress dam.

5) Grouting.

6) What is silting of reservoir ?

7. a) Explain types of aquifer. **5**

   b) Explain preliminary geological survey for dam site selection. **4**

8. a) Explain effect of earthquake. **5**

   b) Explain disaster management of landslide. **4**

9. a) Explain difficulties in tunneling. **5**

   b) Explain any two types of bridges. **4**

SLR-VB – 26

Seat No.	

Set Q

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENGINEERING GEOLOGY

Day and Date : Friday, 12-5-2017 Max. Marks : 70
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 : 14

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

1) The intensity of the earthquake is measured on the
   a) Richter scale b) Time scale
   c) Mercalli scale d) Seismic scale

2) The portion of a dam that touches the ground on the upstream side, is called the
   a) Spillway b) Heel of dam c) Toe of dam d) Axis of dam

3) The most of the dams failure because of
   a) Dams on shell b) Dams on soluble-rock
   c) Dams on permeable rock d) All of these

4) The stability of bridge depend upon
   a) Lateral forces b) Scouring action of river
   c) Earthquake forces d) All of these

5) The factors which promote landslide
   a) Water b) Slope
   c) Structure of rock d) All of these

6) Granite rock is commonly used for construction work because of
   a) High porosity b) Good permeability
   c) High crushing strength d) None of these

P.T.O.

7) The aquifer depend upon
   a) Porosity b) Permeability c) Both a and b d) None of these
8) The Basin shaped igneous intrusion in unfolded region is called
   a) Laccolith b) Lopoliths c) Phacolith d) Sill
9) _____ is the rudaceous sedimentary rock.
   a) Laterite b) Bauxite c) Sandstone d) Conglomerate
10) Major breaks in sedimentation are called
   a) Confirmable b) Unconformities
   c) Stratification d) None of these
11) The highest point on the arch of an anticline is called the
   a) Trough b) Crest c) Limb d) None of these
12) The hardness of fluorite mineral is
   a) Six b) Five c) Four d) Eight
13) Zone between Mohorovisic and Gutenberg discontinuity is known as
   a) Core b) Lower mantle
   c) Upper mantle d) Mantle
14) The falling of stream water from a height is called a
   a) Pot holes b) Water falls c) Gorge d) Meander

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SLR-VB – 26

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENGINEERING GEOLOGY

Day and Date : Friday, 12-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Attempt **any two** questions from Q.no. **03** to **05** and Q. no. **07** to **09**.*
*2) Draw **neat** and labeled diagram **wherever** necessary.*

SECTION – I

2. Write short notes **any five** : **10**
   1) Crust of earth
   2) Oxbow lake
   3) Gaseous products of volcano
   4) Himalaya mountain
   5) Bauxite
   6) Marble.

3. a) Explain mica group of mineral. **5**
   b) Explain sill and dyke igneous intrusion. **4**

4. a) Explain any two sedimentary structures. **5**
   b) Explain any two types of metamorphic rocks. **4**

5. a) Explain any two types of unconformity. **5**
   b) Explain civil engineering significance of fold. **4**

SECTION – II

6. Write short notes **any five** : **10**
   1) Porosity of rock.
   2) What is R.Q.D. ?

3) Durability of rock.

4) Buttress dam.

5) Grouting.

6) What is silting of reservoir ?

7. a) Explain types of aquifer. **5**

   b) Explain preliminary geological survey for dam site selection. **4**

8. a) Explain effect of earthquake. **5**

   b) Explain disaster management of landslide. **4**

9. a) Explain difficulties in tunneling. **5**

   b) Explain any two types of bridges. **4**

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SLR-VB – 26

Seat No.	

Set R

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENGINEERING GEOLOGY

Day and Date : Friday, 12-5-2017 Max. Marks : 70
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 : 14

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

1) The hardness of fluorite mineral is
   a) Six b) Five c) Four d) Eight

2) Zone between Mohorovisic and Gutenberg discontinuity is known as
   a) Core b) Lower mantle
   c) Upper mantle d) Mantle

3) The falling of stream water from a height is called a
   a) Pot holes b) Water falls c) Gorge d) Meander

4) The intensity of the earthquake is measured on the
   a) Richter scale b) Time scale
   c) Mercalli scale d) Seismic scale

5) The portion of a dam that touches the ground on the upstream side, is called the
   a) Spillway b) Heel of dam c) Toe of dam d) Axis of dam

6) The most of the dams failure because of
   a) Dams on shell b) Dams on soluble-rock
   c) Dams on permeable rock d) All of these

P.T.O.

7) The stability of bridge depend upon
   a) Lateral forces b) Scouring action of river
   c) Earthquake forces d) All of these
8) The factors which promote landslide
   a) Water b) Slope
   c) Structure of rock d) All of these
9) Granite rock is commonly used for construction work because of
   a) High porosity b) Good permeability
   c) High crushing strength d) None of these
10) The aquifer depend upon
   a) Porosity b) Permeability c) Both a and b d) None of these
11) The Basin shaped igneous intrusion in unfolded region is called
   a) Laccolith b) Lopoliths c) Phacolith d) Sill
12) _____ is the rudaceous sedimentary rock.
   a) Laterite b) Bauxite c) Sandstone d) Conglomerate
13) Major breaks in sedimentation are called
   a) Confirmable b) Unconformities
   c) Stratification d) None of these
14) The highest point on the arch of an anticline is called the
   a) Trough b) Crest c) Limb d) None of these

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SLR-VB – 26

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENGINEERING GEOLOGY

Day and Date : Friday, 12-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Attempt **any two** questions from Q.no. **03** to **05** and Q. no. **07** to **09**.*
*2) Draw **neat** and labeled diagram **wherever** necessary.*

SECTION – I

2. Write short notes **any five** : **10**
   1) Crust of earth
   2) Oxbow lake
   3) Gaseous products of volcano
   4) Himalaya mountain
   5) Bauxite
   6) Marble.

3. a) Explain mica group of mineral. **5**
   b) Explain sill and dyke igneous intrusion. **4**

4. a) Explain any two sedimentary structures. **5**
   b) Explain any two types of metamorphic rocks. **4**

5. a) Explain any two types of unconformity. **5**
   b) Explain civil engineering significance of fold. **4**

SECTION – II

6. Write short notes **any five** : **10**
   1) Porosity of rock.
   2) What is R.Q.D. ?

3) Durability of rock.

4) Buttress dam.

5) Grouting.

6) What is silting of reservoir ?

7. a) Explain types of aquifer. **5**

   b) Explain preliminary geological survey for dam site selection. **4**

8. a) Explain effect of earthquake. **5**

   b) Explain disaster management of landslide. **4**

9. a) Explain difficulties in tunneling. **5**

   b) Explain any two types of bridges. **4**

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SLR-VB – 26

Seat No.	

Set S

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENGINEERING GEOLOGY

Day and Date : Friday, 12-5-2017 Max. Marks : 70
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 : 14

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

1) The most of the dams failure because of
   a) Dams on shell b) Dams on soluble-rock
   c) Dams on permeable rock d) All of these

2) The stability of bridge depend upon
   a) Lateral forces b) Scouring action of river
   c) Earthquake forces d) All of these

3) The factors which promote landslide
   a) Water b) Slope
   c) Structure of rock d) All of these

4) Granite rock is commonly used for construction work because of
   a) High porosity b) Good permeability
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5) The aquifer depend upon
   a) Porosity b) Permeability c) Both a and b d) None of these

6) The Basin shaped igneous intrusion in unfolded region is called
   a) Laccolith b) Lopoliths c) Phacolith d) Sill

P.T.O.

7) _____ is the rudaceous sedimentary rock.
   a) Laterite b) Bauxite c) Sandstone d) Conglomerate

8) Major breaks in sedimentation are called
   a) Confirmable b) Unconformities
   c) Stratification d) None of these

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11) Zone between Mohorovisic and Gutenberg discontinuity is known as
   a) Core b) Lower mantle
   c) Upper mantle d) Mantle

12) The falling of stream water from a height is called a
   a) Pot holes b) Water falls c) Gorge d) Meander

13) The intensity of the earthquake is measured on the
   a) Richter scale b) Time scale
   c) Mercalli scale d) Seismic scale

14) The portion of a dam that touches the ground on the upstream side, is called the
   a) Spillway b) Heel of dam c) Toe of dam d) Axis of dam

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SLR-VB – 26

Seat No.	

S.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENGINEERING GEOLOGY

Day and Date : Friday, 12-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) Attempt **any two** questions from Q.no. **03** to **05** and Q. no. **07** to **09**.*
*2) Draw **neat** and labeled diagram **wherever** necessary.*

SECTION – I

2. Write short notes **any five** : **10**
   1) Crust of earth
   2) Oxbow lake
   3) Gaseous products of volcano
   4) Himalaya mountain
   5) Bauxite
   6) Marble.

3. a) Explain mica group of mineral. **5**
   b) Explain sill and dyke igneous intrusion. **4**

4. a) Explain any two sedimentary structures. **5**
   b) Explain any two types of metamorphic rocks. **4**

5. a) Explain any two types of unconformity. **5**
   b) Explain civil engineering significance of fold. **4**

SECTION – II

6. Write short notes **any five** : **10**
   1) Porosity of rock.
   2) What is R.Q.D. ?

3) Durability of rock.

4) Buttress dam.

5) Grouting.

6) What is silting of reservoir ?

7. a) Explain types of aquifer. **5**

   b) Explain preliminary geological survey for dam site selection. **4**

8. a) Explain effect of earthquake. **5**

   b) Explain disaster management of landslide. **4**

9. a) Explain difficulties in tunneling. **5**

   b) Explain any two types of bridges. **4**

SLR-VB – 27

Seat No.	

Set P

S.E. Civil (Part – II) (CGPA Pattern) Examination, 2017
STRUCTURAL MECHANICS – II

Day and Date : Tuesday, 16-5-2017 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**.*
*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** and Section – **II***
*4) Assume suitable data **if required**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Principal planes are the planes of
a) maximum shear stress b) minimum shear stress
c) zero shear stress d) none of above

2) In case of conjugate beam method of deflection, deflection at any point on beam is nothing but **1**
a) B.M. at corresponding point on conjugate beam
b) S.F. at corresponding point on conjugate beam
c) Slope on conjugate beam
d) None of the above

3) In case of moment area method of deflection, deflection at any point on beam is nothing but _____ at that point on beam, where x = distance of C.G. from reference. **1**
a) Ax/EI b) A/2xEI c) 2Ax/EI d) xEI/A

4) Effective length (L) of column of length l whose both ends are fixed is **1**
a) $l/2$ b) $2l$ c) $l/\sqrt{2}$ d) l

5) The amount of deflection of a beam subjected to some type of loading depends upon **1**
a) cross-section b) bending moment
c) either a or b d) both a and b

P.T.O.

6) Equivalent Torque is given by **1**

a) $T_e = (M^2 + T^2)$ b) $T_e = (M^2 + T^2)^{1/2}$

c) $T_e = (M^2 + T^2)^{3/2}$ d) $T_e = (M^2 + T^2)^2$

7) Which of the following theories is suitable for ductile material ? **1**

a) maximum principle strain theory b) maximum shear stress theory
c) maximum principle stress theory d) distortion energy theory

8) Strain energy theory was postulated by **1**

a) St. Venant b) Mohr c) Rankine d) Haigh

9) Euler's critical load for a column of length l, moment of inertia I, modulus of elasticity E and both ends are hinged is given by **1**

a) $\Pi^2 EI/l^2$ b) $\Pi^2 EI/4l^2$ c) $\Pi^2 EI/2l^2$ d) $4\Pi^2 EI/l^2$

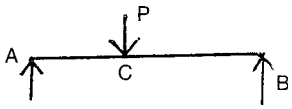
10) Three hinged arch is _____ structure. **1**

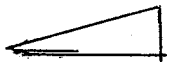
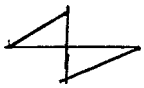
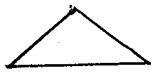
a) determinate b) indeterminate
c) both a and b d) none of the above

11) Strain energy stored in structure by bending is given by the relation **1**

a) $\int M^2/EI\, dx$ b) $\int M^2/2EI\, dx$ c) $\int M^2/3EI\, dx$ d) $\int M^2/4EI\, dx$

12) ILD for shear force for the simply supported beam shown in fig is **2**



a)  b)  c)  d) 

13) ILD is graph showing functions like bending moment, shear force at a section and reactions at supports when load is **1**

a) rolling b) static
c) both a and b d) none of the above

_____

SLR-VB – 27

Seat No.	

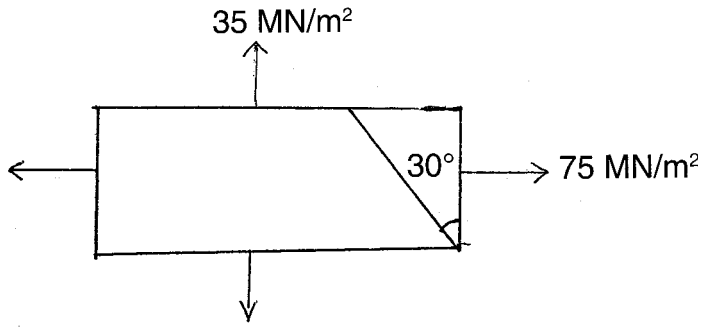
S.E. Civil (Part – II) (CGPA Pattern) Examination, 2017
STRUCTURAL MECHANICS – II

Day and Date : Tuesday, 16-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions** : 1) Solve **any three** questions from Section – **I** and Section – **II
*2) Assume suitable data **if required**.*

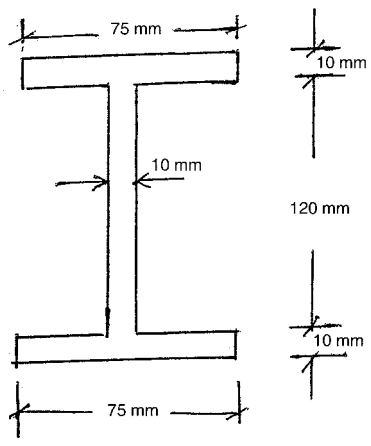
SECTION – I

2. The principal stresses at a point across two perpendicular planes are 75 MN/m^2 (tensile) and 35 MN/m^2 (tensile). Find the normal, tangential stresses and the resultant stress and its obliquity on a plane at 30° with major principle plane. **9**



3. a) Assumptions made in Euler's theory of long columns. **3**

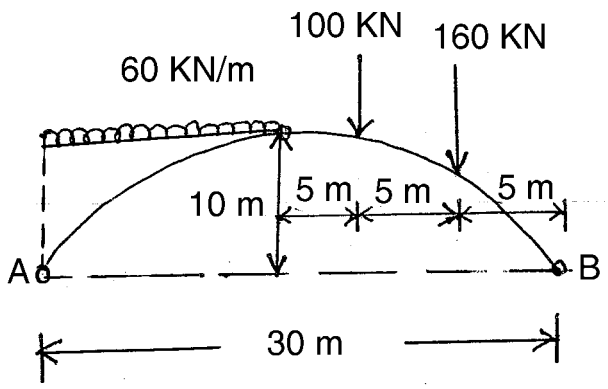
   b) Three steel plates are welded to form a column section shown in figure. If the effective length of the column is 7.5 m, find the factor of safety with respect to buckling for a centric load of 12 KN. Take E = 2×10^5 N/mm^2. **7**



4. a) Equivalent moment and Equivalent torque. **3**

   b) A hollow circular shaft subjected to a torque and bending moment of 40 kNm and 30 KNm respectively. The internal diameter of the shaft is one half external diameter. If the maximum shear stress is not to exceed 80 MN/m^2, find diameter of the shaft. **6**

5. a) A three hinged parabolic arch of span 30 meters and rise of 10 meters. The arch carries a uniformly distributed load of 60 KN per meter run on the left half of its span. It also carries two concentrated loads of 160 KN and 100 KN at 5 m and 10 m from the right end. Determine horizontal thrust at each support. **6**



   b) Explain maximum principle strain theory. **3**

SECTION – II

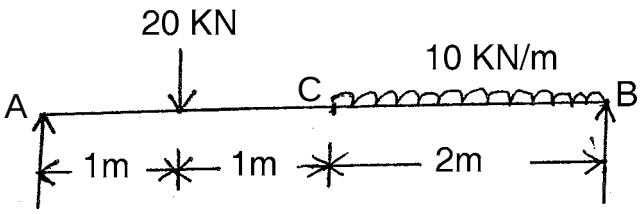
6. A beam AB of 4 meters span in simply supported at the ends. For given loading use Macaulay's method and find : **10**

   a) Deflection at C

   b) Maximum deflection

   c) Slope at the end A

   Given, E = 200×10^6 KN/m^2 I = 20×10^{-6} m^4.



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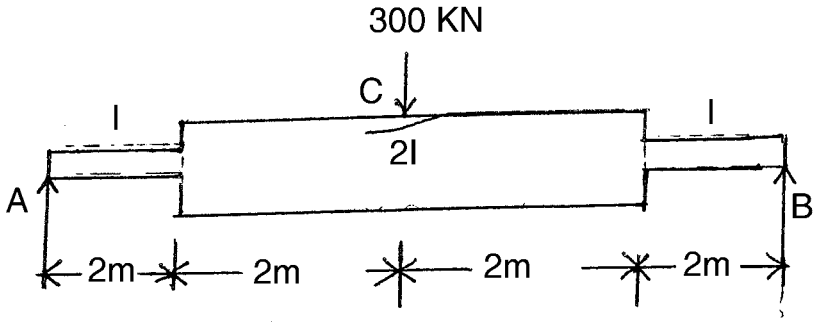

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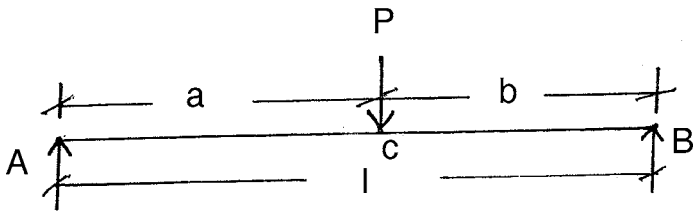
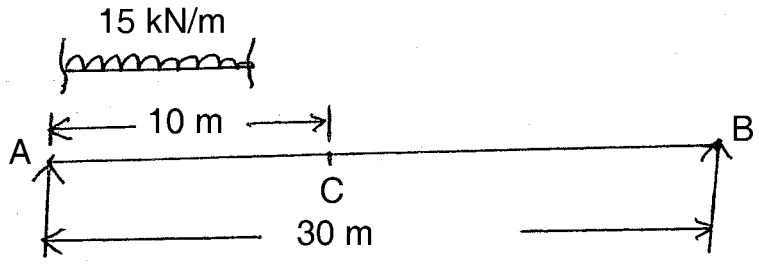


9. A girder of 30 m span is simply supported at its ends. A uniformly distributed load of 15 KN/m and 40 m long is made to roll over the girder from one end to other. Determine the maximum bending moment and shear force at a section 10 m from the left end support. **9**



Set P

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Seat No.	

Set Q

S.E. Civil (Part – II) (CGPA Pattern) Examination, 2017
STRUCTURAL MECHANICS – II

Day and Date : Tuesday, 16-5-2017 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**.*
*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** and Section – **II***
*4) Assume suitable data **if required**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

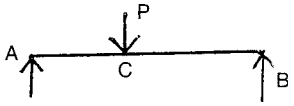
1) Strain energy theory was postulated by **1**
a) St. Venant b) Mohr c) Rankine d) Haigh

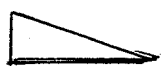
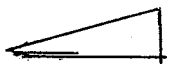
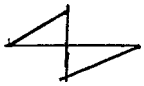
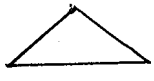
2) Euler's critical load for a column of length l, moment of inertia I, modulus of elasticity E and both ends are hinged is given by **1**
a) $\Pi^2 EI/l^2$ b) $\Pi^2 EI/4l^2$ c) $\Pi^2 EI/2l^2$ d) $4\Pi^2 EI/l^2$

3) Three hinged arch is _____ structure. **1**
a) determinate b) indeterminate
c) both a and b d) none of the above

4) Strain energy stored in structure by bending is given by the relation **1**
a) $\int M^2/EI\, dx$ b) $\int M^2/2EI\, dx$ c) $\int M^2/3EI\, dx$ d) $\int M^2/4EI\, dx$

5) ILD for shear force for the simply supported beam shown in fig is **2**



a)  b)  c)  d) 

6) ILD is graph showing functions like bending moment, shear force at a section and reactions at supports when load is **1**
a) rolling b) static
c) both a and b d) none of the above

P.T.O.

7) Principal planes are the planes of
   a) maximum shear stress b) minimum shear stress
   c) zero shear stress d) none of above

8) In case of conjugate beam method of deflection, deflection at any point on beam is nothing but **1**
   a) B.M. at corresponding point on conjugate beam
   b) S.F. at corresponding point on conjugate beam
   c) Slope on conjugate beam
   d) None of the above

9) In case of moment area method of deflection, deflection at any point on beam is nothing but _____ at that point on beam, where x = distance of C.G. from reference. **1**
   a) Ax/EI b) A/2xEI c) 2Ax/EI d) xEI/A

10) Effective length (L) of column of length l whose both ends are fixed is **1**
   a) $l/2$ b) $2l$ c) $l/\sqrt{2}$ d) l

11) The amount of deflection of a beam subjected to some type of loading depends upon **1**
   a) cross-section b) bending moment
   c) either a or b d) both a and b

12) Equivalent Torque is given by **1**
   a) $T_e = (M^2 + T^2)$ b) $T_e = (M^2 + T^2)^{1/2}$
   c) $T_e = (M^2 + T^2)^{3/2}$ d) $T_e = (M^2 + T^2)^2$

13) Which of the following theories is suitable for ductile material ? **1**
   a) maximum principle strain theory b) maximum shear stress theory
   c) maximum principle stress theory d) distortion energy theory

_____

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Seat No.	

S.E. Civil (Part – II) (CGPA Pattern) Examination, 2017
STRUCTURAL MECHANICS – II

Day and Date : Tuesday, 16-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions** : 1) Solve **any three** questions from Section – **I** and Section – **II
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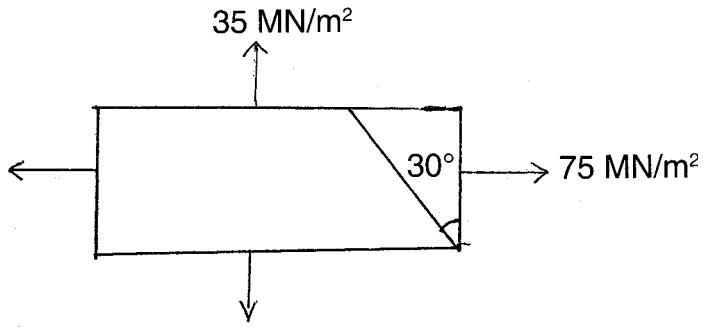
SECTION – I

2. The principal stresses at a point across two perpendicular planes are 75 MN/m^2 (tensile) and 35 MN/m^2 (tensile). Find the normal, tangential stresses and the resultant stress and its obliquity on a plane at 30° with major principle plane. **9**



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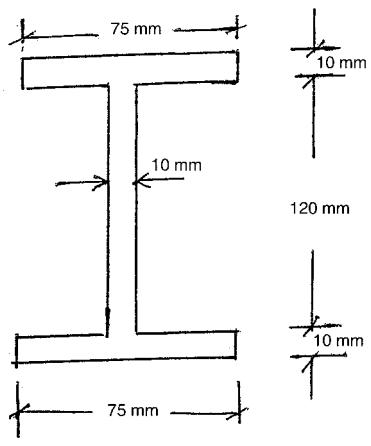
   b) Three steel plates are welded to form a column section shown in figure. If the effective length of the column is 7.5 m, find the factor of safety with respect to buckling for a centric load of 12 KN. Take E = 2×10^5 N/mm^2. **7**



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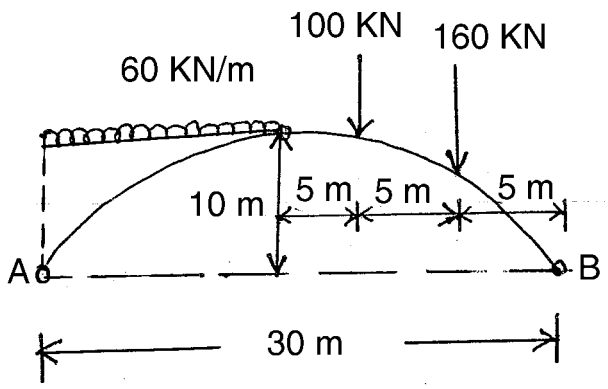
5. a) A three hinged parabolic arch of span 30 meters and rise of 10 meters. The arch carries a uniformly distributed load of 60 KN per meter run on the left half of its span. It also carries two concentrated loads of 160 KN and 100 KN at 5 m and 10 m from the right end. Determine horizontal thrust at each support. **6**



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SECTION – II

6. A beam AB of 4 meters span in simply supported at the ends. For given loading use Macaulay's method and find : **10**

   a) Deflection at C

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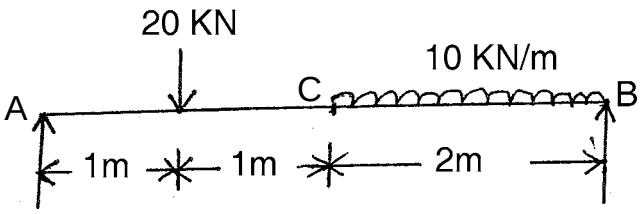
   Given, E = 200×10^6 KN/m^2 I = 20×10^{-6} m^4.



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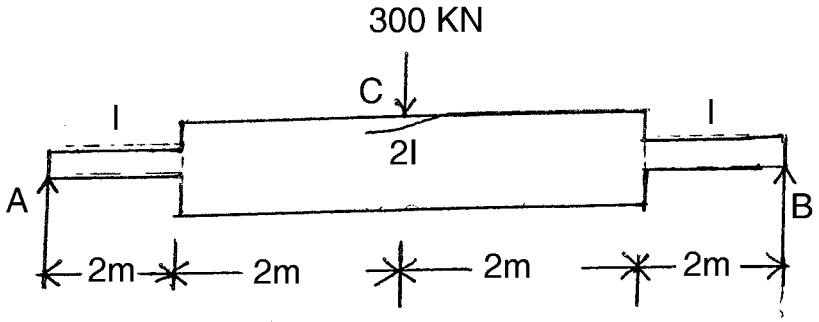

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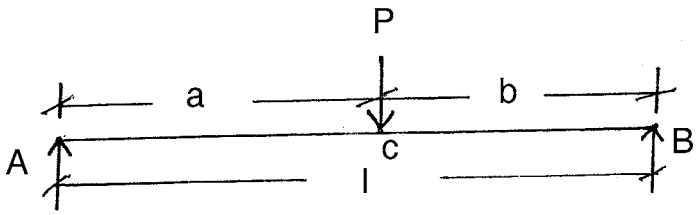

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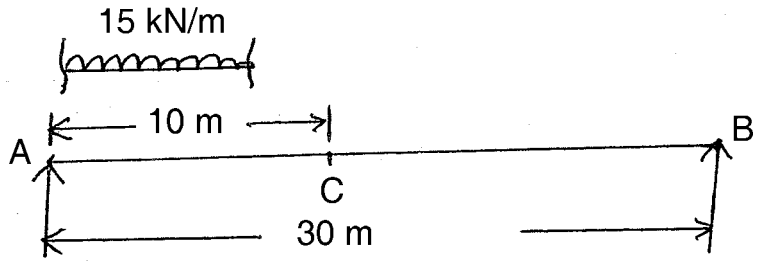

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Seat No.	

Set R

S.E. Civil (Part – II) (CGPA Pattern) Examination, 2017
STRUCTURAL MECHANICS – II

Day and Date : Tuesday, 16-5-2017 Max. Marks : 70
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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1) The amount of deflection of a beam subjected to some type of loading depends upon **1**
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   c) either a or b d) both a and b

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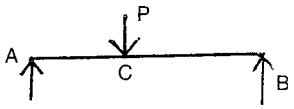
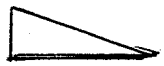
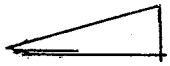
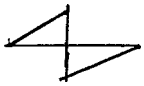
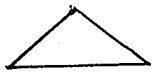


a)  b)  c)  d) 

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Seat No.	

S.E. Civil (Part – II) (CGPA Pattern) Examination, 2017
STRUCTURAL MECHANICS – II

Day and Date : Tuesday, 16-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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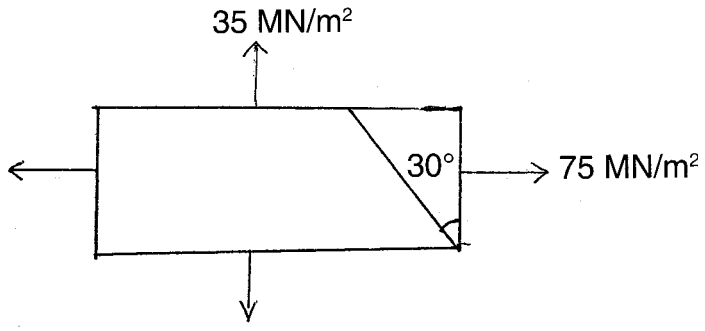

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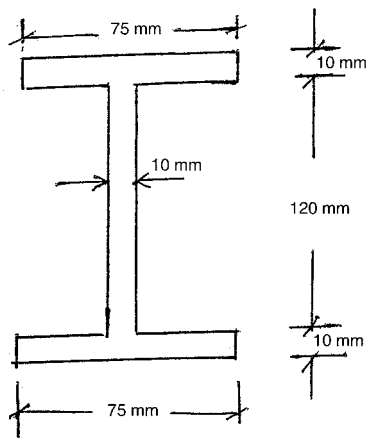

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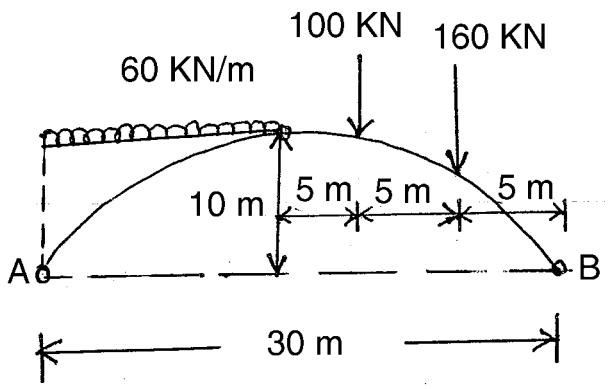

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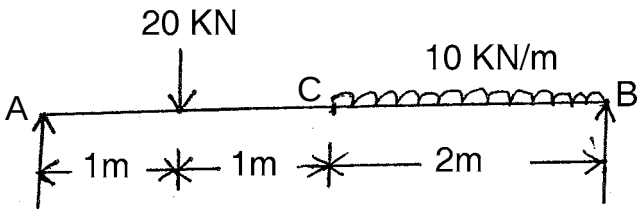
SECTION – II

6. A beam AB of 4 meters span in simply supported at the ends. For given loading use Macaulay's method and find : **10**

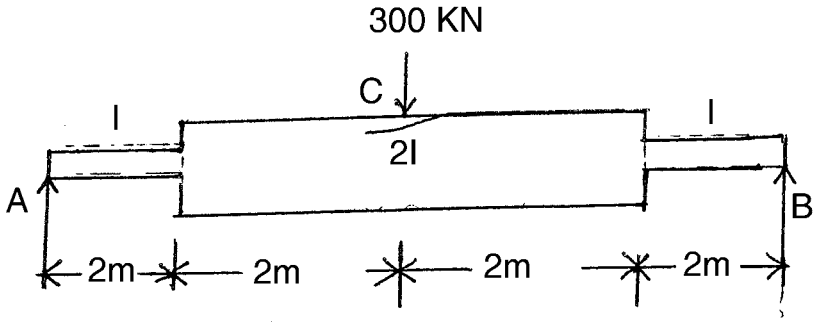
   a) Deflection at C

   b) Maximum deflection

   c) Slope at the end A
   Given, $E = 200\times10^6$ KN/m^2 $I = 20\times10^{-6}m^4$.



7. Using conjugate beam method determine the mid span deflection of the beam. Take E = 200×10^6 KN/m^2 and I = $200\times10^{-4}m^4$. **9**



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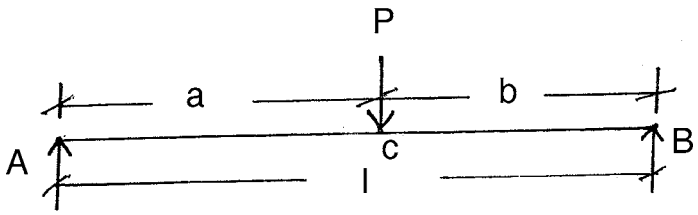

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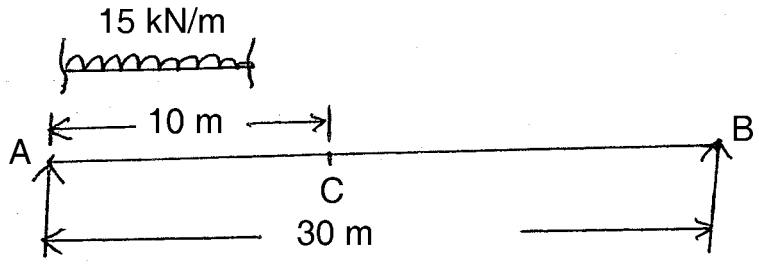

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S.E. Civil (Part – II) (CGPA Pattern) Examination, 2017
STRUCTURAL MECHANICS – II

Day and Date : Tuesday, 16-5-2017 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**.*
*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** and Section – **II***
*4) Assume suitable data **if required**.*

MCQ/Objective Type Questions

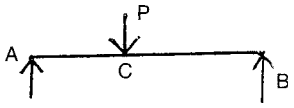
Duration : 30 Minutes Marks : 14

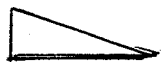
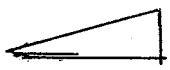
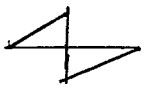
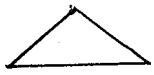
1. Choose the correct answer : **1**

1) Three hinged arch is _____ structure. **1**
a) determinate b) indeterminate
c) both a and b d) none of the above

2) Strain energy stored in structure by bending is given by the relation **1**
a) $\int M^2/EI\,dx$ b) $\int M^2/2EI\,dx$ c) $\int M^2/3EI\,dx$ d) $\int M^2/4EI\,dx$

3) ILD for shear force for the simply supported beam shown in fig is **2**



a)  b)  c)  d) 

4) ILD is graph showing functions like bending moment, shear force at a section and reactions at supports when load is **1**
a) rolling b) static
c) both a and b d) none of the above

5) Principal planes are the planes of
a) maximum shear stress b) minimum shear stress
c) zero shear stress d) none of above

P.T.O.

6) In case of conjugate beam method of deflection, deflection at any point on beam is nothing but **1**
   a) B.M. at corresponding point on conjugate beam
   b) S.F. at corresponding point on conjugate beam
   c) Slope on conjugate beam
   d) None of the above

7) In case of moment area method of deflection, deflection at any point on beam is nothing but _____ at that point on beam, where x = distance of C.G. from reference. **1**
   a) Ax/EI b) A/2xEI c) 2Ax/EI d) xEI/A

8) Effective length (L) of column of length l whose both ends are fixed is **1**
   a) $l/2$ b) $2l$ c) $l/\sqrt{2}$ d) l

9) The amount of deflection of a beam subjected to some type of loading depends upon **1**
   a) cross-section b) bending moment
   c) either a or b d) both a and b

10) Equivalent Torque is given by **1**
   a) $T_e = (M^2 + T^2)$ b) $T_e = (M^2 + T^2)^{1/2}$
   c) $T_e = (M^2 + T^2)^{3/2}$ d) $T_e = (M^2 + T^2)^2$

11) Which of the following theories is suitable for ductile material ? **1**
   a) maximum principle strain theory b) maximum shear stress theory
   c) maximum principle stress theory d) distortion energy theory

12) Strain energy theory was postulated by **1**
   a) St. Venant b) Mohr c) Rankine d) Haigh

13) Euler's critical load for a column of length l, moment of inertia I, modulus of elasticity E and both ends are hinged is given by **1**
   a) $\Pi^2 EI/l^2$ b) $\Pi^2 EI/4l^2$ c) $\Pi^2 EI/2l^2$ d) $4\Pi^2 EI/l^2$

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Seat No.	

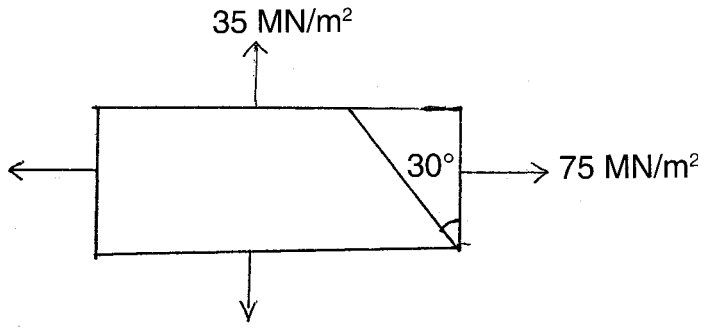
S.E. Civil (Part – II) (CGPA Pattern) Examination, 2017
STRUCTURAL MECHANICS – II

Day and Date : Tuesday, 16-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions** : 1) Solve **any three** questions from Section – **I** and Section – **II
*2) Assume suitable data **if required**.*

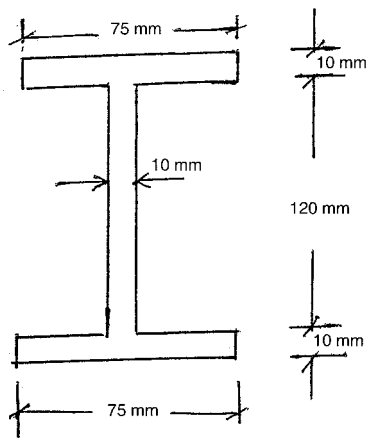
SECTION – I

2. The principal stresses at a point across two perpendicular planes are 75 MN/m^2 (tensile) and 35 MN/m^2 (tensile). Find the normal, tangential stresses and the resultant stress and its obliquity on a plane at 30° with major principle plane. **9**



3. a) Assumptions made in Euler's theory of long columns. **3**

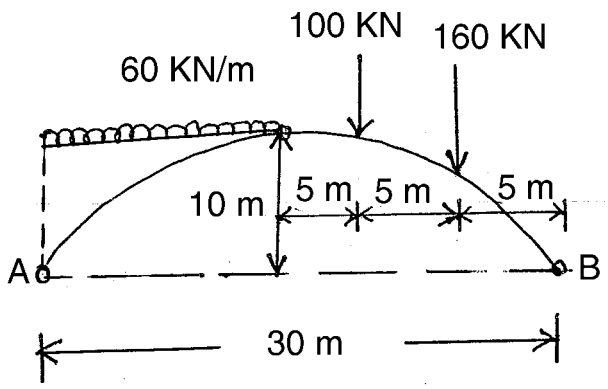
   b) Three steel plates are welded to form a column section shown in figure. If the effective length of the column is 7.5 m, find the factor of safety with respect to buckling for a centric load of 12 KN. Take E = 2×10^5 N/mm^2. **7**



4. a) Equivalent moment and Equivalent torque. **3**

   b) A hollow circular shaft subjected to a torque and bending moment of 40 kNm and 30 KNm respectively. The internal diameter of the shaft is one half external diameter. If the maximum shear stress is not to exceed 80 MN/m^2, find diameter of the shaft. **6**

5. a) A three hinged parabolic arch of span 30 meters and rise of 10 meters. The arch carries a uniformly distributed load of 60 KN per meter run on the left half of its span. It also carries two concentrated loads of 160 KN and 100 KN at 5 m and 10 m from the right end. Determine horizontal thrust at each support. **6**



   b) Explain maximum principle strain theory. **3**

SECTION – II

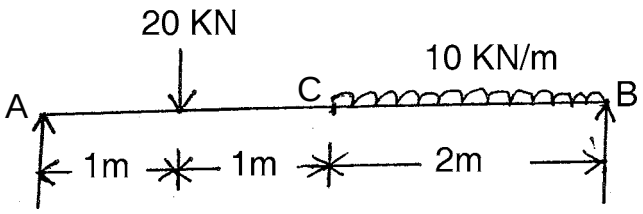
6. A beam AB of 4 meters span in simply supported at the ends. For given loading use Macaulay's method and find : **10**

   a) Deflection at C

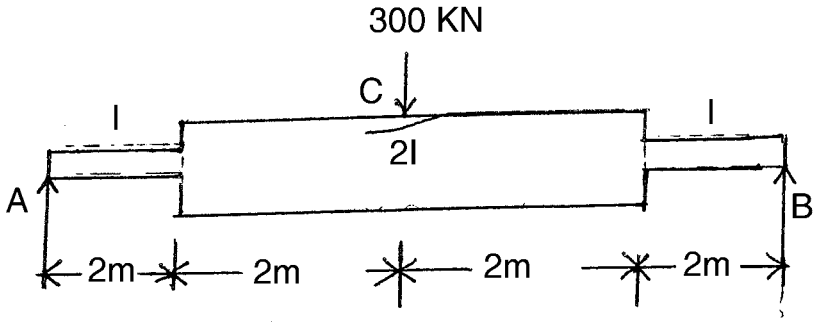
   b) Maximum deflection

   c) Slope at the end A

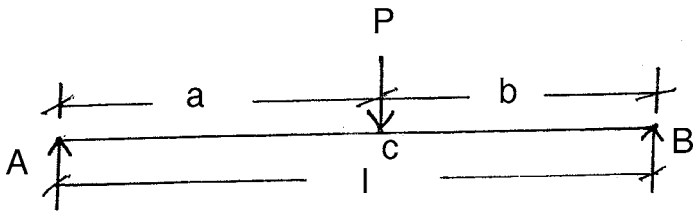
   Given, E = 200×10^6 KN/m^2 I = 20×10^{-6} m^4.



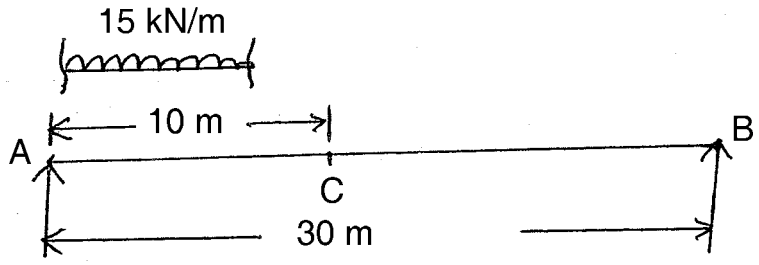
7. Using conjugate beam method determine the mid span deflection of the beam. Take E = 200×10^6 KN/m^2 and I = 200×10^{-4}m^4. **9**



8. A simply supported beam carries a point load P eccentrically on the span. Find the deflection under the load. Assume uniform flexural rigidity. Use strain energy methods (Castigliano's theorem). **9**



9. A girder of 30 m span is simply supported at its ends. A uniformly distributed load of 15 KN/m and 40 m long is made to roll over the girder from one end to other. Determine the maximum bending moment and shear force at a section 10 m from the left end support. **9**



Set S

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Seat No.	

Set **P**

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
SURVEYING – II

Day and Date : Thursday, 18-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) In section* ***I****, Q.No.* ***02*** *and in Section* ***II*** *Q. No.* ***09*** *is* ***compulsory****.*
2) Solve ***any two full*** *questions from Q. No.* ***3*** *to Q. No.* ***5*** *in Section* ***I****.*
3) Solve ***any two full*** *questions from Q. No.* ***6*** *to Q. No.* ***8*** *in Section* ***II****.*
4) Assume ***suitable*** *data if necessary and mention it* ***clearly****.*
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.***
7) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The stadia diaphragm is provided for measuring
   a) Elevation b) Bearing
   c) Horizontal distance d) None of these

2) The radius of one degree curve is
   a) 1719 m b) 1760 m c) 2000 m d) 2100 m

3) An ideal transition curve is also known as a
   a) Clothoid curve b) Cubical curve
   c) Parabolic curve d) None of these

4) A vertical curve is designed on the basis of the
   a) Radius of curve b) Minimum sight distance
   c) Change of gradient d) None of these

5) Geo stationary satellite have
   a) Same distance from earth's centre
   b) Same speed as earth's rotation
   c) Same mass as global weight
   d) Same angle with geodetic stations

P.T.O.

6) The relation between the radius (R) of and degree (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) The substance bar is used to measure
a) Vertical distance b) Horizontal distance
c) Elevation d) None of these

8) Which one of following is long wavelength radiation ?
a) Ultraviolet b) X-ray
c) Infrared d) Gammaray

9) Line in polygon method of GIS is characteristic of
a) Raster overlay b) Vector overlay
c) Buffer operation d) Intersecting operation

10) The graphical elements of vector data structures are
a) Point b) Arc
c) Area d) All of these

11) The GPS is a network of following number of Navstar satellite
a) 21 b) 22
c) 23 d) 24

12) GPS is used for finding
a) Lattitude, longitude, altitude b) Speed
c) Trip distance d) All of these

13) Objectives of GIS are
a) Maximize the efficiency of decision making and planning
b) Provide efficient means for data distribution and handling
c) Both a) and b)
d) None of these

14) _____ and _____ are open source and free GIS software.
a) Map Info, Arc GIS b) OGIS, GRASS
c) Map Info, QGIS d) Arc GIS, QGIS

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Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
SURVEYING – II

Day and Date : Thursday, 18-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) In section* ***I****, Q.No.* ***02*** *and Section* ***II*** *Q. No.* ***09*** *is* ***compulsory****.*
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SECTION – I

2. Attempt **any two** (**Each 4** marks) :

a) Write short note on auto reduction Tachometer.

b) Write short note on types of vertical curve.

c) Write note on application of GPS. **8**

3. a) Describe the method of determining the constant of a tachometer from field measurements. **5**

b) A tachometer was set up at a station 'C' and the following readings were obtained on a staff vertically held.

Inst St.	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 RLof 'D', when the constant of instrument are 100 and 0.15 ? **5**

4. a) Distinguish between different types of horizontal curve. **5**

   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 a peg interval of 20 m. **5**

5. a) What are the three segments of GPS ? Describe them briefly. **5**

   b) Derive an expression for an ideal transition curve. **5**

SECTION – II

6. a) A line 'PQ' 2100 m long, lying at an elevation of 400 m, measures 10.08 cm, on a vertical photograph ? If the focal length of the lens is 24 cm, determine the scale of the photograph in an area, the average elevation which is 600 m ? **5**

   b) Explain with the help of neat sketch an idealised remote sensing system. **5**

7. a) Define GIS. Explain data sources for GIS. **5**

   b) What are the component subsystem of GIS ? Describe them briefly. **5**

8. a) Explain route surveying with respect to reconnaissance location surveys ? **5**

   b) Explain project surveys carried out for tunnel ? **5**

9. Attempt **any two** (**Each 4** marks) : **8**

   a) Write short note on project surveys carried out for culverts and Bridges ?

   b) Write short note on mirror stereoscope.

   c) Give applications of GIS. Discuss how closely GIS is related to remote sensing.

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Seat No.	

Set **Q**

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
SURVEYING – II

Day and Date : Thursday, 18-5-2017 Max. Marks : 70
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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   a) Ultraviolet b) X-ray
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2) Line in polygon method of GIS is characteristic of
   a) Raster overlay b) Vector overlay
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3) The graphical elements of vector data structures are
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4) The GPS is a network of following number of Navstar satellite
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P.T.O.

6) Objectives of GIS are
   a) Maximize the efficiency of decision making and planning
   b) Provide efficient means for data distribution and handling
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7) _____ and _____ are open source and free GIS software.
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8) The stadia diaphragm is provided for measuring
   a) Elevation
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9) The radius of one degree curve is
   a) 1719 m
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11) A vertical curve is designed on the basis of the
   a) Radius of curve
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SLR-VB – 28

Seat No.	

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SURVEYING – II

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SECTION – I

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SECTION – II

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SLR-VB – 28

Seat No.	

Set **R**

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P.T.O.

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SLR-VB – 28

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4) Assume ***suitable*** *data if necessary and mention it* ***clearly****.*
5) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. Attempt **any two** (**Each 4** marks) :

a) Write short note on auto reduction Tachometer.

b) Write short note on types of vertical curve.

c) Write note on application of GPS. **8**

3. a) Describe the method of determining the constant of a tachometer from field measurements. **5**

b) A tachometer was set up at a station 'C' and the following readings were obtained on a staff vertically held.

Inst St.	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 RLof 'D', when the constant of instrument are 100 and 0.15 ? **5**

4. a) Distinguish between different types of horizontal curve. **5**

   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 a peg interval of 20 m. **5**

5. a) What are the three segments of GPS ? Describe them briefly. **5**

   b) Derive an expression for an ideal transition curve. **5**

SECTION – II

6. a) A line 'PQ' 2100 m long, lying at an elevation of 400 m, measures 10.08 cm, on a vertical photograph ? If the focal length of the lens is 24 cm, determine the scale of the photograph in an area, the average elevation which is 600 m ? **5**

   b) Explain with the help of neat sketch an idealised remote sensing system. **5**

7. a) Define GIS. Explain data sources for GIS. **5**

   b) What are the component subsystem of GIS ? Describe them briefly. **5**

8. a) Explain route surveying with respect to reconnaissance location surveys ? **5**

   b) Explain project surveys carried out for tunnel ? **5**

9. Attempt **any two** (**Each 4** marks) : **8**

   a) Write short note on project surveys carried out for culverts and Bridges ?

   b) Write short note on mirror stereoscope.

   c) Give applications of GIS. Discuss how closely GIS is related to remote sensing.

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SLR-VB – 28

Seat No.	

Set **S**

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
SURVEYING – II

Day and Date : Thursday, 18-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) In section* ***I****, Q.No.* ***02*** *and in Section* ***II*** *Q. No.* ***09*** *is* ***compulsory****.*
2) Solve ***any two full*** *questions from Q. No.* ***3*** *to Q. No.* ***5*** *in Section* ***I****.*
3) Solve ***any two full*** *questions from Q. No.* ***6*** *to Q. No.* ***8*** *in Section* ***II****.*
4) Assume ***suitable*** *data if necessary and mention it* ***clearly****.*
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.***
7) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The graphical elements of vector data structures are
   a) Point b) Arc
   c) Area d) All of these

2) The GPS is a network of following number of Navstar satellite
   a) 21 b) 22
   c) 23 d) 24

3) GPS is used for finding
   a) Lattitude, longitude, altitude b) Speed
   c) Trip distance d) All of these

4) Objectives of GIS are
   a) Maximize the efficiency of decision making and planning
   b) Provide efficient means for data distribution and handling
   c) Both a) and b)
   d) None of these

5) _____ and _____ are open source and free GIS software.
   a) Map Info, Arc GIS b) OGIS, GRASS
   c) Map Info, QGIS d) Arc GIS, QGIS

P.T.O.

6) The stadia diaphragm is provided for measuring
   a) Elevation b) Bearing
   c) Horizontal distance d) None of these

7) The radius of one degree curve is
   a) 1719 m b) 1760 m c) 2000 m d) 2100 m

8) An ideal transition curve is also known as a
   a) Clothoid curve b) Cubical curve
   c) Parabolic curve d) None of these

9) A vertical curve is designed on the basis of the
   a) Radius of curve b) Minimum sight distance
   c) Change of gradient d) None of these

10) Geo stationary satellite have
   a) Same distance from earth's centre
   b) Same speed as earth's rotation
   c) Same mass as global weight
   d) Same angle with geodetic stations

11) The relation between the radius (R) of and degree (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) The substance bar is used to measure
   a) Vertical distance b) Horizontal distance
   c) Elevation d) None of these

13) Which one of following is long wavelength radiation ?
   a) Ultraviolet b) X-ray
   c) Infrared d) Gammaray

14) Line in polygon method of GIS is characteristic of
   a) Raster overlay b) Vector overlay
   c) Buffer operation d) Intersecting operation

SLR-VB – 28

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
SURVEYING – II

Day and Date : Thursday, 18-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) In section* ***I****, Q.No.* ***02*** *and Section* ***II*** *Q. No.* ***09*** *is* ***compulsory****.*
2) Solve ***any two full*** *questions from Q. No.* ***3*** *to Q. No.* ***5*** *in Section* ***I****.*
3) Solve ***any two full*** *questions from Q. No.* ***6*** *to Q. No.* ***8*** *in Section* ***II****.*
4) Assume ***suitable*** *data if necessary and mention it* ***clearly****.*
5) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. Attempt **any two** (**Each 4** marks) :

a) Write short note on auto reduction Tachometer.

b) Write short note on types of vertical curve.

c) Write note on application of GPS. **8**

3. a) Describe the method of determining the constant of a tachometer from field measurements. **5**

b) A tachometer was set up at a station 'C' and the following readings were obtained on a staff vertically held.

Inst St.	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 RLof 'D', when the constant of instrument are 100 and 0.15 ? **5**

4. a) Distinguish between different types of horizontal curve. **5**

   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 a peg interval of 20 m. **5**

5. a) What are the three segments of GPS ? Describe them briefly. **5**

   b) Derive an expression for an ideal transition curve. **5**

SECTION – II

6. a) A line 'PQ' 2100 m long, lying at an elevation of 400 m, measures 10.08 cm, on a vertical photograph ? If the focal length of the lens is 24 cm, determine the scale of the photograph in an area, the average elevation which is 600 m ? **5**

   b) Explain with the help of neat sketch an idealised remote sensing system. **5**

7. a) Define GIS. Explain data sources for GIS. **5**

   b) What are the component subsystem of GIS ? Describe them briefly. **5**

8. a) Explain route surveying with respect to reconnaissance location surveys ? **5**

   b) Explain project surveys carried out for tunnel ? **5**

9. Attempt **any two** (**Each 4** marks) : **8**

   a) Write short note on project surveys carried out for culverts and Bridges ?

   b) Write short note on mirror stereoscope.

   c) Give applications of GIS. Discuss how closely GIS is related to remote sensing.

———————————

Seat No.	

SLR-VB – 29

Set **P**

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Saturday, 20-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) Use **both** sides of **full** imperial drawing sheet for Section – **I**.*
*2) Figures on **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**.*
*6) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*7) **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. Objective type of question : **14**

A) State whether following statements are **correct** or **wrong**. (Mention answer in words as correct or wrong **only**). **(1×7=7)**

1) A row house type building have only front and rear open spaces.

2) The covered area with atleast one side open to the outside with the exception of 1 m high parapet wall is called as Verandah.

3) For the semi-detached building the minimum plot size should be 125-250 sqm.

4) The built up area for residential building of plot size 500 sqm to 1000 sqm should be 50 percent of ground coverage.

5) The side open spaces for detached building shall be minimum 3 m.

6) A bath room should have a minimum width of 1.2 m.

7) The sun path is titled towards southern side.

B) MCQ type. (Mention answer in words **only**). **(1×7=7)**

1) Bed room is to be provided on _____ side.
   a) East b) West c) South d) North

2) Minimum size of habitable room should be _____ m^2 minimum.
   a) 8 b) 9 c) 9.5 d) 10

3) Built-up area divided by plot area is
   a) FSI b) FAR
   c) Both a) and b) d) None

4) The actually usable area is called as
   a) Built-up b) Carpet area
   c) Both a) and b) d) None

5) FSI depends on
   a) City b) Gaothan area
   c) Town planning area d) All above

6) Air conditioning is basically a _____ type of ventilation.
   a) Mechanical b) Natural c) Thermal d) Other

7) Low cost housing consist of
   a) Local materials b) Minimum openings
   c) Minimum dimensions d) All of these

_____

SLR-VB – 29

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Saturday, 20-5-2017 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) Use **both** sides of **full** imperial drawing sheet for Section – **I**.*
*2) Figures on **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

2. Plan and draw to a scale 1 : 50 plan for a detached house block having built-up area not more than 100 sq. m. only ground floor to be provided/planned. Provide for the following areas/rooms. Living room – 1, Bed room – 1, Kitchen – 1, Standard size bathroom – 1, Standard size Indian style W. C. – 1, circulation as per requirement. **28**

   Draw to scale 1 : 50 mention dimensions.

   1) Detailed plan with furniture layout. **20**

   2) Standard Section. **8**

SECTION – II

3. Attempt **any four** of the following : **(4×7=28)**

   1) 2 Pipe System of House Drainage with neat sketch.

   2) Explain the types and necessity of traps with neat sketch.

   3) Write a note on “building permit” and “occupancy certificate”.

   4) Write short note “natural ventilation” with neat sketch.

   5) Explain in details “types of plaster”.

   6) Write a short note on “Solar consideration for building planning”.

Set P

Set P

Seat No.	

SLR-VB – 29

Set **Q**

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Saturday, 20-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) Use **both** sides of **full** imperial drawing sheet for Section – **I**.*
*2) Figures on **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**.*
*6) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*7) **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. Objective type of question : **14**

A) State whether following statements are **correct** or **wrong**. (Mention answer in words as correct or wrong **only**). **(1×7=7)**

1) For the semi-detached building the minimum plot size should be 125-250 sqm.

2) The built up area for residential building of plot size 500 sqm to 1000 sqm should be 50 percent of ground coverage.

3) The side open spaces for detached building shall be minimum 3 m.

4) A bath room should have a minimum width of 1.2 m.

5) The sun path is titled towards southern side.

6) A row house type building have only front and rear open spaces.

7) The covered area with atleast one side open to the outside with the exception of 1 m high parapet wall is called as Verandah.

B) MCQ type. (Mention answer in words **only**). **(1×7=7)**

1) Built-up area divided by plot area is
   a) FSI b) FAR
   c) Both a) and b) d) None

2) The actually usable area is called as
   a) Built-up b) Carpet area
   c) Both a) and b) d) None

3) FSI depends on
   a) City b) Gaothan area
   c) Town planning area d) All above

4) Air conditioning is basically a _____ type of ventilation.
   a) Mechanical b) Natural c) Thermal d) Other

5) Low cost housing consist of
   a) Local materials b) Minimum openings
   c) Minimum dimensions d) All of these

6) Bed room is to be provided on _____ side.
   a) East b) West c) South d) North

7) Minimum size of habitable room should be _____ m^2 minimum.
   a) 8 b) 9 c) 9.5 d) 10

_____

SLR-VB – 29

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Saturday, 20-5-2017 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) Use **both** sides of **full** imperial drawing sheet for Section – **I**.*
*2) Figures on **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

2. Plan and draw to a scale 1 : 50 plan for a detached house block having built-up area not more than 100 sq. m. only ground floor to be provided/planned. Provide for the following areas/rooms. Living room – 1, Bed room – 1, Kitchen – 1, Standard size bathroom – 1, Standard size Indian style W. C. – 1, circulation as per requirement. **28**

   Draw to scale 1 : 50 mention dimensions.

   1) Detailed plan with furniture layout. **20**

   2) Standard Section. **8**

SECTION – II

3. Attempt **any four** of the following : **(4×7=28)**

   1) 2 Pipe System of House Drainage with neat sketch.

   2) Explain the types and necessity of traps with neat sketch.

   3) Write a note on “building permit” and “occupancy certificate”.

   4) Write short note “natural ventilation” with neat sketch.

   5) Explain in details “types of plaster”.

   6) Write a short note on “Solar consideration for building planning”.

Set Q

Set Q

Seat No.	

SLR-VB – 29

Set **R**

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Saturday, 20-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) Use **both** sides of **full** imperial drawing sheet for Section – **I**.*
*2) Figures on **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**.*
*6) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*7) **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. Objective type of question : **14**

A) State whether following statements are **correct** or **wrong**. (Mention answer in words as correct or wrong **only**). **(1×7=7)**

1) The side open spaces for detached building shall be minimum 3 m.

2) A bath room should have a minimum width of 1.2 m.

3) The sun path is titled towards southern side.

4) A row house type building have only front and rear open spaces.

5) The covered area with atleast one side open to the outside with the exception of 1 m high parapet wall is called as Verandah.

6) For the semi-detached building the minimum plot size should be 125-250 sqm.

7) The built up area for residential building of plot size 500 sqm to 1000 sqm should be 50 percent of ground coverage.

B) MCQ type. (Mention answer in words **only**). **(1×7=7)**

1) FSI depends on
   a) City b) Gaothan area
   c) Town planning area d) All above

2) Air conditioning is basically a _____ type of ventilation.
   a) Mechanical b) Natural c) Thermal d) Other

3) Low cost housing consist of
   a) Local materials b) Minimum openings
   c) Minimum dimensions d) All of these

4) Bed room is to be provided on _____ side.
   a) East b) West c) South d) North

5) Minimum size of habitable room should be _____ m^2 minimum.
   a) 8 b) 9 c) 9.5 d) 10

6) Built-up area divided by plot area is
   a) FSI b) FAR
   c) Both a) and b) d) None

7) The actually usable area is called as
   a) Built-up b) Carpet area
   c) Both a) and b) d) None

_____

SLR-VB – 29

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Saturday, 20-5-2017 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) Use **both** sides of **full** imperial drawing sheet for Section – **I**.*
*2) Figures on **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

2. Plan and draw to a scale 1 : 50 plan for a detached house block having built-up area not more than 100 sq. m. only ground floor to be provided/planned. Provide for the following areas/rooms. Living room – 1, Bed room – 1, Kitchen – 1, Standard size bathroom – 1, Standard size Indian style W. C. – 1, circulation as per requirement. **28**

   Draw to scale 1 : 50 mention dimensions.

   1) Detailed plan with furniture layout. **20**

   2) Standard Section. **8**

SECTION – II

3. Attempt **any four** of the following : **(4×7=28)**

   1) 2 Pipe System of House Drainage with neat sketch.

   2) Explain the types and necessity of traps with neat sketch.

   3) Write a note on “building permit” and “occupancy certificate”.

   4) Write short note “natural ventilation” with neat sketch.

   5) Explain in details “types of plaster”.

   6) Write a short note on “Solar consideration for building planning”.

Set R

Set R

Seat No.	

SLR-VB – 29

Set S

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Saturday, 20-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) Use **both** sides of **full** imperial drawing sheet for Section – **I**.*
*2) Figures on **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**.*
*6) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*7) **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. Objective type of question : **14**

A) State whether following statements are **correct** or **wrong**. (Mention answer in words as correct or wrong **only**). **(1×7=7)**

1) The built up area for residential building of plot size 500 sqm to 1000 sqm should be 50 percent of ground coverage.

2) The side open spaces for detached building shall be minimum 3 m.

3) A bath room should have a minimum width of 1.2 m.

4) The sun path is titled towards southern side.

5) A row house type building have only front and rear open spaces.

6) The covered area with atleast one side open to the outside with the exception of 1 m high parapet wall is called as Verandah.

7) For the semi-detached building the minimum plot size should be 125-250 sqm.

B) MCQ type. (Mention answer in words **only**). **(1×7=7)**

1) The actually usable area is called as
   a) Built-up b) Carpet area
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2) FSI depends on
   a) City b) Gaothan area
   c) Town planning area d) All above

3) Air conditioning is basically a _____ type of ventilation.
   a) Mechanical b) Natural c) Thermal d) Other

4) Low cost housing consist of
   a) Local materials b) Minimum openings
   c) Minimum dimensions d) All of these

5) Bed room is to be provided on _____ side.
   a) East b) West c) South d) North

6) Minimum size of habitable room should be _____ m^2 minimum.
   a) 8 b) 9 c) 9.5 d) 10

7) Built-up area divided by plot area is
   a) FSI b) FAR
   c) Both a) and b) d) None

_____

SLR-VB – 29

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
BUILDING CONSTRUCTION AND DESIGN

Day and Date : Saturday, 20-5-2017 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

***Instructions** : 1) Use **both** sides of **full** imperial drawing sheet for Section – **I**.*
*2) Figures on **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

2. Plan and draw to a scale 1 : 50 plan for a detached house block having built-up area not more than 100 sq. m. only ground floor to be provided/planned. Provide for the following areas/rooms. Living room – 1, Bed room – 1, Kitchen – 1, Standard size bathroom – 1, Standard size Indian style W. C. – 1, circulation as per requirement. **28**

   Draw to scale 1 : 50 mention dimensions.

   1) Detailed plan with furniture layout. **20**

   2) Standard Section. **8**

SECTION – II

3. Attempt **any four** of the following : **(4×7=28)**

   1) 2 Pipe System of House Drainage with neat sketch.

   2) Explain the types and necessity of traps with neat sketch.

   3) Write a note on “building permit” and “occupancy certificate”.

   4) Write short note “natural ventilation” with neat sketch.

   5) Explain in details “types of plaster”.

   6) Write a short note on “Solar consideration for building planning”.

Set S

Set S

SLR-VB – 30

Seat No.	

Set P

S.E. (Civil) (CGPA) (Part – II) Examination, 2017
FLUID MECHANICS – II

Day and Date : Tuesday, 23-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. **2** from Section **I** and Q. **6** from Section **II** are **compulsory**. Solve **any two** questions from Q. **3**, **4** and **5** from Section **I**. And solve **any two** questions from Q. **7**, **8** and **9** from Section **II**.*

*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 answer : **14**

1) The kinetic energy correction factor is given as

a) $\frac{\int v^2\, dA}{v^2 A}$ b) $\frac{\int v^3\, dA}{v^3 A}$ c) $\frac{\int v\, dA}{vA}$ d) None of the above

2) On specific energy curve above the critical depth _____ flow exsist.
a) critical b) super critical c) sub critical d) uniform

3) Critical depth in channel is expressed by
a) $1 = (Q^2T/G\ A^3)$ b) $1 = (QT^2/G\ A^3)$
c) $1 = (Q^2T^2/G\ A^3)$ d) $1 = (Q^2A^3/G\ T^3)$

4) For steady jump Froude number is
a) 2.5 to 4.5 b) 4.5 to 9.0 c) More than 9 d) 1.7 to 2.5

5) The direct step method is used for
a) flow profile height b) length of flow profile
c) conjugate depth of jump d) none of the above

P.T.O.

6) The clinging nappe is also called as
   a) free nappe b) depressed nappe
   c) adhering nappe d) none of the above

7) For broad crested weir its crest width (B) is related to height of weir (H) as
   a) $B \geq 2.5\ H$ b) $B \leq 10\ H$
   c) $0.1 \leq (H/B) \geq 0.4$ d) all above

8) Speed ratio of turbine is given by
   a) $\frac{u}{\sqrt{2gh}}$ b) $\frac{V_F}{\sqrt{2gh}}$ c) $\frac{\sqrt{2gh}}{V_f}$ d) $\frac{V_w}{\sqrt{2gh}}$

9) Work done by a jet on flat inclined plate moving in direction of jet is
   a) $\rho au\,(V-u)^2 \sin^2\theta$ b) $\rho au\,(V-u)^3 \sin^2\theta$
   c) $\rho au\,(V-u)^2$ d) $\rho au\,(V-u)^2 \sin\theta$

10) Specific speed of pump (Ns) is given as
   a) $\frac{N\sqrt{P}}{H_m^{5/4}}$ b) $\frac{N\sqrt{Q}}{H_m^{5/4}}$ c) $\frac{N\sqrt{p}}{H_m^{3/4}}$ d) None of the above

11) Kaplan turbine is
   a) Impulse turbine b) Radial flow reaction turbine
   c) Axial flow reaction turbine d) None of the above

12) Dimensions of specific weight are
   a) $[M^1 L^2 T^{-2}]$ b) $[M^1 L^{-2} T^{-2}]$ c) $[M^1 L^3 T^{-2}]$ d) $[M^1 L^3 T^2]$

13) Cavitation is caused by
   a) high pressure b) low barometric pressure
   c) low pressure d) high velocity

14) Prototype is
   a) Actual machine
   b) Small scale replica of machine
   c) Large scale replica of machine
   d) Both a) and b)

SLR-VB – 30

Seat No.	

S.E. (Civil) (CGPA) (Part – II) Examination, 2017
FLUID MECHANICS – II

Day and Date : Tuesday, 23-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. **2** from Section **I** and Q. **6** from Section **II** are **compulsory**. Solve **any two** questions from Q. **3**, **4** and **5** from Section **I**. And solve **any two** questions from Q. **7**, **8** and **9** from Section **II**.*
*2) Assume suitable data **if necessary** and state **it clearly**.*

SECTION – I

2. a) Explain the terms : **2**
   i) Conveyance factor of channel and
   ii) Momentum correction factor.
   b) Draw the neat sketches of M1, S3 and C3 water surface profiles and give there conditions of formation. **3**
   c) Find the time required to lower the water level from 5m to 4m in a reservoir of size 90 m * 90 m by **5**
   i) rectangular notch of 1.0 m
   ii) right angle triangular notch
   take Cd = 0.62

3. a) For a gradually varied flow show that $\frac{dy}{dx} = \left[\frac{S_o - S_f}{1 - F_r^2}\right]$. **4**
   b) A rectangular channel of width 4 m is having bed slope of 1 in 1500, find maximum discharge through the channel. Take Cd = 50. **5**

4. a) Derive the expression of most economical channel section for trapezoidal channel section. **3**
   b) A reservoir 4.65×10^4 m^2 area is to be controlled by a rectangular weir with its crest level at 30 m. It is desired to provide such a length of weir that will lower the water level from elevation 31.2 m to 30.6 m in half hour. Determine length of weir. Discharge over the weir is given by the formula $Q = 1.9\ LH^{3/2}$. Where Q is in cumec, L is crest length in meter and H is head over weir in meter. **6**

5. a) Show that for rectangular notch 1% of error in measurement of head causes 1.5% error in measurement of discharge that is $\frac{dQ}{Q} = 1.5 \frac{dH}{H}$. **3**

   b) In a rectangular channel there occurs a hydraulic jump, corresponding to $fr_1 = 4.0$. Determine the critical depth and loss of energy in terms of initial depth y_1. **6**

SECTION – II

6. a) Derive an expression for force exerted by a jet on stationary curved plate, when jet strikes at centre of symmetrical curved plate. **3**

   b) What is mean by multistaging of pump ? Explain with neat sketches. **4**

   c) Explain Reynolds and Froude's model laws. **3**

7. a) Differentiate between impulse and reaction turbine. **3**

   b) Find the force exerted by a jet of water of diameter 70 mm on stationary flat plate, when the jet strikes the plate normally with a velocity of 25 m/sec. **6**

8. a) Define : **3**

      i) Static head

      ii) Manometric efficiency

      iii) Specific speed of a pump.

   b) The inlet and exterior diameter of a impeller of a centrifugal pump are 200 mm and 400 mm respectively. The water enters the impeller radially and velocity of flow is constant. Determine work done by impeller per unit weight of water. **6**

9. a) What is mean by dimensional homogeneity ? Explain with example. **3**

   b) Show that frictional torque τ of a disc of diameter D at a speed N is in fluid of viscosity μ and density ρ in a turbulent flow is given by

   $\tau = D^5 N^2 \rho \Phi \left[\mu / D^2 N \rho\right]$. **6**

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SLR-VB – 30

Seat No.	

Set **Q**

S.E. (Civil) (CGPA) (Part – II) Examination, 2017
FLUID MECHANICS – II

Day and Date : Tuesday, 23-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. **2** from Section **I** and Q. **6** from Section **II** are **compulsory**. Solve **any two** questions from Q. **3**, **4** and **5** from Section **I**. And solve **any two** questions from Q. **7**, **8** and **9** from Section **II**.*

*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 answer : **14**

1) Speed ratio of turbine is given by

a) $\frac{u}{\sqrt{2gh}}$ b) $\frac{V_F}{\sqrt{2gh}}$ c) $\frac{\sqrt{2gh}}{V_f}$ d) $\frac{V_w}{\sqrt{2gh}}$

2) Work done by a jet on flat inclined plate moving in direction of jet is

a) $\rho au\,(V-u)^2 \sin^2\theta$ b) $\rho au\,(V-u)^3 \sin^2\theta$

c) $\rho au\,(V-u)^2$ d) $\rho au\,(V-u)^2 \sin\theta$

3) Specific speed of pump (Ns) is given as

a) $\frac{N\sqrt{P}}{H_m^{5/4}}$ b) $\frac{N\sqrt{Q}}{H_m^{5/4}}$ c) $\frac{N\sqrt{p}}{H_m^{3/4}}$ d) None of the above

4) Kaplan turbine is

a) Impulse turbine b) Radial flow reaction turbine

c) Axial flow reaction turbine d) None of the above

P.T.O.

5) Dimensions of specific weight are
   a) $[M^1 L^2 T^{-2}]$ b) $[M^1 L^{-2} T^{-2}]$ c) $[M^1 L^3 T^{-2}]$ d) $[M^1 L^3 T^2]$
6) Cavitation is caused by
   a) high pressure b) low barometric pressure
   c) low pressure d) high velocity
7) Prototype is
   a) Actual machine
   b) Small scale replica of machine
   c) Large scale replica of machine
   d) Both a) and b)
8) The kinetic energy correction factor is given as
   a) $\frac{\int v^2 \, dA}{v^2 A}$ b) $\frac{\int v^3 \, dA}{v^3 A}$ c) $\frac{\int v \, dA}{vA}$ d) None of the above
9) On specific energy curve above the critical depth _____ flow exsist.
   a) critical b) super critical c) sub critical d) uniform
10) Critical depth in channel is expressed by
   a) $1 = (Q^2T/G\,A^3)$ b) $1 = (QT^2/G\,A^3)$
   c) $1 = (Q^2T^2/G\,A^3)$ d) $1 = (Q^2A^3/G\,T^3)$
11) For steady jump Froude number is
   a) 2.5 to 4.5 b) 4.5 to 9.0 c) More than 9 d) 1.7 to 2.5
12) The direct step method is used for
   a) flow profile height b) length of flow profile
   c) conjugate depth of jump d) none of the above
13) The clinging nappe is also called as
   a) free nappe b) depressed nappe
   c) adhering nappe d) none of the above
14) For broad crested weir its crest width (B) is related to height of weir (H) as
   a) $B \geq 2.5\,H$ b) $B \leq 10\,H$
   c) $0.1 \leq (H/B) \geq 0.4$ d) all above

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SLR-VB – 30

Seat No.	

S.E. (Civil) (CGPA) (Part – II) Examination, 2017
FLUID MECHANICS – II

Day and Date : Tuesday, 23-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. **2** from Section **I** and Q. **6** from Section **II** are **compulsory**. Solve **any two** questions from Q. **3**, **4** and **5** from Section **I**. And solve **any two** questions from Q. **7**, **8** and **9** from Section **II**.*
*2) Assume suitable data **if necessary** and state **it clearly**.*

SECTION – I

2. a) Explain the terms : **2**
   i) Conveyance factor of channel and
   ii) Momentum correction factor.
   b) Draw the neat sketches of M1, S3 and C3 water surface profiles and give there conditions of formation. **3**
   c) Find the time required to lower the water level from 5m to 4m in a reservoir of size 90 m * 90 m by **5**
   i) rectangular notch of 1.0 m
   ii) right angle triangular notch
   take Cd = 0.62

3. a) For a gradually varied flow show that $\frac{dy}{dx} = \left[\frac{S_o - S_f}{1 - F_r^2}\right]$. **4**
   b) A rectangular channel of width 4 m is having bed slope of 1 in 1500, find maximum discharge through the channel. Take Cd = 50. **5**

4. a) Derive the expression of most economical channel section for trapezoidal channel section. **3**
   b) A reservoir 4.65×10^4 m^2 area is to be controlled by a rectangular weir with its crest level at 30 m. It is desired to provide such a length of weir that will lower the water level from elevation 31.2 m to 30.6 m in half hour. Determine length of weir. Discharge over the weir is given by the formula $Q = 1.9\ LH^{3/2}$. Where Q is in cumec, L is crest length in meter and H is head over weir in meter. **6**

5. a) Show that for rectangular notch 1% of error in measurement of head causes 1.5% error in measurement of discharge that is $\frac{dQ}{Q} = 1.5 \frac{dH}{H}$. **3**

   b) In a rectangular channel there occurs a hydraulic jump, corresponding to $fr_1 = 4.0$. Determine the critical depth and loss of energy in terms of initial depth y_1. **6**

SECTION – II

6. a) Derive an expression for force exerted by a jet on stationary curved plate, when jet strikes at centre of symmetrical curved plate. **3**

   b) What is mean by multistaging of pump ? Explain with neat sketches. **4**

   c) Explain Reynolds and Froude's model laws. **3**

7. a) Differentiate between impulse and reaction turbine. **3**

   b) Find the force exerted by a jet of water of diameter 70 mm on stationary flat plate, when the jet strikes the plate normally with a velocity of 25 m/sec. **6**

8. a) Define : **3**

      i) Static head

      ii) Manometric efficiency

      iii) Specific speed of a pump.

   b) The inlet and exterior diameter of a impeller of a centrifugal pump are 200 mm and 400 mm respectively. The water enters the impeller radially and velocity of flow is constant. Determine work done by impeller per unit weight of water. **6**

9. a) What is mean by dimensional homogeneity ? Explain with example. **3**

   b) Show that frictional torque τ of a disc of diameter D at a speed N is in fluid of viscosity μ and density ρ in a turbulent flow is given by

   $\tau = D^5 N^2 \rho \Phi \left[\mu / D^2 N \rho\right]$. **6**

SLR-VB – 30

Seat No.	

Set R

S.E. (Civil) (CGPA) (Part – II) Examination, 2017
FLUID MECHANICS – II

Day and Date : Tuesday, 23-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. **2** from Section **I** and Q. **6** from Section **II** are **compulsory**. Solve **any two** questions from Q. **3**, **4** and **5** from Section **I**. And solve **any two** questions from Q. **7**, **8** and **9** from Section **II**.*

*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 answer : **14**

1) The direct step method is used for
   a) flow profile height b) length of flow profile
   c) conjugate depth of jump d) none of the above

2) The clinging nappe is also called as
   a) free nappe b) depressed nappe
   c) adhering nappe d) none of the above

3) For broad crested weir its crest width (B) is related to height of weir (H) as
   a) $B \geq 2.5\ H$ b) $B \leq 10\ H$
   c) $0.1 \leq (H/B) \geq 0.4$ d) all above

4) Speed ratio of turbine is given by

   a) $\frac{u}{\sqrt{2gh}}$ b) $\frac{V_F}{\sqrt{2gh}}$ c) $\frac{\sqrt{2gh}}{V_f}$ d) $\frac{V_w}{\sqrt{2gh}}$

P.T.O.

5) Work done by a jet on flat inclined plate moving in direction of jet is

a) $\rho a u (V-u)^2 \sin^2\theta$ b) $\rho a u (V-u)^3 \sin^2\theta$

c) $\rho a u (V-u)^2$ d) $\rho a u (V-u)^2 \sin\theta$

6) Specific speed of pump (Ns) is given as

a) $\frac{N\sqrt{P}}{H_m^{5/4}}$ b) $\frac{N\sqrt{Q}}{H_m^{5/4}}$ c) $\frac{N\sqrt{p}}{H_m^{3/4}}$ d) None of the above

7) Kaplan turbine is

a) Impulse turbine b) Radial flow reaction turbine

c) Axial flow reaction turbine d) None of the above

8) Dimensions of specific weight are

a) $[M^1 L^2 T^{-2}]$ b) $[M^1 L^{-2} T^{-2}]$ c) $[M^1 L^3 T^{-2}]$ d) $[M^1 L^3 T^2]$

9) Cavitation is caused by

a) high pressure b) low barometric pressure

c) low pressure d) high velocity

10) Prototype is

a) Actual machine

b) Small scale replica of machine

c) Large scale replica of machine

d) Both a) and b)

11) The kinetic energy correction factor is given as

a) $\frac{\int v^2\, dA}{v^2 A}$ b) $\frac{\int v^3\, dA}{v^3 A}$ c) $\frac{\int v\, dA}{vA}$ d) None of the above

12) On specific energy curve above the critical depth _____ flow exsist.

a) critical b) super critical c) sub critical d) uniform

13) Critical depth in channel is expressed by

a) $1 = (Q^2T/G\,A^3)$ b) $1 = (QT^2/G\,A^3)$

c) $1 = (Q^2T^2/G\,A^3)$ d) $1 = (Q^2A^3/G\,T^3)$

14) For steady jump Froude number is

a) 2.5 to 4.5 b) 4.5 to 9.0 c) More than 9 d) 1.7 to 2.5

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SLR-VB – 30

Seat No.	

S.E. (Civil) (CGPA) (Part – II) Examination, 2017
FLUID MECHANICS – II

Day and Date : Tuesday, 23-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. **2** from Section **I** and Q. **6** from Section **II** are **compulsory**. Solve **any two** questions from Q. **3**, **4** and **5** from Section **I**. And solve **any two** questions from Q. **7**, **8** and **9** from Section **II**.*
*2) Assume suitable data **if necessary** and state **it clearly**.*

SECTION – I

2. a) Explain the terms : **2**
   i) Conveyance factor of channel and
   ii) Momentum correction factor.
   b) Draw the neat sketches of M1, S3 and C3 water surface profiles and give there conditions of formation. **3**
   c) Find the time required to lower the water level from 5m to 4m in a reservoir of size 90 m * 90 m by **5**
   i) rectangular notch of 1.0 m
   ii) right angle triangular notch
   take Cd = 0.62

3. a) For a gradually varied flow show that $\frac{dy}{dx} = \left[\frac{S_o - S_f}{1 - F_r^2}\right]$. **4**
   b) A rectangular channel of width 4 m is having bed slope of 1 in 1500, find maximum discharge through the channel. Take Cd = 50. **5**

4. a) Derive the expression of most economical channel section for trapezoidal channel section. **3**
   b) A reservoir 4.65×10^4 m^2 area is to be controlled by a rectangular weir with its crest level at 30 m. It is desired to provide such a length of weir that will lower the water level from elevation 31.2 m to 30.6 m in half hour. Determine length of weir. Discharge over the weir is given by the formula $Q = 1.9\ LH^{3/2}$. Where Q is in cumec, L is crest length in meter and H is head over weir in meter. **6**

5. a) Show that for rectangular notch 1% of error in measurement of head causes 1.5% error in measurement of discharge that is $\frac{dQ}{Q} = 1.5 \frac{dH}{H}$. **3**

   b) In a rectangular channel there occurs a hydraulic jump, corresponding to $fr_1 = 4.0$. Determine the critical depth and loss of energy in terms of initial depth y_1. **6**

SECTION – II

6. a) Derive an expression for force exerted by a jet on stationary curved plate, when jet strikes at centre of symmetrical curved plate. **3**

   b) What is mean by multistaging of pump ? Explain with neat sketches. **4**

   c) Explain Reynolds and Froude's model laws. **3**

7. a) Differentiate between impulse and reaction turbine. **3**

   b) Find the force exerted by a jet of water of diameter 70 mm on stationary flat plate, when the jet strikes the plate normally with a velocity of 25 m/sec. **6**

8. a) Define : **3**

      i) Static head

      ii) Manometric efficiency

      iii) Specific speed of a pump.

   b) The inlet and exterior diameter of a impeller of a centrifugal pump are 200 mm and 400 mm respectively. The water enters the impeller radially and velocity of flow is constant. Determine work done by impeller per unit weight of water. **6**

9. a) What is mean by dimensional homogeneity ? Explain with example. **3**

   b) Show that frictional torque τ of a disc of diameter D at a speed N is in fluid of viscosity μ and density ρ in a turbulent flow is given by

   $\tau = D^5 N^2 \rho \Phi \left[\mu / D^2 N \rho\right]$. **6**

SLR-VB – 30

Seat No.	

Set **S**

S.E. (Civil) (CGPA) (Part – II) Examination, 2017
FLUID MECHANICS – II

Day and Date : Tuesday, 23-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. **2** from Section **I** and Q. **6** from Section **II** are **compulsory**. Solve **any two** questions from Q. **3**, **4** and **5** from Section **I**. And solve **any two** questions from Q. **7**, **8** and **9** from Section **II**.*

*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 answer : **14**

1) Specific speed of pump (Ns) is given as

a) $\frac{N\sqrt{P}}{H_m^{5/4}}$ b) $\frac{N\sqrt{Q}}{H_m^{5/4}}$ c) $\frac{N\sqrt{p}}{H_m^{3/4}}$ d) None of the above

2) Kaplan turbine is

a) Impulse turbine b) Radial flow reaction turbine
c) Axial flow reaction turbine d) None of the above

3) Dimensions of specific weight are

a) $[M^1 L^2 T^{-2}]$ b) $[M^1 L^{-2} T^{-2}]$ c) $[M^1 L^3 T^{-2}]$ d) $[M^1 L^3 T^2]$

4) Cavitation is caused by

a) high pressure b) low barometric pressure
c) low pressure d) high velocity

5) Prototype is
   a) Actual machine
   b) Small scale replica of machine
   c) Large scale replica of machine
   d) Both a) and b)

6) The kinetic energy correction factor is given as

   a) $\frac{\int v^2\, dA}{v^2 A}$ b) $\frac{\int v^3\, dA}{v^3 A}$ c) $\frac{\int v\, dA}{vA}$ d) None of the above

7) On specific energy curve above the critical depth _____ flow exsist.
   a) critical b) super critical c) sub critical d) uniform

8) Critical depth in channel is expressed by
   a) $1 = (Q^2T/G\, A^3)$ b) $1 = (QT^2/G\, A^3)$
   c) $1 = (Q^2T^2/G\, A^3)$ d) $1 = (Q^2A^3/G\, T^3)$

9) For steady jump Froude number is
   a) 2.5 to 4.5 b) 4.5 to 9.0 c) More than 9 d) 1.7 to 2.5

10) The direct step method is used for
   a) flow profile height b) length of flow profile
   c) conjugate depth of jump d) none of the above

11) The clinging nappe is also called as
   a) free nappe b) depressed nappe
   c) adhering nappe d) none of the above

12) For broad crested weir its crest width (B) is related to height of weir (H) as
   a) $B \geq 2.5\, H$ b) $B \leq 10\, H$
   c) $0.1 \leq (H/B) \geq 0.4$ d) all above

13) Speed ratio of turbine is given by

   a) $\frac{u}{\sqrt{2gh}}$ b) $\frac{V_F}{\sqrt{2gh}}$ c) $\frac{\sqrt{2gh}}{V_f}$ d) $\frac{V_w}{\sqrt{2gh}}$

14) Work done by a jet on flat inclined plate moving in direction of jet is
   a) $\rho au\,(V-u)^2 \sin^2\theta$ b) $\rho au\,(V-u)^3 \sin^2\theta$
   c) $\rho au\,(V-u)^2$ d) $\rho au\,(V-u)^2 \sin\theta$

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SLR-VB – 30

Seat No.	

S.E. (Civil) (CGPA) (Part – II) Examination, 2017
FLUID MECHANICS – II

Day and Date : Tuesday, 23-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. **2** from Section **I** and Q. **6** from Section **II** are **compulsory**. Solve **any two** questions from Q. **3**, **4** and **5** from Section **I**. And solve **any two** questions from Q. **7**, **8** and **9** from Section **II**.*
*2) Assume suitable data **if necessary** and state **it clearly**.*

SECTION – I

2. a) Explain the terms : **2**
   i) Conveyance factor of channel and
   ii) Momentum correction factor.
   b) Draw the neat sketches of M1, S3 and C3 water surface profiles and give there conditions of formation. **3**
   c) Find the time required to lower the water level from 5m to 4m in a reservoir of size 90 m * 90 m by **5**
   i) rectangular notch of 1.0 m
   ii) right angle triangular notch
   take Cd = 0.62

3. a) For a gradually varied flow show that $\frac{dy}{dx} = \left[\frac{S_o - S_f}{1 - F_r^2}\right]$. **4**
   b) A rectangular channel of width 4 m is having bed slope of 1 in 1500, find maximum discharge through the channel. Take Cd = 50. **5**

4. a) Derive the expression of most economical channel section for trapezoidal channel section. **3**
   b) A reservoir 4.65×10^4 m^2 area is to be controlled by a rectangular weir with its crest level at 30 m. It is desired to provide such a length of weir that will lower the water level from elevation 31.2 m to 30.6 m in half hour. Determine length of weir. Discharge over the weir is given by the formula $Q = 1.9\ LH^{3/2}$. Where Q is in cumec, L is crest length in meter and H is head over weir in meter. **6**

5. a) Show that for rectangular notch 1% of error in measurement of head causes 1.5% error in measurement of discharge that is $\frac{dQ}{Q} = 1.5 \frac{dH}{H}$. **3**

   b) In a rectangular channel there occurs a hydraulic jump, corresponding to $fr_1 = 4.0$. Determine the critical depth and loss of energy in terms of initial depth y_1. **6**

SECTION – II

6. a) Derive an expression for force exerted by a jet on stationary curved plate, when jet strikes at centre of symmetrical curved plate. **3**

   b) What is mean by multistaging of pump ? Explain with neat sketches. **4**

   c) Explain Reynolds and Froude's model laws. **3**

7. a) Differentiate between impulse and reaction turbine. **3**

   b) Find the force exerted by a jet of water of diameter 70 mm on stationary flat plate, when the jet strikes the plate normally with a velocity of 25 m/sec. **6**

8. a) Define : **3**

      i) Static head

      ii) Manometric efficiency

      iii) Specific speed of a pump.

   b) The inlet and exterior diameter of a impeller of a centrifugal pump are 200 mm and 400 mm respectively. The water enters the impeller radially and velocity of flow is constant. Determine work done by impeller per unit weight of water. **6**

9. a) What is mean by dimensional homogeneity ? Explain with example. **3**

   b) Show that frictional torque τ of a disc of diameter D at a speed N is in fluid of viscosity μ and density ρ in a turbulent flow is given by

   $\tau = D^5 N^2 \rho \Phi \left[\mu / D^2 N \rho\right]$. **6**

SLR-VB – 31

Seat No.	

Set P

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
WATER RESOURCES ENGINEERING – I

Day and Date : Thursday, 25-5-2017 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) Solve **any three** questions from Section – **I** and **any three** questions from Section – **II**.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever** necessary and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) An isohyets is line joining points having
   a) Equal evaporation value b) Equal barometric pressure
   c) Equal height above the M.S.L. d) Equal rainfall depth in a given duration

2) In India, the precipitation received is mostly
   a) Cyclonic precipitation b) Convective precipitation
   c) Orographic precipitation d) None of these

3) Unit hydrograph theory is suitable for catchments having areas upto
   a) 1000 sq.km b) 2500 sq.km c) 5000 sq.km d) 10000 sq.km

4) A stream receiving contribution from ground water is called
   a) Influent b) Effluent c) Ephemeral d) Basal

5) Current meters are used for measurement of
   a) Velocity b) Discharge c) Depth of flow d) Scour depth

6) The two-point method of measurement of velocity is the average velocity as

   a) $\frac{V_{0.2D} + V_{0.6D}}{2}$ b) $\frac{V_{0.4D} + V_{0.8D}}{2}$ c) $\frac{V_{0.2D} + V_{0.8D}}{2}$ d) $\frac{V_{0.2D} + V_{0.4D}}{2}$

P.T.O.

7) Radius of influence is the horizontal distance between center of pumped well and
   a) Point of cone of depression of maximum drawdown
   b) Point of cone of depression of zero drawdown
   c) The first observation well
   d) Second observation well

8) The discharge per unit drawdown for a well is known as
   a) Specific capacity b) Safe yield
   c) Specific stage d) None of the above

9) As per National Water Policy of India, the government gives top priority to
   a) Drinking water b) Hydropower c) Irrigation water d) None of the above

10) For irrigating orchards the commonly adopted surface irrigation method is
   a) Controlled flooding b) Furrow method
   c) Basin method d) Contour furrow method

11) For conservation of water upto 50%, the best irrigation method is
   a) Subsurface b) Drip c) Sprinkler d) Surface

12) For supplying water to Rabi crop, Kharif crop and Sugarcane, the channel is designed for a capacity equal to the greater of the water requirement of
   a) rabi or kharif
   b) rabi and kharif or sugarcane
   c) rabi and sugarcane or kharif and sugarcane
   d) rabi or kharif or sugarcane

13) The useful moisture of a soil is equal to its
   a) Field capacity
   b) Saturation capacity
   c) Moisture content at permanent wilting point
   d) Difference between field capacity and permanent wilting point within the root zone of plants

14) A minor irrigation scheme involves command area equal to or less than
   a) 100 ha b) 500 ha c) 1000 ha d) 2000 ha

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SLR-VB – 31

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
WATER RESOURCES ENGINEERING – I

Day and Date : Thursday, 25-5-2017 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) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *necessary and mention it* ***clearly****.*

SECTION – I

2. a) Define precipitation. What are the different forms of precipitation ? Explain in brief. **4**

   b) Calculate average precipitation for a catchment area by Isohyetal method. **5**

Isohyet (cm)	Right of 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100	Left of 100
Area under Isohyet (km^2)	8.20	49.70	31.00	36.60	35.30	32.70	9.20

3. a) What is a Unit Hydrograph (UH) theory ? State the assumptions and limitation of UH theory. **5**

   b) In a certain river basin, ordinates of a unit hydrograph (1 cm-6 hr) are given below : **5**

Time (Hr.)	0	6	12	18	24	30	36	42	48
Ordinates of 4 - hr. Flood hydrograph (m^3 / sec)	0	4	12	25	18	12	07	04	0

Determine the peak flood and the total volume of flood flow in the basin corresponding to storm of rainfall depth 3 cm in first 6 hours and 3.5 cm in next 6 hours. Base flow at the time of storm was 5 cumecs. Assume initial loss of 5 mm and infiltration index 2.5 mm/hr.

4. a) Enlist different methods of stream gauging. Explain any one method in detail. **5**

   b) Estimate the streamflow for the measurement data as given : **4**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m / s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m / s)	0	0.2	0.3	0.35	0.40	0.45	0.40	0.50	0.40	0.2	0

5. a) Enlist, classify and discuss in brief, geological formations where ground water occurs. **4**

   b) During a recuperation test, the water in an open well was depressed by pumping by 2.5 m and it is recuperated 1.8 m in 80 minutes. Find : **5**

      i) Yield from a well of 4 m diameter under a depression head of 3m.

      ii) The diameter of the well to yield 8 lit./sec. under a depression head of 2 m.

SECTION – II

6. a) Write a detailed note on river linking projects of India, proposed by NWDA. **4**

   b) State the main components of Drip Irrigation system and describe the functions of each. **5**

7. a) What are the factors affecting duty of irrigation water ? How can duty be improved ? **5**

   b) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given below. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **5**

Crop	**Base period (days)**	**Duty at field (ha / cumec)**	**Area under the crop (Ha)**
Wheat	12	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

8. a) Define the terms :
   i) Culturable command area
   ii) Intensity of irrigation
   iii) Time factor
   iv) Capacity factor. **4**

   b) Write short note on Kolhapur type Weir. **5**

9. a) Discuss the various oil types observed in India. Discuss the suitability of each type for crops and irrigation. **5**

   b) What are the different structures constructed in watershed to retain soil and conserve water ? Discuss briefly. **4**

Set P

SLR-VB – 31

Seat No.	

Set Q

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
WATER RESOURCES ENGINEERING – I

Day and Date : Thursday, 25-5-2017 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) Solve ***any three*** *questions from Section –* ***I*** *and* ***any three*** *questions from Section –* ***II****.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) ***Assume*** *suitable data* ***wherever*** *necessary and mention it* ***clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The discharge per unit drawdown for a well is known as
   a) Specific capacity b) Safe yield
   c) Specific stage d) None of the above

2) As per National Water Policy of India, the government gives top priority to
   a) Drinking water b) Hydropower c) Irrigation water d) None of the above

3) For irrigating orchards the commonly adopted surface irrigation method is
   a) Controlled flooding b) Furrow method
   c) Basin method d) Contour furrow method

4) For conservation of water upto 50%, the best irrigation method is
   a) Subsurface b) Drip c) Sprinkler d) Surface

5) For supplying water to Rabi crop, Kharif crop and Sugarcane, the channel is designed for a capacity equal to the greater of the water requirement of
   a) rabi or kharif
   b) rabi and kharif or sugarcane
   c) rabi and sugarcane or kharif and sugarcane
   d) rabi or kharif or sugarcane

P.T.O.

6) The useful moisture of a soil is equal to its
   a) Field capacity
   b) Saturation capacity
   c) Moisture content at permanent wilting point
   d) Difference between field capacity and permanent wilting point within the root zone of plants

7) A minor irrigation scheme involves command area equal to or less than
   a) 100 ha b) 500 ha c) 1000 ha d) 2000 ha

8) An isohyets is line joining points having
   a) Equal evaporation value b) Equal barometric pressure
   c) Equal height above the M.S.L. d) Equal rainfall depth in a given duration

9) In India, the precipitation received is mostly
   a) Cyclonic precipitation b) Convective precipitation
   c) Orographic precipitation d) None of these

10) Unit hydrograph theory is suitable for catchments having areas upto
   a) 1000 sq.km b) 2500 sq.km c) 5000 sq.km d) 10000 sq.km

11) A stream receiving contribution from ground water is called
   a) Influent b) Effluent c) Ephemeral d) Basal

12) Current meters are used for measurement of
   a) Velocity b) Discharge c) Depth of flow d) Scour depth

13) The two-point method of measurement of velocity is the average velocity as
   a) $\frac{V_{0.2D} + V_{0.6D}}{2}$ b) $\frac{V_{0.4D} + V_{0.8D}}{2}$ c) $\frac{V_{0.2D} + V_{0.8D}}{2}$ d) $\frac{V_{0.2D} + V_{0.4D}}{2}$

14) Radius of influence is the horizontal distance between center of pumped well and
   a) Point of cone of depression of maximum drawdown
   b) Point of cone of depression of zero drawdown
   c) The first observation well
   d) Second observation well

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SLR-VB – 31

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
WATER RESOURCES ENGINEERING – I

Day and Date : Thursday, 25-5-2017 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) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *necessary and mention it* ***clearly****.*

SECTION – I

2. a) Define precipitation. What are the different forms of precipitation ? Explain in brief. **4**

   b) Calculate average precipitation for a catchment area by Isohyetal method. **5**

Isohyet (cm)	Right of 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100	Left of 100
Area under Isohyet (km^2)	8.20	49.70	31.00	36.60	35.30	32.70	9.20

3. a) What is a Unit Hydrograph (UH) theory ? State the assumptions and limitation of UH theory. **5**

   b) In a certain river basin, ordinates of a unit hydrograph (1 cm-6 hr) are given below : **5**

Time (Hr.)	0	6	12	18	24	30	36	42	48
Ordinates of 4 - hr. Flood hydrograph (m^3 / sec)	0	4	12	25	18	12	07	04	0

Determine the peak flood and the total volume of flood flow in the basin corresponding to storm of rainfall depth 3 cm in first 6 hours and 3.5 cm in next 6 hours. Base flow at the time of storm was 5 cumecs. Assume initial loss of 5 mm and infiltration index 2.5 mm/hr.

4. a) Enlist different methods of stream gauging. Explain any one method in detail. **5**

   b) Estimate the streamflow for the measurement data as given : **4**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m / s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m / s)	0	0.2	0.3	0.35	0.40	0.45	0.40	0.50	0.40	0.2	0

5. a) Enlist, classify and discuss in brief, geological formations where ground water occurs. **4**

   b) During a recuperation test, the water in an open well was depressed by pumping by 2.5 m and it is recuperated 1.8 m in 80 minutes. Find : **5**

      i) Yield from a well of 4 m diameter under a depression head of 3m.

      ii) The diameter of the well to yield 8 lit./sec. under a depression head of 2 m.

SECTION – II

6. a) Write a detailed note on river linking projects of India, proposed by NWDA. **4**

   b) State the main components of Drip Irrigation system and describe the functions of each. **5**

7. a) What are the factors affecting duty of irrigation water ? How can duty be improved ? **5**

   b) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given below. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **5**

Crop	**Base period (days)**	**Duty at field (ha / cumec)**	**Area under the crop (Ha)**
Wheat	12	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

8. a) Define the terms :
   i) Culturable command area
   ii) Intensity of irrigation
   iii) Time factor
   iv) Capacity factor. **4**

   b) Write short note on Kolhapur type Weir. **5**

9. a) Discuss the various oil types observed in India. Discuss the suitability of each type for crops and irrigation. **5**

   b) What are the different structures constructed in watershed to retain soil and conserve water ? Discuss briefly. **4**

Set Q

SLR-VB – 31

Seat No.	

Set R

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
WATER RESOURCES ENGINEERING – I

Day and Date : Thursday, 25-5-2017 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) Solve **any three** questions from Section – **I** and **any three** questions from Section – **II**.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever** necessary and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Current meters are used for measurement of
a) Velocity b) Discharge c) Depth of flow d) Scour depth

2) The two-point method of measurement of velocity is the average velocity as
a) $\frac{V_{0.2D} + V_{0.6D}}{2}$ b) $\frac{V_{0.4D} + V_{0.8D}}{2}$ c) $\frac{V_{0.2D} + V_{0.8D}}{2}$ d) $\frac{V_{0.2D} + V_{0.4D}}{2}$

3) Radius of influence is the horizontal distance between center of pumped well and
a) Point of cone of depression of maximum drawdown
b) Point of cone of depression of zero drawdown
c) The first observation well
d) Second observation well

4) The discharge per unit drawdown for a well is known as
a) Specific capacity b) Safe yield
c) Specific stage d) None of the above

5) As per National Water Policy of India, the government gives top priority to
a) Drinking water b) Hydropower c) Irrigation water d) None of the above

P.T.O.

6) For irrigating orchards the commonly adopted surface irrigation method is
   a) Controlled flooding b) Furrow method
   c) Basin method d) Contour furrow method

7) For conservation of water upto 50%, the best irrigation method is
   a) Subsurface b) Drip c) Sprinkler d) Surface

8) For supplying water to Rabi crop, Kharif crop and Sugarcane, the channel is designed for a capacity equal to the greater of the water requirement of
   a) rabi or kharif
   b) rabi and kharif or sugarcane
   c) rabi and sugarcane or kharif and sugarcane
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9) The useful moisture of a soil is equal to its
   a) Field capacity
   b) Saturation capacity
   c) Moisture content at permanent wilting point
   d) Difference between field capacity and permanent wilting point within the root zone of plants

10) A minor irrigation scheme involves command area equal to or less than
   a) 100 ha b) 500 ha c) 1000 ha d) 2000 ha

11) An isohyets is line joining points having
   a) Equal evaporation value b) Equal barometric pressure
   c) Equal height above the M.S.L. d) Equal rainfall depth in a given duration

12) In India, the precipitation received is mostly
   a) Cyclonic precipitation b) Convective precipitation
   c) Orographic precipitation d) None of these

13) Unit hydrograph theory is suitable for catchments having areas upto
   a) 1000 sq.km b) 2500 sq.km c) 5000 sq.km d) 10000 sq.km

14) A stream receiving contribution from ground water is called
   a) Influent b) Effluent c) Ephemeral d) Basal

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SLR-VB – 31

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
WATER RESOURCES ENGINEERING – I

Day and Date : Thursday, 25-5-2017 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) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *necessary and mention it* ***clearly****.*

SECTION – I

2. a) Define precipitation. What are the different forms of precipitation ? Explain in brief. **4**

   b) Calculate average precipitation for a catchment area by Isohyetal method. **5**

Isohyet (cm)	Right of 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100	Left of 100
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3. a) What is a Unit Hydrograph (UH) theory ? State the assumptions and limitation of UH theory. **5**

   b) In a certain river basin, ordinates of a unit hydrograph (1 cm-6 hr) are given below : **5**

Time (Hr.)	0	6	12	18	24	30	36	42	48
Ordinates of 4 - hr. Flood hydrograph (m^3 / sec)	0	4	12	25	18	12	07	04	0

Determine the peak flood and the total volume of flood flow in the basin corresponding to storm of rainfall depth 3 cm in first 6 hours and 3.5 cm in next 6 hours. Base flow at the time of storm was 5 cumecs. Assume initial loss of 5 mm and infiltration index 2.5 mm/hr.

4. a) Enlist different methods of stream gauging. Explain any one method in detail. **5**

   b) Estimate the streamflow for the measurement data as given : **4**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m / s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m / s)	0	0.2	0.3	0.35	0.40	0.45	0.40	0.50	0.40	0.2	0

5. a) Enlist, classify and discuss in brief, geological formations where ground water occurs. **4**

   b) During a recuperation test, the water in an open well was depressed by pumping by 2.5 m and it is recuperated 1.8 m in 80 minutes. Find : **5**

      i) Yield from a well of 4 m diameter under a depression head of 3m.

      ii) The diameter of the well to yield 8 lit./sec. under a depression head of 2 m.

SECTION – II

6. a) Write a detailed note on river linking projects of India, proposed by NWDA. **4**

   b) State the main components of Drip Irrigation system and describe the functions of each. **5**

7. a) What are the factors affecting duty of irrigation water ? How can duty be improved ? **5**

   b) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given below. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **5**

Crop	**Base period (days)**	**Duty at field (ha / cumec)**	**Area under the crop (Ha)**
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Sugarcane	360	800	5600
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8. a) Define the terms :
   i) Culturable command area
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   iii) Time factor
   iv) Capacity factor. **4**

   b) Write short note on Kolhapur type Weir. **5**

9. a) Discuss the various oil types observed in India. Discuss the suitability of each type for crops and irrigation. **5**

   b) What are the different structures constructed in watershed to retain soil and conserve water ? Discuss briefly. **4**

Set R

SLR-VB – 31

Seat No.	

Set S

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
WATER RESOURCES ENGINEERING – I

Day and Date : Thursday, 25-5-2017 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) Solve **any three** questions from Section – **I** and **any three** questions from Section – **II**.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Assume** suitable data **wherever** necessary and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) For irrigating orchards the commonly adopted surface irrigation method is
   a) Controlled flooding b) Furrow method
   c) Basin method d) Contour furrow method

2) For conservation of water upto 50%, the best irrigation method is
   a) Subsurface b) Drip c) Sprinkler d) Surface

3) For supplying water to Rabi crop, Kharif crop and Sugarcane, the channel is designed for a capacity equal to the greater of the water requirement of
   a) rabi or kharif
   b) rabi and kharif or sugarcane
   c) rabi and sugarcane or kharif and sugarcane
   d) rabi or kharif or sugarcane

4) The useful moisture of a soil is equal to its
   a) Field capacity
   b) Saturation capacity
   c) Moisture content at permanent wilting point
   d) Difference between field capacity and permanent wilting point within the root zone of plants

P.T.O.

5) A minor irrigation scheme involves command area equal to or less than
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6) An isohyets is line joining points having
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11) The two-point method of measurement of velocity is the average velocity as

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12) Radius of influence is the horizontal distance between center of pumped well and
   a) Point of cone of depression of maximum drawdown
   b) Point of cone of depression of zero drawdown
   c) The first observation well
   d) Second observation well

13) The discharge per unit drawdown for a well is known as
   a) Specific capacity b) Safe yield
   c) Specific stage d) None of the above

14) As per National Water Policy of India, the government gives top priority to
   a) Drinking water b) Hydropower c) Irrigation water d) None of the above

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SLR-VB – 31

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
WATER RESOURCES ENGINEERING – I

Day and Date : Thursday, 25-5-2017 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) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***wherever*** *necessary and mention it* ***clearly****.*

SECTION – I

2. a) Define precipitation. What are the different forms of precipitation ? Explain in brief. **4**

   b) Calculate average precipitation for a catchment area by Isohyetal method. **5**

Isohyet (cm)	Right of 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100	Left of 100
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   b) In a certain river basin, ordinates of a unit hydrograph (1 cm-6 hr) are given below : **5**

Time (Hr.)	0	6	12	18	24	30	36	42	48
Ordinates of 4 - hr. Flood hydrograph (m^3 / sec)	0	4	12	25	18	12	07	04	0

Determine the peak flood and the total volume of flood flow in the basin corresponding to storm of rainfall depth 3 cm in first 6 hours and 3.5 cm in next 6 hours. Base flow at the time of storm was 5 cumecs. Assume initial loss of 5 mm and infiltration index 2.5 mm/hr.

4. a) Enlist different methods of stream gauging. Explain any one method in detail. **5**

   b) Estimate the streamflow for the measurement data as given : **4**

Distance (m)	0	2	4	6	8	10	12	14	16	18	20
Depth (m)	0	0.5	1.2	1.8	2.4	2.6	2.0	1.8	1.6	1.0	0
Velocity at 0.2d (m / s)	0	0.3	0.4	0.6	0.9	1.2	0.9	0.7	0.5	0.3	0
Velocity at 0.8d (m / s)	0	0.2	0.3	0.35	0.40	0.45	0.40	0.50	0.40	0.2	0

5. a) Enlist, classify and discuss in brief, geological formations where ground water occurs. **4**

   b) During a recuperation test, the water in an open well was depressed by pumping by 2.5 m and it is recuperated 1.8 m in 80 minutes. Find : **5**

      i) Yield from a well of 4 m diameter under a depression head of 3m.

      ii) The diameter of the well to yield 8 lit./sec. under a depression head of 2 m.

SECTION – II

6. a) Write a detailed note on river linking projects of India, proposed by NWDA. **4**

   b) State the main components of Drip Irrigation system and describe the functions of each. **5**

7. a) What are the factors affecting duty of irrigation water ? How can duty be improved ? **5**

   b) The base period, intensity of irrigation and duty of various crops under a canal irrigation system are given below. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. **5**

Crop	**Base period (days)**	**Duty at field (ha / cumec)**	**Area under the crop (Ha)**
Wheat	12	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

8. a) Define the terms :
   i) Culturable command area
   ii) Intensity of irrigation
   iii) Time factor
   iv) Capacity factor. **4**

   b) Write short note on Kolhapur type Weir. **5**

9. a) Discuss the various oil types observed in India. Discuss the suitability of each type for crops and irrigation. **5**

   b) What are the different structures constructed in watershed to retain soil and conserve water ? Discuss briefly. **4**

SLR-VB – 32

Seat No.	

Set P

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
ENGG. MATHEMATICS – III

Day and Date : Saturday, 27-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) $\frac{1}{D-3}x$ is equal to

a) $\frac{x}{2}+\frac{1}{8}$ b) $e^x\frac{x}{2}$ c) $e^{-3x}x$ d) $\frac{-x}{3}-\frac{1}{9}$

2) The general solution of $(x^2D^2 - 5xD + 9)\ y = 0$ is

a) $(C_1 + C_2x)e^{3x}$ b) $(C_1 + C_2x)x^3$ c) $(C_1 + C_2\log x)x^3$ d) None of these

3) The solution of the diff. equation $\frac{d^2y}{dx^2}+\frac{dy}{dx}+y=0$ is

a) $c_1e^x+c_2e^{-x}$ b) $e^{-x}\left[c_1\cos\frac{\sqrt{3}}{2}x+c_2\sin\frac{\sqrt{3}}{2}x\right]$

c) $(c_1+c_2x)\,e^{-x}$ d) $e^{-\frac{x}{2}}\left[c_1\cos\frac{\sqrt{3}}{2}x+c_2\sin\frac{\sqrt{3}}{2}x\right]$

4) $\int_0^\infty e^{-2t}\cos 3t\,dt =$ _____

a) $\frac{2}{13}$ b) $\frac{1}{6}$ c) $\frac{-2}{13}$ d) $\frac{3}{13}$

P.T.O.

5) $L^{-1}\left\{\frac{1}{(s+a)^2}\right\}$ = _____

a) e^{-at} b) te^{-at} c) te^{at} d) e^{at}

6) Solution of $\sqrt{p}+\sqrt{q}=1$ is

a) $z = ax + \left(1+\sqrt{a}\right)^2 y + c$ b) $z = ax + \sqrt{a}\, y + c$

c) $z = ax + \left(1-\sqrt{a}\right)^2 y + c$ d) $z = ax + (1 - a^2)\, y + c$

7) Solution of $xp + yq = z$ is

a) $f(x^2, y^2) = 0$ b) $f(xy, yz) = 0$ c) $f(x, y) = 0$ d) $f\left(\frac{x}{y}, \frac{y}{z}\right) = 0$

8) A coin is tossed 3 times. Probability of obtaining 2 heads will be

a) $\frac{1}{8}$ b) $\frac{3}{8}$ c) $\frac{1}{2}$ d) $\frac{1}{3}$

9) The conditions for expansion of a function in Fourier series are known as

a) Harmonic conditions b) Dirichlet's conditions

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10) The period of $\sin x + \frac{1}{2}\sin 2x$ is

a) π b) $\frac{\pi}{3}$ c) 2π d) $\frac{\pi}{2}$

11) If $r = \sqrt{x^2 + y^2 + z^2}$ and $\bar{r} = xi + yj + 2k$ then ∇r^n =

a) $nr^{n-2}\bar{r}$ b) $nr^{n-1}\bar{r}$ c) $r^n\bar{r}$ d) $\bar{r}$

12) If $\bar{A} = \left(2x^2zi - xy^2zj + 3yz^2k\right)$ then div $\bar{A}$ at a point (1, 1, 1) is

a) $\frac{1}{8}$ b) -8 c) $-\frac{1}{8}$ d) 8

13) If r is coefficient of correlation between x and y, then which of the following is true for r ?

a) It lies between –1 and 1 b) It is independent of origin

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14) If two regression coefficients are 0.1 and 0.9 then value of r is _____

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S.E. (Civil) (Part – II) (CGPA) Examination, 2017
ENGG. MATHEMATICS – III

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SECTION – I

2. a) Solve : $(D^2 + 5D – 6)\ y = \sin 4x.\sin x$. **3**

   b) Solve : $(D^3 – 7D – 6)\ y = (1 + x)e^{2x}$. **3**

   c) Solve : $(D^2 – 1)y = \frac{2}{1+e^x}$. **4**

   OR

   Solve : $(D^2 + 4)\ y = x^2\cos 2x$.

3. a) Solve : $(x^2D^2 – xD + 4)\ y = x^2\sin(\log x)$. **4**

   b) The diff. equation of a horizontal tie-rod of length $2l$ with concentrated load W at the centre with end freely hinged is

   $$E1\frac{d^2y}{dx^2} = Py - \frac{1}{2}Wx$$

   If y = 0 when x = 0 and $\frac{dy}{dx} = 0$ when $x = l$, prove that the defection δ at the centre ($x = l$) is given by

   $$\delta = \frac{W}{2Pn}\left[nl - \tanh nl\right], \text{ where } n^2 = P/EI. \quad \textbf{5}$$

4. Attempt **any three** : **9**

   a) Find $L\left\{e^{-4t}\int_0^t t\sin 3t\,dt\right\}$.

b) Find $L^{-1}\left\{\log\left(\frac{s^2-4}{(s-3)^2}\right)\right\}$.

c) Find $L^{-1}\left\{\frac{3s+1}{(s+1)^4}\right\}$.

d) Evaluate $\int_0^\infty e^{-t}\frac{\sin\sqrt{3}t}{t}dt$, by using, Laplace Transform.

5. a) Solve yp + xq + pq = 0. **3**

b) Solve : $\frac{p}{x^2}+\frac{q}{y^2}=z$. **3**

c) Solve : $p^2 - q^2 = \frac{x-y}{z}$. **3**

SECTION – II

6. a) Suppose 300 misprints are distributed randomly throughout a book of 500 pages. Find probability that a given page contains
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   c) Find the rate of change of ϕ =xyz in the direction normal to surface $x^2y + y^2x + yz^2 = 3$ at a point (1, 1, 1). **3**

7. a) Obtain Fourier series of $f(x) = x^2$ in $(0, 2\pi)$ hence deduce that **5**

$$\frac{\pi^2}{12}=\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+....$$

OR

a) Obtain Fourier series of $f(x)=\begin{cases}\pi x & 0\le x\le 1\\ \pi(2-x) & 1\le x\le 2\end{cases}$ with period 2. **5**

b) The income of group of 10,000 persons is normally distributed with mean Rs. 520 and standard deviation Rs. 60. Find

i) The lowest income of richest 500

ii) The highest income of poorest 500

[For S.N.V Z area from z = 0 to z = 1.645 is 0.45.] **5**

8. a) If $\bar{r}$ is the position vector of a point (x, y, z) and r is modulus of $\bar{r}$ then prove that $r^n\bar{r}$ is an irrotational vector for any value of n but it is solenoidal only if n = –3. **5**

b) Fit a second degree parabola to the following data taking x as independent variable

x :	0	1	2	3	4
y :	1	1.8	1.3	2.5	6.3

4

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b) From the following data find the coefficient of regression of x on y and estimate x when y = 105.

x :	44	58	49	46	58	56	48	46	48	47
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5

Set P

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Set Q

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Set Q

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SLR-VB – 32

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Set R

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Set S

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
ENGG. MATHEMATICS – III

Day and Date : Saturday, 27-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) **Use** of calculator 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 : 14

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

1) The period of $\sin x + \frac{1}{2}\sin 2x$ is

a) π b) $\frac{\pi}{3}$ c) 2π d) $\frac{\pi}{2}$

2) If $r = \sqrt{x^2 + y^2 + z^2}$ and $\bar{r} = xi + yj + 2k$ then $\nabla r^n =$

a) $nr^{n-2}\bar{r}$ b) $nr^{n-1}\bar{r}$ c) $r^n\bar{r}$ d) $\bar{r}$

3) If $\bar{A} = \left(2x^2zi - xy^2zj + 3yz^2k\right)$ then div $\bar{A}$ at a point (1, 1, 1) is

a) $\frac{1}{8}$ b) -8 c) $-\frac{1}{8}$ d) 8

4) If r is coefficient of correlation between x and y, then which of the following is true for r ?

a) It lies between –1 and 1 b) It is independent of origin
c) It is independent of scale d) All of these

5) If two regression coefficients are 0.1 and 0.9 then value of r is _____

a) – 0.3 b) 0.3 c) 0.03 d) 0.09

P.T.O.

6) $\frac{1}{D-3}x$ is equal to

a) $\frac{x}{2}+\frac{1}{8}$ b) $e^x\frac{x}{2}$ c) $e^{-3x}x$ d) $\frac{-x}{3}-\frac{1}{9}$

7) The general solution of $(x^2D^2 - 5xD + 9)\ y = 0$ is

a) $(C_1 + C_2x)e^{3x}$ b) $(C_1 + C_2x)x^3$ c) $(C_1 + C_2\log x)x^3$ d) None of these

8) The solution of the diff. equation $\frac{d^2y}{dx^2}+\frac{dy}{dx}+y=0$ is

a) $c_1e^x+c_2e^{-x}$ b) $e^{-x}\left[c_1\cos\frac{\sqrt{3}}{2}x+c_2\sin\frac{\sqrt{3}}{2}x\right]$

c) $\left(c_1+c_2x\right)e^{-x}$ d) $e^{-\frac{x}{2}}\left[c_1\cos\frac{\sqrt{3}}{2}x+c_2\sin\frac{\sqrt{3}}{2}x\right]$

9) $\int_0^\infty e^{-2t}\cos 3t\,dt =$ _____

a) $\frac{2}{13}$ b) $\frac{1}{6}$ c) $\frac{-2}{13}$ d) $\frac{3}{13}$

10) $L^{-1}\left\{\frac{1}{(s+a)^2}\right\} =$ _____

a) e^{-at} b) te^{-at} c) te^{at} d) e^{at}

11) Solution of $\sqrt{p}+\sqrt{q}=1$ is

a) $z = ax + \left(1+\sqrt{a}\right)^2y+c$ b) $z = ax + \sqrt{a}\,y + c$

c) $z = ax + \left(1-\sqrt{a}\right)^2y+c$ d) $z = ax + (1 - a^2)\,y + c$

12) Solution of $xp + yq = z$ is

a) $f(x^2, y^2) = 0$ b) $f(xy, yz) = 0$ c) $f(x, y) = 0$ d) $f\left(\frac{x}{y},\frac{y}{z}\right)=0$

13) A coin is tossed 3 times. Probability of obtaining 2 heads will be

a) $\frac{1}{8}$ b) $\frac{3}{8}$ c) $\frac{1}{2}$ d) $\frac{1}{3}$

14) The conditions for expansion of a function in Fourier series are known as

a) Harmonic conditions b) Dirichlet's conditions

c) Periodic conditions d) Riemann's conditions

SLR-VB – 32

Seat No.	

S.E. (Civil) (Part – II) (CGPA) Examination, 2017
ENGG. MATHEMATICS – III

Day and Date : Saturday, 27-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 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 : $(D^2 + 5D – 6)\ y = \sin 4x.\sin x$. **3**

   b) Solve : $(D^3 – 7D – 6)\ y = (1 + x)e^{2x}$. **3**

   c) Solve : $(D^2 – 1)y = \frac{2}{1+e^x}$. **4**

   OR

   Solve : $(D^2 + 4)\ y = x^2\cos 2x$.

3. a) Solve : $(x^2D^2 – xD + 4)\ y = x^2\sin(\log x)$. **4**

   b) The diff. equation of a horizontal tie-rod of length $2l$ with concentrated load W at the centre with end freely hinged is

   $$E1\frac{d^2y}{dx^2} = Py - \frac{1}{2}Wx$$

   If y = 0 when x = 0 and $\frac{dy}{dx} = 0$ when x = l, prove that the defection δ at the centre (x = l) is given by

   $$\delta = \frac{W}{2Pn}\left[nl - \tanh nl\right], \text{ where } n^2 = P/EI. \quad \textbf{5}$$

4. Attempt **any three** : **9**

   a) Find $L\left\{e^{-4t}\int_0^t t\sin 3t\,dt\right\}$.

b) Find $L^{-1}\left\{\log\left(\frac{s^2-4}{(s-3)^2}\right)\right\}$.

c) Find $L^{-1}\left\{\frac{3s+1}{(s+1)^4}\right\}$.

d) Evaluate $\int_0^\infty e^{-t}\frac{\sin\sqrt{3}t}{t}dt$, by using, Laplace Transform.

5. a) Solve $yp + xq + pq = 0$. **3**

b) Solve : $\frac{p}{x^2}+\frac{q}{y^2}=z$. **3**

c) Solve : $p^2 - q^2 = \frac{x-y}{z}$. **3**

SECTION – II

6. a) Suppose 300 misprints are distributed randomly throughout a book of 500 pages. Find probability that a given page contains
   i) Exactly two misprints
   ii) Two or more misprints. **3**

b) On an average 3 out of 10 students fail in an examination. If 1000 samples each of 10 students are taken in how many would you expect that
   i) None has failed
   ii) All have failed **3**

c) Find the rate of change of $\phi = xyz$ in the direction normal to surface $x^2y + y^2x + yz^2 = 3$ at a point (1, 1, 1). **3**

7. a) Obtain Fourier series of $f(x) = x^2$ in $(0, 2\pi)$ hence deduce that **5**

$$\frac{\pi^2}{12}=\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+....$$

OR

a) Obtain Fourier series of $f(x)=\begin{cases}\pi x & 0\le x\le 1\\ \pi(2-x) & 1\le x\le 2\end{cases}$ with period 2. **5**

b) The income of group of 10,000 persons is normally distributed with mean Rs. 520 and standard deviation Rs. 60. Find

i) The lowest income of richest 500

ii) The highest income of poorest 500

[For S.N.V Z area from z = 0 to z = 1.645 is 0.45.] **5**

8. a) If $\bar{r}$ is the position vector of a point (x, y, z) and r is modulus of $\bar{r}$ then prove that $r^n\bar{r}$ is an irrotational vector for any value of n but it is solenoidal only if n = –3. **5**

b) Fit a second degree parabola to the following data taking x as independent variable

x :	0	1	2	3	4
y :	1	1.8	1.3	2.5	6.3

4

9. a) Obtain half range sine series for f(x) = xsinx in interval (0, π). **4**

b) From the following data find the coefficient of regression of x on y and estimate x when y = 105.

x :	44	58	49	46	58	56	48	46	48	47
y :	88	114	102	113	91	89	102	93	114	94

5

Set S

SLR-VB – 33

Seat No.	

Set **P**

T.E. (Civil Engineering) (Part – I) (CGPA) Examination, 2017
DESIGN OF STEEL STRUCTURES

Day and Date : Thursday, 4-5-2017 Total 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 scientific non programmable calculator is* ***allowed****.*

4) Figures to the ***right*** *indicate the* ***full*** *marks.*

5) Assume suitable data if ***necessary*** *and mention it* ***clearly*** *before the solution.*

6) Draw the appropriate sketches ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

i) The collapse load for a propped cantilever of span l subjected to uniformly distributed load is

a) 0.414 Mp/l b) 586 Mp/l c) 7.67 Mp/l d) 11.656 Mp/l

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
c) Unequal angles with short legs back to back
d) Equal angles on opposite side of gusset

iv) The deflection of steel beams in buildings other than industrial building is limited to span divided by

a) 180 b) 250 c) 300 d) 325

v) As per the IS 800 purlins are designed as a
   a) simply supported beams b) cantilever beams
   c) continuous beams d) compression member

vi) Sag rods are designed as
   a) compression members b) tension members
   c) laterally supported beams d) laterally unsupported beams

vii) A beam section is classed as low shear case when the factored shear force is less than
   a) 0.4 V_d b) 0.6 V_d c) 0.8 V_d d) V_d

viii) 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) erection loads only

ix) The thickness of base plates determined from the
   a) flexural strength of the plate
   b) shear strength of plate
   c) bearing strength of concrete pedestal
   d) punching criteria

x) The economical spacing of a roof truss depends upon the
   a) cost of purlin and cost of roof covering
   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

xi) The minimum recommended rise of trusses with G.I. sheets is
   a) 1 in 4 b) 1 in 5 c) 1 in 6 d) 1 in 8

xii) The principal rafter of a roof truss with purlins placed at intermediate points on the panel length can be analysed by
   a) method of joint b) method of section
   c) graphical method d) moment distribution method

xiii) Live load for roof trusses should not be less than
   a) 0.2 KN/m^2 b) 0.4 KN/m^2 c) 0.75 KN/m^2 d) 1.5 KN/m^2

xiv) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability are respectively
   a) 1 and 1.5 b) 1.2 and 1.0 c) 1.0 and 1.0 d) 1.2 and 1.5

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SLR-VB – 33

Seat No.	

T.E. (Civil Engineering) (Part – I) (CGPA) Examination, 2017
DESIGN OF STEEL STRUCTURES

Day and Date : Thursday, 4-5-2017 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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3) Assume suitable data if ***necessary*** *and mention it* ***clearly*** *before the solution.*
4) Draw the appropriate sketches ***whenever*** *necessary.*
5) Attempt ***any three*** *questions from* ***each*** *Section.*

SECTION – I

2. A beam of uniform section is built in at the end and simply supported at the other end. If the plastic moment capacity at the fixed end is Mp and fully plastic moment of the beam is 2 Mp. Find the value of load at collapse. **9**

3. An unequal angle 1.5 m long, of a truss is connected to the gusset plate. It carries ultimate tension of 230 KN. Design the section using bolted connection. Assume f_y = 250 MPa and f_u= 410 MPa. **9**

4. Design a single angle strut carrying a service load of 100 KN. The length of member is 2.1 m. Also design the connection. **9**

5. Attempt **any two** following : **10**

   a) A simply supported beam ABC with overhang, simply supported at A and B, subjected to two point loads 2W and W at midpoint of AB and at free end C respectively. Take AB = L and BC = L/2. Find the collapse load.

   b) Explain complete, partial and over complete collapse.

   c) Classify the following sections, where f_y = 250 MPa.

      i) ISLB 300 @ 37.7 Kg/m

      ii) ISHB 400 @ 77.4 Kg/m

      iii) ISA 100 $\times$ 100 $\times$ 6 @ 9.2 Kg/m.

SECTION – II

6. Design a simply supported beam of span 10 m effective span carrying a total factored load of 60 KN/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 an I section purlin for industrial building supported GI sheets roof Given

   Spacing of trusses = 5.0 m

   Spacing of purlins = 1.5 m

   Inclination of main rafter to horizontal = 30°

   Weight of GI sheets = 130 N/m^2

   Imposed snow load = 1.5 KN/m^2

   Wind load = 1.0 KN/m^2 (suction). **9**

8. Design a battened column with two channels back to back of length 10 m to carry an axial factored load of 1400 KN. The column may be assumed to have restrained in position but not restrained in direction at both ends. **10**

9. A column ISHB 350 @ 710 N/m with two plates 450 mm × 20 mm carrying a factored load of 3600 KN. The column is supported on concrete pedestal to be built with M 20 concrete. **9**

SLR-VB – 33

Seat No.	

Set **Q**

T.E. (Civil Engineering) (Part – I) (CGPA) Examination, 2017
DESIGN OF STEEL STRUCTURES

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

i) 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) erection loads only

ii) The thickness of base plates determined from the
a) flexural strength of the plate
b) shear strength of plate
c) bearing strength of concrete pedestal
d) punching criteria

iii) The economical spacing of a roof truss depends upon the
a) cost of purlin and cost of roof covering
b) cost of roof covering and dead load of the roof truss
c) dead load and live loads
d) live loads and cost of purlin

iv) The minimum recommended rise of trusses with G.I. sheets is
a) 1 in 4 b) 1 in 5 c) 1 in 6 d) 1 in 8

P.T.O.

v) The principal rafter of a roof truss with purlins placed at intermediate points on the panel length can be analysed by
   a) method of joint b) method of section
   c) graphical method d) moment distribution method

vi) Live load for roof trusses should not be less than
   a) 0.2 KN/m^2 b) 0.4 KN/m^2 c) 0.75 KN/m^2 d) 1.5 KN/m^2

vii) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability are respectively
   a) 1 and 1.5 b) 1.2 and 1.0 c) 1.0 and 1.0 d) 1.2 and 1.5

viii) The collapse load for a propped cantilever of span l subjected to uniformly distributed load is
   a) 0.414 Mp/l b) 586 Mp/l c) 7.67 Mp/l d) 11.656 Mp/l

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) The deflection of steel beams in buildings other than industrial building is limited to span divided by
   a) 180 b) 250 c) 300 d) 325

xii) As per the IS 800 purlins are designed as a
   a) simply supported beams b) cantilever beams
   c) continuous beams d) compression member

xiii) Sag rods are designed as
   a) compression members b) tension members
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   a) 0.4 V_d b) 0.6 V_d c) 0.8 V_d d) V_d

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SLR-VB – 33

Seat No.	

T.E. (Civil Engineering) (Part – I) (CGPA) Examination, 2017
DESIGN OF STEEL STRUCTURES

Day and Date : Thursday, 4-5-2017 Marks : 56
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SECTION – I

2. A beam of uniform section is built in at the end and simply supported at the other end. If the plastic moment capacity at the fixed end is Mp and fully plastic moment of the beam is 2 Mp. Find the value of load at collapse. **9**

3. An unequal angle 1.5 m long, of a truss is connected to the gusset plate. It carries ultimate tension of 230 KN. Design the section using bolted connection. Assume f_y = 250 MPa and f_u= 410 MPa. **9**

4. Design a single angle strut carrying a service load of 100 KN. The length of member is 2.1 m. Also design the connection. **9**

5. Attempt **any two** following : **10**

   a) A simply supported beam ABC with overhang, simply supported at A and B, subjected to two point loads 2W and W at midpoint of AB and at free end C respectively. Take AB = L and BC = L/2. Find the collapse load.

   b) Explain complete, partial and over complete collapse.

   c) Classify the following sections, where f_y = 250 MPa.

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Set Q

SECTION – II

6. Design a simply supported beam of span 10 m effective span carrying a total factored load of 60 KN/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**

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   Weight of GI sheets = 130 N/m^2

   Imposed snow load = 1.5 KN/m^2

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SLR-VB – 33

Seat No.	

Set **R**

T.E. (Civil Engineering) (Part – I) (CGPA) Examination, 2017
DESIGN OF STEEL STRUCTURES

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

I) As per the IS 800 purlins are designed as a
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P.T.O.

v) The thickness of base plates determined from the
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vi) The economical spacing of a roof truss depends upon the
   a) cost of purlin and cost of roof covering
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vii) The minimum recommended rise of trusses with G.I. sheets is
   a) 1 in 4 b) 1 in 5 c) 1 in 6 d) 1 in 8

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   a) 0.2 KN/m^2 b) 0.4 KN/m^2 c) 0.75 KN/m^2 d) 1.5 KN/m^2

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   a) 350 b) 145 c) 180 d) 250

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SLR-VB – 33

Seat No.	

T.E. (Civil Engineering) (Part – I) (CGPA) Examination, 2017
DESIGN OF STEEL STRUCTURES

Day and Date : Thursday, 4-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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SECTION – I

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3. An unequal angle 1.5 m long, of a truss is connected to the gusset plate. It carries ultimate tension of 230 KN. Design the section using bolted connection. Assume f_y = 250 MPa and f_u= 410 MPa. **9**

4. Design a single angle strut carrying a service load of 100 KN. The length of member is 2.1 m. Also design the connection. **9**

5. Attempt **any two** following : **10**

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   b) Explain complete, partial and over complete collapse.

   c) Classify the following sections, where f_y = 250 MPa.

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      iii) ISA 100 $\times$ 100 $\times$ 6 @ 9.2 Kg/m.

Set R

SECTION – II

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   Weight of GI sheets = 130 N/m^2

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8. Design a battened column with two channels back to back of length 10 m to carry an axial factored load of 1400 KN. The column may be assumed to have restrained in position but not restrained in direction at both ends. **10**

9. A column ISHB 350 @ 710 N/m with two plates 450 mm × 20 mm carrying a factored load of 3600 KN. The column is supported on concrete pedestal to be built with M 20 concrete. **9**

SLR-VB – 33

Seat No.	

Set **S**

T.E. (Civil Engineering) (Part – I) (CGPA) Examination, 2017
DESIGN OF STEEL STRUCTURES

Day and Date : Thursday, 4-5-2017 Total 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 scientific non programmable calculator is* ***allowed****.*

4) Figures to the ***right*** *indicate the* ***full*** *marks.*

5) Assume suitable data if ***necessary*** *and mention it* ***clearly*** *before the solution.*

6) Draw the appropriate sketches ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

i) The economical spacing of a roof truss depends upon the
   a) cost of purlin and cost of roof covering
   b) cost of roof covering and dead load of the roof truss
   c) dead load and live loads
   d) live loads and cost of purlin

ii) The minimum recommended rise of trusses with G.I. sheets is
   a) 1 in 4 b) 1 in 5 c) 1 in 6 d) 1 in 8

iii) The principal rafter of a roof truss with purlins placed at intermediate points on the panel length can be analysed by
   a) method of joint b) method of section
   c) graphical method d) moment distribution method

iv) Live load for roof trusses should not be less than
   a) 0.2 KN/m^2 b) 0.4 KN/m^2 c) 0.75 KN/m^2 d) 1.5 KN/m^2

P.T.O.

v) The partial safety factors for dead load and live load for a roof truss for limit state of serviceability are respectively
a) 1 and 1.5 b) 1.2 and 1.0 c) 1.0 and 1.0 d) 1.2 and 1.5

vi) The collapse load for a propped cantilever of span l subjected to uniformly distributed load is
a) 0.414 Mp/l b) 586 Mp/l c) 7.67 Mp/l d) 11.656 Mp/l

vii) The slenderness ratio of lacing flat is limited to
a) 350 b) 145 c) 180 d) 250

viii) 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

ix) The deflection of steel beams in buildings other than industrial building is limited to span divided by
a) 180 b) 250 c) 300 d) 325

x) As per the IS 800 purlins are designed as a
a) simply supported beams b) cantilever beams
c) continuous beams d) compression member

xi) Sag rods are designed as
a) compression members b) tension members
c) laterally supported beams d) laterally unsupported beams

xii) A beam section is classed as low shear case when the factored shear force is less than
a) 0.4 V_d b) 0.6 V_d c) 0.8 V_d d) V_d

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) erection loads only

xiv) The thickness of base plates determined from the
a) flexural strength of the plate
b) shear strength of plate
c) bearing strength of concrete pedestal
d) punching criteria

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SLR-VB – 33

Seat No.	

T.E. (Civil Engineering) (Part – I) (CGPA) Examination, 2017
DESIGN OF STEEL STRUCTURES

Day and Date : Thursday, 4-5-2017 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*** *indicates the* ***full*** *marks.*
3) Assume suitable data if ***necessary*** *and mention it* ***clearly*** *before the solution.*
4) Draw the appropriate sketches ***whenever*** *necessary.*
5) Attempt ***any three*** *questions from* ***each*** *Section.*

SECTION – I

2. A beam of uniform section is built in at the end and simply supported at the other end. If the plastic moment capacity at the fixed end is Mp and fully plastic moment of the beam is 2 Mp. Find the value of load at collapse. **9**

3. An unequal angle 1.5 m long, of a truss is connected to the gusset plate. It carries ultimate tension of 230 KN. Design the section using bolted connection. Assume f_y = 250 MPa and f_u= 410 MPa. **9**

4. Design a single angle strut carrying a service load of 100 KN. The length of member is 2.1 m. Also design the connection. **9**

5. Attempt **any two** following : **10**

   a) A simply supported beam ABC with overhang, simply supported at A and B, subjected to two point loads 2W and W at midpoint of AB and at free end C respectively. Take AB = L and BC = L/2. Find the collapse load.

   b) Explain complete, partial and over complete collapse.

   c) Classify the following sections, where f_y = 250 MPa.

      i) ISLB 300 @ 37.7 Kg/m

      ii) ISHB 400 @ 77.4 Kg/m

      iii) ISA 100 $\times$ 100 $\times$ 6 @ 9.2 Kg/m.

Set S

SECTION – II

6. Design a simply supported beam of span 10 m effective span carrying a total factored load of 60 KN/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 an I section purlin for industrial building supported GI sheets roof Given

   Spacing of trusses = 5.0 m

   Spacing of purlins = 1.5 m

   Inclination of main rafter to horizontal = 30°

   Weight of GI sheets = 130 N/m^2

   Imposed snow load = 1.5 KN/m^2

   Wind load = 1.0 KN/m^2 (suction). **9**

8. Design a battened column with two channels back to back of length 10 m to carry an axial factored load of 1400 KN. The column may be assumed to have restrained in position but not restrained in direction at both ends. **10**

9. A column ISHB 350 @ 710 N/m with two plates 450 mm × 20 mm carrying a factored load of 3600 KN. The column is supported on concrete pedestal to be built with M 20 concrete. **9**

SLR-VB – 34

Seat No.	

Set P

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – I

Day and Date : Friday, 5-5-2017 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 option.

1) The unit weight of soil at zero air voids depends on
   a) Specific gravity b) Water content
   c) Unit weight of water d) All of the above

2) The soil having particles of nearly same size is said to be
   a) Well graded b) Uniformly graded
   c) Poorly graded d) Gap graded

3) Cell pressure in triaxial cell is known as
   a) Uniform pressure b) Confining pressure
   c) Hoop pressure d) Pore water pressure

4) Piping in soil occurs when
   a) The soil is highly porous
   b) Sudden change in permeability occurs
   c) Effective pressure becomes zero
   d) The soil is highly stratified

P.T.O.

5) The 'y' intercept of Coulombs failure envelope is equal to
   a) Cohesion b) Maximum shear stress
   c) Maximum normal stress d) Angle of friction

6) A soil has a liquid limit of 60% and lies above the A line when plotted on the plasticity chart. The group symbol of soil as per soil classification is
   a) CH b) CI c) CL d) MI

7) The dry density of a soil mass in kN/m^3 having G = 2.6 and e = 0.3, will be
   a) 19.62 b) 18.62 c) 17.62 d) 16.62

8) Pneumatic tyred rollers are preferred for
   a) Cohesionless soils b) Cohesive soils
   c) All types of soils d) None of the above

9) Consolidation is a process of removal of
   a) Air from the voids b) Water from the voids
   c) Both air and water from the voids d) None of these

10) During active case the wall
   a) Moves towards the backfill b) Away from the backfill
   c) Does not move at all d) None of the above

11) A soil backfill has cohesion of 14 kN/m^2, a friction angle of 18°, and unit weight of 16.5 kN/m^3. Then the depth of the tension cracks is
   a) 2 m b) 2.33 m c) 1.98 m d) 2.63 m

12) The critical depth of an unsupported vertical cut in cohesive soil is given by
   a) $H_c = \frac{4c}{\gamma}\tan\alpha$ b) $H_c = \frac{2c}{\gamma}\tan\alpha$
   c) $H_c = \frac{4\gamma}{c}\tan\alpha$ d) $H_c = \frac{2\gamma}{c}\tan\alpha$

13) When degree of consolidation is 40%, the time factor T_v is
   a) 0.196 b) 0.126 c) 0.158 d) 0.400

14) Uniform surcharge
   a) Increases active pressure and decreases passive pressure
   b) Decreases active pressure and increases passive pressure
   c) Increases both active and passive pressure
   d) Decreases both active and passive pressure

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SLR-VB – 34

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – I

Day and Date : Friday, 5-5-2017 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) A soil sample has a porosity of 50%. The specific gravity of solids is 2.73. Calculate :
   a) voids ratio
   b) dry density
   c) unit weight if the soil is 50% saturated and
   d) unit weight if the soil is completed saturated **4**

   B) Sketch the typical grain size distribution curve for uniformly graded, well graded and gap graded soil and discuss their characteristics. **5**

3. A) Explain the salient features of IS plasticity chart. **4**

   B) What do you mean by isobar ? Construct the isobar for 0.2 P, if the concentrated load of P is acting at a point. Use Boussinesq's equation. **5**

4. A) Define the coefficient of permeability and discuss various factors affecting permeability of soil. **4**

   B) A sample in a variable head permeameter is 100 mm in dia and 120 mm high. The permeability of soil estimated to be 10×10^{-4} mm/sec.If it is desired that head in the stand pipe should fall from 250 mm to 100 mm in 180 sec., Determine the size of the stand pipe which should be used. **5**

5. A) Consolidated undrained triaxial tests are performed on two identical specimens of saturated, remoulded soil with pore pressure measurements. The observations are recorded in the table below. Determine the value of the shear parameters, for the soil both in terms of total and effective stresses. **6**

Cell Pressure (kPa)	Deviator stress at failure (kPa)	Pore pressure at failure (kPa)
250	179	101
350	242	145

   B) Write a brief note on unconfined compression test. **4**

SECTION – II

6. Write short notes on : **(2½×4=10)**
   a) Distinguish between compaction and consolidation
   b) Time factor in case of consolidation.
   c) Difference between active earth pressure and passive earth pressure.
   d) Effect of compacting energy on compaction properties of soil.

7. A) In a laboratory 2 cm thick soil sample takes 25 minutes to reach 30% degree of consolidation. Find the time taken for a 5 m thick clay layer in field to reach 40% consolidation. Assume double drainage in both cases. **6**

   B) Define coefficient of consolidation. State the expression of it. **3**

8. A) A cantilever retaining wall having a smooth vertical back face retains dry sandy soil as backfill. Height of backfill is 6 m and backfill has the following properties : Void ratio = 0.45; G = 2.68; $\varphi = 30^\circ$. Draw earth pressure distribution diagram. Determine the active earth pressure intensity at the base of the wall, total pressure and its location. **6**

   B) State coefficient of earth pressure at restand passive earth pressure and also give its expression. **3**

9. A) A soil is having a specific gravity of solids G = 2.75, is subjected to proctor compaction test in a mould of volume V = 945 cm^3. The observations are as follows :

Observation Number	1	2	3	4	5
Mass of Wet Sample, gm	1389	1767	1824	1784	1701
Water Content, %	7.5	15.0	17.5	21.0	25.1

   What are the values of maximum dry unit weight and optimum moisture content ? Draw 100% saturation line. **6**

   B) Discuss the effect of increased compaction effort on the properties of soil. **3**

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SLR-VB – 34

Seat No.	

Set Q

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – I

Day and Date : Friday, 5-5-2017 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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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) Pneumatic tyred rollers are preferred for
   a) Cohesionless soils b) Cohesive soils
   c) All types of soils d) None of the above

2) Consolidation is a process of removal of
   a) Air from the voids b) Water from the voids
   c) Both air and water from the voids d) None of these

3) During active case the wall
   a) Moves towards the backfill b) Away from the backfill
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4) A soil backfill has cohesion of 14 kN/m^2, a friction angle of 18°, and unit weight of 16.5 kN/m^3. Then the depth of the tension cracks is
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   a) $H_c = \frac{4c}{\gamma}\tan\alpha$ b) $H_c = \frac{2c}{\gamma}\tan\alpha$
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P.T.O.

6) When degree of consolidation is 40%, the time factor T_v is
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SLR-VB – 34

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – I

Day and Date : Friday, 5-5-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*

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SECTION – I

2. A) A soil samplehas a porosity of 50%. The specific gravity of solids is 2.73. Calculate :
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   B) Sketch the typical grain size distribution curve for uniformly graded, well graded and gap graded soil and discuss their characteristics. **5**

3. A) Explain the salient features of IS plasticity chart. **4**

   B) What do you mean by isobar ? Construct the isobar for 0.2 P, if the concentrated load of P is acting at a point. Use Boussinesq's equation. **5**

4. A) Define the coefficient of permeability and discuss various factors affecting permeability of soil. **4**

   B) A sample in a variable head permeameter is 100 mm in dia and 120 mm high. The permeability of soil estimated to be 10×10^{-4} mm/sec.If it is desired that head in the stand pipe should fall from 250 mm to 100 mm in 180 sec., Determine the size of the stand pipe which should be used. **5**

5. A) Consolidated undrained triaxial tests are performed on two identical specimens of saturated, remoulded soil with pore pressure measurements. The observations are recorded in the table below. Determine the value of the shear parameters, for the soil both in terms of total and effective stresses. **6**

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SECTION – II

6. Write short notes on : **(2½×4=10)**
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   d) Effect of compacting energy on compaction properties of soil.

7. A) In a laboratory 2 cm thick soil sample takes 25 minutes to reach 30% degree of consolidation. Find the time taken for a 5 m thick clay layer in field to reach 40% consolidation. Assume double drainage in both cases. **6**
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8. A) A cantilever retaining wall having a smooth vertical back face retains dry sandy soil as backfill. Height of backfill is 6 m and backfill has the following properties : Void ratio = 0.45; G = 2.68; $\varphi = 30^\circ$. Draw earth pressure distribution diagram. Determine the active earth pressure intensity at the base of the wall, total pressure and its location. **6**
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Mass of Wet Sample, gm	1389	1767	1824	1784	1701
Water Content, %	7.5	15.0	17.5	21.0	25.1

   What are the values of maximum dry unit weight and optimum moisture content ? Draw 100% saturation line. **6**
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SLR-VB – 34

Seat No.	

Set R

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – I

Day and Date : Friday, 5-5-2017 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-VB – 34

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – I

Day and Date : Friday, 5-5-2017 Marks : 56
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***Instructions** : 1) Solve **any three** questions from **each** Section.*
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SECTION – I

2. A) A soil samplehas a porosity of 50%. The specific gravity of solids is 2.73. Calculate :
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SECTION – II

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   B) Discuss the effect of increased compaction effort on the properties of soil. **3**

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SLR-VB – 34

Seat No.	

Set S

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – I

Day and Date : Friday, 5-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct option.

1) During active case the wall
   a) Moves towards the backfill b) Away from the backfill
   c) Does not move at all d) None of the above

2) A soil backfill has cohesion of 14 kN/m^2, a friction angle of 18°, and unit weight of 16.5 kN/m^3. Then the depth of the tension cracks is
   a) 2 m b) 2.33 m c) 1.98 m d) 2.63 m

3) The critical depth of an unsupported vertical cut in cohesive soil is given by
   a) $H_c = \frac{4c}{\gamma}\tan\alpha$ b) $H_c = \frac{2c}{\gamma}\tan\alpha$
   c) $H_c = \frac{4\gamma}{c}\tan\alpha$ d) $H_c = \frac{2\gamma}{c}\tan\alpha$

4) When degree of consolidation is 40%, the time factor T_v is
   a) 0.196 b) 0.126 c) 0.158 d) 0.400

P.T.O.

5) Uniform surcharge
   a) Increases active pressure and decreases passive pressure
   b) Decreases active pressure and increases passive pressure
   c) Increases both active and passive pressure
   d) Decreases both active and passive pressure

6) The unit weight of soil at zero air voids depends on
   a) Specific gravity b) Water content
   c) Unit weight of water d) All of the above

7) The soil having particles of nearly same size is said to be
   a) Well graded b) Uniformly graded
   c) Poorly graded d) Gap graded

8) Cell pressure in triaxial cell is known as
   a) Uniform pressure b) Confining pressure
   c) Hoop pressure d) Pore water pressure

9) Piping in soil occurs when
   a) The soil is highly porous
   b) Sudden change in permeability occurs
   c) Effective pressure becomes zero
   d) The soil is highly stratified

10) The 'y' intercept of Coulombs failure envelope is equal to
   a) Cohesion b) Maximum shear stress
   c) Maximum normal stress d) Angle of friction

11) A soil has a liquid limit of 60% and lies above the A line when plotted on the plasticity chart. The group symbol of soil as per soil classification is
   a) CH b) CI c) CL d) MI

12) The dry density of a soil mass in kN/m^3 having G = 2.6 and e = 0.3, will be
   a) 19.62 b) 18.62 c) 17.62 d) 16.62

13) Pneumatic tyred rollers are preferred for
   a) Cohesionless soils b) Cohesive soils
   c) All types of soils d) None of the above

14) Consolidation is a process of removal of
   a) Air from the voids b) Water from the voids
   c) Both air and water from the voids d) None of these

SLR-VB – 34

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – I

Day and Date : Friday, 5-5-2017 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) A soil samplehas a porosity of 50%. The specific gravity of solids is 2.73. Calculate :
   a) voids ratio
   b) dry density
   c) unit weight if the soil is 50% saturated and
   d) unit weight if the soil is completed saturated **4**

   B) Sketch the typical grain size distribution curve for uniformly graded, well graded and gap graded soil and discuss their characteristics. **5**

3. A) Explain the salient features of IS plasticity chart. **4**

   B) What do you mean by isobar ? Construct the isobar for 0.2 P, if the concentrated load of P is acting at a point. Use Boussinesq's equation. **5**

4. A) Define the coefficient of permeability and discuss various factors affecting permeability of soil. **4**

   B) A sample in a variable head permeameter is 100 mm in dia and 120 mm high. The permeability of soil estimated to be 10×10^{-4} mm/sec.If it is desired that head in the stand pipe should fall from 250 mm to 100 mm in 180 sec., Determine the size of the stand pipe which should be used. **5**

5. A) Consolidated undrained triaxial tests are performed on two identical specimens of saturated, remoulded soil with pore pressure measurements. The observations are recorded in the table below. Determine the value of the shear parameters, for the soil both in terms of total and effective stresses. **6**

Cell Pressure (kPa)	Deviator stress at failure (kPa)	Pore pressure at failure (kPa)
250	179	101
350	242	145

   B) Write a brief note on unconfined compression test. **4**

SECTION – II

6. Write short notes on : **(2½×4=10)**
   a) Distinguish between compaction and consolidation
   b) Time factor in case of consolidation.
   c) Difference between active earth pressure and passive earth pressure.
   d) Effect of compacting energy on compaction properties of soil.

7. A) In a laboratory 2 cm thick soil sample takes 25 minutes to reach 30% degree of consolidation. Find the time taken for a 5 m thick clay layer in field to reach 40% consolidation. Assume double drainage in both cases. **6**
   B) Define coefficient of consolidation. State the expression of it. **3**

8. A) A cantilever retaining wall having a smooth vertical back face retains dry sandy soil as backfill. Height of backfill is 6 m and backfill has the following properties : Void ratio = 0.45; G = 2.68; $\varphi = 30^\circ$. Draw earth pressure distribution diagram. Determine the active earth pressure intensity at the base of the wall, total pressure and its location. **6**
   B) State coefficient of earth pressure at restand passive earth pressure and also give its expression. **3**

9. A) A soil is having a specific gravity of solids G = 2.75, is subjected to proctor compaction test in a mould of volume V = 945 cm^3. The observations are as follows :

Observation Number	1	2	3	4	5
Mass of Wet Sample, gm	1389	1767	1824	1784	1701
Water Content, %	7.5	15.0	17.5	21.0	25.1

   What are the values of maximum dry unit weight and optimum moisture content ? Draw 100% saturation line. **6**
   B) Discuss the effect of increased compaction effort on the properties of soil. **3**

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SLR-VB – 35

Seat No.	

Set P

T.E. Civil (Part – I) (CGPA) Examination, 2017
BUILDING PLANNING AND DESIGN

Day and Date : Saturday, 6-5-2017 Total Marks : 70
Time : 10.00 a.m. to 2.00 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** indicate **full** marks.*
*4) Assume suitable data **wherever** needed and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. State whether following statements is **correct** or **incorrect**. (**One** mark **each**).
   1) In one point perspective only two sides of object is of true dimension in perspective view.
   2) The vertical angle of vision should not be greater than 20°.
   3) Echo is dull sound.
   4) The minimum clearance between the bed and the side wall is 300 mm.
   5) Reverberation is desirable to add to the musical quality.
   6) Passage/corridor width in Primary Health Centre range from 0.5 m to 1.0 m.
   7) Height of counter in post office should range from 1.6 m to 1.8 m.
   8) ICU in hospital means Intensive Care Unit.
   9) Minimum width of a door opening in a school is 1.0 m.
   10) The horizontal angle of vision should not be greater than 20°.

P.T.O.

11) The slope for floor of Auditorium/Cinema theatre may be with an inclination of 8° to 15° from front side.

12) The desirable sound intensity inside a hotel room is less than 45 dB.

13) The plan of a cinema theatre should be such that the walls converge towards the screen.

14) The desirable maximum distance between last row and the screen when no sound reflectors are provided is 23 m.

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SLR-VB – 35

Seat No.	

T.E. Civil (Part – I) (CGPA) Examination, 2017
BUILDING PLANNING AND DESIGN

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

Instructions *: 1) Figure on **right** indicate **full** marks.*
*2) Assume suitable data **wherever** needed and mention it.*
*3) Use answer book for Section **II**.*
4) Retain all projection/construction lines on drawing sheet.
*5) **All** questions are **compulsory**.*
*6) Use both sides of **full imperial drawing sheet** for Section **I**.*

SECTION – I

2. Design a single storied restaurant building on a highway. The following units are to be provided.
   1) Entrance + General Shop : – 40 to 45 sq.m.
   2) Entrance width = 2.5 m.
   3) Dining Hall : – 40 to 50 sq.m.
   4) Service area and washing area : – 20 sq.m.
   5) Kitchen : – 25 to 30 sq.m.
   6) Store room (Dry, wet and cold) = 30 to 45 sq.m.
   7) Sanitary block for ladies and gents separate as per suitable.
   8) Passage : – 1.5 m.

   The building is R.C.C. framed structured. Assume additional data if required and mention it clearly.

   Draw
   1) A detailed plan (scale 1 : 100) **16**
   2) A detailed furniture arrangement. (scale 1 : 50) **12**

SECTION – II

3. Attempt **any four** of the following : **(4×7=28)**
   1) Explain in brief “types of fire load”.
   2) Explain in brief “Green Buildings”.
   3) Write a note on any two methods of sound insulation for RCC public building with neat sketch.
   4) Write a note on bye laws required for planning and design for public building.
   5) What should be the consideration in planning of building for fire protection ?
   6) Explain the principles of architectural aesthetics used for public building planning.

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Set P

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SLR-VB – 35

Seat No.	

Set Q

T.E. Civil (Part – I) (CGPA) Examination, 2017
BUILDING PLANNING AND DESIGN

Day and Date : Saturday, 6-5-2017 Total Marks : 70
Time : 10.00 a.m. to 2.00 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** indicate **full** marks.*

*4) Assume suitable data **wherever** needed and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. State whether following statements is **correct** or **incorrect**. (**One** mark **each**).

   1) ICU in hospital means Intensive Care Unit.

   2) Minimum width of a door opening in a school is 1.0 m.

   3) The horizontal angle of vision should not be greater than 20°.

   4) The slope for floor of Auditorium/Cinema theatre may be with an inclination of 8° to 15° from front side.

   5) The desirable sound intensity inside a hotel room is less than 45 dB.

   6) The plan of a cinema theatre should be such that the walls converge towards the screen.

   7) The desirable maximum distance between last row and the screen when no sound reflectors are provided is 23 m.

P.T.O.

8) In one point perspective only two sides of object is of true dimension in perspective view.
9) The vertical angle of vision should not be greater than 20°.
10) Echo is dull sound.
11) The minimum clearance between the bed and the side wall is 300 mm.
12) Reverberation is desirable to add to the musical quality.
13) Passage/corridor width in Primary Health Centre range from 0.5 m to 1.0 m.
14) Height of counter in post office should range from 1.6 m to 1.8 m.

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SLR-VB – 35

Seat No.	

T.E. Civil (Part – I) (CGPA) Examination, 2017
BUILDING PLANNING AND DESIGN

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

Instructions *: 1) Figure on **right** indicate **full** marks.*
*2) Assume suitable data **wherever** needed and mention it.*
*3) Use answer book for Section **II**.*
4) Retain all projection/construction lines on drawing sheet.
*5) **All** questions are **compulsory**.*
*6) Use both sides of **full imperial drawing sheet** for Section **I**.*

SECTION – I

2. Design a single storied restaurant building on a highway. The following units are to be provided.
   1) Entrance + General Shop : – 40 to 45 sq.m.
   2) Entrance width = 2.5 m.
   3) Dining Hall : – 40 to 50 sq.m.
   4) Service area and washing area : – 20 sq.m.
   5) Kitchen : – 25 to 30 sq.m.
   6) Store room (Dry, wet and cold) = 30 to 45 sq.m.
   7) Sanitary block for ladies and gents separate as per suitable.
   8) Passage : – 1.5 m.

   The building is R.C.C. framed structured. Assume additional data if required and mention it clearly.

   Draw
   1) A detailed plan (scale 1 : 100) **16**
   2) A detailed furniture arrangement. (scale 1 : 50) **12**

SECTION – II

3. Attempt **any four** of the following : **(4×7=28)**
   1) Explain in brief “types of fire load”.
   2) Explain in brief “Green Buildings”.
   3) Write a note on any two methods of sound insulation for RCC public building with neat sketch.
   4) Write a note on bye laws required for planning and design for public building.
   5) What should be the consideration in planning of building for fire protection ?
   6) Explain the principles of architectural aesthetics used for public building planning.

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SLR-VB – 35

Seat No.	

Set R

T.E. Civil (Part – I) (CGPA) Examination, 2017
BUILDING PLANNING AND DESIGN

Day and Date : Saturday, 6-5-2017 Total Marks : 70
Time : 10.00 a.m. to 2.00 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** indicate **full** marks.*
*4) Assume suitable data **wherever** needed and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. State whether following statements is **correct** or **incorrect**. (**One** mark **each**).
   1) Reverberation is desirable to add to the musical quality.
   2) Passage/corridor width in Primary Health Centre range from 0.5 m to 1.0 m.
   3) Height of counter in post office should range from 1.6 m to 1.8 m.
   4) ICU in hospital means Intensive Care Unit.
   5) Minimum width of a door opening in a school is 1.0 m.
   6) The horizontal angle of vision should not be greater than 20°.
   7) The slope for floor of Auditorium/Cinema theatre may be with an inclination of 8° to 15° from front side.
   8) The desirable sound intensity inside a hotel room is less than 45 dB.
   9) The plan of a cinema theatre should be such that the walls converge towards the screen.

P.T.O.

10) The desirable maximum distance between last row and the screen when no sound reflectors are provided is 23 m.

11) In one point perspective only two sides of object is of true dimension in perspective view.

12) The vertical angle of vision should not be greater than 20°.

13) Echo is dull sound.

14) The minimum clearance between the bed and the side wall is 300 mm.

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SLR-VB – 35

Seat No.	

T.E. Civil (Part – I) (CGPA) Examination, 2017
BUILDING PLANNING AND DESIGN

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

Instructions *: 1) Figure on **right** indicate **full** marks.*
*2) Assume suitable data **wherever** needed and mention it.*
*3) Use answer book for Section **II**.*
4) Retain all projection/construction lines on drawing sheet.
*5) **All** questions are **compulsory**.*
*6) Use both sides of **full imperial drawing sheet** for Section **I**.*

SECTION – I

2. Design a single storied restaurant building on a highway. The following units are to be provided.
   1) Entrance + General Shop : – 40 to 45 sq.m.
   2) Entrance width = 2.5 m.
   3) Dining Hall : – 40 to 50 sq.m.
   4) Service area and washing area : – 20 sq.m.
   5) Kitchen : – 25 to 30 sq.m.
   6) Store room (Dry, wet and cold) = 30 to 45 sq.m.
   7) Sanitary block for ladies and gents separate as per suitable.
   8) Passage : – 1.5 m.

   The building is R.C.C. framed structured. Assume additional data if required and mention it clearly.

   Draw
   1) A detailed plan (scale 1 : 100) **16**
   2) A detailed furniture arrangement. (scale 1 : 50) **12**

SECTION – II

3. Attempt **any four** of the following : **(4×7=28)**
   1) Explain in brief “types of fire load”.
   2) Explain in brief “Green Buildings”.
   3) Write a note on any two methods of sound insulation for RCC public building with neat sketch.
   4) Write a note on bye laws required for planning and design for public building.
   5) What should be the consideration in planning of building for fire protection ?
   6) Explain the principles of architectural aesthetics used for public building planning.

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Set R

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SLR-VB – 35

Seat No.	

Set S

T.E. Civil (Part – I) (CGPA) Examination, 2017
BUILDING PLANNING AND DESIGN

Day and Date : Saturday, 6-5-2017 Total Marks : 70
Time : 10.00 a.m. to 2.00 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** indicate **full** marks.*
*4) Assume suitable data **wherever** needed and mention it.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. State whether following statements is **correct** or **incorrect**. (**One** mark **each**).
   1) The horizontal angle of vision should not be greater than 20°.
   2) The slope for floor of Auditorium/Cinema theatre may be with an inclination of 8° to 15° from front side.
   3) The desirable sound intensity inside a hotel room is less than 45 dB.
   4) The plan of a cinema theatre should be such that the walls converge towards the screen.
   5) The desirable maximum distance between last row and the screen when no sound reflectors are provided is 23 m.
   6) In one point perspective only two sides of object is of true dimension in perspective view.
   7) The vertical angle of vision should not be greater than 20°.
   8) Echo is dull sound.

P.T.O.

9) The minimum clearance between the bed and the side wall is 300 mm.

10) Reverberation is desirable to add to the musical quality.

11) Passage/corridor width in Primary Health Centre range from 0.5 m to 1.0 m.

12) Height of counter in post office should range from 1.6 m to 1.8 m.

13) ICU in hospital means Intensive Care Unit.

14) Minimum width of a door opening in a school is 1.0 m.

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SLR-VB – 35

Seat No.	

T.E. Civil (Part – I) (CGPA) Examination, 2017
BUILDING PLANNING AND DESIGN

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 10.00 a.m. to 2.00 p.m.

Instructions *: 1) Figure on **right** indicate **full** marks.*
*2) Assume suitable data **wherever** needed and mention it.*
*3) Use answer book for Section **II**.*
4) Retain all projection/construction lines on drawing sheet.
*5) **All** questions are **compulsory**.*
*6) Use both sides of **full imperial drawing sheet** for Section **I**.*

SECTION – I

2. Design a single storied restaurant building on a highway. The following units are to be provided.
   1) Entrance + General Shop : – 40 to 45 sq.m.
   2) Entrance width = 2.5 m.
   3) Dining Hall : – 40 to 50 sq.m.
   4) Service area and washing area : – 20 sq.m.
   5) Kitchen : – 25 to 30 sq.m.
   6) Store room (Dry, wet and cold) = 30 to 45 sq.m.
   7) Sanitary block for ladies and gents separate as per suitable.
   8) Passage : – 1.5 m.

   The building is R.C.C. framed structured. Assume additional data if required and mention it clearly.

   Draw
   1) A detailed plan (scale 1 : 100) **16**
   2) A detailed furniture arrangement. (scale 1 : 50) **12**

SECTION – II

3. Attempt **any four** of the following : **(4×7=28)**
   1) Explain in brief “types of fire load”.
   2) Explain in brief “Green Buildings”.
   3) Write a note on any two methods of sound insulation for RCC public building with neat sketch.
   4) Write a note on bye laws required for planning and design for public building.
   5) What should be the consideration in planning of building for fire protection ?
   6) Explain the principles of architectural aesthetics used for public building planning.

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Set S

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SLR-VB – 36

Seat No.	

Set **P**

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – I

Day and Date : Monday, 8-5-2017 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) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume suitable data ***wherever*** *necessary and mention it* ***clearly****.*
5) Use of non-programmable calculator is ***allowed****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The indicator used in determination of chlorides is
   a) EBT b) Starch
   c) Potassium chromate d) MO

2) National board of fire under writers formula for estimating fire demand $Q = 4637\sqrt{P}(1+0.01P)$ where P indicates
   a) Population b) Population in thousands
   c) Population in hundreds d) Population in Lakh

3) Most common cause of acidity in water is
   a) Carbon dioxide b) Oxygen c) Hydrogen d) Nitrogen

4) _____ causes scaling in boilers.
   a) Hardness b) Colour c) Odour d) Taste

5) For design of flocculator the value of G.t should be
   a) 10^4 to 10^5 b) 100 to 1000 c) 10^6 to 10^9 d) All of above

6) For ideal settling basin v_s is settling velocity. If particle is having settling velocity (v_s') more than that of v_s, then particle will removed with _____ efficiency.
   a) Less than 100% b) 100%
   c) 0% (no removal) d) None of these

7) If the sedimentation tank is rectangular in shape having length L, width W and depth D, then for discharge (Q), the settling velocity of particle would be _____
   a) Q/(W×D) b) Q/(L×W) c) Q/(D×L) d) Q/(L×W×D)

8) _____ type of filter requires large area.
   a) Slow sand b) Rapid sand c) Vaccume d) None of these

9) Thrust block is designed for a minimum factor of safety of
   a) 0.5 b) 1 c) 2 d) 4

10) Modulus of elasticity for CI pipe is _____ Kg/m^2.
   a) 7.5×10^9 b) 7.5×10^6 c) 7.5×10^{10} d) 7.5×10^5

11) In equation of $h_f = K.G^n$ the value of 'n' for Hazen William's formula is
   a) 1.85 b) 1.81 c) 1.7 d) 1.0

12) Summits are the points of _____ pressure.
   a) Equal b) Low c) High d) None of these

13) Reflux valves are also known as _____ valves.
   a) Sluice b) Check c) Non-return d) Both b and c

14) Total capacity of distribution reservoir is
   a) Balancing reserve b) Fire reserve
   c) Break down reserve d) Sum of a), b) and c)

_____

SLR-VB – 36

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – I

Day and Date : Monday, 8-5-2017 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) 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 population forecasting. Explain any one in detail. **5**
   b) What is 'break point chlorination' ? **5**

3. a) Differentiate between slow sand and rapid sand filter. **5**
   b) A settling tank is designed for an overflow rate of 4000 lit/m^2/hr. What percentage of particles of diameter **4**
      a) 0.05 mm and
      b) 0.02 mm will be removed in this tank at 10°C.

4. a) Design a flocculator for a flow of 10 mld. **5**
   b) Explain backwashing of Rapid sand filter with neat sketch. **4**

5. Write short notes on following **(any three)** : **9**
   1) Fire demand
   2) Jar test
   3) Ion exchange process
   4) Types of settling.

SECTION – II

6. a) Draw a neat sketch of 'Non return valve' and explain its working. **5**

   b) A water distribution network is an equilateral triangle in shape. If inflow at junction A is 60 units and outflow at B and C are 40 and 20 units respectively. Find corrected flow in each pipe. Take initial value of discharge from A to B = 15 units. Take the value of k in equation $h_f = k.Q^2$, for pipe AB = 4, BC = 1 and CA = 2. Take two trials. **5**

7. a) Explain water pipe corrosion in detail. **5**

   b) What is equivalent pipe ? Derive the formula to calculate equivalent length of pipe if pipes are arranged in series. **4**

8. a) Explain grid iron system of water distribution with neat sketch. **5**

   b) A town with a population of 1 million has a continuous water supply. Average supply is 270 lpcd, the water being supplied by direct pumping. The total supply of 270 lpcd is phased as follows. **4**

Time	Demand in lpc
5 am – 11 am	90
11 am – 3 pm	54
3 pm – 9 pm	81
9 pm – 12 midnight	27
12 midnight – 5 am	18

   Water is supplied from the treatment plant at a uniform rate of 11.25 million litres/hour for all the 24 hours. Find out the capacity of the reservoir by analytical or graphical method.

9. Write short notes on following **(any three)** : **9**

   1) Thrust block design
   2) Mass balancing capacity of reservoir
   3) Piping system using underground-overhead tank supply
   4) Ring system of water distribution layout.

SLR-VB – 36

Seat No.	

Set Q

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – I

Day and Date : Monday, 8-5-2017 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) Figures to the **right** indicate **full** marks.*
*4) Assume suitable data **wherever** necessary and mention it **clearly**.*
*5) Use of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) _____ type of filter requires large area.
a) Slow sand b) Rapid sand c) Vaccume d) None of these

2) Thrust block is designed for a minimum factor of safety of
a) 0.5 b) 1 c) 2 d) 4

3) Modulus of elasticity for CI pipe is _____ Kg/m^2.
a) 7.5×10^9 b) 7.5×10^6 c) 7.5×10^{10} d) 7.5×10^5

4) In equation of $h_f = K.G^n$ the value of 'n' for Hazen William's formula is
a) 1.85 b) 1.81 c) 1.7 d) 1.0

5) Summits are the points of _____ pressure.
a) Equal b) Low c) High d) None of these

6) Reflux valves are also known as _____ valves.
a) Sluice b) Check c) Non-return d) Both b and c

7) Total capacity of distribution reservoir is
a) Balancing reserve b) Fire reserve
c) Break down reserve d) Sum of a), b) and c)

P.T.O.

8) The indicator used in determination of chlorides is
   a) EBT b) Starch
   c) Potassium chromate d) MO

9) National board of fire under writers formula for estimating fire demand $Q = 4637\sqrt{P}(1+0.01P)$ where P indicates
   a) Population b) Population in thousands
   c) Population in hundreds d) Population in Lakh

10) Most common cause of acidity in water is
   a) Carbon dioxide b) Oxygen c) Hydrogen d) Nitrogen

11) _____ causes scaling in boilers.
   a) Hardness b) Colour c) Odour d) Taste

12) For design of flocculator the value of G.t should be
   a) 10^4 to 10^5 b) 100 to 1000 c) 10^6 to 10^9 d) All of above

13) For ideal settling basin v_s is settling velocity. If particle is having settling velocity (v_s') more than that of v_s, then particle will removed with _____ efficiency.
   a) Less than 100% b) 100%
   c) 0% (no removal) d) None of these

14) If the sedimentation tank is rectangular in shape having length L, width W and depth D, then for discharge (Q), the settling velocity of particle would be _____
   a) Q/(W×D) b) Q/(L×W) c) Q/(D×L) d) Q/(L×W×D)

SLR-VB – 36

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – I

Day and Date : Monday, 8-5-2017 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) 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 population forecasting. Explain any one in detail. **5**
   b) What is 'break point chlorination' ? **5**

3. a) Differentiate between slow sand and rapid sand filter. **5**
   b) A settling tank is designed for an overflow rate of 4000 lit/m^2/hr. What percentage of particles of diameter **4**
      a) 0.05 mm and
      b) 0.02 mm will be removed in this tank at 10°C.

4. a) Design a flocculator for a flow of 10 mld. **5**
   b) Explain backwashing of Rapid sand filter with neat sketch. **4**

5. Write short notes on following **(any three)** : **9**
   1) Fire demand
   2) Jar test
   3) Ion exchange process
   4) Types of settling.

Set Q

SECTION – II

6. a) Draw a neat sketch of 'Non return valve' and explain its working. **5**

   b) A water distribution network is an equilateral triangle in shape. If inflow at junction A is 60 units and outflow at B and C are 40 and 20 units respectively. Find corrected flow in each pipe. Take initial value of discharge from A to B = 15 units. Take the value of k in equation $h_f = k.Q^2$, for pipe AB = 4, BC = 1 and CA = 2. Take two trials. **5**

7. a) Explain water pipe corrosion in detail. **5**

   b) What is equivalent pipe ? Derive the formula to calculate equivalent length of pipe if pipes are arranged in series. **4**

8. a) Explain grid iron system of water distribution with neat sketch. **5**

   b) A town with a population of 1 million has a continuous water supply. Average supply is 270 lpcd, the water being supplied by direct pumping. The total supply of 270 lpcd is phased as follows. **4**

Time	Demand in lpc
5 am – 11 am	90
11 am – 3 pm	54
3 pm – 9 pm	81
9 pm – 12 midnight	27
12 midnight – 5 am	18

   Water is supplied from the treatment plant at a uniform rate of 11.25 million litres/hour for all the 24 hours. Find out the capacity of the reservoir by analytical or graphical method.

9. Write short notes on following **(any three)** : **9**

   1) Thrust block design
   2) Mass balancing capacity of reservoir
   3) Piping system using underground-overhead tank supply
   4) Ring system of water distribution layout.

SLR-VB – 36

Seat No.	

Set R

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – I

Day and Date : Monday, 8-5-2017 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) Figures to the **right** indicate **full** marks.*
*4) Assume suitable data **wherever** necessary and mention it **clearly**.*
*5) Use of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) For design of flocculator the value of G.t should be
a) 10^4 to 10^5 b) 100 to 1000 c) 10^6 to 10^9 d) All of above

2) For ideal settling basin v_s is settling velocity. If particle is having settling velocity (v_s') more than that of v_s, then particle will removed with _____ efficiency.
a) Less than 100% b) 100%
c) 0% (no removal) d) None of these

3) If the sedimentation tank is rectangular in shape having length L, width W and depth D, then for discharge (Q), the settling velocity of particle would be _____
a) Q/(W×D) b) Q/(L×W) c) Q/(D×L) d) Q/(L×W×D)

4) _____ type of filter requires large area.
a) Slow sand b) Rapid sand c) Vaccume d) None of these

5) Thrust block is designed for a minimum factor of safety of
a) 0.5 b) 1 c) 2 d) 4

P.T.O.

6) Modulus of elasticity for CI pipe is _____ Kg/m^2.
   a) 7.5×10^9 b) 7.5×10^6 c) 7.5×10^{10} d) 7.5×10^5

7) In equation of $h_f = K.G^n$ the value of 'n' for Hazen William's formula is
   a) 1.85 b) 1.81 c) 1.7 d) 1.0

8) Summits are the points of _____ pressure.
   a) Equal b) Low c) High d) None of these

9) Reflux valves are also known as _____ valves.
   a) Sluice b) Check c) Non-return d) Both b and c

10) Total capacity of distribution reservoir is
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   c) Break down reserve d) Sum of a), b) and c)

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14) _____ causes scaling in boilers.
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_____

SLR-VB – 36

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – I

Day and Date : Monday, 8-5-2017 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) 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 population forecasting. Explain any one in detail. **5**
   b) What is 'break point chlorination' ? **5**

3. a) Differentiate between slow sand and rapid sand filter. **5**
   b) A settling tank is designed for an overflow rate of 4000 lit/m^2/hr. What percentage of particles of diameter **4**
      a) 0.05 mm and
      b) 0.02 mm will be removed in this tank at 10°C.

4. a) Design a flocculator for a flow of 10 mld. **5**
   b) Explain backwashing of Rapid sand filter with neat sketch. **4**

5. Write short notes on following **(any three)** : **9**
   1) Fire demand
   2) Jar test
   3) Ion exchange process
   4) Types of settling.

Set R

SECTION – II

6. a) Draw a neat sketch of 'Non return valve' and explain its working. **5**

   b) A water distribution network is an equilateral triangle in shape. If inflow at junction A is 60 units and outflow at B and C are 40 and 20 units respectively. Find corrected flow in each pipe. Take initial value of discharge from A to B = 15 units. Take the value of k in equation $h_f = k.Q^2$, for pipe AB = 4, BC = 1 and CA = 2. Take two trials. **5**

7. a) Explain water pipe corrosion in detail. **5**

   b) What is equivalent pipe ? Derive the formula to calculate equivalent length of pipe if pipes are arranged in series. **4**

8. a) Explain grid iron system of water distribution with neat sketch. **5**

   b) A town with a population of 1 million has a continuous water supply. Average supply is 270 lpcd, the water being supplied by direct pumping. The total supply of 270 lpcd is phased as follows. **4**

Time	Demand in lpc
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9 pm – 12 midnight	27
12 midnight – 5 am	18

   Water is supplied from the treatment plant at a uniform rate of 11.25 million litres/hour for all the 24 hours. Find out the capacity of the reservoir by analytical or graphical method.

9. Write short notes on following **(any three)** : **9**

   1) Thrust block design
   2) Mass balancing capacity of reservoir
   3) Piping system using underground-overhead tank supply
   4) Ring system of water distribution layout.

SLR-VB – 36

Seat No.	

Set S

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – I

Day and Date : Monday, 8-5-2017 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) Figures to the **right** indicate **full** marks.*
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*5) Use of non-programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Modulus of elasticity for CI pipe is _____ Kg/m^2.
a) 7.5×10^9 b) 7.5×10^6 c) 7.5×10^{10} d) 7.5×10^5

2) In equation of $h_f = K.G^n$ the value of 'n' for Hazen William's formula is
a) 1.85 b) 1.81 c) 1.7 d) 1.0

3) Summits are the points of _____ pressure.
a) Equal b) Low c) High d) None of these

4) Reflux valves are also known as _____ valves.
a) Sluice b) Check c) Non-return d) Both b and c

5) Total capacity of distribution reservoir is
a) Balancing reserve b) Fire reserve
c) Break down reserve d) Sum of a), b) and c)

6) The indicator used in determination of chlorides is
a) EBT b) Starch
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P.T.O.

7) National board of fire under writers formula for estimating fire demand $Q = 4637\sqrt{P}(1+0.01P)$ where P indicates
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   b) Population in thousands
   c) Population in hundreds
   d) Population in Lakh

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12) If the sedimentation tank is rectangular in shape having length L, width W and depth D, then for discharge (Q), the settling velocity of particle would be _____
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13) _____ type of filter requires large area.
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14) Thrust block is designed for a minimum factor of safety of
   a) 0.5 b) 1 c) 2 d) 4

_____

SLR-VB – 36

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – I

Day and Date : Monday, 8-5-2017 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) 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 population forecasting. Explain any one in detail. **5**
   b) What is 'break point chlorination' ? **5**

3. a) Differentiate between slow sand and rapid sand filter. **5**
   b) A settling tank is designed for an overflow rate of 4000 lit/m^2/hr. What percentage of particles of diameter **4**
      a) 0.05 mm and
      b) 0.02 mm will be removed in this tank at 10°C.

4. a) Design a flocculator for a flow of 10 mld. **5**
   b) Explain backwashing of Rapid sand filter with neat sketch. **4**

5. Write short notes on following **(any three)** : **9**
   1) Fire demand
   2) Jar test
   3) Ion exchange process
   4) Types of settling.

SECTION – II

6. a) Draw a neat sketch of 'Non return valve' and explain its working. **5**

   b) A water distribution network is an equilateral triangle in shape. If inflow at junction A is 60 units and outflow at B and C are 40 and 20 units respectively. Find corrected flow in each pipe. Take initial value of discharge from A to B = 15 units. Take the value of k in equation $h_f = k.Q^2$, for pipe AB = 4, BC = 1 and CA = 2. Take two trials. **5**

7. a) Explain water pipe corrosion in detail. **5**

   b) What is equivalent pipe ? Derive the formula to calculate equivalent length of pipe if pipes are arranged in series. **4**

8. a) Explain grid iron system of water distribution with neat sketch. **5**

   b) A town with a population of 1 million has a continuous water supply. Average supply is 270 lpcd, the water being supplied by direct pumping. The total supply of 270 lpcd is phased as follows. **4**

Time	Demand in lpc
5 am – 11 am	90
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   Water is supplied from the treatment plant at a uniform rate of 11.25 million litres/hour for all the 24 hours. Find out the capacity of the reservoir by analytical or graphical method.

9. Write short notes on following **(any three)** : **9**

   1) Thrust block design
   2) Mass balancing capacity of reservoir
   3) Piping system using underground-overhead tank supply
   4) Ring system of water distribution layout.

SLR-VB – 37

Seat No.	

Set P

T.E. (Civil) (Part – I) (CGPA Pattern) Examination, 2017
ENGINEERING MANAGEMENT – I

Day and Date : Tuesday, 9-5-2017 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 calculator 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 alternative : **(1 mark each)**

1) In decision tree problems the event mode is shown by
a) Circle b) Triangle c) Rectangle d) Square

2) Queuing theory is
a) Maximization process b) Minimization process
c) Optimization process d) Descriptive process

3) Acceptance quality level for inspection is stored normally range between
a) 0.5 – 3% b) 50 – 100% c) 0 – 0.5% d) 20 – 50%

4) The biological process of mutation has inspired
a) Artificial neural network b) Fuzzy number
c) Genetic algorithm d) Dynamic programming

5) Maximization problem is LPP will involve
a) Slack variable b) Surplus variable
c) Both a) and b) d) None of these

6) The most popular type of organization used for Civil Engineering
a) Line b) Line and staff c) Functional d) Effective

P.T.O.

7) Time and motion study are elements of _____ management.
   a) Classical b) Scientific c) System d) General

8) Work study as natural as play of rest is assumption of
   a) Theory W b) Theory Y c) Theory X d) Theory Z

9) In ABC analysis least monitoring and control is required for
   a) A class items b) B class items c) C class items d) All 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) Transportation problem can be solved if
   a) No. of rows = no. of columns b) No. of rows $\geq$ no. of columns
   c) No. of rows $\leq$ no. of columns d) All of these

12) Folding back method is used for problems of
   a) Transportation b) Games c) Assignment d) Decision tree

13) Functioning of human brain has inspired
   a) Artificial neural network b) Fuzzy logic
   c) Genetic algorithm d) Dynamic programming

14) 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

_____

SLR-VB – 37

Seat No.	

T.E. (Civil) (Part – I) (CGPA Pattern) Examination, 2017
ENGINEERING MANAGEMENT – I

Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***wherevr*** *necessary.*
3) ***Use*** *graph paer if needed.*
4) ***Use*** *of nonprogrammable calculator is permitted.*

SECTION – I

2. Solve **any three** (**8** marks **each**) :

a) A company manufactures two products A and B. Both products pass through machine M_1 and M_2. The time required to process each unit of product A and B on each machine centre and available capacity of each machine is given below.

Product	**Machine Centre (Processing time/unit hours)**	
	M_1	**M_2**
A	6	2
B	4	4
Available Hours per week	3600	2000

Each unit of Product A gives a profit of Rs. 25 while each unit of Product B gives profit of Rs. 20.

How much quantity of each product should be manufactured to maximize profit ? Solve by graphical method.

b) What is communication ? State its types and barriers in communication with example.

c) Write notes on :

1) Waiting line theory 2) Dynamic programming

d) In the following problem, how should be the tasks allocated one to man so as to minimize the total man hours ?

Tasks	Men			
	1	2	3	4
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

e) A factory is considering 3 course of actions S_1, S_2 and S_3. Correct choice depends upon future demand as low, medium or high with probabilities as 0.1, 0.5 and 0.4.

The cost analysis reveals effect upon the profit as follows :

Profit if demand is	Course of action		
	S_1	S_2	S_3
Low P = 0.1	10	–20	–150
Medium P = 0.5	50	60	20
High P = 0.4	50	100	200

Draw a decision tree and choose correct course of action.

3. Solve **any one** (**4** marks) :

a) Contributions of 1) Gilberth 2) Mayo

b) Discuss motivation.

SECTION – II

4. Solve **any three** (**8** marks **each**) :

a) Classify the following items in ABC categories using graphical method.

Item	Unit Price Rs.	Annual Consumption units	Item	Unit Price Rs.	Annual Consumption units
A – 11	1,200	25	A – 17	400	25
A – 12	900	35	A – 18	5,000	10
A – 13	1,400	15	A – 19	250	15
A – 14	400	55	A – 20	220	25
A – 15	300	35	A – 21	215	25
A – 16	700	10	A – 22	215	25

b) Draw $\bar{X}$ and R chart from the following data and state whether process is in control and not.

Graph is compulsory.

Sample Number	Bottle Vol. in lit.			
	A	B	C	D
1	15.85	16.02	15.83	15.93
2	16.12	16	15.85	16.01
3	16	15.91	15.94	15.83
4	16.2	15.85	15.74	15.93
5	15.74	15.86	16.21	16.10

c) Discuss role of mitigation in disaster management with example.

d) Explain costs associated with EOQ.

e) A fixed cost for product for a started year is Rs. 80,000, the estimated sales for a period are valued for Rs. 2,00,000
The variable cost per unit for single product made is Rs. 4. If each unit sale sales at 20% and no. of units involved with expected volume of output constraints.

Find :

1) BEP
2) Contribution
3) Profit
4) No. of unit sold

5. Write note on (**any one)** (**4** marks) :

a) Importance of material management b) TQM.

———————

Set P

SLR-VB – 37

Seat No.	

Set Q

T.E. (Civil) (Part – I) (CGPA Pattern) Examination, 2017
ENGINEERING MANAGEMENT – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **(1 mark each)**

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   a) Theory W b) Theory Y c) Theory X d) Theory Z

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   a) A class items b) B class items c) C class items d) All of these

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4) Transportation problem can be solved if
   a) No. of rows = no. of columns b) No. of rows $\geq$ no. of columns
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   a) Transportation b) Games
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P.T.O.

6) Functioning of human brain has inspired
   a) Artificial neural network b) Fuzzy logic
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   a) Circle b) Triangle c) Rectangle d) Square

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   a) 0.5 – 3% b) 50 – 100% c) 0 – 0.5% d) 20 – 50%

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12) Maximization problem is LPP will involve
   a) Slack variable b) Surplus variable
   c) Both a) and b) d) None of these

13) The most popular type of organization used for Civil Engineering
   a) Line b) Line and staff c) Functional d) Effective

14) Time and motion study are elements of _____ management.
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_____

SLR-VB – 37

Seat No.	

T.E. (Civil) (Part – I) (CGPA Pattern) Examination, 2017
ENGINEERING MANAGEMENT – I

Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***wherevr*** *necessary.*
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SECTION – I

2. Solve **any three** (**8** marks **each**) :

a) A company manufactures two products A and B. Both products pass through machine M_1 and M_2. The time required to process each unit of product A and B on each machine centre and available capacity of each machine is given below.

Product	**Machine Centre (Processing time/unit hours)**	
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Available Hours per week	3600	2000

Each unit of Product A gives a profit of Rs. 25 while each unit of Product B gives profit of Rs. 20.

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c) Write notes on :

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A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

e) A factory is considering 3 course of actions S_1, S_2 and S_3. Correct choice depends upon future demand as low, medium or high with probabilities as 0.1, 0.5 and 0.4.

The cost analysis reveals effect upon the profit as follows :

Profit if demand is	Course of action		
	S_1	S_2	S_3
Low P = 0.1	10	–20	–150
Medium P = 0.5	50	60	20
High P = 0.4	50	100	200

Draw a decision tree and choose correct course of action.

3. Solve **any one** (**4** marks) :

a) Contributions of 1) Gilberth 2) Mayo

b) Discuss motivation.

SECTION – II

4. Solve **any three** (**8** marks **each**) :

a) Classify the following items in ABC categories using graphical method.

Item	Unit Price Rs.	Annual Consumption units	Item	Unit Price Rs.	Annual Consumption units
A – 11	1,200	25	A – 17	400	25
A – 12	900	35	A – 18	5,000	10
A – 13	1,400	15	A – 19	250	15
A – 14	400	55	A – 20	220	25
A – 15	300	35	A – 21	215	25
A – 16	700	10	A – 22	215	25

b) Draw $\bar{X}$ and R chart from the following data and state whether process is in control and not.
Graph is compulsory.

Sample Number	Bottle Vol. in lit.			
	A	B	C	D
1	15.85	16.02	15.83	15.93
2	16.12	16	15.85	16.01
3	16	15.91	15.94	15.83
4	16.2	15.85	15.74	15.93
5	15.74	15.86	16.21	16.10

c) Discuss role of mitigation in disaster management with example.
d) Explain costs associated with EOQ.
e) A fixed cost for product for a started year is Rs. 80,000, the estimated sales for a period are valued for Rs. 2,00,000
The variable cost per unit for single product made is Rs. 4. If each unit sale sales at 20% and no. of units involved with expected volume of output constraints.
Find :
1) BEP
2) Contribution
3) Profit
4) No. of unit sold

5. Write note on (**any one)** (**4** marks) :
a) Importance of material management b) TQM.

———————

Set Q

SLR-VB – 37

Seat No.	

Set R

T.E. (Civil) (Part – I) (CGPA Pattern) Examination, 2017
ENGINEERING MANAGEMENT – I

Day and Date : Tuesday, 9-5-2017 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 calculator 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 alternative : **(1 mark each)**

1) Maximization problem is LPP will involve
   a) Slack variable b) Surplus variable
   c) Both a) and b) d) None of these

2) The most popular type of organization used for Civil Engineering
   a) Line b) Line and staff c) Functional d) Effective

3) Time and motion study are elements of _____ management.
   a) Classical b) Scientific c) System d) General

4) Work study as natural as play of rest is assumption of
   a) Theory W b) Theory Y c) Theory X d) Theory Z

5) In ABC analysis least monitoring and control is required for
   a) A class items b) B class items c) C class items d) All of these

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

P.T.O.

7) Transportation problem can be solved if
   a) No. of rows = no. of columns
   b) No. of rows $\geq$ no. of columns
   c) No. of rows $\leq$ no. of columns
   d) All of these

8) Folding back method is used for problems of
   a) Transportation b) Games c) Assignment d) Decision tree

9) Functioning of human brain has inspired
   a) Artificial neural network
   b) Fuzzy logic
   c) Genetic algorithm
   d) Dynamic programming

10) 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

11) In decision tree problems the event mode is shown by
   a) Circle b) Triangle c) Rectangle d) Square

12) Queuing theory is
   a) Maximization process
   b) Minimization process
   c) Optimization process
   d) Descriptive process

13) Acceptance quality level for inspection is stored normally range between
   a) 0.5 – 3% b) 50 – 100% c) 0 – 0.5% d) 20 – 50%

14) The biological process of mutation has inspired
   a) Artificial neural network
   b) Fuzzy number
   c) Genetic algorithm
   d) Dynamic programming

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SLR-VB – 37

Seat No.	

T.E. (Civil) (Part – I) (CGPA Pattern) Examination, 2017
ENGINEERING MANAGEMENT – I

Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***wherevr*** *necessary.*
3) ***Use*** *graph paer if needed.*
4) ***Use*** *of nonprogrammable calculator is permitted.*

SECTION – I

2. Solve **any three** (**8** marks **each**) :

a) A company manufactures two products A and B. Both products pass through machine M_1 and M_2. The time required to process each unit of product A and B on each machine centre and available capacity of each machine is given below.

Product	**Machine Centre (Processing time/unit hours)**	
	M_1	**M_2**
A	6	2
B	4	4
Available Hours per week	3600	2000

Each unit of Product A gives a profit of Rs. 25 while each unit of Product B gives profit of Rs. 20.

How much quantity of each product should be manufactured to maximize profit ? Solve by graphical method.

b) What is communication ? State its types and barriers in communication with example.

c) Write notes on :

1) Waiting line theory 2) Dynamic programming

d) In the following problem, how should be the tasks allocated one to man so as to minimize the total man hours ?

Tasks	Men			
	1	2	3	4
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

e) A factory is considering 3 course of actions S_1, S_2 and S_3. Correct choice depends upon future demand as low, medium or high with probabilities as 0.1, 0.5 and 0.4.

The cost analysis reveals effect upon the profit as follows :

Profit if demand is	Course of action		
	S_1	S_2	S_3
Low P = 0.1	10	–20	–150
Medium P = 0.5	50	60	20
High P = 0.4	50	100	200

Draw a decision tree and choose correct course of action.

3. Solve **any one** (**4** marks) :

a) Contributions of 1) Gilberth 2) Mayo

b) Discuss motivation.

SECTION – II

4. Solve **any three** (**8** marks **each**) :

a) Classify the following items in ABC categories using graphical method.

Item	Unit Price Rs.	Annual Consumption units	Item	Unit Price Rs.	Annual Consumption units
A – 11	1,200	25	A – 17	400	25
A – 12	900	35	A – 18	5,000	10
A – 13	1,400	15	A – 19	250	15
A – 14	400	55	A – 20	220	25
A – 15	300	35	A – 21	215	25
A – 16	700	10	A – 22	215	25

b) Draw $\bar{X}$ and R chart from the following data and state whether process is in control and not.
Graph is compulsory.

Sample Number	Bottle Vol. in lit.			
	A	B	C	D
1	15.85	16.02	15.83	15.93
2	16.12	16	15.85	16.01
3	16	15.91	15.94	15.83
4	16.2	15.85	15.74	15.93
5	15.74	15.86	16.21	16.10

c) Discuss role of mitigation in disaster management with example.
d) Explain costs associated with EOQ.
e) A fixed cost for product for a started year is Rs. 80,000, the estimated sales for a period are valued for Rs. 2,00,000
The variable cost per unit for single product made is Rs. 4. If each unit sale sales at 20% and no. of units involved with expected volume of output constraints.
Find :
1) BEP
2) Contribution
3) Profit
4) No. of unit sold

5. Write note on (**any one)** (**4** marks) :
a) Importance of material management b) TQM.

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Set R

SLR-VB – 37

Seat No.	

Set S

T.E. (Civil) (Part – I) (CGPA Pattern) Examination, 2017
ENGINEERING MANAGEMENT – I

Day and Date : Tuesday, 9-5-2017 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 calculator 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 alternative : **(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) Transportation problem can be solved if
   a) No. of rows = no. of columns
   b) No. of rows $\geq$ no. of columns
   c) No. of rows $\leq$ no. of columns
   d) All of these

3) Folding back method is used for problems of
   a) Transportation
   b) Games
   c) Assignment
   d) Decision tree

4) Functioning of human brain has inspired
   a) Artificial neural network
   b) Fuzzy logic
   c) Genetic algorithm
   d) Dynamic programming

5) 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

6) In decision tree problems the event mode is shown by
   a) Circle b) Triangle c) Rectangle d) Square

7) Queuing theory is
   a) Maximization process b) Minimization process
   c) Optimization process d) Descriptive process

8) Acceptance quality level for inspection is stored normally range between
   a) 0.5 – 3% b) 50 – 100% c) 0 – 0.5% d) 20 – 50%

9) The biological process of mutation has inspired
   a) Artificial neural network b) Fuzzy number
   c) Genetic algorithm d) Dynamic programming

10) Maximization problem is LPP will involve
   a) Slack variable b) Surplus variable
   c) Both a) and b) d) None of these

11) The most popular type of organization used for Civil Engineering
   a) Line b) Line and staff c) Functional d) Effective

12) Time and motion study are elements of _____ management.
   a) Classical b) Scientific c) System d) General

13) Work study as natural as play of rest is assumption of
   a) Theory W b) Theory Y c) Theory X d) Theory Z

14) In ABC analysis least monitoring and control is required for
   a) A class items b) B class items c) C class items d) All of these

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SLR-VB – 37

Seat No.	

T.E. (Civil) (Part – I) (CGPA Pattern) Examination, 2017
ENGINEERING MANAGEMENT – I

Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***wherevr*** *necessary.*
3) ***Use*** *graph paer if needed.*
4) ***Use*** *of nonprogrammable calculator is permitted.*

SECTION – I

2. Solve **any three** (**8** marks **each**) :

a) A company manufactures two products A and B. Both products pass through machine M_1 and M_2. The time required to process each unit of product A and B on each machine centre and available capacity of each machine is given below.

Product	**Machine Centre (Processing time/unit hours)**	
	M_1	**M_2**
A	6	2
B	4	4
Available Hours per week	3600	2000

Each unit of Product A gives a profit of Rs. 25 while each unit of Product B gives profit of Rs. 20.

How much quantity of each product should be manufactured to maximize profit ? Solve by graphical method.

b) What is communication ? State its types and barriers in communication with example.

c) Write notes on :

1) Waiting line theory 2) Dynamic programming

d) In the following problem, how should be the tasks allocated one to man so as to minimize the total man hours ?

Tasks	Men			
	1	2	3	4
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

e) A factory is considering 3 course of actions S_1, S_2 and S_3. Correct choice depends upon future demand as low, medium or high with probabilities as 0.1, 0.5 and 0.4.

The cost analysis reveals effect upon the profit as follows :

Profit if demand is	Course of action		
	S_1	S_2	S_3
Low P = 0.1	10	–20	–150
Medium P = 0.5	50	60	20
High P = 0.4	50	100	200

Draw a decision tree and choose correct course of action.

3. Solve **any one** (**4** marks) :

a) Contributions of 1) Gilberth 2) Mayo

b) Discuss motivation.

SECTION – II

4. Solve **any three** (**8** marks **each**) :

a) Classify the following items in ABC categories using graphical method.

Item	Unit Price Rs.	Annual Consumption units	Item	Unit Price Rs.	Annual Consumption units
A – 11	1,200	25	A – 17	400	25
A – 12	900	35	A – 18	5,000	10
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A – 14	400	55	A – 20	220	25
A – 15	300	35	A – 21	215	25
A – 16	700	10	A – 22	215	25

b) Draw $\overline{X}$ and R chart from the following data and state whether process is in control and not.

Graph is compulsory.

Sample Number	Bottle Vol. in lit.			
	A	B	C	D
1	15.85	16.02	15.83	15.93
2	16.12	16	15.85	16.01
3	16	15.91	15.94	15.83
4	16.2	15.85	15.74	15.93
5	15.74	15.86	16.21	16.10

c) Discuss role of mitigation in disaster management with example.

d) Explain costs associated with EOQ.

e) A fixed cost for product for a started year is Rs. 80,000, the estimated sales for a period are valued for Rs. 2,00,000
The variable cost per unit for single product made is Rs. 4. If each unit sale sales at 20% and no. of units involved with expected volume of output constraints.

Find :

1) BEP
2) Contribution
3) Profit
4) No. of unit sold

5. Write note on (**any one)** (**4** marks) :

a) Importance of material management b) TQM.

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Set S

SLR-VB – 38

Seat No.	

Set **P**

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 12-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 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) **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

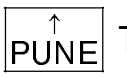
1. Choose the correct alternative : **14**

1) The first road development plan is known as _____ plan.
a) Bombay b) Pune c) Calcutta d) None

2) For roads minimum ruling gradient is
a) 1 in 10 b) 1 in 20 c) 1 in 30 d) 1 in 40

3) The maximum width of vehicle as recommended by IRC is
a) 1.85 m b) 2 m c) 2.5 m d) 4 m

4) Bottom most layer of pavement is called as
a) Subgrade b) Sub-base c) Base course d) None

5) 

This type of sign is
a) Mandatory b) Information c) Both a) and b) d) None

6) Los Angle's abrasion test is carried out to determine _____ of aggregate.
a) Strength b) Toughness c) Harshness d) Hardness

7) Which traffic study data is required to locate the express way along desired lines
a) Traffic volume study b) Spot speed study
c) Axle load survey d) O-D studies

8) Dowel bars are places at
a) Longitudinal joints b) Transverse joints
c) Both a) and b) d) None of these

P.T.O.

9) In ESWL concept, the stresses due to wheel load at any depth greater than 2S, is considered to be equivalent to a single wheel load of magnitude,

a) 4P b) 3P c) 6P d) 2P

10) Critical loading positions in cement concrete pavements are

a) Interior, edge and middle b) Interior, edge and diagonal

c) Interior, edge and straight d) Interior, edge and corner

11) One of the following methods is used for tunneling in soft soils

a) Fore poling method b) Drift method

c) Full-face method d) Heading and bench method

12) Thickness of the tunnel lining is determined by

a) T = 50 D b) T = 82 D

c) T = 30 D d) None of the above

13) Bearings are provided in bridges to

a) Allow translation and rotation in bridges
b) Transfer forces from superstructure to substructure
c) Displacements in vertical and horizontal directions
d) All of these

14) One of the following is a shallow foundation

a) Pile foundation b) Well foundation

c) Raft foundation d) Under reamed piles

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SLR-VB – 38

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 12-5-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

2. Solve **any four** (**7** marks **each**) : **(7×4=28)**

a) Calculate safe overtaking sight distance from the following data for one way and two way traffic.

1) Speed of over taking vehicle = 96 kmph
2) Speed of over taken vehicle = 22.16 m/s
3) Reaction time = 02 sec.
4) Accleration = 2.5 kmph/sec.

b) Explain principles of highway planning.

c) What is gradient ? Why it is to be provided ? State different types of gradient. why gradient compensation is required on curves.

d) Write a detail note on “origin and destination studies”.

e) Explain different types of traffic control devices.

f) Write down the importance of aggregate impact test and aggregate abrasion test.

g) What is alignment ? Discuss factors affecting alignment.

SECTION – II

3. Answer **any four** questions (**7** marks **each**) : **(7×4=28)**

a) What are the various factors to be considered in pavement design? Discuss the significance of each.

b) Enumerate the construction steps of Bituminous Concrete roads.

c) 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 11000 to 13000 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.

d) Explain different types of bridge bearings.

e) Define afflux; calculate the afflux under the bridge for a linear waterway of 150 meters constructed across a stream whose natural linear waterway is 220 meters. Average flood discharge is 1200 meter^3/sec and average flood depth is 3 meters.

f) Describe any one method tunneling in soft rock.

g) State and explain the size and shapes of tunnels.

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SLR-VB – 38

Seat No.	

Set **Q**

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 12-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 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) **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) Dowel bars are places at
   a) Longitudinal joints b) Transverse joints
   c) Both a) and b) d) None of these

2) In ESWL concept, the stresses due to wheel load at any depth greater than 2S, is considered to be equivalent to a single wheel load of magnitude,
   a) 4P b) 3P c) 6P d) 2P

3) Critical loading positions in cement concrete pavements are
   a) Interior, edge and middle b) Interior, edge and diagonal
   c) Interior, edge and straight d) Interior, edge and corner

4) One of the following methods is used for tunneling in soft soils
   a) Fore poling method b) Drift method
   c) Full-face method d) Heading and bench method

5) Thickness of the tunnel lining is determined by
   a) T = 50 D b) T = 82 D
   c) T = 30 D d) None of the above

6) Bearings are provided in bridges to
   a) Allow translation and rotation in bridges
   b) Transfer forces from superstructure to substructure
   c) Displacements in vertical and horizontal directions
   d) All of these

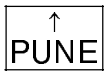
7) One of the following is a shallow foundation
   a) Pile foundation b) Well foundation
   c) Raft foundation d) Under reamed piles

8) The first road development plan is known as _____ plan.
   a) Bombay b) Pune c) Calcutta d) None

9) For roads minimum ruling gradient is
   a) 1 in 10 b) 1 in 20 c) 1 in 30 d) 1 in 40

10) The maximum width of vehicle as recommended by IRC is
   a) 1.85 m b) 2 m c) 2.5 m d) 4 m

11) Bottom most layer of pavement is called as
   a) Subgrade b) Sub-base c) Base course d) None

12) 

This type of sign is
   a) Mandatory b) Information c) Both a) and b) d) None

13) Los Angle's abrasion test is carried out to determine _____ of aggregate.
   a) Strength b) Toughness c) Harshness d) Hardness

14) Which traffic study data is required to locate the express way along desired lines
   a) Traffic volume study b) Spot speed study
   c) Axle load survey d) O-D studies

_____

SLR-VB – 38

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 12-5-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

2. Solve **any four** (**7** marks **each**) : **(7×4=28)**

a) Calculate safe overtaking sight distance from the following data for one way and two way traffic.

1) Speed of over taking vehicle = 96 kmph
2) Speed of over taken vehicle = 22.16 m/s
3) Reaction time = 02 sec.
4) Accleration = 2.5 kmph/sec.

b) Explain principles of highway planning.

c) What is gradient ? Why it is to be provided ? State different types of gradient. why gradient compensation is required on curves.

d) Write a detail note on “origin and destination studies”.

e) Explain different types of traffic control devices.

f) Write down the importance of aggregate impact test and aggregate abrasion test.

g) What is alignment ? Discuss factors affecting alignment.

SECTION – II

3. Answer **any four** questions (**7** marks **each**) : **(7×4=28)**

a) What are the various factors to be considered in pavement design? Discuss the significance of each.

b) Enumerate the construction steps of Bituminous Concrete roads.

c) 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 11000 to 13000 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.

d) Explain different types of bridge bearings.

e) Define afflux; calculate the afflux under the bridge for a linear waterway of 150 meters constructed across a stream whose natural linear waterway is 220 meters. Average flood discharge is 1200 meter^3/sec and average flood depth is 3 meters.

f) Describe any one method tunneling in soft rock.

g) State and explain the size and shapes of tunnels.

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SLR-VB – 38

Seat No.	

Set **R**

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – I

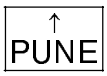
Day and Date : Friday, 12-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***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) **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) 

This type of sign is
a) Mandatory b) Information c) Both a) and b) d) None

2) Los Angle's abrasion test is carried out to determine _____ of aggregate.
a) Strength b) Toughness c) Harshness d) Hardness

3) Which traffic study data is required to locate the express way along desired lines
a) Traffic volume study b) Spot speed study
c) Axle load survey d) O-D studies

4) Dowel bars are places at
a) Longitudinal joints b) Transverse joints
c) Both a) and b) d) None of these

5) In ESWL concept, the stresses due to wheel load at any depth greater than 2S, is considered to be equivalent to a single wheel load of magnitude,
a) 4P b) 3P c) 6P d) 2P

6) Critical loading positions in cement concrete pavements are
a) Interior, edge and middle b) Interior, edge and diagonal
c) Interior, edge and straight d) Interior, edge and corner

P.T.O.

7) One of the following methods is used for tunneling in soft soils
   a) Fore poling method b) Drift method
   c) Full-face method d) Heading and bench method
8) Thickness of the tunnel lining is determined by
   a) T = 50 D b) T = 82 D
   c) T = 30 D d) None of the above
9) Bearings are provided in bridges to
   a) Allow translation and rotation in bridges
   b) Transfer forces from superstructure to substructure
   c) Displacements in vertical and horizontal directions
   d) All of these
10) One of the following is a shallow foundation
   a) Pile foundation b) Well foundation
   c) Raft foundation d) Under reamed piles
11) The first road development plan is known as _____ plan.
   a) Bombay b) Pune c) Calcutta d) None
12) For roads minimum ruling gradient is
   a) 1 in 10 b) 1 in 20 c) 1 in 30 d) 1 in 40
13) The maximum width of vehicle as recommended by IRC is
   a) 1.85 m b) 2 m c) 2.5 m d) 4 m
14) Bottom most layer of pavement is called as
   a) Subgrade b) Sub-base c) Base course d) None

_____

SLR-VB – 38

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 12-5-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

2. Solve **any four** (**7** marks **each**) : **(7×4=28)**

a) Calculate safe overtaking sight distance from the following data for one way and two way traffic.

1) Speed of over taking vehicle = 96 kmph
2) Speed of over taken vehicle = 22.16 m/s
3) Reaction time = 02 sec.
4) Accleration = 2.5 kmph/sec.

b) Explain principles of highway planning.

c) What is gradient ? Why it is to be provided ? State different types of gradient. why gradient compensation is required on curves.

d) Write a detail note on “origin and destination studies”.

e) Explain different types of traffic control devices.

f) Write down the importance of aggregate impact test and aggregate abrasion test.

g) What is alignment ? Discuss factors affecting alignment.

SECTION – II

3. Answer **any four** questions (**7** marks **each**) : **(7×4=28)**

a) What are the various factors to be considered in pavement design? Discuss the significance of each.

b) Enumerate the construction steps of Bituminous Concrete roads.

c) 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 11000 to 13000 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.

d) Explain different types of bridge bearings.

e) Define afflux; calculate the afflux under the bridge for a linear waterway of 150 meters constructed across a stream whose natural linear waterway is 220 meters. Average flood discharge is 1200 meter^3/sec and average flood depth is 3 meters.

f) Describe any one method tunneling in soft rock.

g) State and explain the size and shapes of tunnels.

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SLR-VB – 38

Seat No.	

Set S

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 12-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 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) **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) Critical loading positions in cement concrete pavements are
   a) Interior, edge and middle b) Interior, edge and diagonal
   c) Interior, edge and straight d) Interior, edge and corner

2) One of the following methods is used for tunneling in soft soils
   a) Fore poling method b) Drift method
   c) Full-face method d) Heading and bench method

3) Thickness of the tunnel lining is determined by
   a) T = 50 D b) T = 82 D
   c) T = 30 D d) None of the above

4) Bearings are provided in bridges to
   a) Allow translation and rotation in bridges
   b) Transfer forces from superstructure to substructure
   c) Displacements in vertical and horizontal directions
   d) All of these

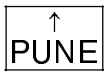
5) One of the following is a shallow foundation
   a) Pile foundation b) Well foundation
   c) Raft foundation d) Under reamed piles

6) The first road development plan is known as _____ plan.
   a) Bombay b) Pune c) Calcutta d) None

7) For roads minimum ruling gradient is
   a) 1 in 10 b) 1 in 20 c) 1 in 30 d) 1 in 40

8) The maximum width of vehicle as recommended by IRC is
   a) 1.85 m b) 2 m c) 2.5 m d) 4 m

9) Bottom most layer of pavement is called as
   a) Subgrade b) Sub-base c) Base course d) None

10) 

This type of sign is
   a) Mandatory b) Information c) Both a) and b) d) None

11) Los Angle's abrasion test is carried out to determine _____ of aggregate.
   a) Strength b) Toughness c) Harshness d) Hardness

12) Which traffic study data is required to locate the express way along desired lines
   a) Traffic volume study b) Spot speed study
   c) Axle load survey d) O-D studies

13) Dowel bars are places at
   a) Longitudinal joints b) Transverse joints
   c) Both a) and b) d) None of these

14) In ESWL concept, the stresses due to wheel load at any depth greater than 2S, is considered to be equivalent to a single wheel load of magnitude,
   a) 4P b) 3P c) 6P d) 2P

_____

SLR-VB – 38

Seat No.	

T.E. (Civil) (Part – I) (CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – I

Day and Date : Friday, 12-5-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

2. Solve **any four** (**7** marks **each**) : **(7×4=28)**

a) Calculate safe overtaking sight distance from the following data for one way and two way traffic.

1) Speed of over taking vehicle = 96 kmph
2) Speed of over taken vehicle = 22.16 m/s
3) Reaction time = 02 sec.
4) Accleration = 2.5 kmph/sec.

b) Explain principles of highway planning.

c) What is gradient ? Why it is to be provided ? State different types of gradient. why gradient compensation is required on curves.

d) Write a detail note on “origin and destination studies”.

e) Explain different types of traffic control devices.

f) Write down the importance of aggregate impact test and aggregate abrasion test.

g) What is alignment ? Discuss factors affecting alignment.

SECTION – II

3. Answer **any four** questions (**7** marks **each**) : **(7×4=28)**

a) What are the various factors to be considered in pavement design? Discuss the significance of each.

b) Enumerate the construction steps of Bituminous Concrete roads.

c) 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 11000 to 13000 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.

d) Explain different types of bridge bearings.

e) Define afflux; calculate the afflux under the bridge for a linear waterway of 150 meters constructed across a stream whose natural linear waterway is 220 meters. Average flood discharge is 1200 meter^3/sec and average flood depth is 3 meters.

f) Describe any one method tunneling in soft rock.

g) State and explain the size and shapes of tunnels.

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Seat No.	

Set P

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
STRUCTURAL MECHANICS – III

Day and Date : Monday, 15-5-2017 Max. Marks : 70
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) Figures to the **right** indicate **full** marks.*
*4) **Assume** additional data if required and mention **it clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Which one of the following doesn't fall under category of force method ? **1**
   a) Consistent deformation method b) Flexibility method
   c) Stiffness method d) Energy method

2) In linearly elastic structural element **1**
   a) Stiffness is equal to flexibility
   b) Stiffness is directly proportional to flexibility
   c) Stiffness is inversely proportional to flexibility
   d) Stiffness is not related to flexibility

3) Degree of static indeterminacy of frame shown in fig. (3.0) **1**

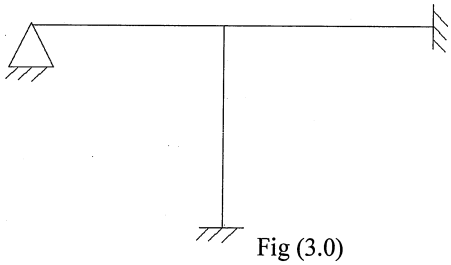


Fig (3.0)

   a) 1 b) 5 c) 4 d) 6

4) Degree of kinematic indeterminacy of beam shown in fig. (4.0) **1**

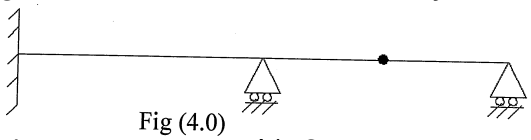


Fig (4.0)

   a) 1 b) 3 c) 2 d) 5

P.T.O.

5) Strain energy due to bending is given by **1**

a) $\int \frac{M^2}{2EI} dx$ b) $\int \frac{M^2}{4EI} dx$ c) $\int \frac{M^2}{EI} dx$ d) $\int \frac{2M^2}{EI} dx$

6) Degree of static indeterminacy of the truss shown in fig. (6.0) **1**

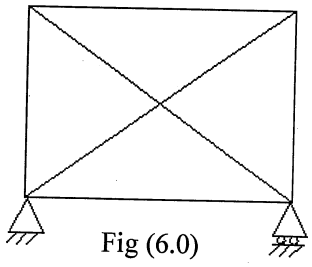


Fig (6.0)

a) 3 b) 1 c) 0 d) 5

7) Propped cantilever of span L carries UDL of w kN/m throughout, value of propped reaction is **1**

a) wL/4 b) 3wL/8 c) wL/3 d) 5wL/8

8) The size of stiffness matrix equals to **1**

a) DSI b) DKI c) DSI + DKI d) DSI – DKI

9) Moment required to produce unit rotation is called **1**

a) Translational stiffness b) Axial stiffness
c) Rotational stiffness d) All of the above

10) Shape of ILD for fixed beam is **1**

a) Linear b) Parabolic c) All of these d) None of these

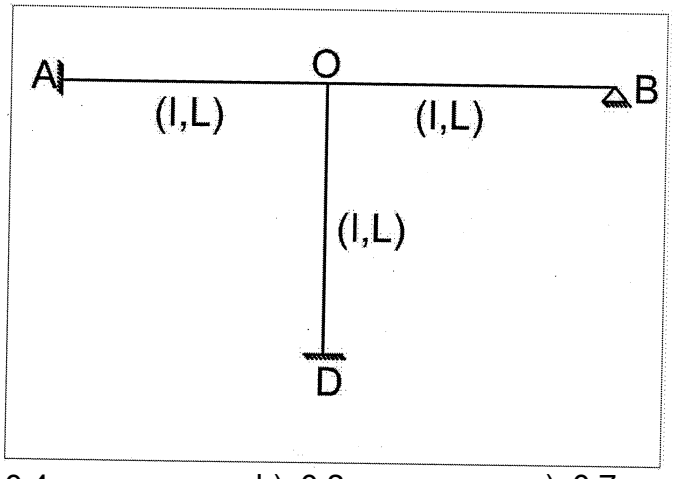
11) The size of stiffness matrix for propped cantilever is **1**

a) 1 × 1 b) 2 × 2 c) 3 × 3 d) 4 × 4

12) The fixed end moment for fixed beam having udl thought span is **1**

a) $wl^2/24$ b) $wl^2/12$ c) $wl^2/16$ d) $wl^2/8$

13) The distribution factor of member OA is **2**



a) 0.4 b) 0.3 c) 0.7 d) 0.4

SLR-VB – 40

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
STRUCTURAL MECHANICS – III

Day and Date : Monday, 15-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Figures to the **right** indicate **full** marks.*
*2) In Section **I**; Q. No. **2** is **compulsory**. Solve **any two** questions from remaining.*
*3) In Section II, solve **any three** questions.*
*4) **Assume** additional data if required and mention **it clearly**.*

SECTION – I

2. a) Distinguish between indeterminate and determinate structures. **(2.5×4=10)**
   b) Enlist properties of flexibility matrix.
   c) Write the equation for horizontal thrust and vertical reaction of two hinged parabolic arch subjected to UDL.
   d) Determine degree of static and kinematic indeterminacy of the structure.

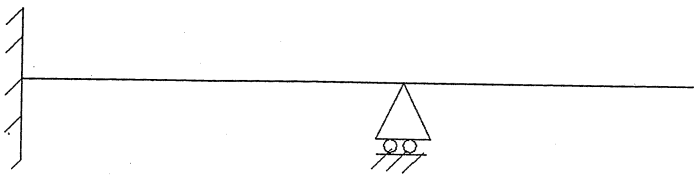


Fig (i)

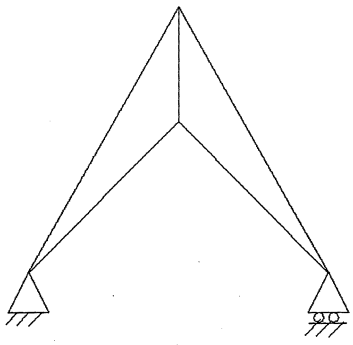


Fig (ii)

   e) Enlist various methods of displacement method of analysis.

3. Analyze the beam using consistent deformation method. Refer fig. 3.1 **9**

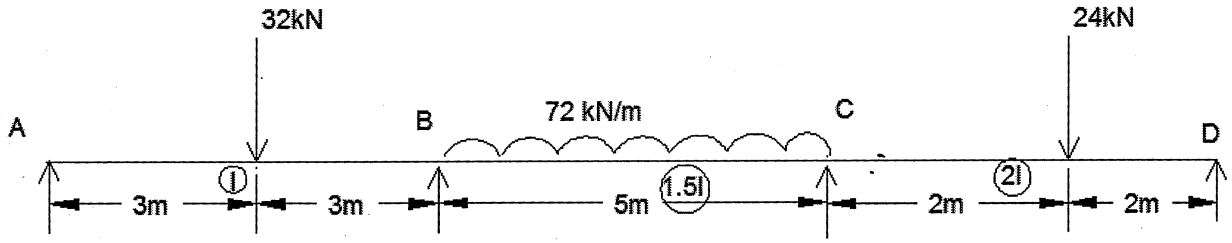


Fig (3.1)

4. Draw SFD and BMD using Strain Energy method. **9**

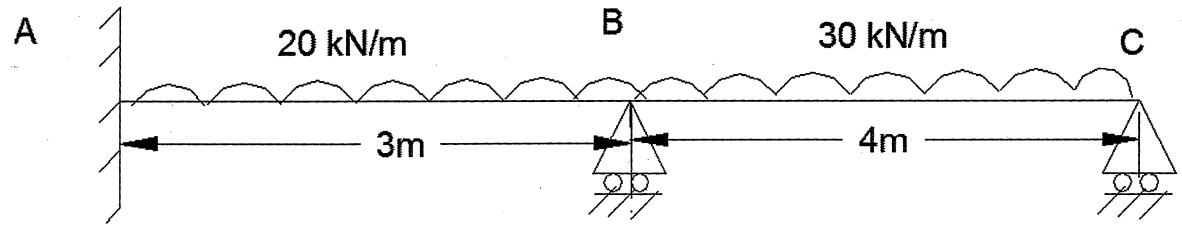


Fig (4.1)

5. Analyze the bent using flexibility method. **9**

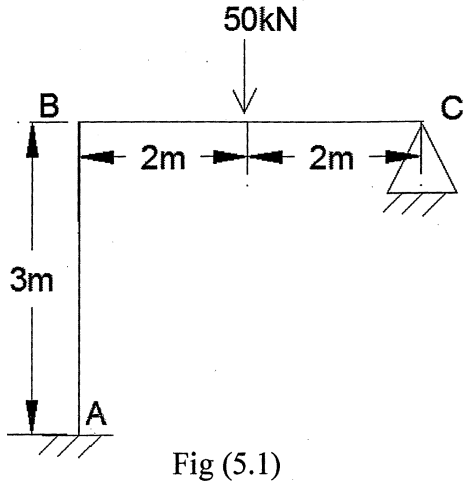


Fig (5.1)

SECTION – II

6. A continuous beam ABC has its span AB = 4 and BC = 6 m. Beam is fixed at end A and has simple supports at B and C. Span AB has a centrally applied load of 20 KN and the span BC has uniformly distributed load of intensity 2 KN/m. If support C settles by an amount 2.5 mm in relation to the supports A and B, analyse by moment distribution method. EI is constant throughout the beam and is equal to 30,000 KN-m^2. **9**

7. Derive stiffness matrix for a beam as shown in Fig No. 7.1. **9**

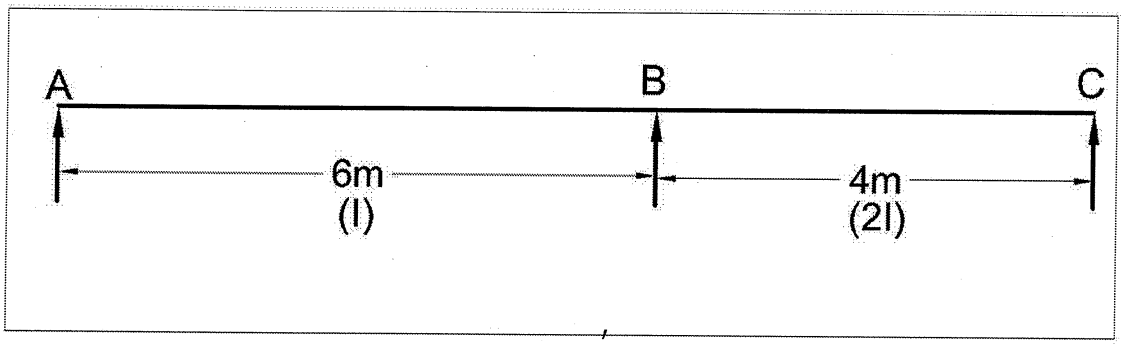


Fig.7.1

8. Draw ILD bending moment at D and reaction at A as shown in Fig. No. 8.1. Plot ordinate at 1 m interval. D is a midpoint of span AB. **9**

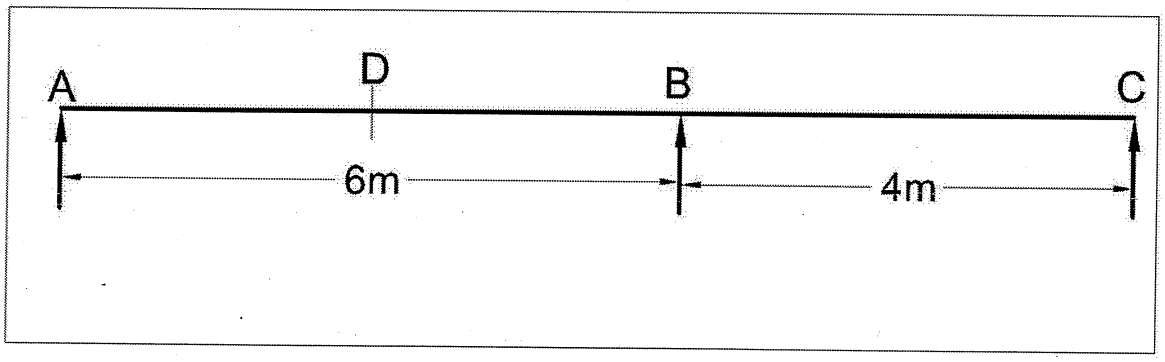


Fig 8.1

9. Draw bending moment diagram for structural frame as shown in Fig. No. 9.1. Use stiffness approach for analysis. **10**

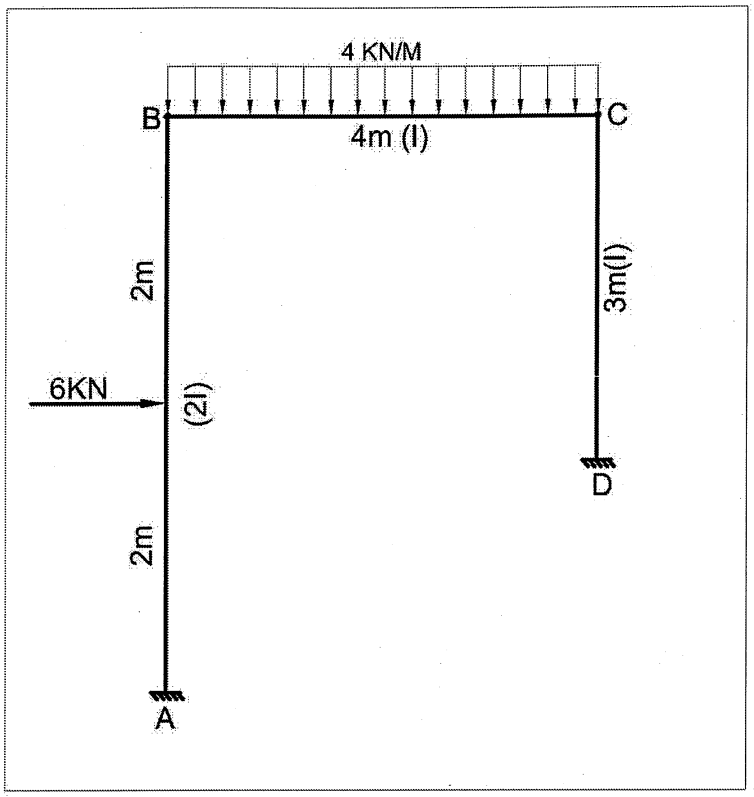


Fig. No. 9.1

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Seat No.	

Set Q

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
STRUCTURAL MECHANICS – III

Day and Date : Monday, 15-5-2017 Max. Marks : 70
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) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Assume*** *additional data if required and mention* ***it clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Degree of static indeterminacy of the truss shown in fig. (6.0) **1**

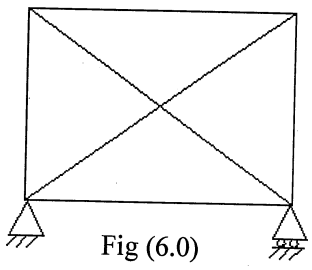


Fig (6.0)

a) 3 b) 1 c) 0 d) 5

2) Propped cantilever of span L carries UDL of w kN/m throughout, value of propped reaction is **1**
a) wL/4 b) 3wL/8 c) wL/3 d) 5wL/8

3) The size of stiffness matrix equals to **1**
a) DSI b) DKI c) DSI + DKI d) DSI – DKI

4) Moment required to produce unit rotation is called **1**
a) Translational stiffness b) Axial stiffness
c) Rotational stiffness d) All of the above

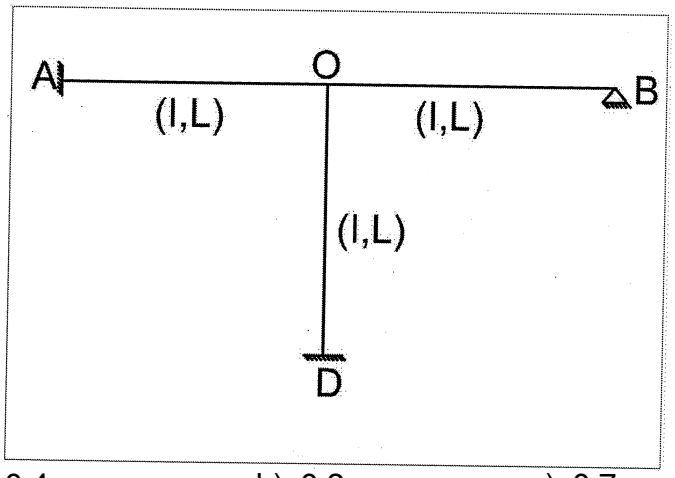
5) Shape of ILD for fixed beam is **1**
a) Linear b) Parabolic c) All of these d) None of these

6) The size of stiffness matrix for propped cantilever is **1**
a) 1 × 1 b) 2 × 2 c) 3 × 3 d) 4 × 4

P.T.O.

7) The fixed end moment for fixed beam having udl thought span is **1**
a) $wl^2/24$ b) $wl^2/12$ c) $wl^2/16$ d) $wl^2/8$

8) The distribution factor of member OA is **2**



a) 0.4 b) 0.3 c) 0.7 d) 0.4

9) Which one of the following doesn't fall under category of force method ? **1**
a) Consistent deformation method b) Flexibility method
c) Stiffness method d) Energy method

10) In linearly elastic structural element **1**
a) Stiffness is equal to flexibility
b) Stiffness is directly proportional to flexibility
c) Stiffness is inversely proportional to flexibility
d) Stiffness is not related to flexibility

11) Degree of static indeterminacy of frame shown in fig. (3.0) **1**

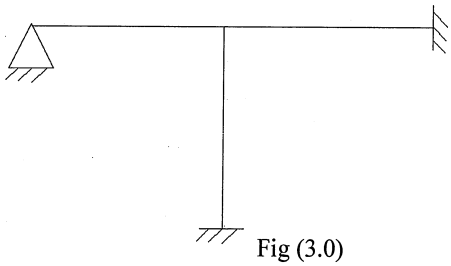


Fig (3.0)

a) 1 b) 5 c) 4 d) 6

12) Degree of kinematic indeterminacy of beam shown in fig. (4.0) **1**

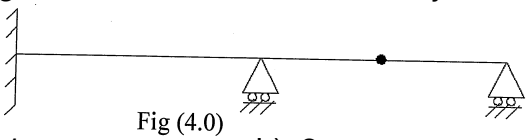


Fig (4.0)

a) 1 b) 3 c) 2 d) 5

13) Strain energy due to bending is given by **1**

a) $\int \frac{M^2}{2EI} dx$ b) $\int \frac{M^2}{4EI} dx$ c) $\int \frac{M^2}{EI} dx$ d) $\int \frac{2M^2}{EI} dx$

SLR-VB – 40

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
STRUCTURAL MECHANICS – III

Day and Date : Monday, 15-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Figures to the **right** indicate **full** marks.*
*2) In Section **I**; Q. No. **2** is **compulsory**. Solve **any two** questions from remaining.*
*3) In Section II, solve **any three** questions.*
*4) **Assume** additional data if required and mention **it clearly**.*

SECTION – I

2. a) Distinguish between indeterminate and determinate structures. **(2.5×4=10)**
   b) Enlist properties of flexibility matrix.
   c) Write the equation for horizontal thrust and vertical reaction of two hinged parabolic arch subjected to UDL.
   d) Determine degree of static and kinematic indeterminacy of the structure.

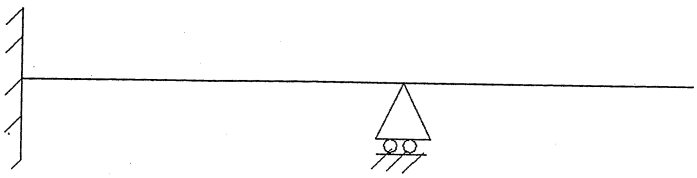


Fig (i)

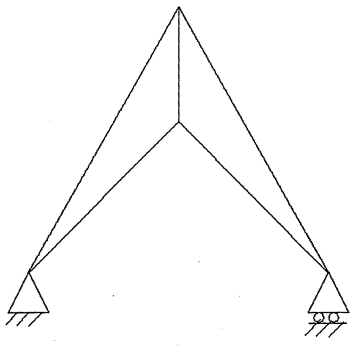


Fig (ii)

   e) Enlist various methods of displacement method of analysis.

3. Analyze the beam using consistent deformation method. Refer fig. 3.1 **9**

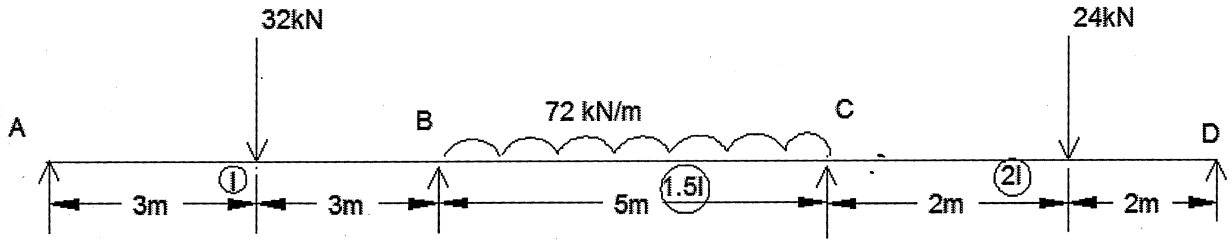


Fig (3.1)

4. Draw SFD and BMD using Strain Energy method. **9**

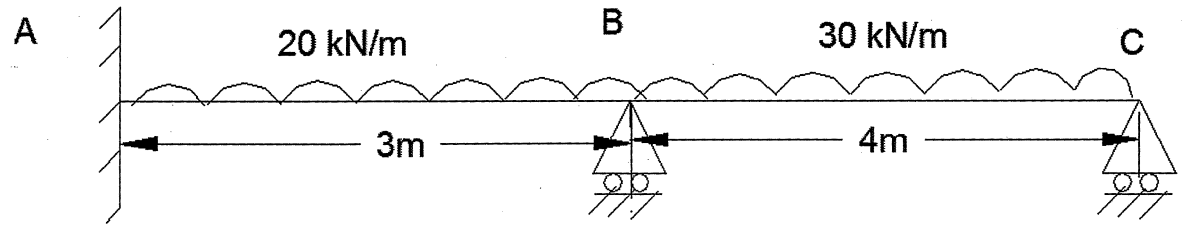


Fig (4.1)

5. Analyze the bent using flexibility method. **9**

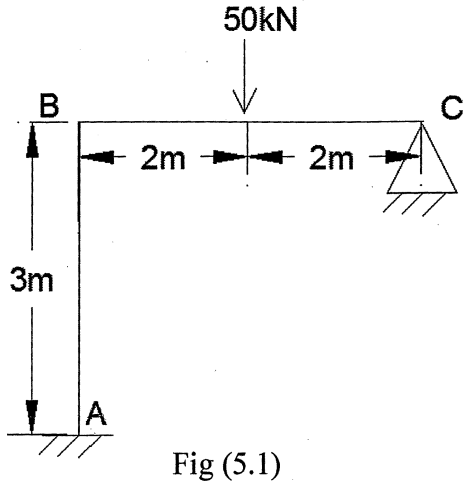


Fig (5.1)

SECTION – II

6. A continuous beam ABC has its span AB = 4 and BC = 6 m. Beam is fixed at end A and has simple supports at B and C. Span AB has a centrally applied load of 20 KN and the span BC has uniformly distributed load of intensity 2 KN/m. If support C settles by an amount 2.5 mm in relation to the supports A and B, analyse by moment distribution method. EI is constant throughout the beam and is equal to 30,000 KN-m^2. **9**

7. Derive stiffness matrix for a beam as shown in Fig No. 7.1. **9**

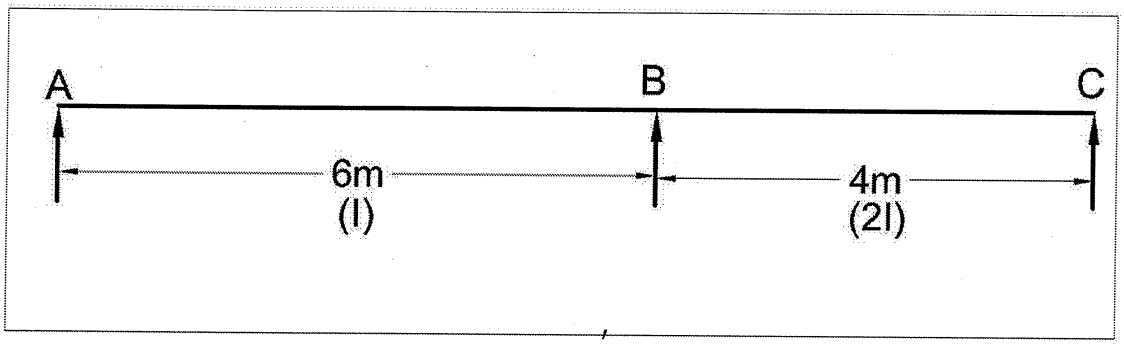


Fig.7.1

8. Draw ILD bending moment at D and reaction at A as shown in Fig. No. 8.1. Plot ordinate at 1 m interval. D is a midpoint of span AB. **9**

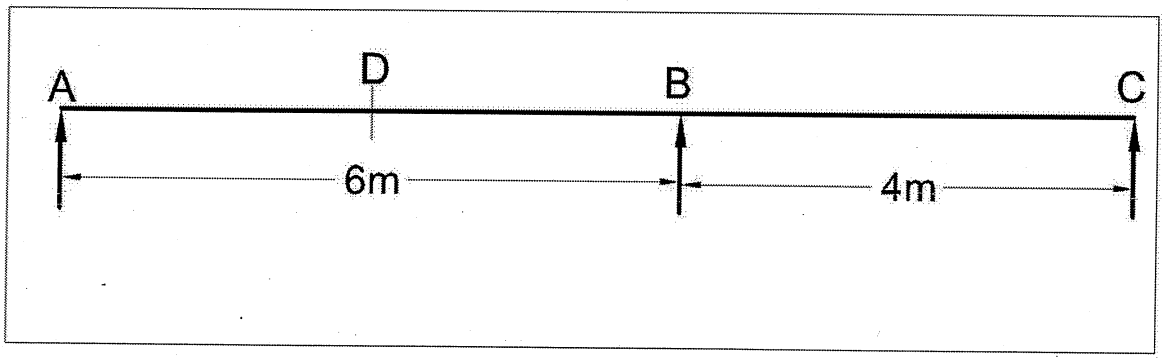


Fig 8.1

9. Draw bending moment diagram for structural frame as shown in Fig. No. 9.1. Use stiffness approach for analysis. **10**

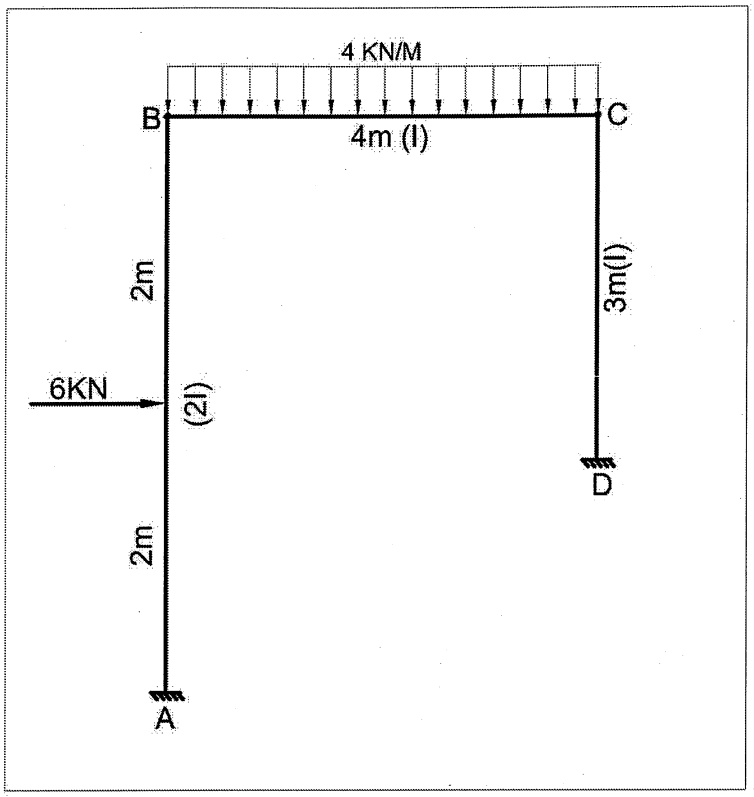


Fig. No. 9.1

SLR-VB – 40

Seat No.	

Set R

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
STRUCTURAL MECHANICS – III

Day and Date : Monday, 15-5-2017 Max. Marks : 70
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) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Assume*** *additional data if required and mention* ***it clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

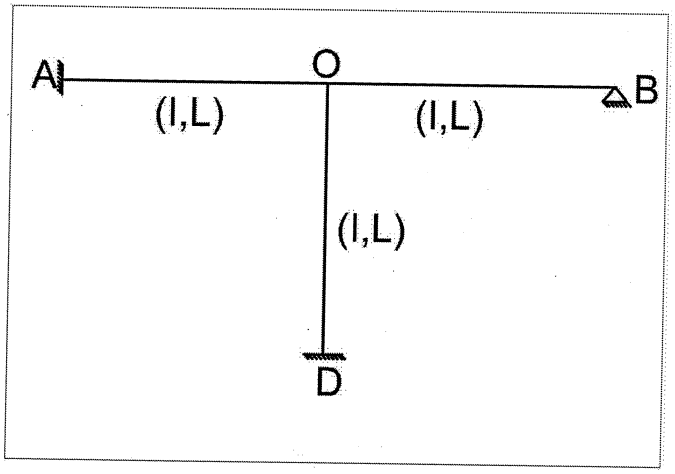
1. Choose the correct answer :

1) Shape of ILD for fixed beam is **1**
a) Linear b) Parabolic c) All of these d) None of these

2) The size of stiffness matrix for propped cantilever is **1**
a) 1×1 b) 2×2 c) 3×3 d) 4×4

3) The fixed end moment for fixed beam having udl thought span is **1**
a) $wl^2/24$ b) $wl^2/12$ c) $wl^2/16$ d) $wl^2/8$

4) The distribution factor of member OA is **2**



a) 0.4 b) 0.3 c) 0.7 d) 0.4

5) Which one of the following doesn't fall under category of force method ? **1**
a) Consistent deformation method b) Flexibility method
c) Stiffness method d) Energy method

P.T.O.

6) In linearly elastic structural element **1**
   a) Stiffness is equal to flexibility
   b) Stiffness is directly proportional to flexibility
   c) Stiffness is inversely proportional to flexibility
   d) Stiffness is not related to flexibility

7) Degree of static indeterminacy of frame shown in fig. (3.0) **1**

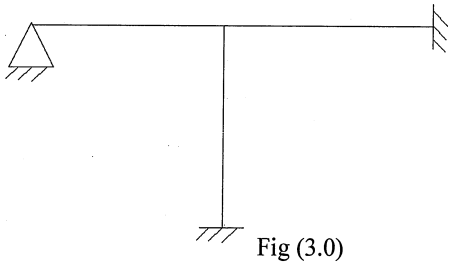


Fig (3.0)

a) 1 b) 5 c) 4 d) 6

8) Degree of kinematic indeterminacy of beam shown in fig. (4.0) **1**

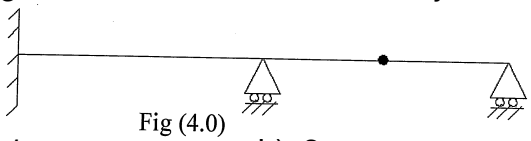


Fig (4.0)

a) 1 b) 3 c) 2 d) 5

9) Strain energy due to bending is given by **1**

a) $\int \frac{M^2}{2EI} dx$ b) $\int \frac{M^2}{4EI} dx$ c) $\int \frac{M^2}{EI} dx$ d) $\int \frac{2M^2}{EI} dx$

10) Degree of static indeterminacy of the truss shown in fig. (6.0) **1**

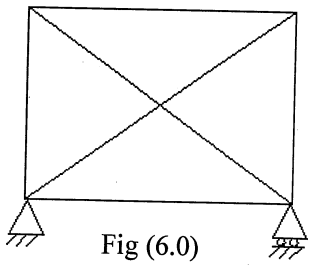


Fig (6.0)

a) 3 b) 1 c) 0 d) 5

11) Propped cantilever of span L carries UDL of w kN/m throughout, value of propped reaction is **1**
   a) wL/4 b) 3wL/8 c) wL/3 d) 5wL/8

12) The size of stiffness matrix equals to **1**
   a) DSI b) DKI c) DSI + DKI d) DSI – DKI

13) Moment required to produce unit rotation is called **1**
   a) Translational stiffness b) Axial stiffness
   c) Rotational stiffness d) All of the above

SLR-VB – 40

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
STRUCTURAL MECHANICS – III

Day and Date : Monday, 15-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Figures to the **right** indicate **full** marks.*
*2) In Section **I**; Q. No. **2** is **compulsory**. Solve **any two** questions from remaining.*
*3) In Section II, solve **any three** questions.*
*4) **Assume** additional data if required and mention **it clearly**.*

SECTION – I

2. a) Distinguish between indeterminate and determinate structures. **(2.5×4=10)**
   b) Enlist properties of flexibility matrix.
   c) Write the equation for horizontal thrust and vertical reaction of two hinged parabolic arch subjected to UDL.
   d) Determine degree of static and kinematic indeterminacy of the structure.

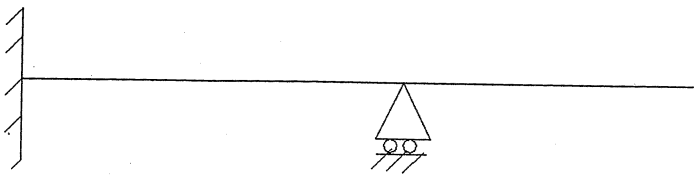


Fig (i)

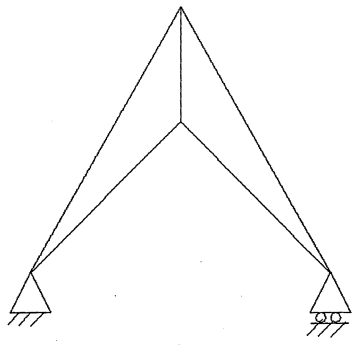


Fig (ii)

   e) Enlist various methods of displacement method of analysis.

3. Analyze the beam using consistent deformation method. Refer fig. 3.1 **9**

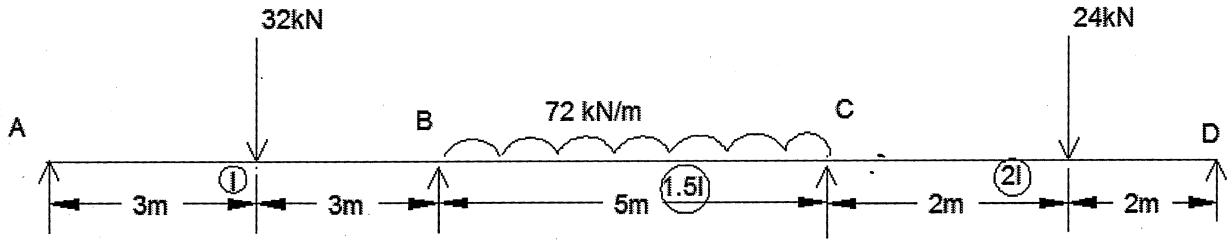


Fig (3.1)

4. Draw SFD and BMD using Strain Energy method. **9**

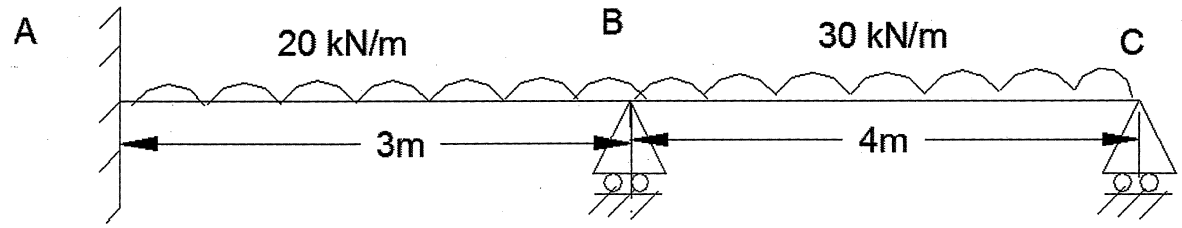


Fig (4.1)

5. Analyze the bent using flexibility method. **9**

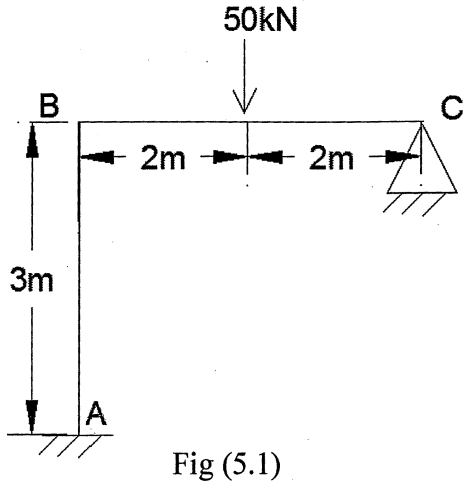


Fig (5.1)

SECTION – II

6. A continuous beam ABC has its span AB = 4 and BC = 6 m. Beam is fixed at end A and has simple supports at B and C. Span AB has a centrally applied load of 20 KN and the span BC has uniformly distributed load of intensity 2 KN/m. If support C settles by an amount 2.5 mm in relation to the supports A and B, analyse by moment distribution method. EI is constant throughout the beam and is equal to 30,000 KN-m^2. **9**

7. Derive stiffness matrix for a beam as shown in Fig No. 7.1. **9**

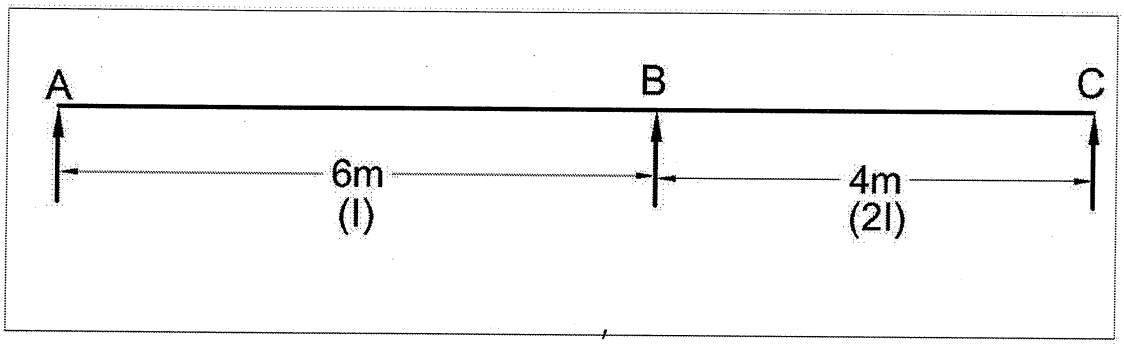


Fig.7.1

8. Draw ILD bending moment at D and reaction at A as shown in Fig. No. 8.1. Plot ordinate at 1 m interval. D is a midpoint of span AB. **9**

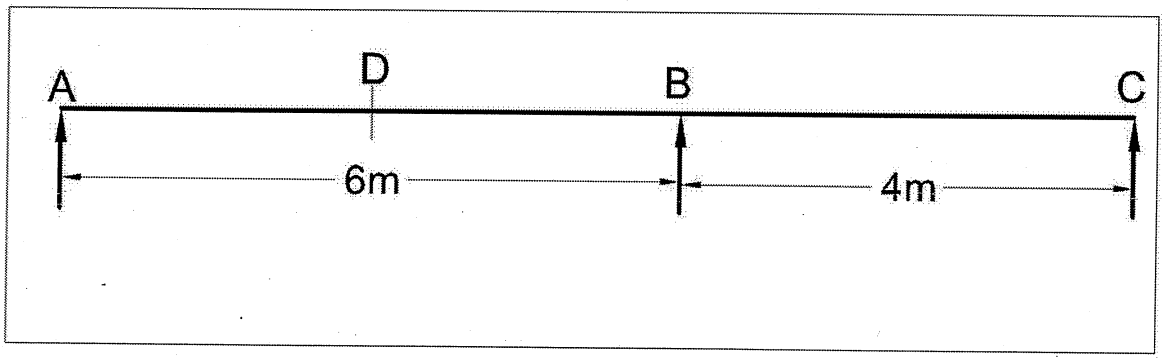


Fig 8.1

9. Draw bending moment diagram for structural frame as shown in Fig. No. 9.1. Use stiffness approach for analysis. **10**

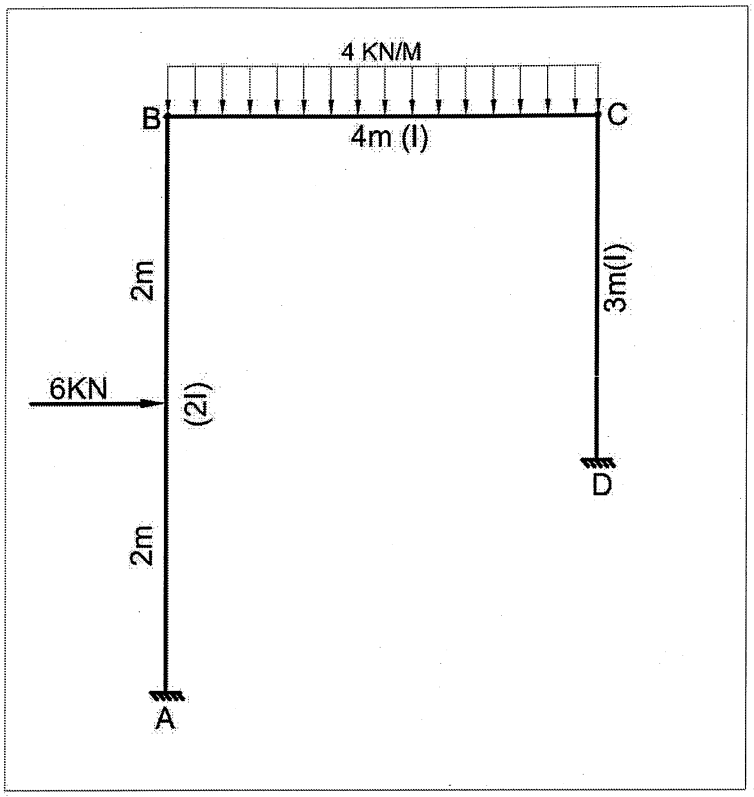


Fig. No. 9.1

SLR-VB – 40

Seat No.	

Set S

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
STRUCTURAL MECHANICS – III

Day and Date : Monday, 15-5-2017 Max. Marks : 70
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) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Assume*** *additional data if required and mention* ***it clearly****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Degree of kinematic indeterminacy of beam shown in fig. (4.0) **1**

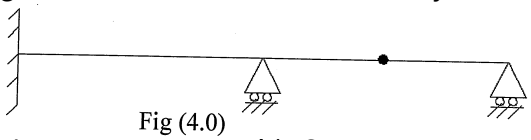


Fig (4.0)

a) 1 b) 3 c) 2 d) 5

2) Strain energy due to bending is given by **1**

a) $\int \frac{M^2}{2EI} dx$ b) $\int \frac{M^2}{4EI} dx$ c) $\int \frac{M^2}{EI} dx$ d) $\int \frac{2M^2}{EI} dx$

3) Degree of static indeterminacy of the truss shown in fig. (6.0) **1**

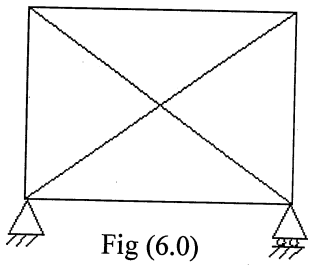


Fig (6.0)

a) 3 b) 1 c) 0 d) 5

4) Propped cantilever of span L carries UDL of w kN/m throughout, value of propped reaction is **1**

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P.T.O.

5) The size of stiffness matrix equals to **1**
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7) Shape of ILD for fixed beam is **1**
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9) The fixed end moment for fixed beam having udl thought span is **1**
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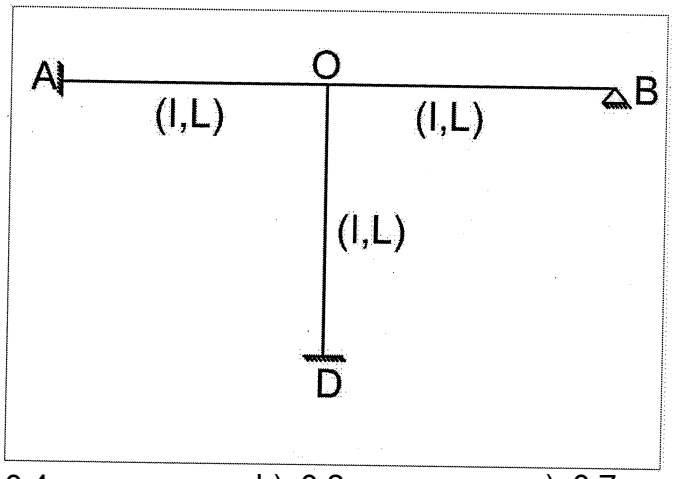
10) The distribution factor of member OA is **2**



   a) 0.4 b) 0.3 c) 0.7 d) 0.4

11) Which one of the following doesn't fall under category of force method ? **1**
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   c) Stiffness method d) Energy method

12) In linearly elastic structural element **1**
   a) Stiffness is equal to flexibility
   b) Stiffness is directly proportional to flexibility
   c) Stiffness is inversely proportional to flexibility
   d) Stiffness is not related to flexibility

13) Degree of static indeterminacy of frame shown in fig. (3.0) **1**

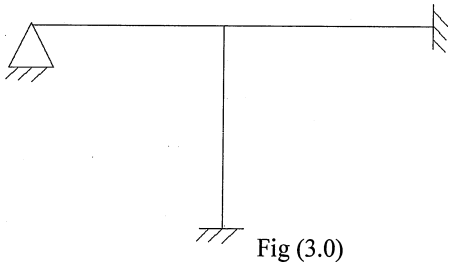

Fig (3.0)

   a) 1 b) 5 c) 4 d) 6

SLR-VB – 40

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
STRUCTURAL MECHANICS – III

Day and Date : Monday, 15-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Figures to the **right** indicate **full** marks.*
*2) In Section **I**; Q. No. **2** is **compulsory**. Solve **any two** questions from remaining.*
*3) In Section II, solve **any three** questions.*
*4) **Assume** additional data if required and mention **it clearly**.*

SECTION – I

2. a) Distinguish between indeterminate and determinate structures. **(2.5×4=10)**
   b) Enlist properties of flexibility matrix.
   c) Write the equation for horizontal thrust and vertical reaction of two hinged parabolic arch subjected to UDL.
   d) Determine degree of static and kinematic indeterminacy of the structure.

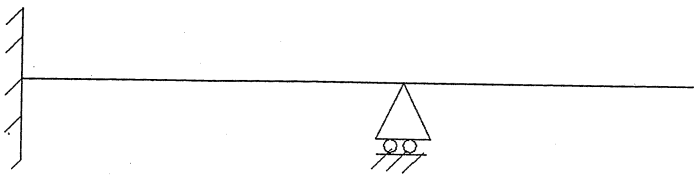

Fig (i)

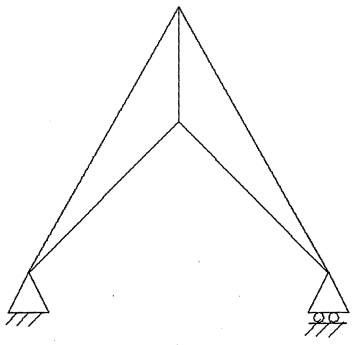

Fig (ii)

   e) Enlist various methods of displacement method of analysis.

3. Analyze the beam using consistent deformation method. Refer fig. 3.1 **9**

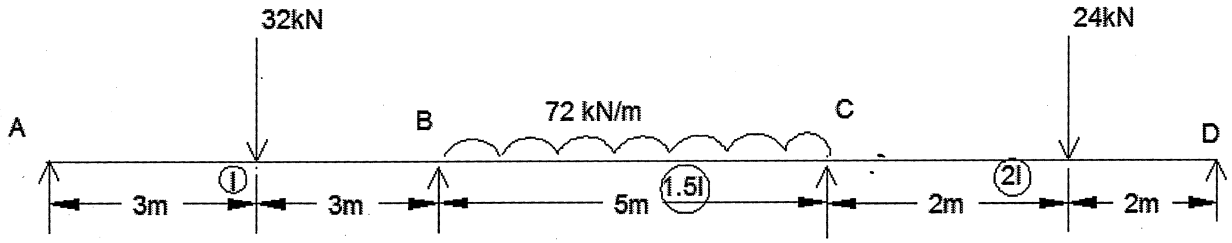

Fig (3.1)

4. Draw SFD and BMD using Strain Energy method. **9**

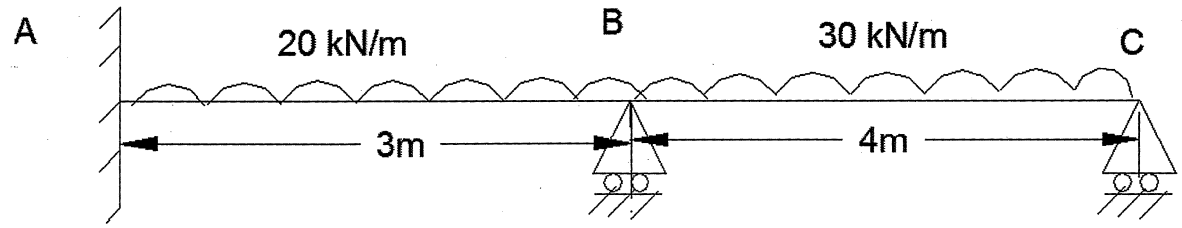

Fig (4.1)

5. Analyze the bent using flexibility method. **9**

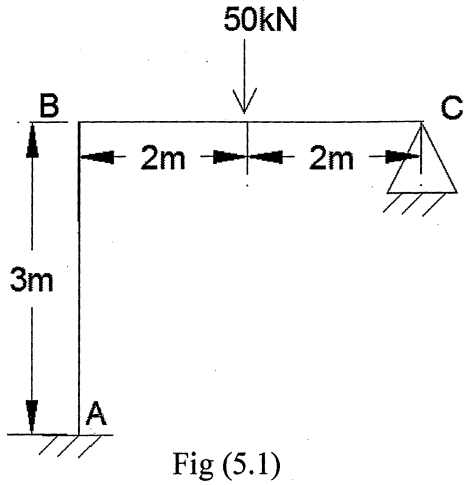

Fig (5.1)

SECTION – II

6. A continuous beam ABC has its span AB = 4 and BC = 6 m. Beam is fixed at end A and has simple supports at B and C. Span AB has a centrally applied load of 20 KN and the span BC has uniformly distributed load of intensity 2 KN/m. If support C settles by an amount 2.5 mm in relation to the supports A and B, analyse by moment distribution method. EI is constant throughout the beam and is equal to 30,000 KN-m^2. **9**

7. Derive stiffness matrix for a beam as shown in Fig No. 7.1. **9**

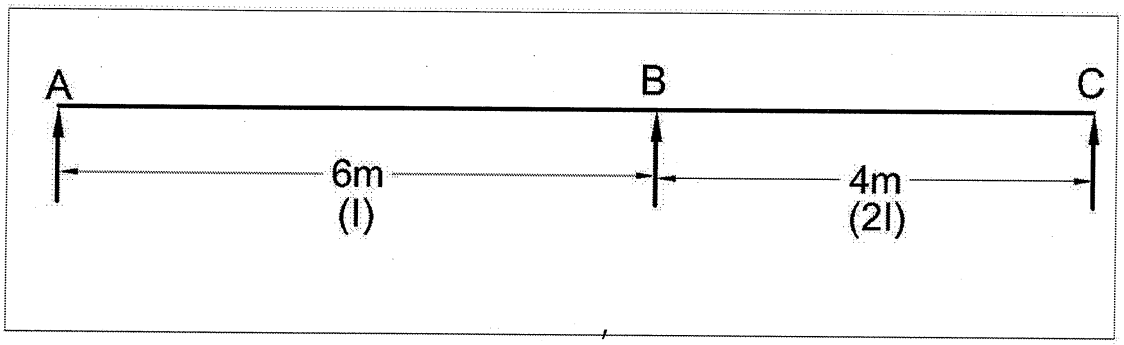

Fig.7.1

8. Draw ILD bending moment at D and reaction at A as shown in Fig. No. 8.1. Plot ordinate at 1 m interval. D is a midpoint of span AB. **9**

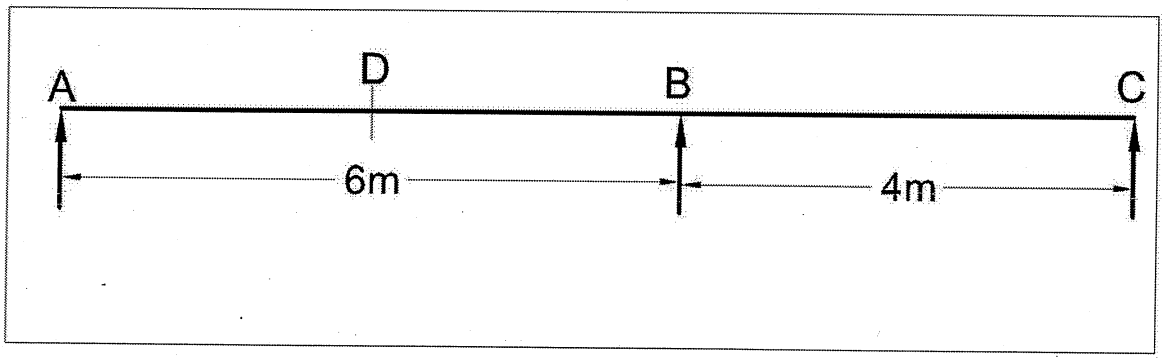

Fig 8.1

9. Draw bending moment diagram for structural frame as shown in Fig. No. 9.1. Use stiffness approach for analysis. **10**

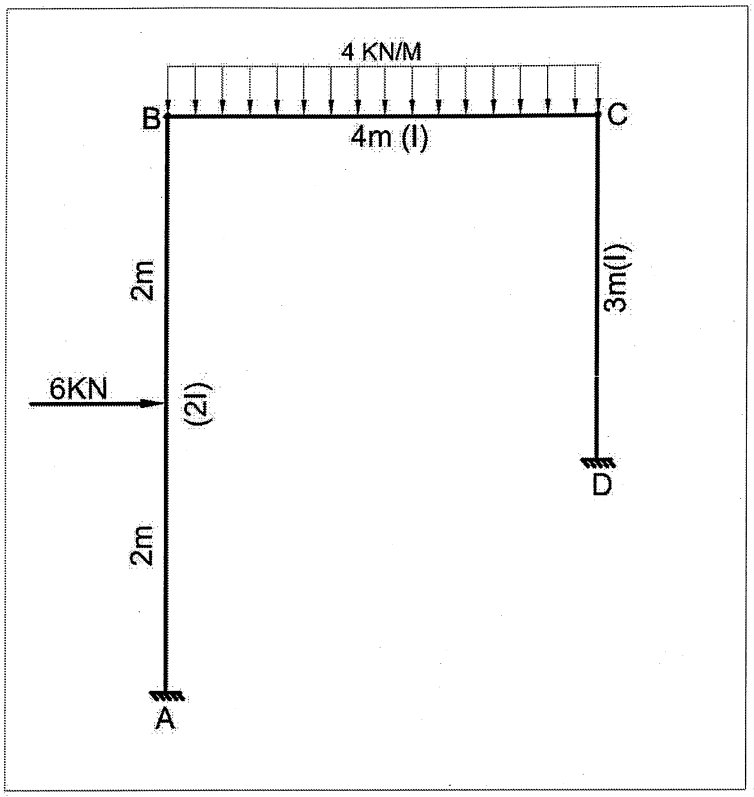

Fig. No. 9.1

SLR-VB – 41

Seat No.	

Set **P**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – II

Day and Date : Wednesday, 17-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) Answer ***any three*** *questions out of Q.* ***2****, Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *in Section –* ***I****.*
3) Q. ***6*** *is* ***compulsory****, answer* ***any two*** *questions out of Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *in Section –* ***II****.*
4) Assume additional data if ***required*** *and mention it* ***clearly.***
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 appropriate options. **(14×1=14)**

1) In case of clayey soil which settlement is predominant ?
   a) Immediate b) Consolidation
   c) Secondary consolidation d) None

2) If RQD is 26%, what is the quality of rock is
   a) Poor b) Fair c) Good d) Excellent

3) If the water table is at the base of the footing, what are the water table correction factors (RW_1 and RW_2) in Terazaghi's equation $CN_c + \gamma DN_q RW_1 + \gamma BN\ \gamma RW_2$
   a) $RW_1 = 0.5$, $RW_2 = 1$ b) $RW_1 = 1$, $RW_2 = 0.5$
   c) $RW_1 = 0.5$, $RW_2 = 0.5$ d) $RW_1 = 1$, $RW_2 = 1$

P.T.O.

4) In Plate Load Test the loading arrangement is done by
   a) Gravity loading method b) Reaction truss method
   c) Pressure meter method d) Both a) and b)

5) As per IS 1904-1986, the permissible settlement for isolated foundation in sand is
   a) 25 mm b) 50 mm c) 60 mm d) 75 mm

6) Dilatancy correction is applied to SPT test results when
   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

7) Spacing of borings for highways is
   a) 100 m – 200 m b) 250 m – 300 m
   c) 500 m – 1000 m d) None

8) Ideal cell fill material for cellular cofferdam is
   a) Clay soil with G = 2.6 b) Sandy soil with G = 2.6
   c) Clay soil with G = 2.7 d) Sandy soil with G = 2.74

9) Maximum distance below water level up to which pneumatic caisson can be used is
   a) 10 m b) 20 m c) 30 m d) 40 m

10) Cellular cofferdam are commonly used when depth of water is
   a) > 10 m b) < 15 m c) > 15 m d) None of the above

11) Anchored sheet pile wall embedded in cohesive soil, shape of the pressure distribution diagram below dredge level is
   a) Parabolic b) Triangular c) Rectangular d) None

12) Scour depth is calculated by using formula given by
   a) Darcey b) Terzaghi c) Rankine d) Lacey

13) Factor of safety used to calculate Pile capacity by dynamic formula is
   a) 2.5 b) 3.0 c) 4.5 d) 6.0

14) In method of slices, which component is having negative values for few slices
   a) Vertical b) Horizontal c) Normal d) Tangential

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SLR-VB – 41

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – II

Day and Date : Wednesday, 17-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) Answer ***any three*** *questions out of Q.* ***2****, Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *in Section –* ***I****.*
3) Q. ***6*** *is* ***compulsory****, answer* ***any two*** *questions out of Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *in Section –* ***II****.*
4) Assume additional data if ***required*** *and mention it* ***clearly.***

SECTION – I

2. a) Explain different criteria for satisfactory performance of foundation. **4**
   b) Write in detail about 'Wash Boring' with neat sketch. **5**

3. a) A square footing located at a depth of 1.3 m below the ground to carry safe load of 800 kN. Find the size of the footing if the desired factor of safety is 3. The soil has the following properties : Void ratio = 0.55, Degree of saturation = 50%, Specific gravity 2.67, Cohesion = 8 kN/m^2, Angle of internal friction = 30°. Use Terzaghi's bearing capacity analysis.
   Terazaghi's bearing capacity factors for $\varphi = 30^\circ$ are
   $N_c = 37.2$, $Nq = 22.5$, $N\gamma = 19.7$. **6**
   b) A 30 cm square plate settles by 8 mm in the plate load test on cohesionless soil when the intensity of loading is 180 kN/m^2. Estimate the settlement of shallow foundation of 1.6 m square footing under same intensity of loading. **4**

4. a) What are the 3 different settlement components of total settlement ? Explain the terms involved in the calculation of each settlement component. **5**
   b) Find the consolidation settlement of a clay layer of 8 m thick which has initial void ratio as 1.068 and effective pressure 214 kN/m^2. Compression index is 0.245. Increase in overburden pressure above the clay layer is 10 kN/m^2. **4**

5. a) What is expansive soil ? What precautions need to be taken while designing foundation in expansive soil ? **4**
   b) Explain the functions of geotextiles with neat sketches. **5**

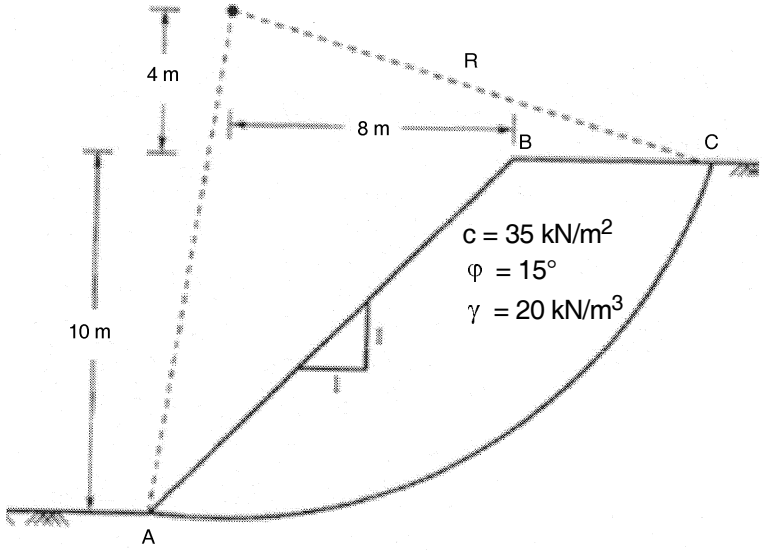
SECTION – II

6. Write short notes on **any four** : **(3×4=12)**
   a) Negative skin friction.
   b) Trapezoidal combined footing.
   c) Rock fill cofferdam.
   d) Felds rule.
   e) Stability number.

7. a) A 30 kN drop hammer was used to drive an RCC pile. It has free fall of 2.0 m. The average penetration recorded in the last few blows is 6 mm per blow. Estimate allowable load on the pile according to engineering News Record formula. [assume c = 0.025 m]. **3**
   b) Design a combined footing for the two columns carrying loads of 700 kN and 800 kN, lighter column load is close to the boundary and clear distance of this column from the boundary is 300 mm, size of each column is 400 mm × 400 mm. Assume SBC of soil is 150 kN/m^2. Draw SFD and BMD indicating values at critical locations. **5**

8. a) Calculate depth of embedment for cantilever sheet pile wall using following details Height of wall = 5.6 m, soil above dredge level – granular γ = 20 kN/m^3, c = 0 and φ = 30° soil below dredge level is clay having γ = 18 kN/m^3, c = 35 kN/m^2 and φ = 0°. **5**
   b) Explain diaphragm type cellular cofferdam and circular type cellular cofferdam with neat sketches. **3**

9. a) Analyse the slope shown in figure by using friction circle method. The properties of the soil are γ = 20 kN/m^3, c = 35 kN/m^2 and φ = 15°. **5**



   b) Explain types of rotational slope failure with illustrative sketch. **3**

Set P

SLR-VB – 41

Seat No.	

Set **Q**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – II

Day and Date : Wednesday, 17-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) Answer ***any three*** *questions out of Q.* ***2****, Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *in Section –* ***I****.*
3) Q. ***6*** *is* ***compulsory****, answer* ***any two*** *questions out of Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *in Section –* ***II****.*
4) Assume additional data if ***required*** *and mention it* ***clearly.***
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 appropriate options. **(14×1=14)**

1) Ideal cell fill material for cellular cofferdam is
   a) Clay soil with G = 2.6 b) Sandy soil with G = 2.6
   c) Clay soil with G = 2.7 d) Sandy soil with G = 2.74

2) Maximum distance below water level up to which pneumatic caisson can be used is
   a) 10 m b) 20 m c) 30 m d) 40 m

3) Cellular cofferdam are commonly used when depth of water is
   a) > 10 m b) < 15 m c) > 15 m d) None of the above

4) Anchored sheet pile wall embedded in cohesive soil, shape of the pressure distribution diagram below dredge level is
   a) Parabolic b) Triangular
   c) Rectangular d) None

P.T.O.

5) Scour depth is calculated by using formula given by
   a) Darcey b) Terzaghi c) Rankine d) Lacey

6) Factor of safety used to calculate Pile capacity by dynamic formula is
   a) 2.5 b) 3.0 c) 4.5 d) 6.0

7) In method of slices, which component is having negative values for few slices
   a) Vertical b) Horizontal c) Normal d) Tangential

8) In case of clayey soil which settlement is predominant ?
   a) Immediate b) Consolidation
   c) Secondary consolidation d) None

9) If RQD is 26%, what is the quality of rock is
   a) Poor b) Fair c) Good d) Excellent

10) If the water table is at the base of the footing, what are the water table correction factors (RW_1 and RW_2) in Terazaghi's equation $CN_c + \gamma DN_q RW_1 + \gamma BN\ \gamma RW_2$
   a) $RW_1 = 0.5, RW_2 = 1$ b) $RW_1 = 1, RW_2 = 0.5$
   c) $RW_1 = 0.5, RW_2 = 0.5$ d) $RW_1 = 1, RW_2 = 1$

11) In Plate Load Test the loading arrangement is done by
   a) Gravity loading method b) Reaction truss method
   c) Pressure meter method d) Both a) and b)

12) As per IS 1904-1986, the permissible settlement for isolated foundation in sand is
   a) 25 mm b) 50 mm c) 60 mm d) 75 mm

13) Dilatancy correction is applied to SPT test results when
   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

14) Spacing of borings for highways is
   a) 100 m – 200 m b) 250 m – 300 m
   c) 500 m – 1000 m d) None

SLR-VB – 41

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – II

Day and Date : Wednesday, 17-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) Answer ***any three*** *questions out of Q.* ***2****, Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *in Section –* ***I****.*
3) Q. ***6*** *is* ***compulsory****, answer* ***any two*** *questions out of Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *in Section –* ***II****.*
4) Assume additional data if ***required*** *and mention it* ***clearly.***

SECTION – I

2. a) Explain different criteria for satisfactory performance of foundation. **4**
   b) Write in detail about 'Wash Boring' with neat sketch. **5**

3. a) A square footing located at a depth of 1.3 m below the ground to carry safe load of 800 kN. Find the size of the footing if the desired factor of safety is 3. The soil has the following properties : Void ratio = 0.55, Degree of saturation = 50%, Specific gravity 2.67, Cohesion = 8 kN/m^2, Angle of internal friction = 30°. Use Terzaghi's bearing capacity analysis.
   Terazaghi's bearing capacity factors for $\varphi = 30^\circ$ are
   $N_c = 37.2$, $Nq = 22.5$, $N\gamma = 19.7$. **6**
   b) A 30 cm square plate settles by 8 mm in the plate load test on cohesionless soil when the intensity of loading is 180 kN/m^2. Estimate the settlement of shallow foundation of 1.6 m square footing under same intensity of loading. **4**

4. a) What are the 3 different settlement components of total settlement ? Explain the terms involved in the calculation of each settlement component. **5**
   b) Find the consolidation settlement of a clay layer of 8 m thick which has initial void ratio as 1.068 and effective pressure 214 kN/m^2. Compression index is 0.245. Increase in overburden pressure above the clay layer is 10 kN/m^2. **4**

5. a) What is expansive soil ? What precautions need to be taken while designing foundation in expansive soil ? **4**
   b) Explain the functions of geotextiles with neat sketches. **5**

Set Q

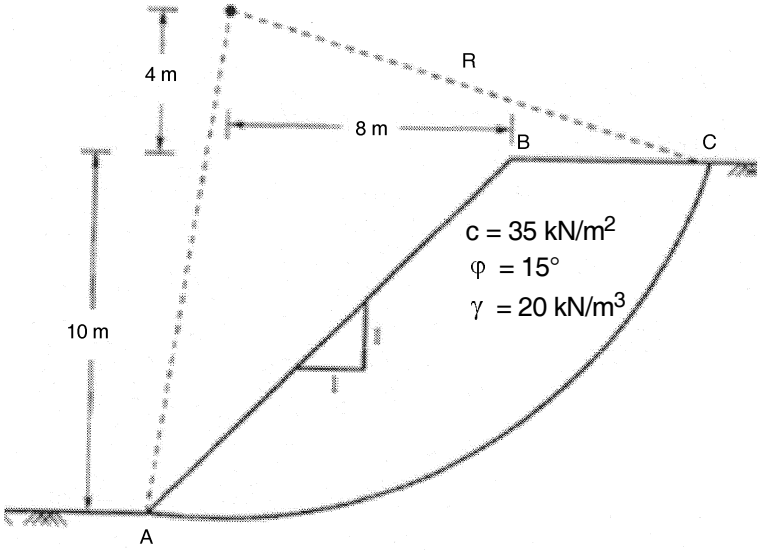
SECTION – II

6. Write short notes on **any four** : **(3×4=12)**
   a) Negative skin friction.
   b) Trapezoidal combined footing.
   c) Rock fill cofferdam.
   d) Felds rule.
   e) Stability number.

7. a) A 30 kN drop hammer was used to drive an RCC pile. It has free fall of 2.0 m. The average penetration recorded in the last few blows is 6 mm per blow. Estimate allowable load on the pile according to engineering News Record formula. [assume c = 0.025 m]. **3**
   b) Design a combined footing for the two columns carrying loads of 700 kN and 800 kN, lighter column load is close to the boundary and clear distance of this column from the boundary is 300 mm, size of each column is 400 mm × 400 mm. Assume SBC of soil is 150 kN/m^2. Draw SFD and BMD indicating values at critical locations. **5**

8. a) Calculate depth of embedment for cantilever sheet pile wall using following details Height of wall = 5.6 m, soil above dredge level – granular γ = 20 kN/m^3, c = 0 and φ = 30° soil below dredge level is clay having γ = 18 kN/m^3, c = 35 kN/m^2 and φ = 0°. **5**
   b) Explain diaphragm type cellular cofferdam and circular type cellular cofferdam with neat sketches. **3**

9. a) Analyse the slope shown in figure by using friction circle method. The properties of the soil are γ = 20 kN/m^3, c = 35 kN/m^2 and φ = 15°. **5**



   b) Explain types of rotational slope failure with illustrative sketch. **3**

Set Q

SLR-VB – 41

Seat No.	

Set R

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – II

Day and Date : Wednesday, 17-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) Answer ***any three*** *questions out of Q.* ***2****, Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *in Section –* ***I****.*
3) Q. ***6*** *is* ***compulsory****, answer* ***any two*** *questions out of Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *in Section –* ***II****.*
4) Assume additional data if ***required*** *and mention it* ***clearly.***
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 appropriate options. **(14×1=14)**

1) As per IS 1904-1986, the permissible settlement for isolated foundation in sand is
a) 25 mm b) 50 mm c) 60 mm d) 75 mm

2) Dilatancy correction is applied to SPT test results when
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

3) Spacing of borings for highways is
a) 100 m – 200 m b) 250 m – 300 m
c) 500 m – 1000 m d) None

4) Ideal cell fill material for cellular cofferdam is
a) Clay soil with G = 2.6 b) Sandy soil with G = 2.6
c) Clay soil with G = 2.7 d) Sandy soil with G = 2.74

P.T.O.

5) Maximum distance below water level up to which pneumatic caisson can be used is
   a) 10 m b) 20 m c) 30 m d) 40 m

6) Cellular cofferdam are commonly used when depth of water is
   a) > 10 m b) < 15 m c) > 15 m d) None of the above

7) Anchored sheet pile wall embedded in cohesive soil, shape of the pressure distribution diagram below dredge level is
   a) Parabolic b) Triangular c) Rectangular d) None

8) Scour depth is calculated by using formula given by
   a) Darcey b) Terzaghi c) Rankine d) Lacey

9) Factor of safety used to calculate Pile capacity by dynamic formula is
   a) 2.5 b) 3.0 c) 4.5 d) 6.0

10) In method of slices, which component is having negative values for few slices
   a) Vertical b) Horizontal c) Normal d) Tangential

11) In case of clayey soil which settlement is predominant ?
   a) Immediate b) Consolidation
   c) Secondary consolidation d) None

12) If RQD is 26%, what is the quality of rock is
   a) Poor b) Fair c) Good d) Excellent

13) If the water table is at the base of the footing, what are the water table correction factors (RW_1 and RW_2) in Terazaghi's equation $CN_c + \gamma DN_q RW_1 + \gamma BN\ \gamma RW_2$
   a) $RW_1 = 0.5$, $RW_2 = 1$ b) $RW_1 = 1$, $RW_2 = 0.5$
   c) $RW_1 = 0.5$, $RW_2 = 0.5$ d) $RW_1 = 1$, $RW_2 = 1$

14) In Plate Load Test the loading arrangement is done by
   a) Gravity loading method b) Reaction truss method
   c) Pressure meter method d) Both a) and b)

SLR-VB – 41

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – II

Day and Date : Wednesday, 17-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) Answer ***any three*** *questions out of Q.* ***2****, Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *in Section –* ***I****.*
3) Q. ***6*** *is* ***compulsory****, answer* ***any two*** *questions out of Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *in Section –* ***II****.*
4) Assume additional data if ***required*** *and mention it* ***clearly.***

SECTION – I

2. a) Explain different criteria for satisfactory performance of foundation. **4**
   b) Write in detail about 'Wash Boring' with neat sketch. **5**

3. a) A square footing located at a depth of 1.3 m below the ground to carry safe load of 800 kN. Find the size of the footing if the desired factor of safety is 3. The soil has the following properties : Void ratio = 0.55, Degree of saturation = 50%, Specific gravity 2.67, Cohesion = 8 kN/m^2, Angle of internal friction = 30°. Use Terzaghi's bearing capacity analysis.
   Terazaghi's bearing capacity factors for $\varphi = 30^\circ$ are
   $N_c = 37.2$, $Nq = 22.5$, $N\gamma = 19.7$. **6**
   b) A 30 cm square plate settles by 8 mm in the plate load test on cohesionless soil when the intensity of loading is 180 kN/m^2. Estimate the settlement of shallow foundation of 1.6 m square footing under same intensity of loading. **4**

4. a) What are the 3 different settlement components of total settlement ? Explain the terms involved in the calculation of each settlement component. **5**
   b) Find the consolidation settlement of a clay layer of 8 m thick which has initial void ratio as 1.068 and effective pressure 214 kN/m^2. Compression index is 0.245. Increase in overburden pressure above the clay layer is 10 kN/m^2. **4**

5. a) What is expansive soil ? What precautions need to be taken while designing foundation in expansive soil ? **4**
   b) Explain the functions of geotextiles with neat sketches. **5**

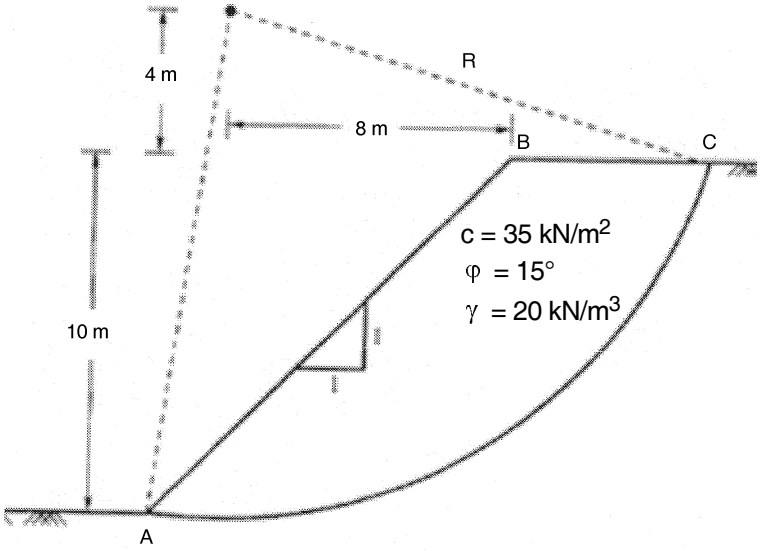
SECTION – II

6. Write short notes on **any four** : **(3×4=12)**
   a) Negative skin friction.
   b) Trapezoidal combined footing.
   c) Rock fill cofferdam.
   d) Felds rule.
   e) Stability number.

7. a) A 30 kN drop hammer was used to drive an RCC pile. It has free fall of 2.0 m. The average penetration recorded in the last few blows is 6 mm per blow. Estimate allowable load on the pile according to engineering News Record formula. [assume c = 0.025 m]. **3**
   b) Design a combined footing for the two columns carrying loads of 700 kN and 800 kN, lighter column load is close to the boundary and clear distance of this column from the boundary is 300 mm, size of each column is 400 mm × 400 mm. Assume SBC of soil is 150 kN/m^2. Draw SFD and BMD indicating values at critical locations. **5**

8. a) Calculate depth of embedment for cantilever sheet pile wall using following details Height of wall = 5.6 m, soil above dredge level – granular γ = 20 kN/m^3, c = 0 and φ = 30° soil below dredge level is clay having γ = 18 kN/m^3, c = 35 kN/m^2 and φ = 0°. **5**
   b) Explain diaphragm type cellular cofferdam and circular type cellular cofferdam with neat sketches. **3**

9. a) Analyse the slope shown in figure by using friction circle method. The properties of the soil are γ = 20 kN/m^3, c = 35 kN/m^2 and φ = 15°. **5**



   b) Explain types of rotational slope failure with illustrative sketch. **3**

Set R

SLR-VB – 41

Seat No.	

Set S

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – II

Day and Date : Wednesday, 17-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) Answer ***any three*** *questions out of Q.* ***2****, Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *in Section –* ***I****.*
3) Q. ***6*** *is* ***compulsory****, answer* ***any two*** *questions out of Q.* ***7****, Q.* ***8*** *and Q.* ***9*** *in Section –* ***II****.*
4) Assume additional data if ***required*** *and mention it* ***clearly.***
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 appropriate options. **(14×1=14)**

1) Cellular cofferdam are commonly used when depth of water is
a) > 10 m b) < 15 m c) > 15 m d) None of the above

2) Anchored sheet pile wall embedded in cohesive soil, shape of the pressure distribution diagram below dredge level is
a) Parabolic b) Triangular c) Rectangular d) None

3) Scour depth is calculated by using formula given by
a) Darcey b) Terzaghi c) Rankine d) Lacey

4) Factor of safety used to calculate Pile capacity by dynamic formula is
a) 2.5 b) 3.0 c) 4.5 d) 6.0

5) In method of slices, which component is having negative values for few slices
a) Vertical b) Horizontal c) Normal d) Tangential

P.T.O.

6) In case of clayey soil which settlement is predominant ?
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   c) Secondary consolidation d) None

7) If RQD is 26%, what is the quality of rock is
   a) Poor b) Fair c) Good d) Excellent

8) If the water table is at the base of the footing, what are the water table correction factors (RW_1 and RW_2) in Terazaghi's equation $CN_c + \gamma DN_q RW_1 + \gamma BN\ \gamma RW_2$
   a) $RW_1 = 0.5$, $RW_2 = 1$ b) $RW_1 = 1$, $RW_2 = 0.5$
   c) $RW_1 = 0.5$, $RW_2 = 0.5$ d) $RW_1 = 1$, $RW_2 = 1$

9) In Plate Load Test the loading arrangement is done by
   a) Gravity loading method b) Reaction truss method
   c) Pressure meter method d) Both a) and b)

10) As per IS 1904-1986, the permissible settlement for isolated foundation in sand is
   a) 25 mm b) 50 mm c) 60 mm d) 75 mm

11) Dilatancy correction is applied to SPT test results when
   a) Soil is silty sand
   b) Water table is present above test level
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12) Spacing of borings for highways is
   a) 100 m – 200 m b) 250 m – 300 m
   c) 500 m – 1000 m d) None

13) Ideal cell fill material for cellular cofferdam is
   a) Clay soil with G = 2.6 b) Sandy soil with G = 2.6
   c) Clay soil with G = 2.7 d) Sandy soil with G = 2.74

14) Maximum distance below water level up to which pneumatic caisson can be used is
   a) 10 m b) 20 m c) 30 m d) 40 m

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SLR-VB – 41

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOTECHNICAL ENGINEERING – II

Day and Date : Wednesday, 17-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) Answer ***any three*** *questions out of Q.* ***2****, Q.* ***3****, Q.* ***4*** *and Q.* ***5*** *in Section –* ***I****.*
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4) Assume additional data if ***required*** *and mention it* ***clearly.***

SECTION – I

2. a) Explain different criteria for satisfactory performance of foundation. **4**
   b) Write in detail about 'Wash Boring' with neat sketch. **5**

3. a) A square footing located at a depth of 1.3 m below the ground to carry safe load of 800 kN. Find the size of the footing if the desired factor of safety is 3. The soil has the following properties : Void ratio = 0.55, Degree of saturation = 50%, Specific gravity 2.67, Cohesion = 8 kN/m^2, Angle of internal friction = 30°. Use Terzaghi's bearing capacity analysis.
   Terazaghi's bearing capacity factors for $\varphi = 30^\circ$ are
   $N_c = 37.2$, $Nq = 22.5$, $N\gamma = 19.7$. **6**
   b) A 30 cm square plate settles by 8 mm in the plate load test on cohesionless soil when the intensity of loading is 180 kN/m^2. Estimate the settlement of shallow foundation of 1.6 m square footing under same intensity of loading. **4**

4. a) What are the 3 different settlement components of total settlement ? Explain the terms involved in the calculation of each settlement component. **5**
   b) Find the consolidation settlement of a clay layer of 8 m thick which has initial void ratio as 1.068 and effective pressure 214 kN/m^2. Compression index is 0.245. Increase in overburden pressure above the clay layer is 10 kN/m^2. **4**

5. a) What is expansive soil ? What precautions need to be taken while designing foundation in expansive soil ? **4**
   b) Explain the functions of geotextiles with neat sketches. **5**

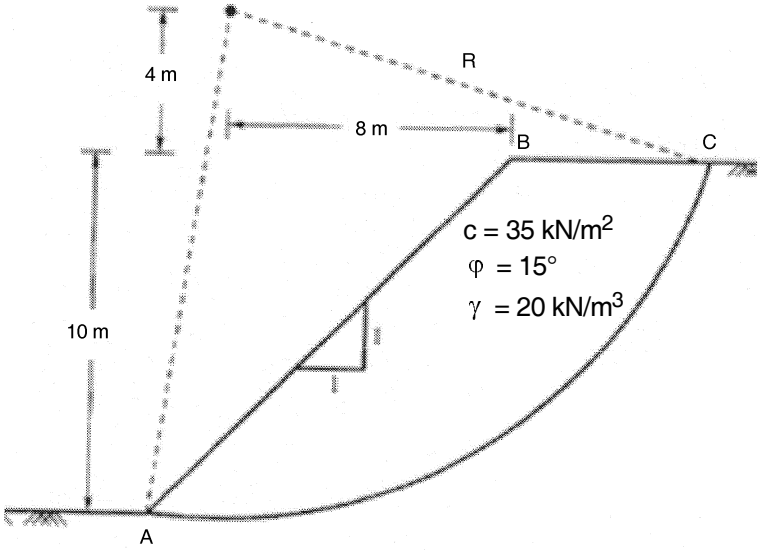
SECTION – II

6. Write short notes on **any four** : **(3×4=12)**
   a) Negative skin friction.
   b) Trapezoidal combined footing.
   c) Rock fill cofferdam.
   d) Felds rule.
   e) Stability number.

7. a) A 30 kN drop hammer was used to drive an RCC pile. It has free fall of 2.0 m. The average penetration recorded in the last few blows is 6 mm per blow. Estimate allowable load on the pile according to engineering News Record formula. [assume c = 0.025 m]. **3**
   b) Design a combined footing for the two columns carrying loads of 700 kN and 800 kN, lighter column load is close to the boundary and clear distance of this column from the boundary is 300 mm, size of each column is 400 mm × 400 mm. Assume SBC of soil is 150 kN/m^2. Draw SFD and BMD indicating values at critical locations. **5**

8. a) Calculate depth of embedment for cantilever sheet pile wall using following details Height of wall = 5.6 m, soil above dredge level – granular γ = 20 kN/m^3, c = 0 and φ = 30° soil below dredge level is clay having γ = 18 kN/m^3, c = 35 kN/m^2 and φ = 0°. **5**
   b) Explain diaphragm type cellular cofferdam and circular type cellular cofferdam with neat sketches. **3**

9. a) Analyse the slope shown in figure by using friction circle method. The properties of the soil are γ = 20 kN/m^3, c = 35 kN/m^2 and φ = 15°. **5**



   b) Explain types of rotational slope failure with illustrative sketch. **3**

Set S

SLR-VB – 42

Seat No.	

Set P

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – II

Day and Date : Friday, 19-5-2017 Total Marks : 70
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** indicate **full** marks.*
*4) Assume suitable data **wherever** necessary and mention it clearly.*
*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) Developing countries have _____ per capita daily solid waste generation rate than developed countries.
   a) Lesser b) Greater
   c) Same d) None of these

2) _____ occurs in the stream due to hydrolysis of organic matter.
   a) Reduction b) Oxidation
   c) Dilution d) Temperature

3) The variation of oxygen deficit with the distance and time along the length of stream is represented by a graph called as
   a) Saturation b) Oxygen sag curve
   c) Self-purification d) Temperature

4) Which of the following is not a combustible waste ?
   a) paper b) wood c) glass d) clothes

5) The layer of atmosphere closest to earth surface is
   a) Mesosphere b) Troposphere
   c) Ionosphere d) None of these

6) DO deficit = DO_{sat} –
   a) Initial DO
   b) Final DO
   c) Actual DO or DO_{mix}
   d) None of these

7) Food items take _____ time to degenerate.
   a) A week or two
   b) One month
   c) One year
   d) Can't be predicted

8) _____ are used for the separation of gases as well as particulates from the flue gas.
   a) Cyclone
   b) Bag-house
   c) ESP
   d) Scrubbers

9) Most widespread air pollutants are
   a) Sox
   b) NOx
   c) CO
   d) Ozone

10) Velocity control in grit chambers can be achieved by
   a) Sutro weir
   b) Proportional weir
   c) Parabolic grit chamber
   d) All of above

11) For BOD test standard temperature refers to _____ °C.
   a) 10 b) 105 c) 20 d) 550

12) Unit of SVI is
   a) Lit/kg
   b) mm/gm
   c) ml/gm
   d) None of above

13) Septic tank is _____ type of treatment.
   a) aerobic
   b) anaerobic
   c) facultative
   d) all of above

14) _____ is observed in oxidation ponds.
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   b) COD-BOD symbiosis
   c) Algae-protozoa symbiosis
   d) None of these

_____

SLR-VB – 42

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – II

Day and Date : Friday, 19-5-2017 Marks : 56
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** and in Section – **II** solve **any three** questions from Question no. **6** to Question no. **9**.*
*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) Units of a waste water treatment flowsheet are shown below : **5**

Anaerobic Digester $\rightarrow$ gift chamber $\rightarrow$ SST $\rightarrow$ PST $\rightarrow$ Screen chamber $\rightarrow$ sludge thickener $\rightarrow$ Aeration tank $\rightarrow$ chlorine contact tank $\rightarrow$ sludge drying beds.

Arrange above units in correct logical sequence by drawing a neat flow diagram (including recirculation, energy recovery etc.) and tabulate function of each unit.

b) Calculate BOD_1 at 37°C for a sewage sample whose standard BOD is 100 mg/Lit. Take k = 0.1/day (Base 10). **5**

3. a) Explain w.r.t. Activated Sludge Process (ASP). **4**

1) HRT
2) Sludge age
3) Volumetric loading
4) F/M

b) Design a circular sedimentation tank to treat domestic sewage of the city of population 60,000. The average demand of the city is 180 lpcd. Assume 70% of water reaches the plant. Maximum demand is 2.7 times the average demand. **5**

4. a) Which equation is used in design of HRTF ? Write the equation for two stage filter and explain meaning of each and every term. **4**
   b) Design a septic tank for 100 users. **5**

5. Write short note on :
   a) RBC **3**
   b) Type of screen chambers **3**
   c) Sludge drying beds. **3**

SECTION – II

6. a) Explain actions involved in self-purification of stream process. **5**
   b) Differentiate between Centralized and Decentralized waste water treatment systems. Draw concept sketches. **5**

7. a) Explain with neat sketch ‘structure of atmosphere’. **4**
   b) Using following data find out properties of resultant mix. **5**

	River	**Waste water**
Flow (m^3/sec)	0.7	0.231
DO (mg/lit)	8.2	2
BOD_5 (mg/lit)	3.4	45
Temperature (^0C)	23	26

State whether you can find out pH of mix by using the formula that you have used to find DO, BOD and Temperature of mix. If answer is no, Why ?

8. a) Enlist different composting methods and explain ‘Indore method’ of composting. **4**
   b) Classify solid wastes base on types. **5**

9. Write short note on :
   a) Effects of air pollutants on materials. **3**
   b) ESP. **3**
   c) Cyclone separator. **3**

SLR-VB – 42

Seat No.	

Set Q

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – II

Day and Date : Friday, 19-5-2017 Total Marks : 70
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** indicate **full** marks.*
*4) Assume suitable data **wherever** necessary and mention it clearly.*
*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) _____ are used for the separation of gases as well as particulates from the flue gas.
a) Cyclone b) Bag-house
c) ESP d) Scrubbers

2) Most widespread air pollutants are
a) Sox b) NOx
c) CO d) Ozone

3) Velocity control in grit chambers can be achieved by
a) Sutro weir b) Proportional weir
c) Parabolic grit chamber d) All of above

4) For BOD test standard temperature refers to _____ °C.
a) 10 b) 105 c) 20 d) 550

5) Unit of SVI is
a) Lit/kg b) mm/gm
c) ml/gm d) None of above

6) Septic tank is _____ type of treatment.
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c) facultative d) all of above

P.T.O.

7) _____ is observed in oxidation ponds.
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10) The variation of oxygen deficit with the distance and time along the length of stream is represented by a graph called as
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13) DO deficit = DO_{sat} –
   a) Initial DO b) Final DO
   c) Actual DO or DO_{mix} d) None of these

14) Food items take _____ time to degenerate.
   a) A week or two b) One month
   c) One year d) Can't be predicted

_____

SLR-VB – 42

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – II

Day and Date : Friday, 19-5-2017 Marks : 56
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** and in Section – **II** solve **any three** questions from Question no. **6** to Question no. **9**.*
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SECTION – I

2. a) Units of a waste water treatment flowsheet are shown below : **5**

Anaerobic Digester $\rightarrow$ gift chamber $\rightarrow$ SST $\rightarrow$ PST $\rightarrow$ Screen chamber $\rightarrow$ sludge thickener $\rightarrow$ Aeration tank $\rightarrow$ chlorine contact tank $\rightarrow$ sludge drying beds.

Arrange above units in correct logical sequence by drawing a neat flow diagram (including recirculation, energy recovery etc.) and tabulate function of each unit.

b) Calculate BOD_1 at 37°C for a sewage sample whose standard BOD is 100 mg/Lit. Take k = 0.1/day (Base 10). **5**

3. a) Explain w.r.t. Activated Sludge Process (ASP). **4**

1) HRT
2) Sludge age
3) Volumetric loading
4) F/M

b) Design a circular sedimentation tank to treat domestic sewage of the city of population 60,000. The average demand of the city is 180 lpcd. Assume 70% of water reaches the plant. Maximum demand is 2.7 times the average demand. **5**

4. a) Which equation is used in design of HRTF ? Write the equation for two stage filter and explain meaning of each and every term. **4**
   b) Design a septic tank for 100 users. **5**

5. Write short note on :
   a) RBC **3**
   b) Type of screen chambers **3**
   c) Sludge drying beds. **3**

SECTION – II

6. a) Explain actions involved in self-purification of stream process. **5**
   b) Differentiate between Centralized and Decentralized waste water treatment systems. Draw concept sketches. **5**

7. a) Explain with neat sketch ‘structure of atmosphere’. **4**
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	River	**Waste water**
Flow (m^3/sec)	0.7	0.231
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BOD_5 (mg/lit)	3.4	45
Temperature (^0C)	23	26

State whether you can find out pH of mix by using the formula that you have used to find DO, BOD and Temperature of mix. If answer is no, Why ?

8. a) Enlist different composting methods and explain ‘Indore method’ of composting. **4**
   b) Classify solid wastes base on types. **5**

9. Write short note on :
   a) Effects of air pollutants on materials. **3**
   b) ESP. **3**
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SLR-VB – 42

Seat No.	

Set R

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – II

Day and Date : Friday, 19-5-2017 Total Marks : 70
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** indicate **full** marks.*
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*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) The layer of atmosphere closest to earth surface is
   a) Mesosphere b) Troposphere
   c) Ionosphere d) None of these

2) DO deficit = DO_{sat} –
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3) Food items take _____ time to degenerate.
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4) _____ are used for the separation of gases as well as particulates from the flue gas.
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P.T.O.

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_____

SLR-VB – 42

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – II

Day and Date : Friday, 19-5-2017 Marks : 56
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** and in Section – **II** solve **any three** questions from Question no. **6** to Question no. **9**.*
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SECTION – I

2. a) Units of a waste water treatment flowsheet are shown below : **5**

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b) Calculate BOD_1 at 37°C for a sewage sample whose standard BOD is 100 mg/Lit. Take k = 0.1/day (Base 10). **5**

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4. a) Which equation is used in design of HRTF ? Write the equation for two stage filter and explain meaning of each and every term. **4**
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5. Write short note on :
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SECTION – II

6. a) Explain actions involved in self-purification of stream process. **5**
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9. Write short note on :
   a) Effects of air pollutants on materials. **3**
   b) ESP. **3**
   c) Cyclone separator. **3**

SLR-VB – 42

Seat No.	

Set S

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – II

Day and Date : Friday, 19-5-2017 Total Marks : 70
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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*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) Velocity control in grit chambers can be achieved by
   a) Sutro weir b) Proportional weir
   c) Parabolic grit chamber d) All of above

2) For BOD test standard temperature refers to _____ °C.
   a) 10 b) 105 c) 20 d) 550

3) Unit of SVI is
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P.T.O.

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_____

SLR-VB – 42

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
ENVIRONMENTAL ENGINEERING – II

Day and Date : Friday, 19-5-2017 Marks : 56
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** and in Section – **II** solve **any three** questions from Question no. **6** to Question no. **9**.*
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*3) Assume suitable data **wherever** necessary and mention it clearly.*
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SECTION – I

2. a) Units of a waste water treatment flowsheet are shown below : **5**

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b) Calculate BOD_1 at 37°C for a sewage sample whose standard BOD is 100 mg/Lit. Take k = 0.1/day (Base 10). **5**

3. a) Explain w.r.t. Activated Sludge Process (ASP). **4**

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4. a) Which equation is used in design of HRTF ? Write the equation for two stage filter and explain meaning of each and every term. **4**
   b) Design a septic tank for 100 users. **5**

5. Write short note on :
   a) RBC **3**
   b) Type of screen chambers **3**
   c) Sludge drying beds. **3**

SECTION – II

6. a) Explain actions involved in self-purification of stream process. **5**
   b) Differentiate between Centralized and Decentralized waste water treatment systems. Draw concept sketches. **5**

7. a) Explain with neat sketch ‘structure of atmosphere’. **4**
   b) Using following data find out properties of resultant mix. **5**

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Temperature (^0C)	23	26

State whether you can find out pH of mix by using the formula that you have used to find DO, BOD and Temperature of mix. If answer is no, Why ?

8. a) Enlist different composting methods and explain ‘Indore method’ of composting. **4**
   b) Classify solid wastes base on types. **5**

9. Write short note on :
   a) Effects of air pollutants on materials. **3**
   b) ESP. **3**
   c) Cyclone separator. **3**

SLR-VB – 43

Seat No.	

Set P

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017
ENGINEERING MANAGEMENT – II

Day and Date : Monday, 22-5-2017 Total Marks : 70
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) Q. **2** and **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*4) **Assume** suitable data **if necessary** but mention it **clearly**.*
*5) Use of non programmable calculators is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Based on the following statements select the appropriate option.
1. There can be only one critical path in a project network.
2. It is necessary to introduce a dummy activity in AON network to ensure logic.
3. The critical path is the longest path in the network.

a) 1 – True ; 2 and 3 – False b) 2 – True ; 1 and 3 – False
c) 1, 2 – True ; 3 – False d) 3 – True ; 1, 2 – False

2) The critical path activities has _____ float.
a) Negative b) Zero c) Non zero d) Positive

3) The critical path is the _____ path in the project and delaying the critical path will delay the _____
a) Shortest, activity duration b) Longest, project
c) Earliest, early start of the activity d) Latest, slack of an activity

4) Choose the correct condition is
a) Crash Direct cost > Normal Direct cost, Crash time > Normal time
b) Crash Direct cost < Normal Direct cost, Crash time > Normal time
c) Crash Direct cost < Normal Direct cost, Crash time < Normal time
d) Crash Direct cost > Normal Direct cost, Crash time < Normal time

5) Crashing involves
   a) Performing activities in parallel in order to reduce project duration
   b) Reducing the duration of critical activities in order to reduce project duration
   c) Usage of floats available to reduce project duration
   d) Changing the sequence of activities to reduce project duration

6) Indirect cost _____ when the project is crashed.
   a) Increases b) Decreases c) Becomes zero d) None of the above

7) Select the appropriate option.
   1. Manpower is a consumable resource.
   2. Machinery are reusable resources.
   3. Materials are non-consumable resources.
   4. All resources are consumable.
   a) True : 1, 2 ; : False : 3, 4 b) True : 3,4 ; False : 1, 2
   c) True : 2 ; False : 1,3,4 d) All the above are true

8) In recurring deposit scheme _____ factor will be used.
   a) USCRF b) USPWF c) USSFF d) None

9) Bank is interested to apply interest rate compounded _____ to the customer.
   a) Daily b) Monthly c) Quarterly d) Annually

10) 15% rate per month compounded monthly is _____ type of interest rate.
   a) Nominal b) Effective c) Simple d) None of these

11) The uniform amount to be invested at the end of each period in order to produce a fixed amount can be calculated using factor
   a) U S C A F b) U S C R F c) U S P W F d) U S S F F

12) The method which has basis to return as the results of dividing the annual net profit by the capital invested is
   a) Yield method b) Payback method
   c) PW method d) EUAC method

13) Annuity means
   a) All payments of equal amount
   b) A series of payment
   c) Equal payment at equal time interval
   d) All of these

14) Engineering Economics analysis is a method for
   a) Cost analysis of various project alternatives
   b) Calculating duration of the project
   c) Doing the sensitivity analysis
   d) None of these

_____

SLR-VB – 43

Seat No.	

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017

ENGINEERING MANAGEMENT – II

Day and Date : Monday, 22-5-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *and* ***6*** *are* ***compulsory****. Attempt* ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *and* ***any two*** *out of Q.* ***7*** *to Q.* ***9****.*

2) ***Assume*** *suitable data* ***if necessary*** *but mention it* ***clearly****.*

3) Use of non programmable calculators is ***allowed****.*

SECTION – I

2. A) The details of the project are given below in the table. Draw a bar chart and show the project duration. **5**

Activity	Duration	Predecessors
A	5	–
B	9	A
C	3	A
D	6	A
E	4	B, C
F	4	C, D
G	4	E, F

B) Use the above mentioned data given in Table. Draw the network. Show the duration and critical path of the project network ? **5**

3. A) Draw network, show critical path. **5**

Activity No.	Activity	Duration	Predecessors
1	Order and deliver piles	15	Start
2	Cast beams	20	Start
3	Drive piles east	12	1
4	Construct east pile cap	8	3
5	Construct east abutment	36	4
6	Drive piles center	6	3
7	Construct center pile cap	7	4, 6
8	Construct center pile	27	5, 7
9	Drive piles west	12	6
10	Construct west pile cap	8	7, 9
11	Construct west abutment	36	8, 10
12	Place beams on east span	7	2, 8
13	Place beams on west span	7	11, 12
14	Deck slab east	15	12
15	Deck slab west	15	13, 14
16	Lay roads	25	15

B) Calculate all types of floats for all the activities in the network of Q.3 A). **4**

4. A) The details of the project network are given below in table :

Table 2 Activity	Predecessor	Optimistic (days)	Most Likely (days)	Pessimistic (days)
A	–	2	3	5
B	–	2	4	6
C	–	4	8	14
D	A	4	8	12
E	B	8	10	15
F	B	3	3	6
G	C	6	9	12
H	D, E	2	7	9
I	E, D	1	3	7
J	F, G	2	6	10
K	F, G	4	7	10

Calculate the standard deviation for the project. **5**

B) The details of the project network are given below in table. 1 Indirect cost (Overhead) is Rs. 250/day throughout the duration of the project.

Table 1 Activity	Predecessor	ND (days)	CD (days)	NC (Rs.)	CC (Rs.)
A	–	120	100	12,000	14,000
B	–	20	15	1,800	2,800
C	B	40	30	16,000	22,000
D	C	30	20	1,400	2,000
E	D	50	40	3,600	4,800
F	B	60	45	13,500	18,000

What is the critical path for the project ? Which activity has the least cost slope ? **4**

5. Write short notes on : **9**

i) Interpretation of reports generated by Project Management Software.

ii) Information system planning.

iii) Precedence network.

SECTION – II

6. a) Define value engineering and also explain the stages in value engineering. **4**

b) The cranes are required for lifting the materials etc. during construction project for high rise building for a period of 8 years with money worth as 14%. Two types of cranes are available.

Type A Crane : Initial cost as Rs. 40,000 having salvage value of Rs. 5,000 with maintenance and repair cost of Rs. 1,800/year. A major overhaul at the end of 3rd year costing Rs. 6,000. Crane driver is paid Rs. 240/month salary.

Type B Crane : Initial cost of Rs. 16,000, with repair and maintenance cost of Rs. 1,200 per year. A major overhaul at end of 4th year costing Rs. 5,000. Crane driver is paid Rs. 240/month salary.

Select the most economical type of crane by using PWM. **6**

7. a) Which are the various types of uniform series factor ? Explain any one of them. **5**

   b) A father, on the day his son is born, wishes to determine what amount would have to be paid into an account now bearing interest at 10% compounded annually to provide payment of Rs. 5,000 on his sons 21st birthday ? **4**

8. a) A person wants to deposit Rs. 50,000 in a bank for 5 years. There are two schemes available.

      i) The interest rate 12% compounded monthly.

      ii) The interest rate 14% compounded quarterly.

      Which scheme will give him higher benefit ? **5**

   b) What is time value of money ? **4**

9. Write a note on (**3** marks **each**) : **9**

   a) Life cycle costing

   b) BOT

   c) Effective and Nominal interest rate.

SLR-VB – 43

Seat No.	

Set **Q**

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017
ENGINEERING MANAGEMENT – II

Day and Date : Monday, 22-5-2017 Total Marks : 70
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) Q. **2** and **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*4) **Assume** suitable data **if necessary** but mention it **clearly**.*
*5) Use of non programmable calculators is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In recurring deposit scheme _____ factor will be used.
a) USCRF b) USPWF c) USSFF d) None

2) Bank is interested to apply interest rate compounded _____ to the customer.
a) Daily b) Monthly c) Quarterly d) Annually

3) 15% rate per month compounded monthly is _____ type of interest rate.
a) Nominal b) Effective c) Simple d) None of these

4) The uniform amount to be invested at the end of each period in order to produce a fixed amount can be calculated using factor
a) U S C A F b) U S C R F c) U S P W F d) U S S F F

5) The method which has basis to return as the results of dividing the annual net profit by the capital invested is
a) Yield method b) Payback method
c) PW method d) EUAC method

6) Annuity means
a) All payments of equal amount
b) A series of payment
c) Equal payment at equal time interval
d) All of these

P.T.O.

7) Engineering Economics analysis is a method for
   a) Cost analysis of various project alternatives
   b) Calculating duration of the project
   c) Doing the sensitivity analysis
   d) None of these

8) Based on the following statements select the appropriate option.
   1. There can be only one critical path in a project network.
   2. It is necessary to introduce a dummy activity in AON network to ensure logic.
   3. The critical path is the longest path in the network.

   a) 1 – True ; 2 and 3 – False b) 2 – True ; 1 and 3 – False
   c) 1, 2 – True ; 3 – False d) 3 – True ; 1, 2 – False

9) The critical path activities has _____ float.
   a) Negative b) Zero c) Non zero d) Positive

10) The critical path is the _____ path in the project and delaying the critical path will delay the _____
   a) Shortest, activity duration b) Longest, project
   c) Earliest, early start of the activity d) Latest, slack of an activity

11) Choose the correct condition is
   a) Crash Direct cost > Normal Direct cost, Crash time > Normal time
   b) Crash Direct cost < Normal Direct cost, Crash time > Normal time
   c) Crash Direct cost < Normal Direct cost, Crash time < Normal time
   d) Crash Direct cost > Normal Direct cost, Crash time < Normal time

12) Crashing involves
   a) Performing activities in parallel in order to reduce project duration
   b) Reducing the duration of critical activities in order to reduce project duration
   c) Usage of floats available to reduce project duration
   d) Changing the sequence of activities to reduce project duration

13) Indirect cost _____ when the project is crashed.
   a) Increases b) Decreases c) Becomes zero d) None of the above

14) Select the appropriate option.
   1. Manpower is a consumable resource.
   2. Machinery are reusable resources.
   3. Materials are non-consumable resources.
   4. All resources are consumable.

   a) True : 1, 2 ; : False : 3, 4 b) True : 3,4 ; False : 1, 2
   c) True : 2 ; False : 1,3,4 d) All the above are true

_____

SLR-VB – 43

Seat No.	

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017

ENGINEERING MANAGEMENT – II

Day and Date : Monday, 22-5-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. **2** and **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*

*2) **Assume** suitable data **if necessary** but mention it **clearly**.*

*3) Use of non programmable calculators is **allowed**.*

SECTION – I

2. A) The details of the project are given below in the table. Draw a bar chart and show the project duration. **5**

Activity	Duration	Predecessors
A	5	–
B	9	A
C	3	A
D	6	A
E	4	B, C
F	4	C, D
G	4	E, F

B) Use the above mentioned data given in Table. Draw the network. Show the duration and critical path of the project network ? **5**

3. A) Draw network, show critical path. **5**

Activity No.	Activity	Duration	Predecessors
1	Order and deliver piles	15	Start
2	Cast beams	20	Start
3	Drive piles east	12	1
4	Construct east pile cap	8	3
5	Construct east abutment	36	4
6	Drive piles center	6	3
7	Construct center pile cap	7	4, 6
8	Construct center pile	27	5, 7
9	Drive piles west	12	6
10	Construct west pile cap	8	7, 9
11	Construct west abutment	36	8, 10
12	Place beams on east span	7	2, 8
13	Place beams on west span	7	11, 12
14	Deck slab east	15	12
15	Deck slab west	15	13, 14
16	Lay roads	25	15

B) Calculate all types of floats for all the activities in the network of Q.3 A). **4**

4. A) The details of the project network are given below in table :

Table 2 Activity	Predecessor	Optimistic (days)	Most Likely (days)	Pessimistic (days)
A	–	2	3	5
B	–	2	4	6
C	–	4	8	14
D	A	4	8	12
E	B	8	10	15
F	B	3	3	6
G	C	6	9	12
H	D, E	2	7	9
I	E, D	1	3	7
J	F, G	2	6	10
K	F, G	4	7	10

Calculate the standard deviation for the project. **5**

B) The details of the project network are given below in table. 1 Indirect cost (Overhead) is Rs. 250/day throughout the duration of the project.

Table 1 Activity	Predecessor	ND (days)	CD (days)	NC (Rs.)	CC (Rs.)
A	–	120	100	12,000	14,000
B	–	20	15	1,800	2,800
C	B	40	30	16,000	22,000
D	C	30	20	1,400	2,000
E	D	50	40	3,600	4,800
F	B	60	45	13,500	18,000

What is the critical path for the project ? Which activity has the least cost slope ? **4**

5. Write short notes on : **9**

i) Interpretation of reports generated by Project Management Software.

ii) Information system planning.

iii) Precedence network.

SECTION – II

6. a) Define value engineering and also explain the stages in value engineering. **4**

b) The cranes are required for lifting the materials etc. during construction project for high rise building for a period of 8 years with money worth as 14%. Two types of cranes are available.

Type A Crane : Initial cost as Rs. 40,000 having salvage value of Rs. 5,000 with maintenance and repair cost of Rs. 1,800/year. A major overhaul at the end of 3rd year costing Rs. 6,000. Crane driver is paid Rs. 240/month salary.

Type B Crane : Initial cost of Rs. 16,000, with repair and maintenance cost of Rs. 1,200 per year. A major overhaul at end of 4th year costing Rs. 5,000. Crane driver is paid Rs. 240/month salary.

Select the most economical type of crane by using PWM. **6**

7. a) Which are the various types of uniform series factor ? Explain any one of them. **5**

   b) A father, on the day his son is born, wishes to determine what amount would have to be paid into an account now bearing interest at 10% compounded annually to provide payment of Rs. 5,000 on his sons 21st birthday ? **4**

8. a) A person wants to deposit Rs. 50,000 in a bank for 5 years. There are two schemes available.

      i) The interest rate 12% compounded monthly.

      ii) The interest rate 14% compounded quarterly.

      Which scheme will give him higher benefit ? **5**

   b) What is time value of money ? **4**

9. Write a note on (**3** marks **each**) : **9**

   a) Life cycle costing

   b) BOT

   c) Effective and Nominal interest rate.

SLR-VB – 43

Seat No.	

Set **R**

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017
ENGINEERING MANAGEMENT – II

Day and Date : Monday, 22-5-2017 Total Marks : 70
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) Q. **2** and **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*4) **Assume** suitable data **if necessary** but mention it **clearly**.*
*5) Use of non programmable calculators is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Crashing involves
   a) Performing activities in parallel in order to reduce project duration
   b) Reducing the duration of critical activities in order to reduce project duration
   c) Usage of floats available to reduce project duration
   d) Changing the sequence of activities to reduce project duration

2) Indirect cost _____ when the project is crashed.
   a) Increases b) Decreases c) Becomes zero d) None of the above

3) Select the appropriate option.
   1. Manpower is a consumable resource.
   2. Machinery are reusable resources.
   3. Materials are non-consumable resources.
   4. All resources are consumable.
   a) True : 1, 2 ; : False : 3, 4 b) True : 3,4 ; False : 1, 2
   c) True : 2 ; False : 1,3,4 d) All the above are true

4) In recurring deposit scheme _____ factor will be used.
   a) USCRF b) USPWF c) USSFF d) None

5) Bank is interested to apply interest rate compounded _____ to the customer.
   a) Daily b) Monthly c) Quarterly d) Annually

P.T.O.

6) 15% rate per month compounded monthly is _____ type of interest rate.
   a) Nominal b) Effective c) Simple d) None of these

7) The uniform amount to be invested at the end of each period in order to produce a fixed amount can be calculated using factor
   a) U S C A F b) U S C R F c) U S P W F d) U S S F F

8) The method which has basis to return as the results of dividing the annual net profit by the capital invested is
   a) Yield method b) Payback method
   c) PW method d) EUAC method

9) Annuity means
   a) All payments of equal amount
   b) A series of payment
   c) Equal payment at equal time interval
   d) All of these

10) Engineering Economics analysis is a method for
   a) Cost analysis of various project alternatives
   b) Calculating duration of the project
   c) Doing the sensitivity analysis
   d) None of these

11) Based on the following statements select the appropriate option.
   1. There can be only one critical path in a project network.
   2. It is necessary to introduce a dummy activity in AON network to ensure logic.
   3. The critical path is the longest path in the network.
   a) 1 – True ; 2 and 3 – False b) 2 – True ; 1 and 3 – False
   c) 1, 2 – True ; 3 – False d) 3 – True ; 1, 2 – False

12) The critical path activities has _____ float.
   a) Negative b) Zero c) Non zero d) Positive

13) The critical path is the _____ path in the project and delaying the critical path will delay the _____
   a) Shortest, activity duration b) Longest, project
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14) Choose the correct condition is
   a) Crash Direct cost > Normal Direct cost, Crash time > Normal time
   b) Crash Direct cost < Normal Direct cost, Crash time > Normal time
   c) Crash Direct cost < Normal Direct cost, Crash time < Normal time
   d) Crash Direct cost > Normal Direct cost, Crash time < Normal time

_____

SLR-VB – 43

Seat No.	

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017

ENGINEERING MANAGEMENT – II

Day and Date : Monday, 22-5-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *and* ***6*** *are* ***compulsory****. Attempt* ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *and* ***any two*** *out of Q.* ***7*** *to Q.* ***9****.*

2) ***Assume*** *suitable data* ***if necessary*** *but mention it* ***clearly****.*

3) Use of non programmable calculators is ***allowed****.*

SECTION – I

2. A) The details of the project are given below in the table. Draw a bar chart and show the project duration. **5**

Activity	Duration	Predecessors
A	5	–
B	9	A
C	3	A
D	6	A
E	4	B, C
F	4	C, D
G	4	E, F

B) Use the above mentioned data given in Table. Draw the network. Show the duration and critical path of the project network ? **5**

3. A) Draw network, show critical path. **5**

Activity No.	Activity	Duration	Predecessors
1	Order and deliver piles	15	Start
2	Cast beams	20	Start
3	Drive piles east	12	1
4	Construct east pile cap	8	3
5	Construct east abutment	36	4
6	Drive piles center	6	3
7	Construct center pile cap	7	4, 6
8	Construct center pile	27	5, 7
9	Drive piles west	12	6
10	Construct west pile cap	8	7, 9
11	Construct west abutment	36	8, 10
12	Place beams on east span	7	2, 8
13	Place beams on west span	7	11, 12
14	Deck slab east	15	12
15	Deck slab west	15	13, 14
16	Lay roads	25	15

B) Calculate all types of floats for all the activities in the network of Q.3 A). **4**

4. A) The details of the project network are given below in table :

Table 2 Activity	Predecessor	Optimistic (days)	Most Likely (days)	Pessimistic (days)
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B	–	2	4	6
C	–	4	8	14
D	A	4	8	12
E	B	8	10	15
F	B	3	3	6
G	C	6	9	12
H	D, E	2	7	9
I	E, D	1	3	7
J	F, G	2	6	10
K	F, G	4	7	10

Calculate the standard deviation for the project. **5**

B) The details of the project network are given below in table. 1 Indirect cost (Overhead) is Rs. 250/day throughout the duration of the project.

Table 1 Activity	Predecessor	ND (days)	CD (days)	NC (Rs.)	CC (Rs.)
A	–	120	100	12,000	14,000
B	–	20	15	1,800	2,800
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D	C	30	20	1,400	2,000
E	D	50	40	3,600	4,800
F	B	60	45	13,500	18,000

What is the critical path for the project ? Which activity has the least cost slope ? **4**

5. Write short notes on : **9**

i) Interpretation of reports generated by Project Management Software.

ii) Information system planning.

iii) Precedence network.

SECTION – II

6. a) Define value engineering and also explain the stages in value engineering. **4**

b) The cranes are required for lifting the materials etc. during construction project for high rise building for a period of 8 years with money worth as 14%. Two types of cranes are available.

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Type B Crane : Initial cost of Rs. 16,000, with repair and maintenance cost of Rs. 1,200 per year. A major overhaul at end of 4th year costing Rs. 5,000. Crane driver is paid Rs. 240/month salary.

Select the most economical type of crane by using PWM. **6**

7. a) Which are the various types of uniform series factor ? Explain any one of them. **5**

   b) A father, on the day his son is born, wishes to determine what amount would have to be paid into an account now bearing interest at 10% compounded annually to provide payment of Rs. 5,000 on his sons 21st birthday ? **4**

8. a) A person wants to deposit Rs. 50,000 in a bank for 5 years. There are two schemes available.

      i) The interest rate 12% compounded monthly.

      ii) The interest rate 14% compounded quarterly.

      Which scheme will give him higher benefit ? **5**

   b) What is time value of money ? **4**

9. Write a note on (**3** marks **each**) : **9**

   a) Life cycle costing

   b) BOT

   c) Effective and Nominal interest rate.

SLR-VB – 43

Seat No.	

Set S

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017
ENGINEERING MANAGEMENT – II

Day and Date : Monday, 22-5-2017 Total Marks : 70
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) Q. **2** and **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*4) **Assume** suitable data **if necessary** but mention it **clearly**.*
*5) Use of non programmable calculators is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) 15% rate per month compounded monthly is _____ type of interest rate.
a) Nominal b) Effective c) Simple d) None of these

2) The uniform amount to be invested at the end of each period in order to produce a fixed amount can be calculated using factor
a) U S C A F b) U S C R F c) U S P W F d) U S S F F

3) The method which has basis to return as the results of dividing the annual net profit by the capital invested is
a) Yield method b) Payback method
c) PW method d) EUAC method

4) Annuity means
a) All payments of equal amount
b) A series of payment
c) Equal payment at equal time interval
d) All of these

5) Engineering Economics analysis is a method for
a) Cost analysis of various project alternatives
b) Calculating duration of the project
c) Doing the sensitivity analysis
d) None of these

P.T.O.

6) Based on the following statements select the appropriate option.
   1. There can be only one critical path in a project network.
   2. It is necessary to introduce a dummy activity in AON network to ensure logic.
   3. The critical path is the longest path in the network.

   a) 1 – True ; 2 and 3 – False b) 2 – True ; 1 and 3 – False
   c) 1, 2 – True ; 3 – False d) 3 – True ; 1, 2 – False

7) The critical path activities has _____ float.
   a) Negative b) Zero c) Non zero d) Positive

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   a) Crash Direct cost > Normal Direct cost, Crash time > Normal time
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   a) True : 1, 2 ; : False : 3, 4 b) True : 3,4 ; False : 1, 2
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SLR-VB – 43

Seat No.	

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017

ENGINEERING MANAGEMENT – II

Day and Date : Monday, 22-5-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. **2** and **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*

*2) **Assume** suitable data **if necessary** but mention it **clearly**.*

*3) Use of non programmable calculators is **allowed**.*

SECTION – I

2. A) The details of the project are given below in the table. Draw a bar chart and show the project duration. **5**

Activity	Duration	Predecessors
A	5	–
B	9	A
C	3	A
D	6	A
E	4	B, C
F	4	C, D
G	4	E, F

B) Use the above mentioned data given in Table. Draw the network. Show the duration and critical path of the project network ? **5**

3. A) Draw network, show critical path. **5**

Activity No.	Activity	Duration	Predecessors
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5	Construct east abutment	36	4
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B) Calculate all types of floats for all the activities in the network of Q.3 A). **4**

4. A) The details of the project network are given below in table :

Table 2 Activity	Predecessor	Optimistic (days)	Most Likely (days)	Pessimistic (days)
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D	A	4	8	12
E	B	8	10	15
F	B	3	3	6
G	C	6	9	12
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I	E, D	1	3	7
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K	F, G	4	7	10

Calculate the standard deviation for the project. **5**

B) The details of the project network are given below in table. 1 Indirect cost (Overhead) is Rs. 250/day throughout the duration of the project.

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D	C	30	20	1,400	2,000
E	D	50	40	3,600	4,800
F	B	60	45	13,500	18,000

What is the critical path for the project ? Which activity has the least cost slope ? **4**

5. Write short notes on : **9**

i) Interpretation of reports generated by Project Management Software.

ii) Information system planning.

iii) Precedence network.

SECTION – II

6. a) Define value engineering and also explain the stages in value engineering. **4**

b) The cranes are required for lifting the materials etc. during construction project for high rise building for a period of 8 years with money worth as 14%. Two types of cranes are available.

Type A Crane : Initial cost as Rs. 40,000 having salvage value of Rs. 5,000 with maintenance and repair cost of Rs. 1,800/year. A major overhaul at the end of 3rd year costing Rs. 6,000. Crane driver is paid Rs. 240/month salary.

Type B Crane : Initial cost of Rs. 16,000, with repair and maintenance cost of Rs. 1,200 per year. A major overhaul at end of 4th year costing Rs. 5,000. Crane driver is paid Rs. 240/month salary.

Select the most economical type of crane by using PWM. **6**

7. a) Which are the various types of uniform series factor ? Explain any one of them. **5**

   b) A father, on the day his son is born, wishes to determine what amount would have to be paid into an account now bearing interest at 10% compounded annually to provide payment of Rs. 5,000 on his sons 21st birthday ? **4**

8. a) A person wants to deposit Rs. 50,000 in a bank for 5 years. There are two schemes available.

      i) The interest rate 12% compounded monthly.

      ii) The interest rate 14% compounded quarterly.

      Which scheme will give him higher benefit ? **5**

   b) What is time value of money ? **4**

9. Write a note on (**3** marks **each**) : **9**

   a) Life cycle costing

   b) BOT

   c) Effective and Nominal interest rate.

SLR-VB – 44

Seat No.	

Set P

T.E. (Civil) (Part – II) (New CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – II

Day and Date : Wednesday, 24-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume suitable data **wherever** needed and mention it.*
*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) Gauge width for N.G. track is
a) 1.67 m b) 1 m c) .762 m d) None

2) Stresses in Railway track are produced due to
a) Wheel load b) Hammer blow
c) Horizontal thrust d) All the above

3) _____ movement of rail is creep.
a) Transverse b) Longitudinal
c) Both a) and b) d) None

4) The bottom most part of permanent way is
a) Rails b) Sleepers c) Fish plates d) None

5) Heel divergence for B.G. is
a) 9.8 cm b) 11.7 cm c) 13.7 cm d) None

6) The combination of one cross over the other cross over is _____ cross over.
a) Scissor b) Double
c) Both a) and b) d) None

P.T.O.

7) During foggy and cloudy weather _____ signal is useful.
   a) Detonating b) Hand c) Fixed d) None

8) Consider the following statements : Wind rose diagram is used for the purposes of
   1) Runway orientation
   2) Estimating the runway capacity
   3) Geometric design of holding apron, of these statements

   a) 1) and 2) are correct
   b) 2) and 3) are correct
   c) 1) and 3) are correct
   d) 1) alone is correct

9) A defined area on a land aerodrome intended to accommodate of loading or unloading passengers is called
   a) Apron b) Hangers
   c) Approach surface d) Terminal area

10) Pick up the correct statement from the following.
   a) The basic length of a runway is increased at a rate of 7% per 300 m of elevation of M.S.L.
   b) The standard temperature at the site is obtained by reducing the standard sea level temperature of 15° C at the rate of 6.5° C per 1000 m rise in elevation
   c) The aerodrome reference temperature is the monthly mean of the mean daily temperature for the hottest month of the year
   d) All the above

11) 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

12) In the night approximate location of the airfield is shown by
   a) Rotating Beacon b) Taxiway lighting
   c) Approach lighting d) None of these

13) _____ is a structure constructed at the tip of a breakwater near the harbour entrance.
   a) Dolphin b) Wharf c) Pierheads d) Jetties

14) Slip is the space of water area between two
   a) Adjacent fenders b) Adjacent piers
   c) Adjacent jetties d) Adjacent dolphins

_____

SLR-VB – 44

Seat No.	

T.E. (Civil) (Part – II) (New CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – II

Day and Date : Wednesday, 24-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figure on* ***right*** *indicates* ***full*** *marks.*
2) Assume suitable data ***wherever*** *needed and mention it.*

SECTION – I

2. Solve **any three**.
   a) What should be the gradient for a B.G track when the grade resistance together with curve resistance due to a curve of 3° shall be equal to the resistance due to a ruling gradient of I in 200 ? **7**
   b) Explain with sketch “Coning of wheels”. **7**
   c) Describe with figures different types of fixtures and fastenings used in railways. **6**
   d) Draw a systematic sketch of a left hand turnout and name different parts. **7**
   e) Explain “principle of interlocking”. **6**

3. Write short notes on **any two** (**4** marks **each**).
   a) History of Railway Engineering in India.
   b) Sleeper Density.
   c) Cant Deficiency.

SECTION – II

4. Answer **any two** questions (**7** marks **each**).
   a) What are the factors to be considered for the selection of site of an airport ? Explain the importance of each factor.
   b) What is a wind rose diagram ? What are its types ? Explain any one in detail.

c) The monthly mean temperature of the atmosphere at a particular site where an airport is to be developed, are given below. Determine the airport reference temperature. If the site is at mean sea level determine the actual runway length. The runway is assumed to be level.

Month	Temperature		Month	Temperature	
	Mean Ave. Daily	Mean Max. Daily		Mean Aver. Daily	Mean Max. Daily
January	3	5	July	32	37
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March	20	23	September	27	31
April	25	32	October	22	28
May	35	47	November	12	18
June	40	50	December	6	9

d) Write a short notes on **any two** with neat sketches :

a) Beacon light

b) Runway lighting

c) Displaced threshold marking.

5 Answer **any two** questions (**7** marks **each**).

a) Give a sketch showing the layout of the harbour showing break water, entrance channel, turning basin, piers and wharfs. Explain function of any two components in detail.

b) Define breakwater and list the different types of breakwater. Explain any one with sketch.

c) Briefly discuss on relevance of wind tides and littoral currents on the design of harbours.

d) Write a short notes on **any two** :

a) Natural Harbour.

b) Quays and Jetties.

c) Tetra pods.

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SLR-VB – 44

Seat No.	

Set **Q**

T.E. (Civil) (Part – II) (New CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – II

Day and Date : Wednesday, 24-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume suitable data **wherever** needed and mention it.*
*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) Consider the following statements : Wind rose diagram is used for the purposes of
   1) Runway orientation
   2) Estimating the runway capacity
   3) Geometric design of holding apron, of these statements

   a) 1) and 2) are correct b) 2) and 3) are correct
   c) 1) and 3) are correct d) 1) alone is correct

2) A defined area on a land aerodrome intended to accommodate of loading or unloading passengers is called
   a) Apron b) Hangers
   c) Approach surface d) Terminal area

3) Pick up the correct statement from the following.
   a) The basic length of a runway is increased at a rate of 7% per 300 m of elevation of M.S.L.
   b) The standard temperature at the site is obtained by reducing the standard sea level temperature of 15° C at the rate of 6.5° C per 1000 m rise in elevation
   c) The aerodrome reference temperature is the monthly mean of the mean daily temperature for the hottest month of the year
   d) All the above

P.T.O.

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) In the night approximate location of the airfield is shown by
   a) Rotating Beacon b) Taxiway lighting
   c) Approach lighting d) None of these

6) _____ is a structure constructed at the tip of a breakwater near the harbour entrance.
   a) Dolphin b) Wharf c) Pierheads d) Jetties

7) Slip is the space of water area between two
   a) Adjacent fenders b) Adjacent piers
   c) Adjacent jetties d) Adjacent dolphins

8) Gauge width for N.G. track is
   a) 1.67 m b) 1 m c) .762 m d) None

9) Stresses in Railway track are produced due to
   a) Wheel load b) Hammer blow
   c) Horizontal thrust d) All the above

10) _____ movement of rail is creep.
   a) Transverse b) Longitudinal
   c) Both a) and b) d) None

11) The bottom most part of permanent way is
   a) Rails b) Sleepers c) Fish plates d) None

12) Heel divergence for B.G. is
   a) 9.8 cm b) 11.7 cm c) 13.7 cm d) None

13) The combination of one cross over the other cross over is _____ cross over.
   a) Scissor b) Double
   c) Both a) and b) d) None

14) During foggy and cloudy weather _____ signal is useful.
   a) Detonating b) Hand c) Fixed d) None

_____

SLR-VB – 44

Seat No.	

T.E. (Civil) (Part – II) (New CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – II

Day and Date : Wednesday, 24-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figure on* ***right*** *indicates* ***full*** *marks.*
2) Assume suitable data ***wherever*** *needed and mention it.*

SECTION – I

2. Solve **any three**.
   a) What should be the gradient for a B.G track when the grade resistance together with curve resistance due to a curve of 3° shall be equal to the resistance due to a ruling gradient of I in 200 ? **7**
   b) Explain with sketch “Coning of wheels”. **7**
   c) Describe with figures different types of fixtures and fastenings used in railways. **6**
   d) Draw a systematic sketch of a left hand turnout and name different parts. **7**
   e) Explain “principle of interlocking”. **6**

3. Write short notes on **any two** (**4** marks **each**).
   a) History of Railway Engineering in India.
   b) Sleeper Density.
   c) Cant Deficiency.

SECTION – II

4. Answer **any two** questions (**7** marks **each**).
   a) What are the factors to be considered for the selection of site of an airport ? Explain the importance of each factor.
   b) What is a wind rose diagram ? What are its types ? Explain any one in detail.

c) The monthly mean temperature of the atmosphere at a particular site where an airport is to be developed, are given below. Determine the airport reference temperature. If the site is at mean sea level determine the actual runway length. The runway is assumed to be level.

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March	20	23	September	27	31
April	25	32	October	22	28
May	35	47	November	12	18
June	40	50	December	6	9

d) Write a short notes on **any two** with neat sketches :

a) Beacon light

b) Runway lighting

c) Displaced threshold marking.

5 Answer **any two** questions (**7** marks **each**).

a) Give a sketch showing the layout of the harbour showing break water, entrance channel, turning basin, piers and wharfs. Explain function of any two components in detail.

b) Define breakwater and list the different types of breakwater. Explain any one with sketch.

c) Briefly discuss on relevance of wind tides and littoral currents on the design of harbours.

d) Write a short notes on **any two** :

a) Natural Harbour.

b) Quays and Jetties.

c) Tetra pods.

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SLR-VB – 44

Seat No.	

Set **R**

T.E. (Civil) (Part – II) (New CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – II

Day and Date : Wednesday, 24-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume suitable data **wherever** needed and mention it.*
*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) Heel divergence for B.G. is
a) 9.8 cm b) 11.7 cm c) 13.7 cm d) None

2) The combination of one cross over the other cross over is _____ cross over.
a) Scissor b) Double
c) Both a) and b) d) None

3) During foggy and cloudy weather _____ signal is useful.
a) Detonating b) Hand c) Fixed d) None

4) Consider the following statements : Wind rose diagram is used for the purposes of
1) Runway orientation
2) Estimating the runway capacity
3) Geometric design of holding apron, of these statements

a) 1) and 2) are correct
b) 2) and 3) are correct
c) 1) and 3) are correct
d) 1) alone is correct

P.T.O.

5) A defined area on a land aerodrome intended to accommodate of loading or unloading passengers is called
   a) Apron b) Hangers
   c) Approach surface d) Terminal area

6) Pick up the correct statement from the following.
   a) The basic length of a runway is increased at a rate of 7% per 300 m of elevation of M.S.L.
   b) The standard temperature at the site is obtained by reducing the standard sea level temperature of 15° C at the rate of 6.5° C per 1000 m rise in elevation
   c) The aerodrome reference temperature is the monthly mean of the mean daily temperature for the hottest month of the year
   d) All the above

7) 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

8) In the night approximate location of the airfield is shown by
   a) Rotating Beacon b) Taxiway lighting
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9) _____ is a structure constructed at the tip of a breakwater near the harbour entrance.
   a) Dolphin b) Wharf c) Pierheads d) Jetties

10) Slip is the space of water area between two
   a) Adjacent fenders b) Adjacent piers
   c) Adjacent jetties d) Adjacent dolphins

11) Gauge width for N.G. track is
   a) 1.67 m b) 1 m c) .762 m d) None

12) Stresses in Railway track are produced due to
   a) Wheel load b) Hammer blow
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13) _____ movement of rail is creep.
   a) Transverse b) Longitudinal
   c) Both a) and b) d) None

14) The bottom most part of permanent way is
   a) Rails b) Sleepers c) Fish plates d) None

_____

SLR-VB – 44

Seat No.	

T.E. (Civil) (Part – II) (New CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – II

Day and Date : Wednesday, 24-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figure on* ***right*** *indicates* ***full*** *marks.*
2) Assume suitable data ***wherever*** *needed and mention it.*

SECTION – I

2. Solve **any three**.
   a) What should be the gradient for a B.G track when the grade resistance together with curve resistance due to a curve of 3° shall be equal to the resistance due to a ruling gradient of I in 200 ? **7**
   b) Explain with sketch “Coning of wheels”. **7**
   c) Describe with figures different types of fixtures and fastenings used in railways. **6**
   d) Draw a systematic sketch of a left hand turnout and name different parts. **7**
   e) Explain “principle of interlocking”. **6**

3. Write short notes on **any two** (**4** marks **each**).
   a) History of Railway Engineering in India.
   b) Sleeper Density.
   c) Cant Deficiency.

SECTION – II

4. Answer **any two** questions (**7** marks **each**).
   a) What are the factors to be considered for the selection of site of an airport ? Explain the importance of each factor.
   b) What is a wind rose diagram ? What are its types ? Explain any one in detail.

c) The monthly mean temperature of the atmosphere at a particular site where an airport is to be developed, are given below. Determine the airport reference temperature. If the site is at mean sea level determine the actual runway length. The runway is assumed to be level.

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April	25	32	October	22	28
May	35	47	November	12	18
June	40	50	December	6	9

d) Write a short notes on **any two** with neat sketches :

a) Beacon light

b) Runway lighting

c) Displaced threshold marking.

5 Answer **any two** questions (**7** marks **each**).

a) Give a sketch showing the layout of the harbour showing break water, entrance channel, turning basin, piers and wharfs. Explain function of any two components in detail.

b) Define breakwater and list the different types of breakwater. Explain any one with sketch.

c) Briefly discuss on relevance of wind tides and littoral currents on the design of harbours.

d) Write a short notes on **any two** :

a) Natural Harbour.

b) Quays and Jetties.

c) Tetra pods.

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SLR-VB – 44

Seat No.	

Set S

T.E. (Civil) (Part – II) (New CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – II

Day and Date : Wednesday, 24-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Figure on **right** indicates **full** marks.*
*2) Assume suitable data **wherever** needed and mention it.*
*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) Pick up the correct statement from the following.
   a) The basic length of a runway is increased at a rate of 7% per 300 m of elevation of M.S.L.
   b) The standard temperature at the site is obtained by reducing the standard sea level temperature of 15° C at the rate of 6.5° C per 1000 m rise in elevation
   c) The aerodrome reference temperature is the monthly mean of the mean daily temperature for the hottest month of the year
   d) All the above

2) 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

3) In the night approximate location of the airfield is shown by
   a) Rotating Beacon b) Taxiway lighting
   c) Approach lighting d) None of these

4) _____ is a structure constructed at the tip of a breakwater near the harbour entrance.
   a) Dolphin b) Wharf c) Pierheads d) Jetties

5) Slip is the space of water area between two
   a) Adjacent fenders b) Adjacent piers
   c) Adjacent jetties d) Adjacent dolphins

6) Gauge width for N.G. track is
   a) 1.67 m b) 1 m c) .762 m d) None

7) Stresses in Railway track are produced due to
   a) Wheel load b) Hammer blow
   c) Horizontal thrust d) All the above

8) _____ movement of rail is creep.
   a) Transverse b) Longitudinal
   c) Both a) and b) d) None

9) The bottom most part of permanent way is
   a) Rails b) Sleepers c) Fish plates d) None

10) Heel divergence for B.G. is
   a) 9.8 cm b) 11.7 cm c) 13.7 cm d) None

11) The combination of one cross over the other cross over is _____ cross over.
   a) Scissor b) Double
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12) During foggy and cloudy weather _____ signal is useful.
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13) Consider the following statements : Wind rose diagram is used for the purposes of
   1) Runway orientation
   2) Estimating the runway capacity
   3) Geometric design of holding apron, of these statements

   a) 1) and 2) are correct
   b) 2) and 3) are correct
   c) 1) and 3) are correct
   d) 1) alone is correct

14) A defined area on a land aerodrome intended to accommodate of loading or unloading passengers is called
   a) Apron b) Hangers
   c) Approach surface d) Terminal area

_____

SLR-VB – 44

Seat No.	

T.E. (Civil) (Part – II) (New CGPA) Examination, 2017
TRANSPORTATION ENGINEERING – II

Day and Date : Wednesday, 24-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figure on* ***right*** *indicates* ***full*** *marks.*
2) Assume suitable data ***wherever*** *needed and mention it.*

SECTION – I

2. Solve **any three**.
   a) What should be the gradient for a B.G track when the grade resistance together with curve resistance due to a curve of 3° shall be equal to the resistance due to a ruling gradient of I in 200 ? **7**
   b) Explain with sketch “Coning of wheels”. **7**
   c) Describe with figures different types of fixtures and fastenings used in railways. **6**
   d) Draw a systematic sketch of a left hand turnout and name different parts. **7**
   e) Explain “principle of interlocking”. **6**

3. Write short notes on **any two** (**4** marks **each**).
   a) History of Railway Engineering in India.
   b) Sleeper Density.
   c) Cant Deficiency.

SECTION – II

4. Answer **any two** questions (**7** marks **each**).
   a) What are the factors to be considered for the selection of site of an airport ? Explain the importance of each factor.
   b) What is a wind rose diagram ? What are its types ? Explain any one in detail.

c) The monthly mean temperature of the atmosphere at a particular site where an airport is to be developed, are given below. Determine the airport reference temperature. If the site is at mean sea level determine the actual runway length. The runway is assumed to be level.

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April	25	32	October	22	28
May	35	47	November	12	18
June	40	50	December	6	9

d) Write a short notes on **any two** with neat sketches :

a) Beacon light

b) Runway lighting

c) Displaced threshold marking.

5 Answer **any two** questions (**7** marks **each**).

a) Give a sketch showing the layout of the harbour showing break water, entrance channel, turning basin, piers and wharfs. Explain function of any two components in detail.

b) Define breakwater and list the different types of breakwater. Explain any one with sketch.

c) Briefly discuss on relevance of wind tides and littoral currents on the design of harbours.

d) Write a short notes on **any two** :

a) Natural Harbour.

b) Quays and Jetties.

c) Tetra pods.

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SLR-VB – 45 (b)

Seat No.	

Set **P**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1) Q. No.* ***I*** *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

I. Choose the correct answer : **(10×1=10)**

1) The term 'weft' refers to
   a) The longitudinal yarn of the geotextile
   b) The transverse yarn of the geotextile
   c) Both a) and b)
   d) None of the above

2) The modern concept of reinforced earth was invented by
   a) Henry Vidal b) Terzaghi
   c) Coulomb d) None of these

3) To protect geosynthetic from UV exposure _____ is added to it.
   a) plastic b) carbon black c) benzene d) cement

4) The shape of apertures in geonets is
   a) square b) circular c) triangular d) diamond

5) The core of GCL is made of
   a) Bentonite clay b) Cement c) Clay d) Timber

6) Erosion control can be accomplished by using
   a) Geotextile b) Geofoam c) Geonet d) All of these

7) Response under constant loading is called
   a) Creep b) Strain c) Stress d) None of these

8) MFI is acronym for
   a) Mount Flow Instrument b) Money Fix Installment
   c) Metal Flow Index d) Melt Flow Index

9) Indian standard for sampling of geosynthetic specimens is
   a) IS 800 b) IS 14706 c) IS 456 d) IS 2700

10) The width of grips for performing the grab tensile strength is
   a) 25 mm b) 10 mm c) 15 mm d) 35 mm

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SLR-VB – 45 (b)

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Marks : 40

Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1) Out of Q. **II** to Q. **VI**, solve **any four** questions.*
*2) **Assume** additional data if required and state it **clearly**.*
*3) Figures to the **right** indicate **full** marks.*

II. Explain manufacturing process of any two types of geosynthetics with illustrative sketch. **(5+5)**

III. With a neat sketch explain the procedure for **(5+5)**

a) In plane permeability of geosynthetics.

b) Grab tensile strength of geosynthetics.

IV. a) Explain the concept of reinforced earth. **5**

b) Explain the construction of reinforced earth retaining wall in five steps. **5**

V. a) What is erosion of soil ? How it will be controlled by using geosynthetics ? **5**

b) Write a note on Binquet and Lee's approach. **5**

VI. Write shor note on : **10**

a) Geosynthetics application in pavement for separation and reinforcement.

b) Geonet for drainage in landfills.

Set P

SLR-VB – 45 (b)

Seat No.	

Set **Q**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1) Q. No.* ***I*** *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

I. Choose the correct answer : **(10×1=10)**

1) Indian standard for sampling of geosynthetic specimens is
   a) IS 800 b) IS 14706 c) IS 456 d) IS 2700

2) The width of grips for performing the grab tensile strength is
   a) 25 mm b) 10 mm c) 15 mm d) 35 mm

3) Response under constant loading is called
   a) Creep b) Strain c) Stress d) None of these

4) MFI is acronym for
   a) Mount Flow Instrument b) Money Fix Installment
   c) Metal Flow Index d) Melt Flow Index

5) The term 'weft' refers to
   a) The longitudinal yarn of the geotextile
   b) The transverse yarn of the geotextile
   c) Both a) and b)
   d) None of the above

P.T.O.

6) The modern concept of reinforced earth was invented by
   a) Henry Vidal b) Terzaghi
   c) Coulomb d) None of these

7) To protect geosynthetic from UV exposure _____ is added to it.
   a) plastic b) carbon black c) benzene d) cement

8) The shape of apertures in geonets is
   a) square b) circular c) triangular d) diamond

9) The core of GCL is made of
   a) Bentonite clay b) Cement c) Clay d) Timber

10) Erosion control can be accomplished by using
   a) Geotextile b) Geofoam c) Geonet d) All of these

_____

SLR-VB – 45 (b)

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Marks : 40

Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1) Out of Q. **II** to Q. **VI**, solve **any four** questions.*
*2) **Assume** additional data if required and state it **clearly**.*
*3) Figures to the **right** indicate **full** marks.*

II. Explain manufacturing process of any two types of geosynthetics with illustrative sketch. **(5+5)**

III. With a neat sketch explain the procedure for **(5+5)**

a) In plane permeability of geosynthetics.

b) Grab tensile strength of geosynthetics.

IV. a) Explain the concept of reinforced earth. **5**

b) Explain the construction of reinforced earth retaining wall in five steps. **5**

V. a) What is erosion of soil ? How it will be controlled by using geosynthetics ? **5**

b) Write a note on Binquet and Lee's approach. **5**

VI. Write shor note on : **10**

a) Geosynthetics application in pavement for separation and reinforcement.

b) Geonet for drainage in landfills.

Set Q

SLR-VB – 45 (b)

Seat No.	

Set **R**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1) Q. No.* ***I*** *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

I. Choose the correct answer : **(10×1=10)**

1) The core of GCL is made of
   a) Bentonite clay b) Cement c) Clay d) Timber

2) Erosion control can be accomplished by using
   a) Geotextile b) Geofoam c) Geonet d) All of these

3) Indian standard for sampling of geosynthetic specimens is
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4) The width of grips for performing the grab tensile strength is
   a) 25 mm b) 10 mm c) 15 mm d) 35 mm

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P.T.O.

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   b) The transverse yarn of the geotextile
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10) MFI is acronym for
   a) Mount Flow Instrument b) Money Fix Installment
   c) Metal Flow Index d) Melt Flow Index

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SLR-VB – 45 (b)

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Marks : 40

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Instructions : *1) Out of Q. **II** to Q. **VI**, solve **any four** questions.*
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VI. Write shor note on : **10**

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Set R

SLR-VB – 45 (b)

Seat No.	

Set S

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1) Q. No. **I** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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MCQ/Objective Type Questions

Marks : 10

I. Choose the correct answer : **(10×1=10)**

1) To protect geosynthetic from UV exposure _____ is added to it.
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P.T.O.

7) Indian standard for sampling of geosynthetic specimens is
   a) IS 800 b) IS 14706 c) IS 456 d) IS 2700

8) The width of grips for performing the grab tensile strength is
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———————

SLR-VB – 45 (b)

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
GEOSYNTHETICS AND REINFORCED SOIL STRUCTURES
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Marks : 40

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VI. Write shor note on : **10**

a) Geosynthetics application in pavement for separation and reinforcement.

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Set S

SLR-VB – 45 (d)

Seat No.	

Set **P**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
SELF LEARNING : (Technical) TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***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 Question No. **2** to Question No. **7**.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) The process mapping is a _____ diagram.
a) Data flow b) Work flow c) Circular d) Audit

2) The objective of ISO-9000 family of Quality management is
a) Customer satisfaction b) Employee satisfaction
c) Skill enhancement d) Environmental issues

3) According to Deming, Quality problems are
a) Due to management b) Due to method
c) Due to machine d) Due to material

4) _____ helps organization reduce employee turnover and absenteeism.
a) Job design b) Training and development
c) Wage revision d) All of the above

5) What is ISO ?
a) Indian Organisation for Standard
b) Internal Organization for Standard
c) International Organization for Standard
d) None of the above

P.T.O.

6) Rectangle represents _____ while plotting flow chart.
   a) Step in activity
   b) Decision making
   c) Direction of flow
   d) None of the above

7) Service Assurance is
   a) Confidence with customer
   b) Customer has trust
   c) Employee has knowledge
   d) All of the above

8) ISO emphasis on
   a) Prevention
   b) Inspection
   c) Rejection
   d) All of the above

9) ISO – 14001 gives stress on
   a) Plan – Do-check – Act
   b) Environmental protection
   c) Prevention rather than detection
   d) All of the above

10) MSP means
   a) Microsoft Primavera
   b) Microsoft Project
   c) Management System Project
   d) None

_____

SLR-VB – 45 (d)

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
SELF LEARNING : (Technical) TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

***Instruction** : Attempt **any four** from Question No. **2** to Question No. **7**.*

2. Define TQM. Explain its various elements.

3. Explain the term quality and quality control.

4. Write a note on MIS.

5. Explain the principles of TQM.

6. Explain in detail SIX sigma.

7. What are the duties of quality council ?

Set P

Set P

SLR-VB – 45 (d)

Seat No.	

Set **Q**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
SELF LEARNING : (Technical) TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***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 Question No. **2** to Question No. **7**.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) ISO – 14001 gives stress on
   a) Plan – Do-check – Act
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   a) Customer satisfaction
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P.T.O.

7) According to Deming, Quality problems are
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   d) Due to material

8) _____ helps organization reduce employee turnover and absenteeism.
   a) Job design
   b) Training and development
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   d) All of the above

9) What is ISO ?
   a) Indian Organisation for Standard
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   d) None of the above

10) Rectangle represents _____ while plotting flow chart.
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   b) Decision making
   c) Direction of flow
   d) None of the above

_____

SLR-VB – 45 (d)

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
SELF LEARNING : (Technical) TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

***Instruction** : Attempt **any four** from Question No. **2** to Question No. **7**.*

2. Define TQM. Explain its various elements.

3. Explain the term quality and quality control.

4. Write a note on MIS.

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6. Explain in detail SIX sigma.

7. What are the duties of quality council ?

Set Q

Set Q

SLR-VB – 45 (d)

Seat No.	

Set **R**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
SELF LEARNING : (Technical) TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***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 Question No. **2** to Question No. **7**.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) What is ISO ?
   a) Indian Organisation for Standard
   b) Internal Organization for Standard
   c) International Organization for Standard
   d) None of the above

2) Rectangle represents _____ while plotting flow chart.
   a) Step in activity b) Decision making
   c) Direction of flow d) None of the above

3) ISO – 14001 gives stress on
   a) Plan – Do-check – Act b) Environmental protection
   c) Prevention rather than detection d) All of the above

4) MSP means
   a) Microsoft Primavera b) Microsoft Project
   c) Management System Project d) None

5) According to Deming, Quality problems are
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P.T.O.

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_____

SLR-VB – 45 (d)

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
SELF LEARNING : (Technical) TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

***Instruction** : Attempt **any four** from Question No. **2** to Question No. **7**.*

2. Define TQM. Explain its various elements.

3. Explain the term quality and quality control.

4. Write a note on MIS.

5. Explain the principles of TQM.

6. Explain in detail SIX sigma.

7. What are the duties of quality council ?

Set R

Set R

SLR-VB – 45 (d)

Seat No.	

Set **S**

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
SELF LEARNING : (Technical) TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***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 Question No. **2** to Question No. **7**.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) According to Deming, Quality problems are
   a) Due to management b) Due to method
   c) Due to machine d) Due to material

2) _____ helps organization reduce employee turnover and absenteeism.
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8) MSP means
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9) The process mapping is a _____ diagram.
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10) The objective of ISO-9000 family of Quality management is
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_____

SLR-VB – 45 (d)

Seat No.	

T.E. (Civil) (Part – II) (New – CGPA) Examination, 2017
SELF LEARNING : (Technical) TQM AND MIS IN CIVIL ENGINEERING

Day and Date : Friday, 26-5-2017 Marks : 40
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***Instruction** : Attempt **any four** from Question No. **2** to Question No. **7**.*

2. Define TQM. Explain its various elements.

3. Explain the term quality and quality control.

4. Write a note on MIS.

5. Explain the principles of TQM.

6. Explain in detail SIX sigma.

7. What are the duties of quality council ?

Set S

SLR-VB – 45(A)

Seat No.	

Set **P**

T.E. (Civil Engineering) (Part – II) (New – CGPA) Examination, 2017
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) Figures on **right** indicates **full** marks.*
*2) Assume suitable data **wherever** necessary 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 joints, parallel to the center line of the road, are called
   a) Longitudinal joints b) Transverse joints
   c) Expansion joints d) Contraction joints

2) A large difference of temperature between the top and the bottom of the slab causes _____ of the slab.
   a) Hardening b) Warping c) Crazing d) All of these

3) The aggregate abrasion value should not exceed _____ percent for aggregate to be used in Bituminous concrete surface course of pavements.
   a) 40 b) 30 c) 20 d) 10

4) Weight of sample taken for Los Angeles abrasion test is 2500 gm and after test weight of the specimen retained on 1.70 mm test sieve is 2100 gm, the abrasion value of the sample is
   a) 16 b) 20 c) 25 d) 30

5) Bitumen of grade 80/100 means
   a) Its penetration value is 8 to 10 mm
   b) Its penetration value is 8 mm
   c) Its penetration value is 10 mm
   d) Its penetration value is 80 to 100 mm

6) The test conducted on distressed pavement to know the deflection of the pavement is
   a) Bump integrator test
   b) Benkelman test
   c) Skid resistance test
   d) Roughness test

7) Which of the following represents hardest grade of bitumen ?
   a) 30/40
   b) 60/70
   c) 80/100
   d) 100/120

8) The unit of softening point and ductility of bitumen are expressed in,
   a) Kg and °C
   b) cm and mm
   c) °C and cm
   d) Poise and °C

9) _____ 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

10) In a water absorption test of 20 mm aggregate, the weight of saturated surface dry aggregates in air is 1200 gm and after 24 hours oven dried, the weight reduced to 1180 gm, the actual water absorbed by aggregates is,
   a) 1.81%
   b) 2.81%
   c) 3.81%
   d) 4.81%

_____

SLR-VB – 45(A)

Seat No.	

T.E. (Civil Engineering) (Part – II) (New – CGPA) Examination, 2017
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

***Instructions**: 1) Figures on **right** indicates **full** marks.*

*2) Assume suitable data **wherever** necessary and mention it **clearly**.*

2. Answer **any five** questions (**8** marks **each**). **(8×5=40)**

a) Draw a neat sketch of flexible pavement and explain briefly the functions of each component parts of pavement.

b) Explain briefly the principle of Burmister's two layer theory and mention the advantages over the elastic single layer theory for the analysis of flexible pavement.

c) Mention the specifications of materials and constructions steps for Water Bound Macadam Base course.

d) Discuss the principles and scope of soil-cement stabilization.

e) List the different types of distresses and causes in flexible pavements.

f) Using the data given below, calculate the wheel load at a) interior b) edge and c) corner regions of a cement concrete pavement using Westergaard's stress equations. Also determine the probable location where the crack is likely to develop due to corner loading.

Wheel Load, P = 5100 kg

Modulus of elasticity of cement concrete, $E = 3.0 \times 10^5$ kg/cm^2

Pavement Thickness, h = 18 cm

Poisson's ratio of concrete, $\mu = 0.15$

Modulus of subgrade reaction, K = 6.0 kg/cm^2

Radius of contact area, a = 15 cm.

g) Design a new flexible pavement using IRC-37-2001 method for a two lane undivided carriageway with following details :

Design CBR value of subgrade = 5.0%

Commercial vehicles per day = 2000 per day

Average growth rate = 5.0% per year

Design life = 20 years

VDF value = 4.5

Lane distribution factor = 0.75, also calculate the each pavement layer thickness using IRC-37 catalogue (Use Figure – 1 and 2).

h) The rebound deflection values determined at 15 spots are given below. Determine the values of i) mean deflection ii) standard deviation and iii) characteristic deflection for an important highway with heavy traffic.

Rebound deflection values in mm : 1.40, 1.32, 1.25, 1.35, 1.48, 1.60, 1.65, 1.55, 1.45, 1.40, 1.36, 1.46, 1.50, 1.52 and 1.45.

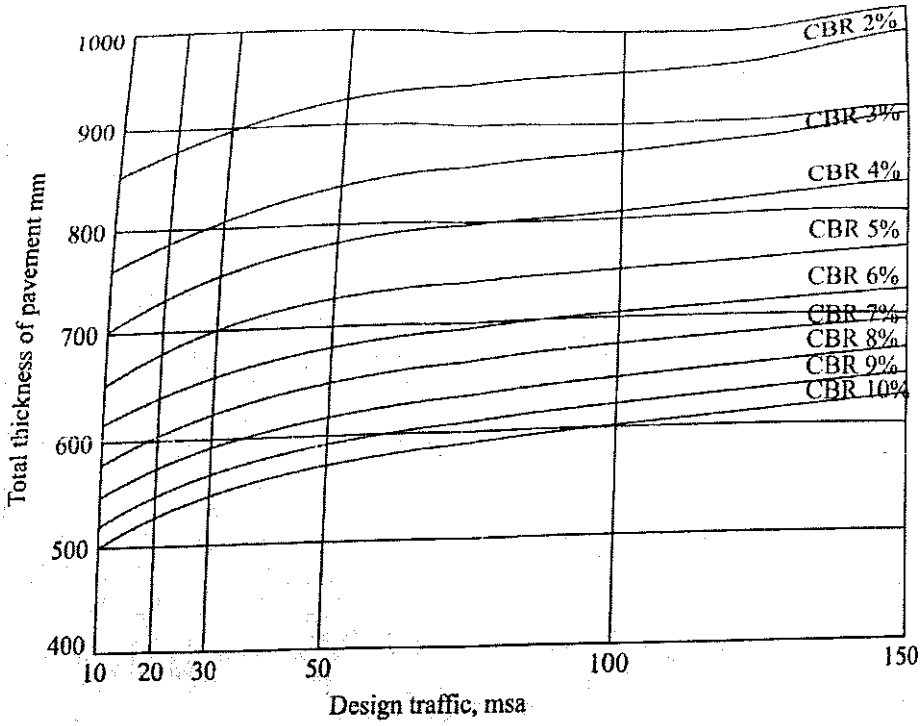

Chart II. Pavement thickness design chart for traffic 10-150 msa

Figure – 1

IRC-37-2001				
PAVEMENT DESIGN CATALOGUE				
PLATE 2 – RECOMMENDED DESIGNS FOR TRAFFIC RANGE 10-150 msa				
Cumulative Traffic (msa)	Total Pavement Thickness (mm)	Pavement Composition		Granular Base and Sub-base (mm)
		Bituminous Surfacing		
		BC (mm)	DBM (mm)	
10	660	40	70	
20	690	40	100	
30	710	40	120	Base = 250
50	730	40	140	Sub-base = 300
100	750	50	150	
150	770	50	170	

Figure – 2

Set P

SLR-VB – 45(A)

Seat No.	

Set **Q**

T.E. (Civil Engineering) (Part – II) (New – CGPA) Examination, 2017
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) Figures on **right** indicates **full** marks.*
*2) Assume suitable data **wherever** necessary 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) _____ 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

2) In a water absorption test of 20 mm aggregate, the weight of saturated surface dry aggregates in air is 1200 gm and after 24 hours oven dried, the weight reduced to 1180 gm, the actual water absorbed by aggregates is,

a) 1.81% b) 2.81%
c) 3.81% d) 4.81%

3) Which of the following represents hardest grade of bitumen ?

a) 30/40 b) 60/70
c) 80/100 d) 100/120

P.T.O.

4) The unit of softening point and ductility of bitumen are expressed in,
   a) Kg and °C
   b) cm and mm
   c) °C and cm
   d) Poise and °C

5) The joints, parallel to the center line of the road, are called
   a) Longitudinal joints
   b) Transverse joints
   c) Expansion joints
   d) Contraction joints

6) A large difference of temperature between the top and the bottom of the slab causes _____ of the slab.
   a) Hardening b) Warping c) Crazing d) All of these

7) The aggregate abrasion value should not exceed _____ percent for aggregate to be used in Bituminous concrete surface course of pavements.
   a) 40 b) 30 c) 20 d) 10

8) Weight of sample taken for Los Angeles abrasion test is 2500 gm and after test weight of the specimen retained on 1.70 mm test sieve is 2100 gm, the abrasion value of the sample is
   a) 16 b) 20 c) 25 d) 30

9) Bitumen of grade 80/100 means
   a) Its penetration value is 8 to 10 mm
   b) Its penetration value is 8 mm
   c) Its penetration value is 10 mm
   d) Its penetration value is 80 to 100 mm

10) The test conducted on distressed pavement to know the deflection of the pavement is
   a) Bump integrator test
   b) Benkelman test
   c) Skid resistance test
   d) Roughness test

_____

SLR-VB – 45(A)

Seat No.	

T.E. (Civil Engineering) (Part – II) (New – CGPA) Examination, 2017
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

***Instructions**: 1) Figures on **right** indicates **full** marks.*

*2) Assume suitable data **wherever** necessary and mention it **clearly**.*

2. Answer **any five** questions (**8** marks **each**). **(8×5=40)**

a) Draw a neat sketch of flexible pavement and explain briefly the functions of each component parts of pavement.

b) Explain briefly the principle of Burmister's two layer theory and mention the advantages over the elastic single layer theory for the analysis of flexible pavement.

c) Mention the specifications of materials and constructions steps for Water Bound Macadam Base course.

d) Discuss the principles and scope of soil-cement stabilization.

e) List the different types of distresses and causes in flexible pavements.

f) Using the data given below, calculate the wheel load at a) interior b) edge and c) corner regions of a cement concrete pavement using Westergaard's stress equations. Also determine the probable location where the crack is likely to develop due to corner loading.

Wheel Load, P = 5100 kg

Modulus of elasticity of cement concrete, $E = 3.0 \times 10^5$ kg/cm^2

Pavement Thickness, h = 18 cm

Poisson's ratio of concrete, $\mu = 0.15$

Modulus of subgrade reaction, K = 6.0 kg/cm^2

Radius of contact area, a = 15 cm.

g) Design a new flexible pavement using IRC-37-2001 method for a two lane undivided carriageway with following details :

Design CBR value of subgrade = 5.0%

Commercial vehicles per day = 2000 per day

Average growth rate = 5.0% per year

Design life = 20 years

VDF value = 4.5

Lane distribution factor = 0.75, also calculate the each pavement layer thickness using IRC-37 catalogue (Use Figure – 1 and 2).

h) The rebound deflection values determined at 15 spots are given below. Determine the values of i) mean deflection ii) standard deviation and iii) characteristic deflection for an important highway with heavy traffic.

Rebound deflection values in mm : 1.40, 1.32, 1.25, 1.35, 1.48, 1.60, 1.65, 1.55, 1.45, 1.40, 1.36, 1.46, 1.50, 1.52 and 1.45.

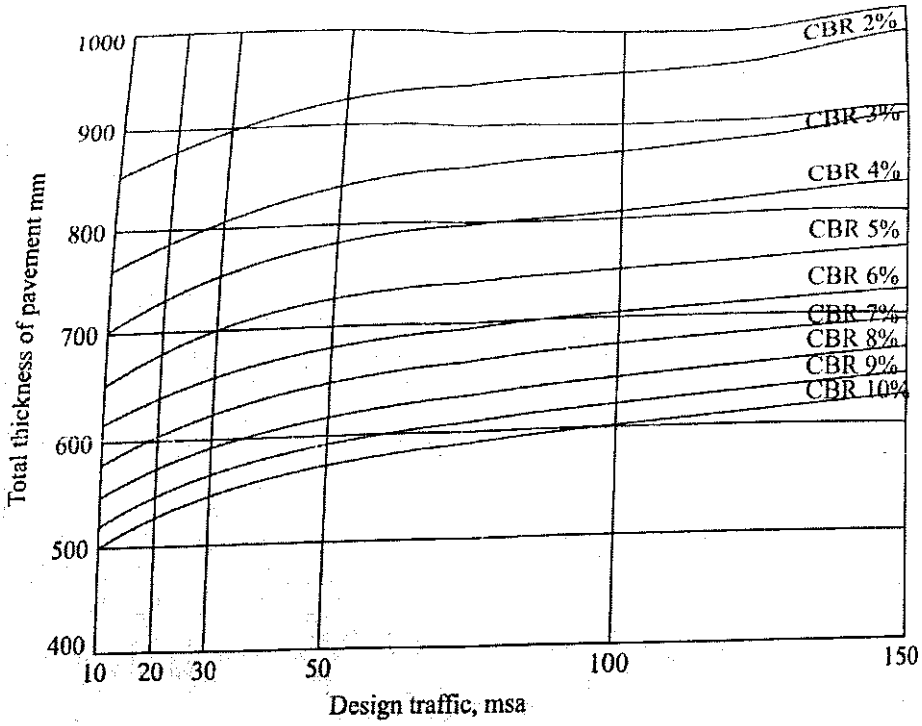

Chart II. Pavement thickness design chart for traffic 10-150 msa

Figure – 1

IRC-37-2001				
PAVEMENT DESIGN CATALOGUE				
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		BC (mm)	DBM (mm)	
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150	770	50	170	

Figure – 2

Set Q

SLR-VB – 45(A)

Seat No.	

Set **R**

T.E. (Civil Engineering) (Part – II) (New – CGPA) Examination, 2017
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) Figures on **right** indicates **full** marks.*
*2) Assume suitable data **wherever** necessary 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) Bitumen of grade 80/100 means
   a) Its penetration value is 8 to 10 mm
   b) Its penetration value is 8 mm
   c) Its penetration value is 10 mm
   d) Its penetration value is 80 to 100 mm

2) The test conducted on distressed pavement to know the deflection of the pavement is
   a) Bump integrator test b) Benkelman test
   c) Skid resistance test d) Roughness test

3) _____ 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

4) In a water absorption test of 20 mm aggregate, the weight of saturated surface dry aggregates in air is 1200 gm and after 24 hours oven dried, the weight reduced to 1180 gm, the actual water absorbed by aggregates is,

a) 1.81% b) 2.81%

c) 3.81% d) 4.81%

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a) 40 b) 30 c) 20 d) 10

6) Weight of sample taken for Los Angeles abrasion test is 2500 gm and after test weight of the specimen retained on 1.70 mm test sieve is 2100 gm, the abrasion value of the sample is

a) 16 b) 20 c) 25 d) 30

7) The joints, parallel to the center line of the road, are called

a) Longitudinal joints b) Transverse joints

c) Expansion joints d) Contraction joints

8) A large difference of temperature between the top and the bottom of the slab causes _____ of the slab.

a) Hardening b) Warping

c) Crazing d) All of these

9) Which of the following represents hardest grade of bitumen ?

a) 30/40 b) 60/70

c) 80/100 d) 100/120

10) The unit of softening point and ductility of bitumen are expressed in,

a) Kg and °C b) cm and mm

c) °C and cm d) Poise and °C

_____

SLR-VB – 45(A)

Seat No.	

T.E. (Civil Engineering) (Part – II) (New – CGPA) Examination, 2017
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Friday, 26-5-2017 Marks : 40
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2. Answer **any five** questions (**8** marks **each**). **(8×5=40)**

a) Draw a neat sketch of flexible pavement and explain briefly the functions of each component parts of pavement.

b) Explain briefly the principle of Burmister's two layer theory and mention the advantages over the elastic single layer theory for the analysis of flexible pavement.

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Wheel Load, P = 5100 kg

Modulus of elasticity of cement concrete, $E = 3.0 \times 10^5$ kg/cm^2

Pavement Thickness, h = 18 cm

Poisson's ratio of concrete, $\mu = 0.15$

Modulus of subgrade reaction, K = 6.0 kg/cm^2

Radius of contact area, a = 15 cm.

g) Design a new flexible pavement using IRC-37-2001 method for a two lane undivided carriageway with following details :

Design CBR value of subgrade = 5.0%

Commercial vehicles per day = 2000 per day

Average growth rate = 5.0% per year

Design life = 20 years

VDF value = 4.5

Lane distribution factor = 0.75, also calculate the each pavement layer thickness using IRC-37 catalogue (Use Figure – 1 and 2).

h) The rebound deflection values determined at 15 spots are given below. Determine the values of i) mean deflection ii) standard deviation and iii) characteristic deflection for an important highway with heavy traffic.

Rebound deflection values in mm : 1.40, 1.32, 1.25, 1.35, 1.48, 1.60, 1.65, 1.55, 1.45, 1.40, 1.36, 1.46, 1.50, 1.52 and 1.45.

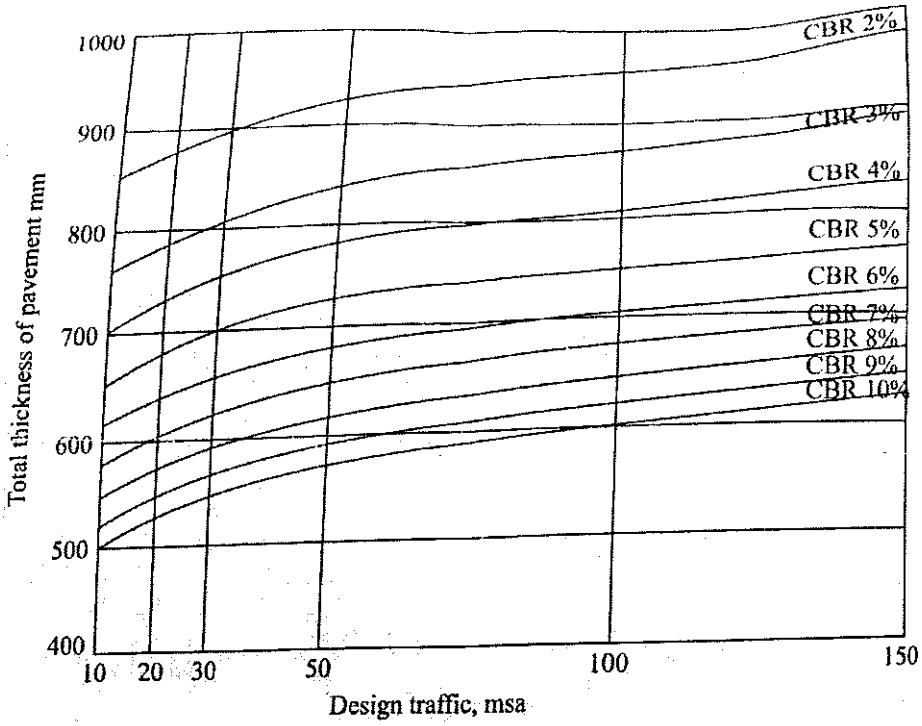

Chart II. Pavement thickness design chart for traffic 10-150 msa

Figure – 1

IRC-37-2001				
PAVEMENT DESIGN CATALOGUE				
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		Bituminous Surfacing		
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30	710	40	120	Base = 250
50	730	40	140	Sub-base = 300
100	750	50	150	
150	770	50	170	

Figure – 2

Set R

SLR-VB – 45(A)

Seat No.	

Set **S**

T.E. (Civil Engineering) (Part – II) (New – CGPA) Examination, 2017
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Friday, 26-5-2017 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) Figures on **right** indicates **full** marks.*
*2) Assume suitable data **wherever** necessary 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 aggregate abrasion value should not exceed _____ percent for aggregate to be used in Bituminous concrete surface course of pavements.
a) 40 b) 30 c) 20 d) 10

2) Weight of sample taken for Los Angeles abrasion test is 2500 gm and after test weight of the specimen retained on 1.70 mm test sieve is 2100 gm, the abrasion value of the sample is
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3) Bitumen of grade 80/100 means
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4) The test conducted on distressed pavement to know the deflection of the pavement is
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5) Which of the following represents hardest grade of bitumen ?
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6) The unit of softening point and ductility of bitumen are expressed in,
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   a) Longitudinal joints
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   c) Expansion joints
   d) Contraction joints

10) A large difference of temperature between the top and the bottom of the slab causes _____ of the slab.
   a) Hardening
   b) Warping
   c) Crazing
   d) All of these

_____

SLR-VB – 45(A)

Seat No.	

T.E. (Civil Engineering) (Part – II) (New – CGPA) Examination, 2017
PAVEMENT ANALYSIS AND DESIGN
(Self-Learning-Technical Course)

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

***Instructions**: 1) Figures on **right** indicates **full** marks.*

*2) Assume suitable data **wherever** necessary and mention it **clearly**.*

2. Answer **any five** questions (**8** marks **each**). **(8×5=40)**

a) Draw a neat sketch of flexible pavement and explain briefly the functions of each component parts of pavement.

b) Explain briefly the principle of Burmister's two layer theory and mention the advantages over the elastic single layer theory for the analysis of flexible pavement.

c) Mention the specifications of materials and constructions steps for Water Bound Macadam Base course.

d) Discuss the principles and scope of soil-cement stabilization.

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Modulus of elasticity of cement concrete, $E = 3.0 \times 10^5$ kg/cm^2

Pavement Thickness, h = 18 cm

Poisson's ratio of concrete, $\mu = 0.15$

Modulus of subgrade reaction, K = 6.0 kg/cm^2

Radius of contact area, a = 15 cm.

g) Design a new flexible pavement using IRC-37-2001 method for a two lane undivided carriageway with following details :

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Commercial vehicles per day = 2000 per day

Average growth rate = 5.0% per year

Design life = 20 years

VDF value = 4.5

Lane distribution factor = 0.75, also calculate the each pavement layer thickness using IRC-37 catalogue (Use Figure – 1 and 2).

h) The rebound deflection values determined at 15 spots are given below. Determine the values of i) mean deflection ii) standard deviation and iii) characteristic deflection for an important highway with heavy traffic.

Rebound deflection values in mm : 1.40, 1.32, 1.25, 1.35, 1.48, 1.60, 1.65, 1.55, 1.45, 1.40, 1.36, 1.46, 1.50, 1.52 and 1.45.

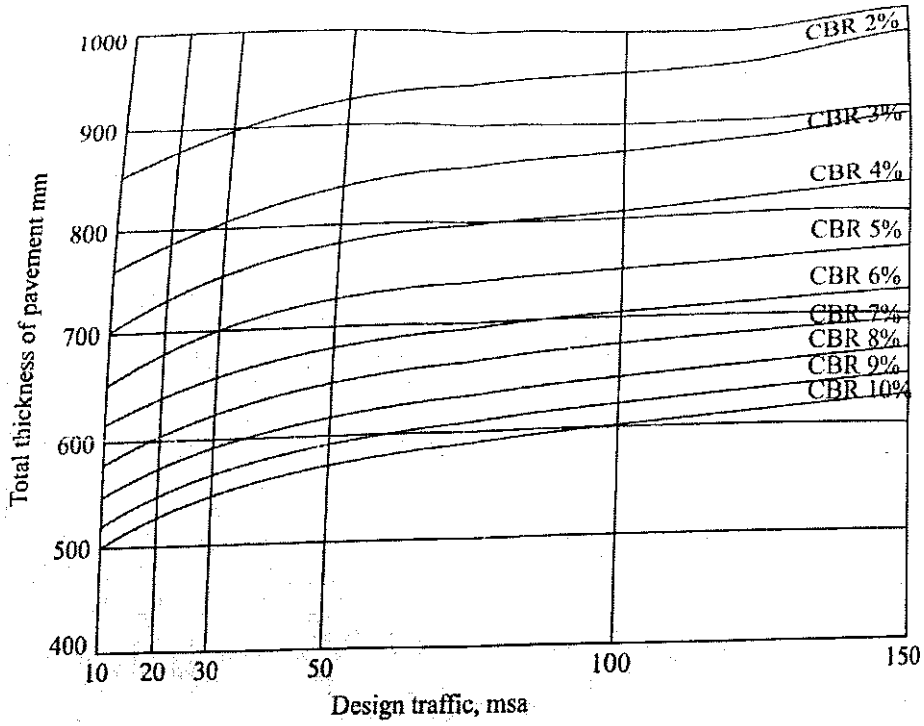

Chart II. Pavement thickness design chart for traffic 10-150 msa

Figure – 1

IRC-37-2001				
PAVEMENT DESIGN CATALOGUE				
PLATE 2 – RECOMMENDED DESIGNS FOR TRAFFIC RANGE 10-150 msa				
Cumulative Traffic (msa)	Total Pavement Thickness (mm)	Pavement Composition		Granular Base and Sub-base (mm)
		Bituminous Surfacing		
		BC (mm)	DBM (mm)	
10	660	40	70	
20	690	40	100	
30	710	40	120	Base = 250
50	730	40	140	Sub-base = 300
100	750	50	150	
150	770	50	170	

Figure – 2

Set S

SLR-VB – 45(C)

Seat No.	

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017
PLANNING FOR SUSTAINABLE DEVELOPMENT
Self Learning (Technical)

Day and Date: Friday, 26-5-2017 Max. Marks: 50
Time: 3.00 p.m. to 5.00 p.m.

***Instructions**: 1) Solve **any five** questions.*
*2) Figures to the **right** indicates **full** marks.*

1. Explain three pillars of sustainability. **10**
2. Discuss in detail the purpose of environmental innovation indicators. **10**
3. Discuss concerns and criticism regarding sustainable development. **10**
4. Discuss concept of 'Sustainability: squaring circle ?' **10**
5. Write a detailed note on : eco innovation as special type of innovation. **10**
6. Discuss planning for sustainable development with respect to infrastructure projects. **10**
7. Explain in detail how governance can help in the sustainable development. **10**

SLR-VB – 45(e)

Seat No.	

T.E. (Civil) (Part – II) (New-CGPA) Examination, 2017
EARTHQUAKE RESISTANT NON-ENGINEERED CONSTRUCTION
(Self Learning Technical Course)

Day and Date : Friday, 26-5-2017 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Write a detailed note on internal structure of Earth. **10**

2. Landslide is cause as well as effect of an earthquake. Justify the statement. **10**

3. Explain the different magnitude scales to measure an earthquake. **10**

4. What are causes of damages due to earthquake in the stone masonry construction ? **10**

5. What is meant by Strengthening ? Explain few Strengthening features for walls. **10**

6. Explain the significance of RC bands in masonry construction. **10**

SLR-VB – 46

Seat No.	

Set P

B.E. (Civil) (Part – I) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Thursday, 4-5-2017 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**.*
*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 456 and non programmable calculator is **allowed**.*
*4) Assume suitable data if **required** and state it **clearly**.*
*5) MCQ Eq. No. **1, 4, 6, 10, 12** and **13** are containing **2** marks **each**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer :

1) An R.C.C. beam is of size 300×1000 mm. It is subjected to V = 150 kN. M = 150 kNm and T = 30kN-m. at limiting conditions. Equivalent bending moment and Equivalent shear force at ultimate loads are respectively **2**
   a) 151 kN-m, 310 kN b) 226.5 kN-m, 206 kN
   c) 100.5 kN-m, 310 kN d) 226.5 kN-m, 310 kN

2) Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by **1**
   a) Rankine formula b) Rankine Grashoff formula
   c) Marcus formula d) Rankine-Marcus formula

3) The neutral axis of a T-beam exists **1**
   a) within the flange b) at the bottom edge of the slab
   c) below the slab d) all the above

4) 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 **2**
   a) 360 kN b) 1000 kN c) 100 kN d) 794 kN

5) The diameter of longitudinal bars of a column should never be less than **1**
   a) 6 mm b) 8 mm c) 10 mm d) 12 mm

P.T.O.

6) The limited steel for a singly reinforced beam with M_{15} and Fe_{415} in mm^2 is _____ (b = 200 mm; d = 300 mm) **2**
   a) 234 b) 456 c) 432 d) 567

7) The maximum area of tension reinforcement in beams shall not exceed **1**
   a) 0.15% b) 1.5% c) 4% d) 1%

8) The amount of reinforcement for main bars in a slab, is based upon **1**
   a) minimum bending moment b) maximum shear force
   c) maximum bending moment d) minimum shear force

9) A continuous beam shall be deemed to be a shallow beam if the ratio of effective span to overall depth, is **1**
   a) 2.5 b) 2.0 c) less than 2 d) greater than 2.5

10) Factored load carrying capacity of a column of 300 mm $\times$ 600 mm size with minimum percentage of steel is _____ (M_{20} and Fe_{415}) **2**
   a) 1840 kN b) 180 kN c) 1829 kN d) None

11) The percentage of minimum reinforcement in slabs is _____ of the gross sectional area, if HYSD bars are used. **1**
   a) 0.10% b) 0.20% c) 0.15% d) 0.18%

12) The limiting moment of resistance of a singly reinforced beam of size 200 $\times$ 500 (effective) reinforced with Fe_{415} is (M_{15} grade concrete) **2**
   a) 103.5 kN-m b) 69 kN-m c) 90 kN-m d) 235.4 kN-m

13) 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 **2**
   a) 400 mm b) 500 mm c) 657 mm d) 456 mm

14) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at **1**
   a) Supports b) Mid span c) Every section d) Quarter span

_____

SLR-VB – 46

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Thursday, 4-5-2017 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) Assume suitable data if required and state it **clearly**.*
*4) Draw neat sketches **wherever** necessary.*

SECTION – I

II. A roof of clear dimensions 3m$\times$5m supported on walls of 300mm thickness, with corners are held down. Design the slab, if the beam is carrying a live load of 3 kN/m^2 and floor finish 1 kN/m^2. Use M_{20} concrete and Fe_{415} steel. **13**

III. A rectangular beam 200mm wide and 350mm deep up to the centre of reinforcement has to resist a factored moment of 40 kN-m. Design the section. Use M_{25} and Fe_{415} steel. **13**

IV. An R.C.C. beam having 300 mm$\times$600 mm section, the beam is reinforced with 4-20 mm Φ . Bars in tension and 2-20 mm Φ . Bars are placed at a 50 mm from top in the compression zone. Find the factored moment of resistance of the beam. Use M_{25} concrete and Fe_{500} steel. **13**

V. A floor of 150 mm thick slab forming part of T-beam which are of 8 m span. The end bearing are 450 mm thick. Spacing of T beam is 3.5 m. the live load on the floor is 4 kN/m^2. Design an intermediate beam for flexure. Use M_{20} concrete and Fe_{500} steel. **14**

Set P

SECTION – II

VI. Design a rectangular beam of spans 7 m to carry a dead load of 12 kN/m and live load of 16 kN/m. The beam is continuous over more than 3 spans and is supported by columns. Use M_{20} concrete and Fe_{415} steel. **14**

VII. Determine the reinforcement required for a beam size 300 mm$\times$600 mm subjected to a factored bending moment 120 kN-m, a factored shear force 100 kN and a factored torsion moment of 60 kN-m. Use M_{25} concrete and Fe_{415} steel. **13**

VIII. A reinforced concrete column of 3 m long and restrained in position and direction at both ends to carry an axial load of 1400 kN. Design the column using M_{20} concrete and Fe_{500} steel. **13**

IX. Design a circular column with helical reinforcement to carry an axial load of 1800 kN. The column is having spiral ties. The column is 3.2 m long and in effectively held in at both ends, but not restrained against rotation. Use M_{25} concrete and Fe_{500} steel. **13**

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SLR-VB – 46

Seat No.	

Set Q

B.E. (Civil) (Part – I) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Thursday, 4-5-2017 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**.*
*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 456 and non programmable calculator is **allowed**.*
*4) Assume suitable data if **required** and state it **clearly**.*
*5) MCQ Eq. No. **6, 8, 11, 13, 5** and **6** are containing **2** marks **each**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer :

1) The amount of reinforcement for main bars in a slab, is based upon **1**
   a) minimum bending moment b) maximum shear force
   c) maximum bending moment d) minimum shear force

2) A continuous beam shall be deemed to be a shallow beam if the ratio of effective span to overall depth, is **1**
   a) 2.5 b) 2.0 c) less than 2 d) greater than 2.5

3) Factored load carrying capacity of a column of 300 mm $\times$ 600 mm size with minimum percentage of steel is _____ (M_{20} and Fe_{415}) **2**
   a) 1840 kN b) 180 kN c) 1829 kN d) None

4) The percentage of minimum reinforcement in slabs is _____ of the gross sectional area, if HYSD bars are used. **1**
   a) 0.10% b) 0.20% c) 0.15% d) 0.18%

5) The limiting moment of resistance of a singly reinforced beam of size 200 $\times$ 500 (effective) reinforced with Fe_{415} is (M_{15} grade concrete) **2**
   a) 103.5 kN-m b) 69 kN-m c) 90 kN-m d) 235.4 kN-m

6) 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 **2**
   a) 400 mm b) 500 mm c) 657 mm d) 456 mm

P.T.O.

7) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at **1**
   a) Supports b) Mid span c) Every section d) Quarter span

8) An R.C.C. beam is of size 300×1000 mm. It is subjected to V = 150 kN. M = 150 kNm and T = 30kN-m. at limiting conditions. Equivalent bending moment and Equivalent shear force at ultimate loads are respectively **2**
   a) 151 kN-m, 310 kN b) 226.5 kN-m, 206 kN
   c) 100.5 kN-m, 310 kN d) 226.5 kN-m, 310 kN

9) Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by **1**
   a) Rankine formula b) Rankine Grashoff formula
   c) Marcus formula d) Rankine-Marcus formula

10) The neutral axis of a T-beam exists **1**
   a) within the flange b) at the bottom edge of the slab
   c) below the slab d) all the above

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 **2**
   a) 360 kN b) 1000 kN c) 100 kN d) 794 kN

12) The diameter of longitudinal bars of a column should never be less than **1**
   a) 6 mm b) 8 mm c) 10 mm d) 12 mm

13) The limited steel for a singly reinforced beam with M_{15} and Fe_{415} in mm^2 is _____ (b = 200 mm; d = 300 mm) **2**
   a) 234 b) 456 c) 432 d) 567

14) The maximum area of tension reinforcement in beams shall not exceed **1**
   a) 0.15% b) 1.5% c) 4% d) 1%

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SLR-VB – 46

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Thursday, 4-5-2017 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) Assume suitable data if required and state it **clearly**.*
*4) Draw neat sketches **wherever** necessary.*

SECTION – I

II. A roof of clear dimensions 3m$\times$5m supported on walls of 300mm thickness, with corners are held down. Design the slab, if the beam is carrying a live load of 3 kN/m^2 and floor finish 1 kN/m^2. Use M_{20} concrete and Fe_{415} steel. **13**

III. A rectangular beam 200mm wide and 350mm deep up to the centre of reinforcement has to resist a factored moment of 40 kN-m. Design the section. Use M_{25} and Fe_{415} steel. **13**

IV. An R.C.C. beam having 300 mm$\times$600 mm section, the beam is reinforced with 4-20 mm Φ . Bars in tension and 2-20 mm Φ . Bars are placed at a 50 mm from top in the compression zone. Find the factored moment of resistance of the beam. Use M_{25} concrete and Fe_{500} steel. **13**

V. A floor of 150 mm thick slab forming part of T-beam which are of 8 m span. The end bearing are 450 mm thick. Spacing of T beam is 3.5 m. the live load on the floor is 4 kN/m^2. Design an intermediate beam for flexure. Use M_{20} concrete and Fe_{500} steel. **14**

Set Q

SECTION – II

VI. Design a rectangular beam of spans 7 m to carry a dead load of 12 kN/m and live load of 16 kN/m. The beam is continuous over more than 3 spans and is supported by columns. Use M_{20} concrete and Fe_{415} steel. **14**

VII. Determine the reinforcement required for a beam size 300 mm$\times$600 mm subjected to a factored bending moment 120 kN-m, a factored shear force 100 kN and a factored torsion moment of 60 kN-m. Use M_{25} concrete and Fe_{415} steel. **13**

VIII. A reinforced concrete column of 3 m long and restrained in position and direction at both ends to carry an axial load of 1400 kN. Design the column using M_{20} concrete and Fe_{500} steel. **13**

IX. Design a circular column with helical reinforcement to carry an axial load of 1800 kN. The column is having spiral ties. The column is 3.2 m long and in effectively held in at both ends, but not restrained against rotation. Use M_{25} concrete and Fe_{500} steel. **13**

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SLR-VB – 46

Seat No.	

Set R

B.E. (Civil) (Part – I) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Thursday, 4-5-2017 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**.*
*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 456 and non programmable calculator is **allowed**.*
*4) Assume suitable data if **required** and state it **clearly**.*
*5) MCQ Eq. No. **11, 14, 2, 6, 8** and **9** are containing **2** marks **each**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer :

1) The diameter of longitudinal bars of a column should never be less than **1**
a) 6 mm b) 8 mm c) 10 mm d) 12 mm

2) The limited steel for a singly reinforced beam with M_{15} and Fe_{415} in mm^2 is _____ (b = 200 mm; d = 300 mm) **2**
a) 234 b) 456 c) 432 d) 567

3) The maximum area of tension reinforcement in beams shall not exceed **1**
a) 0.15% b) 1.5% c) 4% d) 1%

4) The amount of reinforcement for main bars in a slab, is based upon **1**
a) minimum bending moment b) maximum shear force
c) maximum bending moment d) minimum shear force

5) A continuous beam shall be deemed to be a shallow beam if the ratio of effective span to overall depth, is **1**
a) 2.5 b) 2.0 c) less than 2 d) greater than 2.5

6) Factored load carrying capacity of a column of 300 mm × 600 mm size with minimum percentage of steel is _____ (M_{20} and Fe_{415}) **2**
a) 1840 kN b) 180 kN c) 1829 kN d) None

P.T.O.

7) The percentage of minimum reinforcement in slabs is _____ of the gross sectional area, if HYSD bars are used. **1**
   a) 0.10% b) 0.20% c) 0.15% d) 0.18%

8) The limiting moment of resistance of a singly reinforced beam of size 200×500 (effective) reinforced with Fe_{415} is (M_{15} grade concrete) **2**
   a) 103.5 kN-m b) 69 kN-m c) 90 kN-m d) 235.4 kN-m

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 **2**
   a) 400 mm b) 500 mm c) 657 mm d) 456 mm

10) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at **1**
   a) Supports b) Mid span c) Every section d) Quarter span

11) An R.C.C beam is of size 300×1000 mm. It is subjected to V = 150 kN. M = 150 kNm and T = 30kN-m. at limiting conditions. Equivalent bending moment and Equivalent shear force at ultimate loads are respectively **2**
   a) 151 kN-m, 310 kN b) 226.5 kN-m, 206 kN
   c) 100.5 kN-m, 310 kN d) 226.5 kN-m, 310 kN

12) Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by **1**
   a) Rankine formula b) Rankine Grashoff formula
   c) Marcus formula d) Rankine-Marcus formula

13) The neutral axis of a T-beam exists **1**
   a) within the flange b) at the bottom edge of the slab
   c) below the slab d) all the above

14) 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 **2**
   a) 360 kN b) 1000 kN c) 100 kN d) 794 kN

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SLR-VB – 46

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Thursday, 4-5-2017 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) Assume suitable data if required and state it **clearly**.*
*4) Draw neat sketches **wherever** necessary.*

SECTION – I

II. A roof of clear dimensions 3m$\times$5m supported on walls of 300mm thickness, with corners are held down. Design the slab, if the beam is carrying a live load of 3 kN/m^2 and floor finish 1 kN/m^2. Use M_{20} concrete and Fe_{415} steel. **13**

III. A rectangular beam 200mm wide and 350mm deep up to the centre of reinforcement has to resist a factored moment of 40 kN-m. Design the section. Use M_{25} and Fe_{415} steel. **13**

IV. An R.C.C. beam having 300 mm$\times$600 mm section, the beam is reinforced with 4-20 mm Φ . Bars in tension and 2-20 mm Φ . Bars are placed at a 50 mm from top in the compression zone. Find the factored moment of resistance of the beam. Use M_{25} concrete and Fe_{500} steel. **13**

V. A floor of 150 mm thick slab forming part of T-beam which are of 8 m span. The end bearing are 450 mm thick. Spacing of T beam is 3.5 m. the live load on the floor is 4 kN/m^2. Design an intermediate beam for flexure. Use M_{20} concrete and Fe_{500} steel. **14**

Set R

SECTION – II

VI. Design a rectangular beam of spans 7 m to carry a dead load of 12 kN/m and live load of 16 kN/m. The beam is continuous over more than 3 spans and is supported by columns. Use M_{20} concrete and Fe_{415} steel. **14**

VII. Determine the reinforcement required for a beam size 300 mm$\times$600 mm subjected to a factored bending moment 120 kN-m, a factored shear force 100 kN and a factored torsion moment of 60 kN-m. Use M_{25} concrete and Fe_{415} steel. **13**

VIII. A reinforced concrete column of 3 m long and restrained in position and direction at both ends to carry an axial load of 1400 kN. Design the column using M_{20} concrete and Fe_{500} steel. **13**

IX. Design a circular column with helical reinforcement to carry an axial load of 1800 kN. The column is having spiral ties. The column is 3.2 m long and in effectively held in at both ends, but not restrained against rotation. Use M_{25} concrete and Fe_{500} steel. **13**

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SLR-VB – 46

Seat No.	

Set S

B.E. (Civil) (Part – I) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Thursday, 4-5-2017 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**.*
*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 456 and non programmable calculator is **allowed**.*
*4) Assume suitable data if **required** and state it **clearly**.*
*5) MCQ Eq. No. **1, 3, 4, 6, 9** and **11** are containing **2** marks **each**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer :

1) Factored load carrying capacity of a column of 300 mm $\times$ 600 mm size with minimum percentage of steel is _____ (M_{20} and Fe_{415}) **2**

a) 1840 kN b) 180 kN c) 1829 kN d) None

2) The percentage of minimum reinforcement in slabs is _____ of the gross sectional area, if HYSD bars are used. **1**

a) 0.10% b) 0.20% c) 0.15% d) 0.18%

3) The limiting moment of resistance of a singly reinforced beam of size 200 $\times$ 500 (effective) reinforced with Fe_{415} is (M_{15} grade concrete) **2**

a) 103.5 kN-m b) 69 kN-m c) 90 kN-m d) 235.4 kN-m

4) 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 **2**

a) 400 mm b) 500 mm c) 657 mm d) 456 mm

5) Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at **1**

a) Supports b) Mid span c) Every section d) Quarter span

P.T.O.

6) An R.C.C. beam is of size 300×1000 mm. It is subjected to V = 150 kN. M = 150 kNm and T = 30kN-m. at limiting conditions. Equivalent bending moment and Equivalent shear force at ultimate loads are respectively **2**

a) 151 kN-m, 310 kN b) 226.5 kN-m, 206 kN
c) 100.5 kN-m, 310 kN d) 226.5 kN-m, 310 kN

7) Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by **1**

a) Rankine formula b) Rankine Grashoff formula
c) Marcus formula d) Rankine-Marcus formula

8) The neutral axis of a T-beam exists **1**

a) within the flange b) at the bottom edge of the slab
c) below the slab d) all the above

9) 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 **2**

a) 360 kN b) 1000 kN c) 100 kN d) 794 kN

10) The diameter of longitudinal bars of a column should never be less than **1**

a) 6 mm b) 8 mm c) 10 mm d) 12 mm

11) The limited steel for a singly reinforced beam with M_{15} and Fe_{415} in mm^2 is _____ (b = 200 mm; d = 300 mm) **2**

a) 234 b) 456 c) 432 d) 567

12) The maximum area of tension reinforcement in beams shall not exceed **1**

a) 0.15% b) 1.5% c) 4% d) 1%

13) The amount of reinforcement for main bars in a slab, is based upon **1**

a) minimum bending moment b) maximum shear force
c) maximum bending moment d) minimum shear force

14) A continuous beam shall be deemed to be a shallow beam if the ratio of effective span to overall depth, is **1**

a) 2.5 b) 2.0 c) less than 2 d) greater than 2.5

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SLR-VB – 46

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – I

Day and Date : Thursday, 4-5-2017 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) Assume suitable data if required and state it **clearly**.*
*4) Draw neat sketches **wherever** necessary.*

SECTION – I

II. A roof of clear dimensions 3m$\times$5m supported on walls of 300mm thickness, with corners are held down. Design the slab, if the beam is carrying a live load of 3 kN/m^2 and floor finish 1 kN/m^2. Use M_{20} concrete and Fe_{415} steel. **13**

III. A rectangular beam 200mm wide and 350mm deep up to the centre of reinforcement has to resist a factored moment of 40 kN-m. Design the section. Use M_{25} and Fe_{415} steel. **13**

IV. An R.C.C. beam having 300 mm$\times$600 mm section, the beam is reinforced with 4-20 mm Φ . Bars in tension and 2-20 mm Φ . Bars are placed at a 50 mm from top in the compression zone. Find the factored moment of resistance of the beam. Use M_{25} concrete and Fe_{500} steel. **13**

V. A floor of 150 mm thick slab forming part of T-beam which are of 8 m span. The end bearing are 450 mm thick. Spacing of T beam is 3.5 m. the live load on the floor is 4 kN/m^2. Design an intermediate beam for flexure. Use M_{20} concrete and Fe_{500} steel. **14**

SECTION – II

VI. Design a rectangular beam of spans 7 m to carry a dead load of 12 kN/m and live load of 16 kN/m. The beam is continuous over more than 3 spans and is supported by columns. Use M_{20} concrete and Fe_{415} steel. **14**

VII. Determine the reinforcement required for a beam size 300 mm$\times$600 mm subjected to a factored bending moment 120 kN-m, a factored shear force 100 kN and a factored torsion moment of 60 kN-m. Use M_{25} concrete and Fe_{415} steel. **13**

VIII. A reinforced concrete column of 3 m long and restrained in position and direction at both ends to carry an axial load of 1400 kN. Design the column using M_{20} concrete and Fe_{500} steel. **13**

IX. Design a circular column with helical reinforcement to carry an axial load of 1800 kN. The column is having spiral ties. The column is 3.2 m long and in effectively held in at both ends, but not restrained against rotation. Use M_{25} concrete and Fe_{500} steel. **13**

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SLR-VB – 47

Seat No.	

Set P

B.E. (Civil) (Part – I) Examination, 2017
QUANTITY SURVEYING AND VALUATION

Day and Date : Friday, 5-5-2017 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 **if necessary** but mention **it clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Pick up the item of work expressed in numbers
   A) Windows B) Bands of specified width
   C) White washing D) Earth work
2) Pick up the item of work expressed in running meter (RM)
   A) Doors B) Hand rail C) Plastering D) Cement Concrete
3) Pick up the item of work expressed in square meters
   A) Trusses B) Cornice
   C) Partition of specified thickness D) Brick Masonary
4) Pick up the item of work expressed in Cubic meters
   A) Doors B) Hand rail C) Plastering D) Cement concrete
5) The concurrence of the Competent Authority of the Administrative Ministry/Department requisitioning the work should be obtained to the
   A) Preliminary Estimate for the work B) Detailed Estimate for the work
   C) Revised Estimate for the work D) Supplementary Estimate
6) Excess up to _____ % of the amount of the administrative approval may be authorised by officers of the CPWD, upto their respective powers of technical sanction.
   A) 1 B) 2 C) 5 D) 10
7) For Monumental structures types of buildings, the economic life shall be taken as below
   A) 100 years B) 75 years C) 55 years D) 30 years
8) For RCC framed structures types of buildings, the economic life shall be taken as below
   A) 100 years B) 75 years C) 55 years D) 30 years
9) For Load bearing structures types of buildings, the economic life shall be taken as below
   A) 100 years B) 75 years C) 55 years D) 30 years

P.T.O.

10) For Semi permanent structures types of buildings, the economic life shall be taken as below

A) 100 years B) 75 years C) 55 years D) 30 years

11) The technical sanction can be exceeded upto _____ % beyond which revised 'technical sanction' shall be necessary.

A) 1 B) 2 C) 5 D) 10

12) A provision of contingency shall be kept for preliminary estimate of work of estimated cost upto 1 crore as follows

A) 5% B) 5% subject to minimum of Rs. 5 Lakh

C) 3% subject to minimum of Rs. 5 Lakh D) 3%

13) A provision of contingency shall be kept for preliminary estimate of work of estimated cost more than 1 crore as follows

A) 5% B) 5% subject to minimum of Rs. 5 Lakh

C) 3% subject to minimum of Rs. 5 Lakh D) 3%

14) In long and short wall method of estimation, the length of short wall is the centre to centre distance between the walls

A) Minus one breadth of the wall on each side

B) Minus half breadth of wall on each side

C) Plus one breadth of wall on each side

D) Plus half breadth of wall on each side

15) In preliminary estimates provision for services like sanitary, water supply, drainage and electric installations etc., should be made on the basis of

A) plinth area rates B) built up area

C) plot area D) length of service line

16) In preliminary estimate the cost of work-charged establishment is covered as

A) 3% B) 5% C) 10% D) Under contingency

17) According to the practice in Central PWD, earnest money is paid by each tenderer to enable the Government to ensure that a tenderer does not

A) Back out of his tender before its acceptance

B) Refuse to execute the work after it has been awarded to him

C) Compromise with quality of work

D) A or B

18) The amount of the earnest money, which a contractor should deposit with the tender, is regulated by the following scales. For works estimated to cost upto Rs. ten crores

A) 1% of the estimated cost B) 2% of the estimated cost

C) 20 lakh + 1% of the estimated cost D) 20 lakh + 2% of the estimated cost

19) The amount of the earnest money, which a contractor should deposit with the tender, is regulated by the following scales. For works estimated to cost more than Rs. ten crores

A) 1% of the estimated cost B) 2% of the estimated cost

C) 20 lakh + 1% of the estimated cost D) 20 lakh + 2% of the estimated cost

20) No deductions are required during the measurement of concreting work if the area of opening is less than or equal to

A) 0.1 Sq.m. B) 0.5 Sq.m C) 1.0 Sq.m. D) 3.0 Sq.m.

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SLR-VB – 47

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
QUANTITY SURVEYING AND VALUATION

Day and Date : Friday, 5-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 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.no. **6** to Q.**8**.*
*2) Assume suitable data **if necessary** but mention **it clearly**.*

2. Calculate quantity of R.C.C. in toe wall, waist slab (both flights) and landing (mid and first floor) for the staircase (Fig. 4.12). Also calculate quantity of brickwork and plastering for steps. Prepare a measurement sheet and enter the data. **14**

3. A) Prepare an approximate estimate of building project with total plinth area of all building is 800 sqm. and from following data.
   i) Plinth area rate Rs. 4,500 per sqm
   ii) Cost of water supply @7½% of cost of building.
   iii) Cost of Sanitary and Electrical installations each @7½% of cost of building.
   iv) Cost of architectural features @1% of building cost.
   v) Cost of roads and lawns @5% of building cost.
   vi) Cost of P.S. and contingencies @4% of building cost. **8**

   B) State the methods of approximate estimate, explain any one. **5**

4. A) Write the detailed specifications for **8**
   a) 1st class brickwork in 1 : 6 cement mortar
   b) Earthwork in excavation.

   B) Write note on Provisonal quantities and Provisional sums. **5**

5. A) Carry out Rate analysis for the following items. **8**
   a) Cement mortar 1 : 4
   b) Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including disposal of excavated earth upto 50 m and lift upto 1.5 m, disposed soil to belevelled and neatly dressed in All kinds of soil.

   B) Differentiate between long wall short wall and Center line method. **5**

6. A) List various types of contract and explain BOT contract. **8**

   B) What is Earnest Money Deposit and Security Deposit ? **5**

Set P

7. A) List various methods of valuation and describe Belting method of valuation of land with suitable example. **8**

   B) Define : **5**

   1) Book Value
   2) Accommodation Value
   3) Speculation Value
   4) Scrap Value
   5) Potential Value.

8. A) An R.C.C. framed structure building having estimated future life of 80 years, fetches a gross annual rent of Rs. 2,200/- per month. Work out its capitalized value on the basis of 6% net yield. The rate of compound interest for sinking fund may be 4%. The plot measures 400 sq.m. and cost of land may be taken as Rs. 120/- per sq.m. The other out goings are

   i) Repair and maintenance = 8.33% of gross income
   ii) Municipal and property taxes = 25% gross income
   iii) Management and miscellaneous = 7% gross income.

   The plinth area of the building is 800 sq.m. and cost per sq.m. may be taken as Rs. 500/- per sq.m. **8**

   B) Explain Easement Rights. **5**

9. What do you mean by valuation ? What is its necessity ? List various methods of valuation and describe any three of them giving examples. **14**

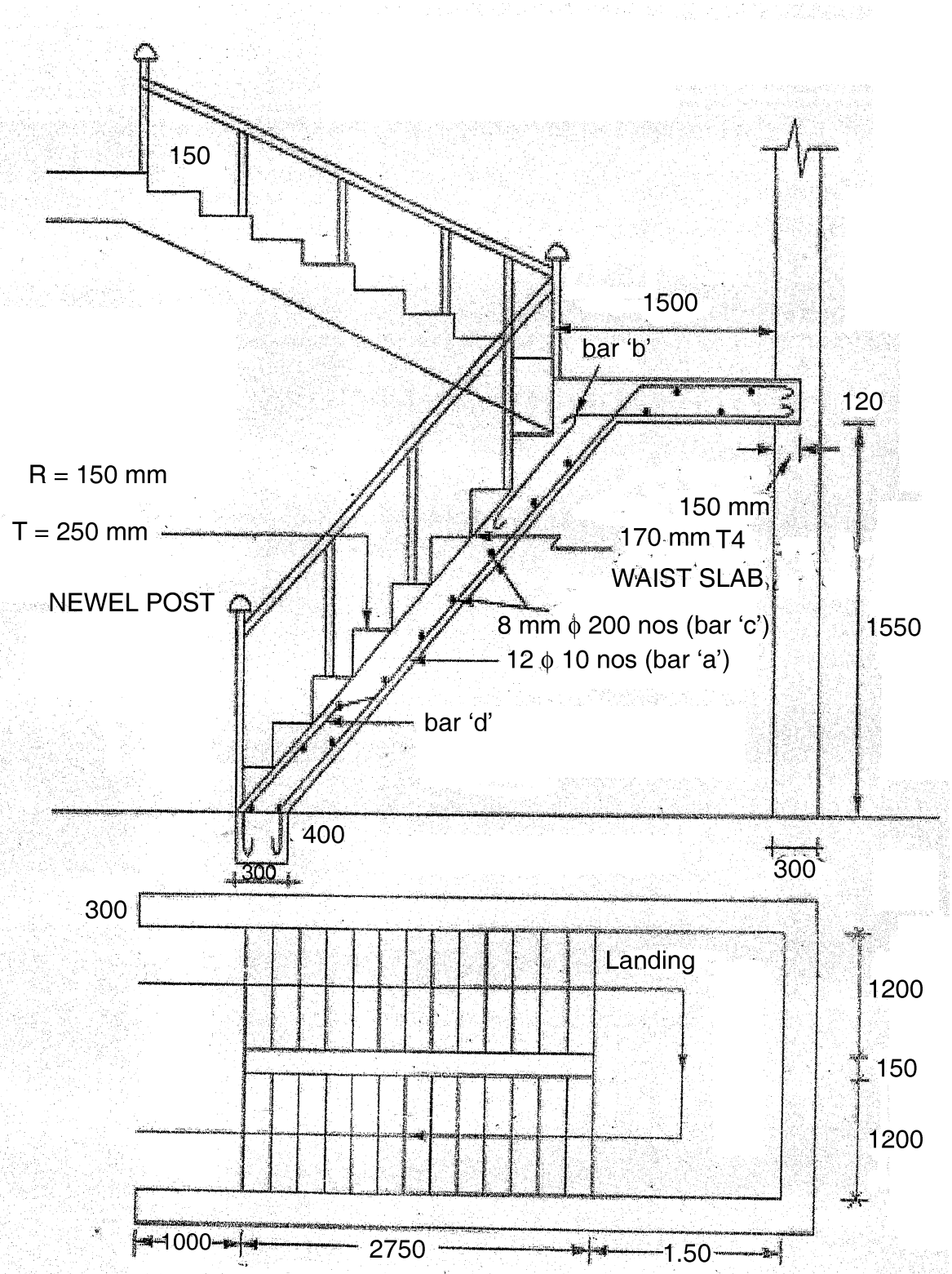
150
1500
bar 'b'
120
R = 150 mm
T = 250 mm
150 mm
170 mm T4
WAIST SLAB
NEWEL POST
8 mm ϕ 200 nos (bar 'c')
12 ϕ 10 nos (bar 'a')
1550
bar 'd'
400
300
300
300
Landing
1200
150
1200
1000
2750
1.50

Fig. 4.12

Set P

SLR-VB – 47

Seat No.	

Set Q

B.E. (Civil) (Part – I) Examination, 2017
QUANTITY SURVEYING AND VALUATION

Day and Date : Friday, 5-5-2017 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 **if necessary** but mention **it clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) In preliminary estimate the cost of work-charged establishment is covered as
A) 3% B) 5% C) 10% D) Under contingency

2) According to the practice in Central PWD, earnest money is paid by each tenderer to enable the Government to ensure that a tenderer does not
A) Back out of his tender before its acceptance
B) Refuse to execute the work after it has been awarded to him
C) Compromise with quality of work
D) A or B

3) The amount of the earnest money, which a contractor should deposit with the tender, is regulated by the following scales. For works estimated to cost upto Rs. ten crores
A) 1% of the estimated cost B) 2% of the estimated cost
C) 20 lakh + 1% of the estimated cost D) 20 lakh + 2% of the estimated cost

4) The amount of the earnest money, which a contractor should deposit with the tender, is regulated by the following scales. For works estimated to cost more than Rs. ten crores
A) 1% of the estimated cost B) 2% of the estimated cost
C) 20 lakh + 1% of the estimated cost D) 20 lakh + 2% of the estimated cost

5) No deductions are required during the measurement of concreting work if the area of opening is less than or equal to
A) 0.1 Sq.m. B) 0.5 Sq.m C) 1.0 Sq.m. D) 3.0 Sq.m.

6) Pick up the item of work expressed in numbers
A) Windows B) Bands of specified width
C) White washing D) Earth work

P.T.O.

7) Pick up the item of work expressed in running meter (RM)
A) Doors B) Hand rail C) Plastering D) Cement Concrete

8) Pick up the item of work expressed in square meters
A) Trusses B) Cornice
C) Partition of specified thickness D) Brick Masonary

9) Pick up the item of work expressed in Cubic meters
A) Doors B) Hand rail C) Plastering D) Cement concrete

10) The concurrence of the Competent Authority of the Administrative Ministry/Department requisitioning the work should be obtained to the
A) Preliminary Estimate for the work B) Detailed Estimate for the work
C) Revised Estimate for the work D) Supplementary Estimate

11) Excess up to _____ % of the amount of the administrative approval may be authorised by officers of the CPWD, upto their respective powers of technical sanction.
A) 1 B) 2 C) 5 D) 10

12) For Monumental structures types of buildings, the economic life shall be taken as below
A) 100 years B) 75 years C) 55 years D) 30 years

13) For RCC framed structures types of buildings, the economic life shall be taken as below
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15) For Semi permanent structures types of buildings, the economic life shall be taken as below
A) 100 years B) 75 years C) 55 years D) 30 years

16) The technical sanction can be exceeded upto _____ % beyond which revised 'technical sanction' shall be necessary.
A) 1 B) 2 C) 5 D) 10

17) A provision of contingency shall be kept for preliminary estimate of work of estimated cost upto 1 crore as follows
A) 5% B) 5% subject to minimum of Rs. 5 Lakh
C) 3% subject to minimum of Rs. 5 Lakh D) 3%

18) A provision of contingency shall be kept for preliminary estimate of work of estimated cost more than 1 crore as follows
A) 5% B) 5% subject to minimum of Rs. 5 Lakh
C) 3% subject to minimum of Rs. 5 Lakh D) 3%

19) In long and short wall method of estimation, the length of short wall is the centre to centre distance between the walls
A) Minus one breadth of the wall on each side
B) Minus half breadth of wall on each side
C) Plus one breadth of wall on each side
D) Plus half breadth of wall on each side

20) In preliminary estimates provision for services like sanitary, water supply, drainage and electric installations etc., should be made on the basis of
A) plinth area rates B) built up area
C) plot area D) length of service line

SLR-VB – 47

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
QUANTITY SURVEYING AND VALUATION

Day and Date : Friday, 5-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 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.no. **6** to Q.**8**.*
*2) Assume suitable data **if necessary** but mention **it clearly**.*

2. Calculate quantity of R.C.C. in toe wall, waist slab (both flights) and landing (mid and first floor) for the staircase (Fig. 4.12). Also calculate quantity of brickwork and plastering for steps. Prepare a measurement sheet and enter the data. **14**

3. A) Prepare an approximate estimate of building project with total plinth area of all building is 800 sqm. and from following data.
   i) Plinth area rate Rs. 4,500 per sqm
   ii) Cost of water supply @7½% of cost of building.
   iii) Cost of Sanitary and Electrical installations each @7½% of cost of building.
   iv) Cost of architectural features @1% of building cost.
   v) Cost of roads and lawns @5% of building cost.
   vi) Cost of P.S. and contingencies @4% of building cost. **8**

   B) State the methods of approximate estimate, explain any one. **5**

4. A) Write the detailed specifications for **8**
   a) 1st class brickwork in 1 : 6 cement mortar
   b) Earthwork in excavation.

   B) Write note on Provisonal quantities and Provisional sums. **5**

5. A) Carry out Rate analysis for the following items. **8**
   a) Cement mortar 1 : 4
   b) Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including disposal of excavated earth upto 50 m and lift upto 1.5 m, disposed soil to belevelled and neatly dressed in All kinds of soil.

   B) Differentiate between long wall short wall and Center line method. **5**

6. A) List various types of contract and explain BOT contract. **8**

   B) What is Earnest Money Deposit and Security Deposit ? **5**

Set Q

7. A) List various methods of valuation and describe Belting method of valuation of land with suitable example. **8**

   B) Define : **5**

   1) Book Value
   2) Accommodation Value
   3) Speculation Value
   4) Scrap Value
   5) Potential Value.

8. A) An R.C.C. framed structure building having estimated future life of 80 years, fetches a gross annual rent of Rs. 2,200/- per month. Work out its capitalized value on the basis of 6% net yield. The rate of compound interest for sinking fund may be 4%. The plot measures 400 sq.m. and cost of land may be taken as Rs. 120/- per sq.m. The other out goings are

   i) Repair and maintenance = 8.33% of gross income
   ii) Municipal and property taxes = 25% gross income
   iii) Management and miscellaneous = 7% gross income.

   The plinth area of the building is 800 sq.m. and cost per sq.m. may be taken as Rs. 500/- per sq.m. **8**

   B) Explain Easement Rights. **5**

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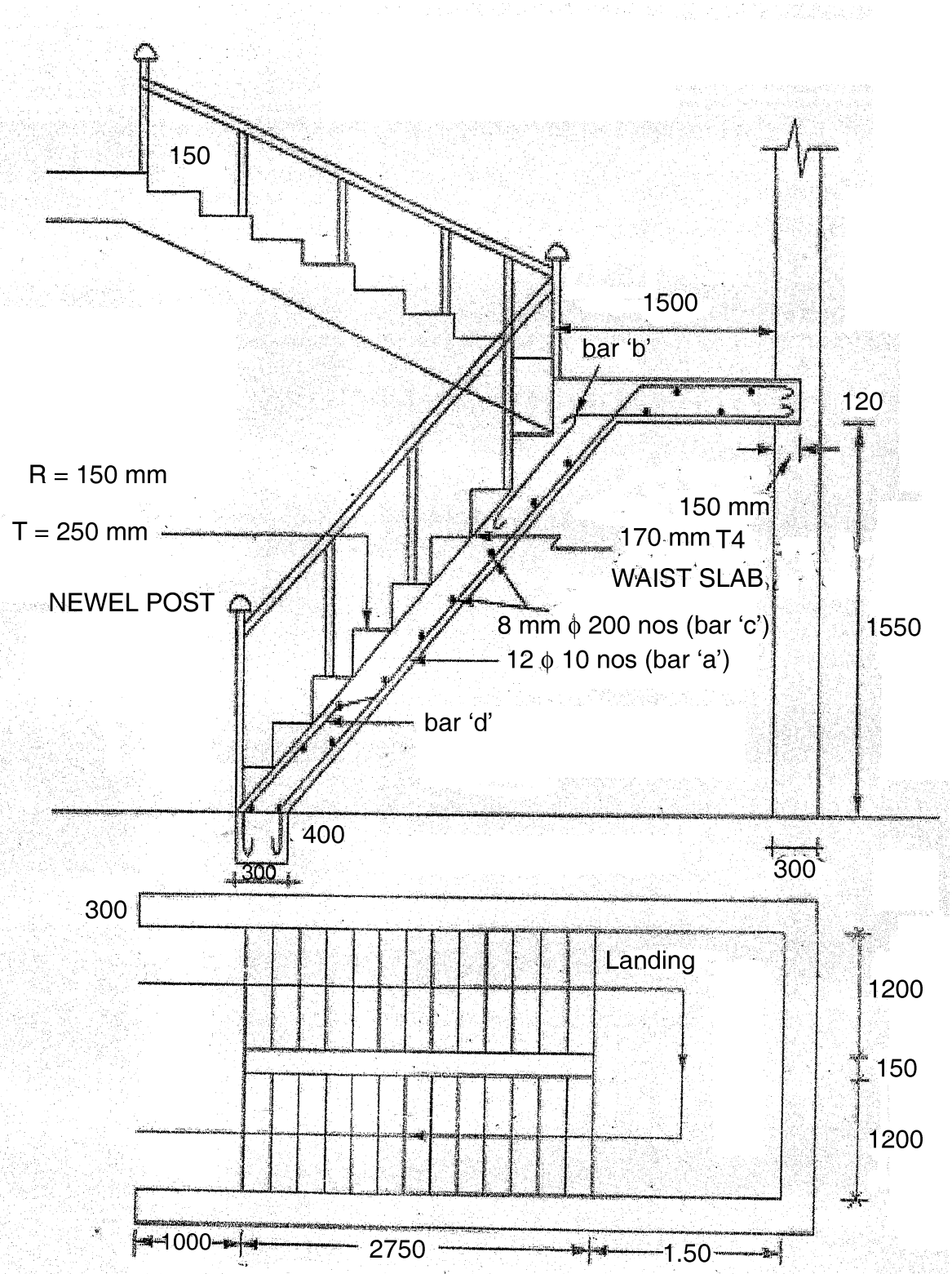
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Fig. 4.12

Set Q

SLR-VB – 47

Seat No.	

Set R

B.E. (Civil) (Part – I) Examination, 2017
QUANTITY SURVEYING AND VALUATION

Day and Date : Friday, 5-5-2017 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. Choose the correct answer : **(20×1=20)**

1) The technical sanction can be exceeded upto _____ % beyond which revised 'technical sanction' shall be necessary.
A) 1 B) 2 C) 5 D) 10

2) A provision of contingency shall be kept for preliminary estimate of work of estimated cost upto 1 crore as follows
A) 5% B) 5% subject to minimum of Rs. 5 Lakh
C) 3% subject to minimum of Rs. 5 Lakh D) 3%

3) A provision of contingency shall be kept for preliminary estimate of work of estimated cost more than 1 crore as follows
A) 5% B) 5% subject to minimum of Rs. 5 Lakh
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4) In long and short wall method of estimation, the length of short wall is the centre to centre distance between the walls
A) Minus one breadth of the wall on each side
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C) Plus one breadth of wall on each side
D) Plus half breadth of wall on each side

5) In preliminary estimates provision for services like sanitary, water supply, drainage and electric installations etc., should be made on the basis of
A) plinth area rates B) built up area
C) plot area D) length of service line

6) In preliminary estimate the cost of work-charged establishment is covered as
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P.T.O.

7) According to the practice in Central PWD, earnest money is paid by each tenderer to enable the Government to ensure that a tenderer does not
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SLR-VB – 47

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
QUANTITY SURVEYING AND VALUATION

Day and Date : Friday, 5-5-2017 Marks : 80
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Set R

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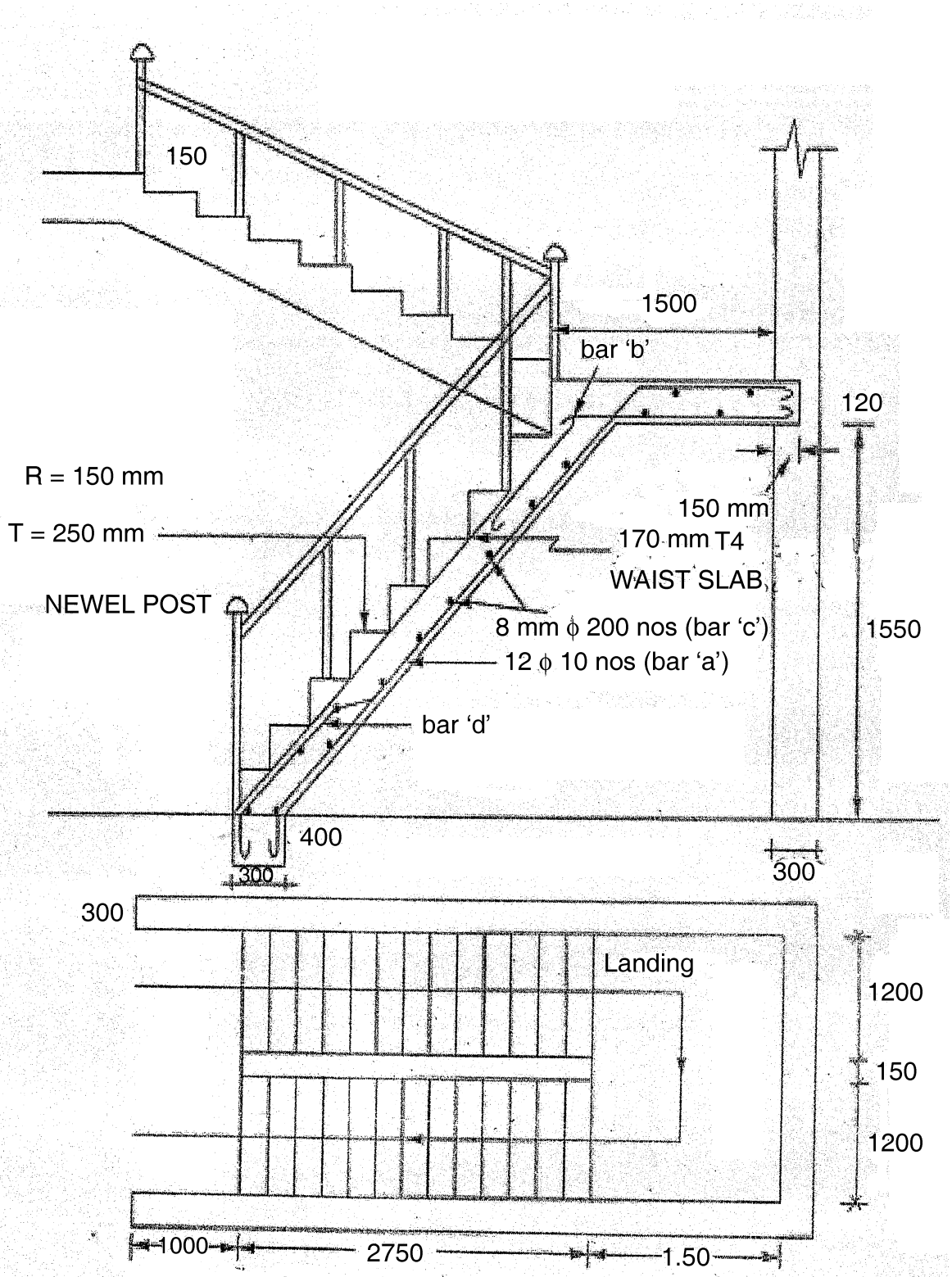
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Fig. 4.12

Set R

SLR-VB – 47

Seat No.	

Set S

B.E. (Civil) (Part – I) Examination, 2017
QUANTITY SURVEYING AND VALUATION

Day and Date : Friday, 5-5-2017 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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P.T.O.

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SLR-VB – 47

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
QUANTITY SURVEYING AND VALUATION

Day and Date : Friday, 5-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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   B) Differentiate between long wall short wall and Center line method. **5**

6. A) List various types of contract and explain BOT contract. **8**

   B) What is Earnest Money Deposit and Security Deposit ? **5**

Set S

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   The plinth area of the building is 800 sq.m. and cost per sq.m. may be taken as Rs. 500/- per sq.m. **8**

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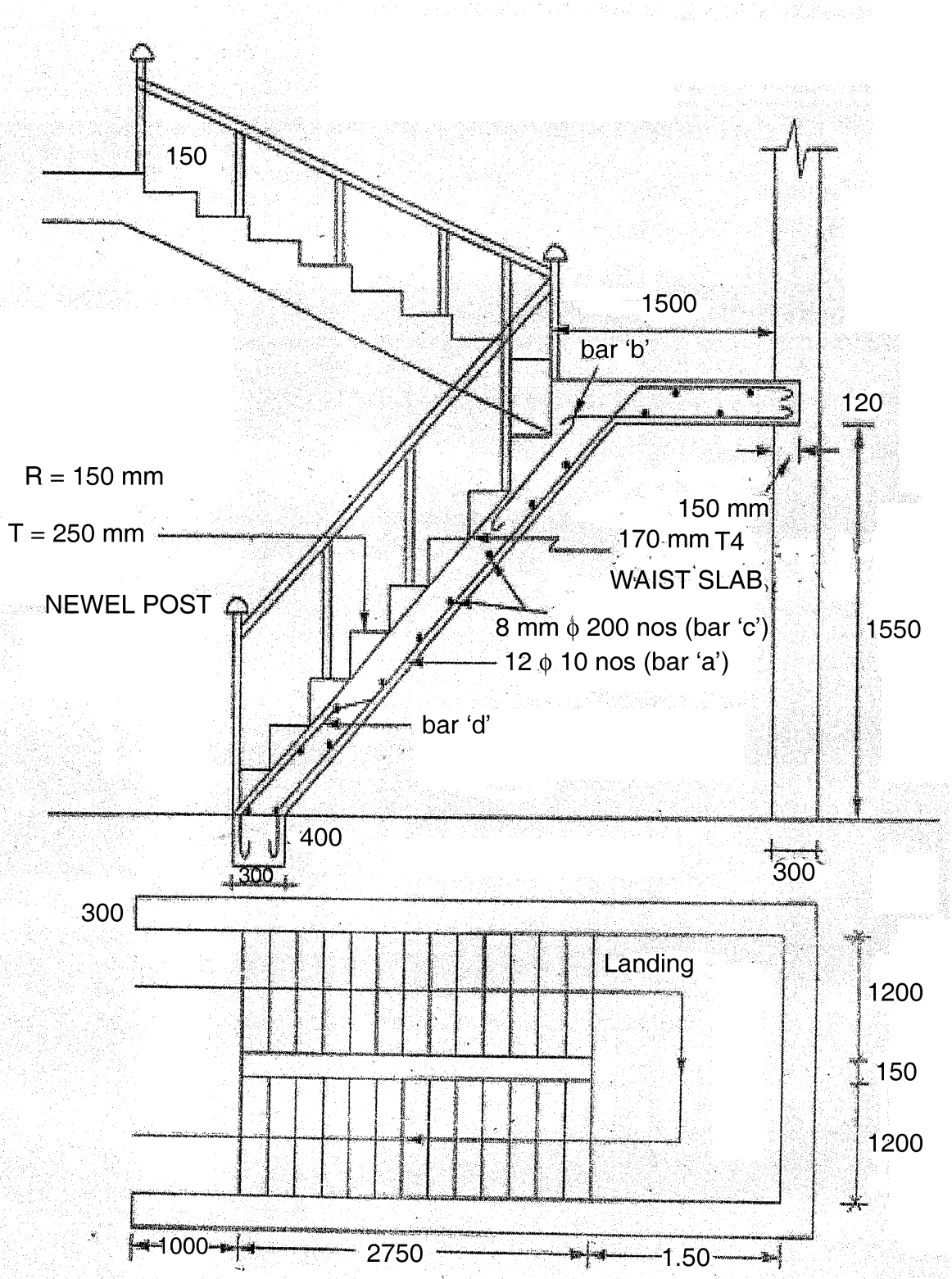
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NEWEL POST
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1550
bar 'd'
400
300
300
300
Landing
1200
150
1200
1000
2750
1.50

Fig. 4.12

Set S

SLR-VB – 48

Seat No.	

Set P

B.E. (Civil) Part – I Examination, 2017
EARTHQUAKE ENGINEERING

Day and Date : Saturday, 6-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) MCQ **1** to **10** carries **one** mark **each** and MCQ **11** to **15** carries **two** marks **each**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*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 : **10**

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) The response steadily decreases when the frequency ratio is
   a) <1 b) >1 c) = 1 d) = 2

4) The transmissibility is zero at the frequency ratio (ω / ω_n) equal to
   a) 0.5 b) 1.0 c) $\sqrt{2}$ d) 2

5) The damping in a dynamic system is represented as equivalent to
   a) Coulomb damping b) Viscous damping
   c) Friction damping d) Negative damping

6) The response is greatly affected by damping in the region
   a) $\omega / \omega_n < 0.5$ b) $\omega / \omega_n > 1.5$
   c) $\omega / \omega_n = 0$ d) $\omega / \omega_n = 1$

7) The response is maximum when
   a) Damping ratio = 1 b) Frequency ratio = 1
   c) Stiffness ratio = 1 d) Mass ratio = 1

8) With the increase in the stiffness of the structural system, the natural period
   a) Increases b) Decreases
   c) Remains same d) Constant

9) Viscous damping is proportional to
   a) Displacement b) Acceleration c) Velocity d) Amplitude

10) Most rigid element in the structure will receive
   a) Least of the lateral load due to seismic action
   b) Most of the lateral load due to seismic action
   c) The same lateral load as that of any element, due to seismic action
   d) Marginal of the lateral load due to seismic action

11) In the equivalent static procedure, the natural period of the building is **2**
   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 **2**
   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 torsional irregularity in a plan will arise due to **2**
   a) Centre of stiffness not coinciding with the centre of mass
   b) Centre of gravity not coinciding with the centre of mass
   c) Centre of stiffness not coinciding with the centre of rigidity
   d) Centre of stiffness coinciding with the centre of rigidity

14) The important factor for a school building is **2**
   a) 1 b) 1.5 c) 1.25 d) 2

15) The acceleration response spectrum in IS-1893-2002 is for the damping of **2**
   a) 2% b) 10% c) 5% d) 10%

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SLR-VB – 48

Seat No.	

B.E. (Civil) Part – I Examination, 2017
EARTHQUAKE ENGINEERING

Day and Date : Saturday, 6-5-2017 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 : 2002 is **allowed**.*
*4) Assume suitable data if **necessary** and mention it **clearly**.*

SECTION – I

2. a) Distinguish between Rayleigh waves and love waves. **4**

   b) Describe the direct and indirect effects of earthquake. **10**

3. Derive the governing differential equation for damped free vibration. Also find out the solution of above differential equation for the case of under critical damping. **13**

4. A SDOF system consists of a man with weight 1800 N and spring of stiffness 14 kN/mm. By testing the system it was found that a force of 450 N produce relative velocity of 0.3 m/s.

   Find :

   a) The damping ratio.

   b) Damped frequency of vibration (ω_D).

   c) Logarithmic decrement (δ) and

   d) The ratio of two successive amplitudes. **13**

5. Derive the Duhamel's integral for damped system. From this expression reduce the expression for Duhamel's integral for undamped system. **13**

SECTION – II

6. It is proposed to construct a R.C.C. five storied commercial building having plan dimensions as shown in Fig. 1 in zone III with following data. Determine the lateral forces and base shear. The all column sizes are 300 × 450 mm and beams sizes are 230 × 450 mm. The slab thickness is 120 mm and thk. of walls is 230 mm. The ht. of floor is 3.15 m and Live load is 3.0 kN/m^2 IS 13920 will not be used. The strata is medium. **14**

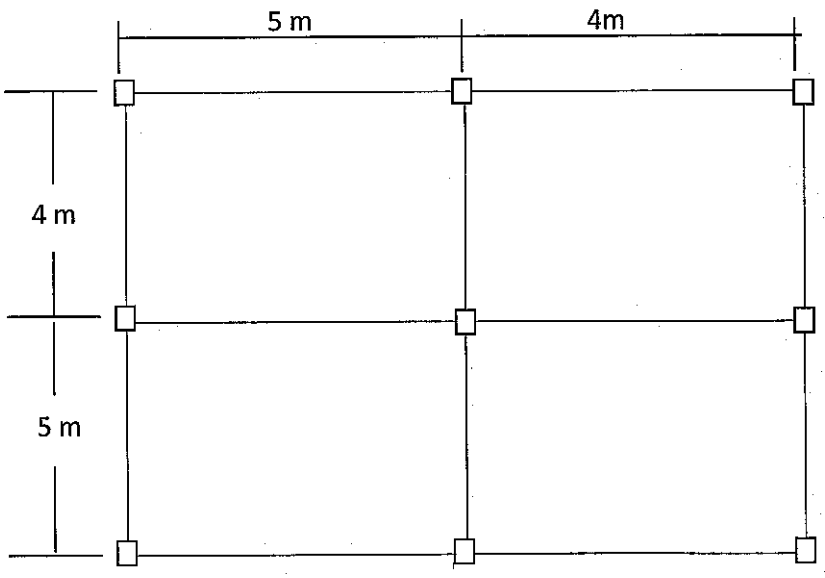

Figure No. 1

7. Explain the design philosophy necessary to be adopted in Earthquake resistant design. How it differs from that to gravity forces design ? **13**

8. What are the factors that make steel the most ideal material for earthquake resistance ? Explain how it is useful in confinement of RC members. **13**

9. Describe the various earthquake resistant features that can be introduced in masonry building to make it earthquake resistant. **13**

SLR-VB – 48

Seat No.	

Set Q

B.E. (Civil) Part – I Examination, 2017
EARTHQUAKE ENGINEERING

Day and Date : Saturday, 6-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) MCQ **1** to **10** carries **one** mark **each** and MCQ **11** to **15** carries **two** marks **each**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*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 : **10**

1) The response is maximum when
   a) Damping ratio = 1 b) Frequency ratio = 1
   c) Stiffness ratio = 1 d) Mass ratio = 1

2) With the increase in the stiffness of the structural system, the natural period
   a) Increases b) Decreases
   c) Remains same d) Constant

3) Viscous damping is proportional to
   a) Displacement b) Acceleration c) Velocity d) Amplitude

4) Most rigid element in the structure will receive
   a) Least of the lateral load due to seismic action
   b) Most of the lateral load due to seismic action
   c) The same lateral load as that of any element, due to seismic action
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5) 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

6) 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

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11) The important factor for a school building is **2**
   a) 1 b) 1.5 c) 1.25 d) 2

12) The acceleration response spectrum in IS-1893-2002 is for the damping of **2**
   a) 2% b) 10% c) 5% d) 10%

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SLR-VB – 48

Seat No.	

B.E. (Civil) Part – I Examination, 2017
EARTHQUAKE ENGINEERING

Day and Date : Saturday, 6-5-2017 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 : 2002 is **allowed**.*
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SECTION – I

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   Find :

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5. Derive the Duhamel's integral for damped system. From this expression reduce the expression for Duhamel's integral for undamped system. **13**

SECTION – II

6. It is proposed to construct a R.C.C. five storied commercial building having plan dimensions as shown in Fig. 1 in zone III with following data. Determine the lateral forces and base shear. The all column sizes are 300 × 450 mm and beams sizes are 230 × 450 mm. The slab thickness is 120 mm and thk. of walls is 230 mm. The ht. of floor is 3.15 m and Live load is 3.0 kN/m^2 IS 13920 will not be used. The strata is medium. **14**

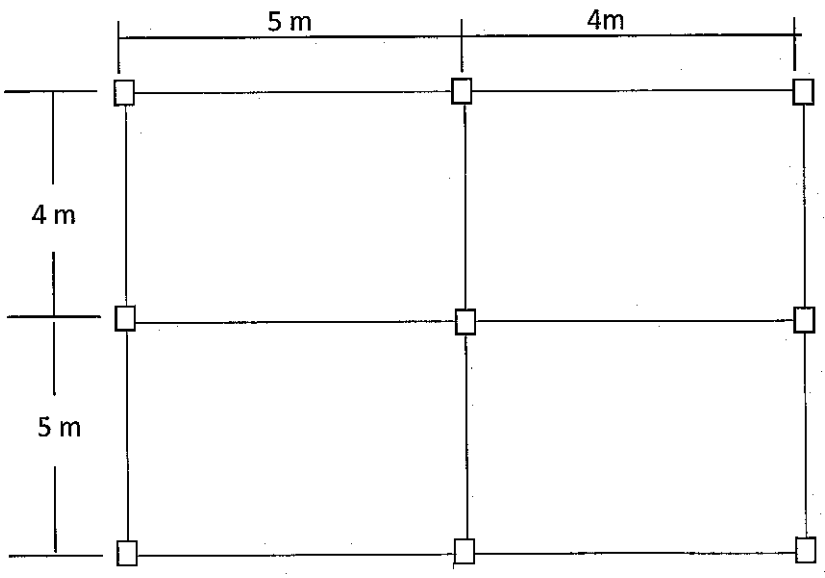

Figure No. 1

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SLR-VB – 48

Seat No.	

Set R

B.E. (Civil) Part – I Examination, 2017
EARTHQUAKE ENGINEERING

Day and Date : Saturday, 6-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) MCQ **1** to **10** carries **one** mark **each** and MCQ **11** to **15** carries **two** marks **each**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*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 : **10**

1) The response is greatly affected by damping in the region

a) $\omega/\omega_n < 0.5$ b) $\omega/\omega_n > 1.5$

c) $\omega/\omega_n = 0$ d) $\omega/\omega_n = 1$

2) The response is maximum when

a) Damping ratio = 1 b) Frequency ratio = 1
c) Stiffness ratio = 1 d) Mass ratio = 1

3) With the increase in the stiffness of the structural system, the natural period

a) Increases b) Decreases
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4) Viscous damping is proportional to

a) Displacement b) Acceleration c) Velocity d) Amplitude

5) Most rigid element in the structure will receive

a) Least of the lateral load due to seismic action
b) Most of the lateral load due to seismic action
c) The same lateral load as that of any element, due to seismic action
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6) 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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7) Choose the correct option from following statements.
   a) Earthquake causes landslide b) Landslide causes earthquake
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   a) 2% b) 10% c) 5% d) 10%

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15) The important factor for a school building is **2**
   a) 1 b) 1.5 c) 1.25 d) 2

_____

SLR-VB – 48

Seat No.	

B.E. (Civil) Part – I Examination, 2017
EARTHQUAKE ENGINEERING

Day and Date : Saturday, 6-5-2017 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 : 2002 is **allowed**.*
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SECTION – I

2. a) Distinguish between Rayleigh waves and love waves. **4**

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SECTION – II

6. It is proposed to construct a R.C.C. five storied commercial building having plan dimensions as shown in Fig. 1 in zone III with following data. Determine the lateral forces and base shear. The all column sizes are 300 × 450 mm and beams sizes are 230 × 450 mm. The slab thickness is 120 mm and thk. of walls is 230 mm. The ht. of floor is 3.15 m and Live load is 3.0 kN/m^2 IS 13920 will not be used. The strata is medium. **14**

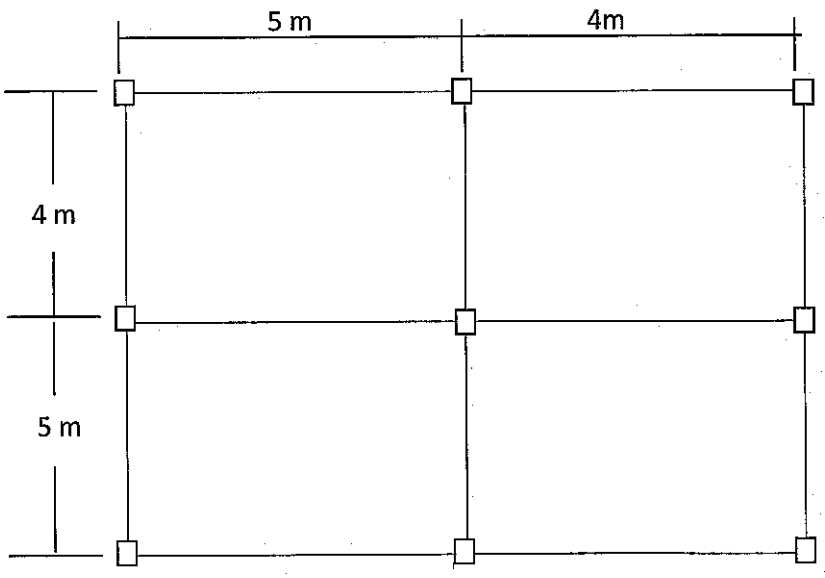

Figure No. 1

7. Explain the design philosophy necessary to be adopted in Earthquake resistant design. How it differs from that to gravity forces design ? **13**

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SLR-VB – 48

Seat No.	

Set S

B.E. (Civil) Part – I Examination, 2017
EARTHQUAKE ENGINEERING

Day and Date : Saturday, 6-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions**: 1) MCQ **1** to **10** carries **one** mark **each** and MCQ **11** to **15** carries **two** marks **each**.*
*2) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**.*
*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 : **10**

1) The damping in a dynamic system is represented as equivalent to
   a) Coulomb damping b) Viscous damping
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2) The response is greatly affected by damping in the region
   a) $\omega / \omega_n < 0.5$ b) $\omega / \omega_n > 1.5$
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P.T.O.

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_____

SLR-VB – 48

Seat No.	

B.E. (Civil) Part – I Examination, 2017
EARTHQUAKE ENGINEERING

Day and Date : Saturday, 6-5-2017 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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SECTION – II

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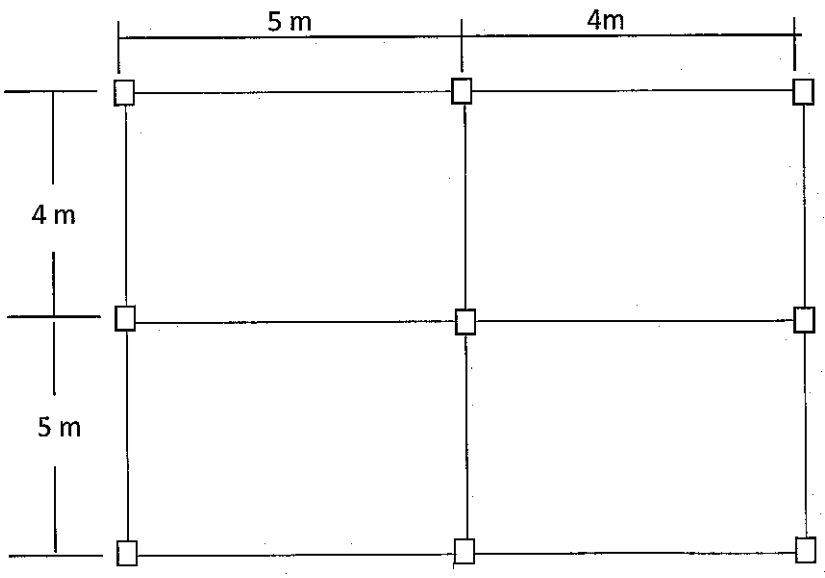

Figure No. 1

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SLR-VB – 49

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2017
WATER RESOURCES ENGINEERING – II

Day and Date : Monday, 8-5-2017 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) The 'surcharge storage' in a dam reservoir is the volume of water stored between
   a) Minimum and maximum reservoir levels
   b) Minimum and normal reservoir levels
   c) Normal and maximum reservoir levels
   d) None of the above

2) The capacity of a storage reservoir can be decided by using
   a) The mass curve of inflow
   b) The mass curve of outflow
   c) Both a) and b)
   d) None of the above

3) The vertical downward earthquake acceleration, $\alpha_y = 0.1g$, acting on a gravity dam, will
   a) Increase the resisting weight of the dam by 10%
   b) Decrease the resisting weight of the dam by 10%
   c) Increase the uplift by 10%
   d) None of the above

4) Transverse joints in concrete gravity dams are the
   a) Horizontal construction joints at each lift height
   b) Vertical construction joints full of height and width
   c) Diagonal construction joints for torsion
   d) None of the above

5) Amongst the following types of dam sections, the thinnest and most economical section is expected for a
   a) Constant angle arch dam
   b) Shell-arch dam
   c) Constant radius arch dam
   d) Concrete gravity dam

6) The base width of a rock fill dam, in comparison to that of an earthen dam, is
   a) Much larger
   b) Much smaller
   c) Sometimes larger sometimes smaller
   d) Almost equal

7) When seepage takes place through the body of an earthen dam, it leads to
   a) Development of pore pressures in the dam body
   b) Reduction in the shear strength of the dam
   c) Reduction in the developed shear stresses in the dam
   d) a) and b) both

8) If the operating head on an ogee spillway is more than the design head, then
   a) The pressure on the spillway crest will be zero
   b) The pressure on the spillway crest will be negative, causing cavitation
   c) The pressure on the spillway crest will be positive
   d) The discharge coefficient of the spillway will be reduced

P.T.O.

9) The W.E.S. downstream profile of an ogee spillway can be represented by an equation : $(x/H_d)^n = K(y/H_d)$; where the coefficients K and n for a vertical upstream spillway would respectively be
a) 2.0 and 1.85 b) 0.5 and 1.85 c) 2.0 and 0.85 d) 0.5 and 0.85

where (x, y) are the coordinates on the crest profile with crest apex as origin.

10) The most ideal condition for energy dissipation in the design of spillway is the one, when
a) The tail water rating curve lies above the jump rating curve at all discharges
b) The tail water rating curve coincides with the jump rating curve at all discharges
c) The tail water rating curve lies below the jump rating at all discharges
d) The tail water rating curve either lies above or below the jump rating curve, depending upon the discharge

11) In a barrage project, a divide wall is provided to
a) Separate the lower crest 'undersluice side' from the higher crest 'weir side'
b) Separate the higher crest 'undersluice side' from the lower crest 'weir side'
c) Keep the cross-currents away from the barrage body
d) Serve none of the above purposes

12) In a hilly district, where watershed line is very high as compared to the head-works , which type of alignment you would recommend for a proposed canal, if cross-drainage is to be avoided
a) Canal along the ridge line b) Canal along the contour line
c) Canal across the contour lines d) None of them

13) A ridge canal is also called a
a) Watershed canal b) Contour canal c) Side slope canal d) None of them

14) Unlined irrigation canals, when aligned on curvilinear routes in plan, will have to be pitched on
a) Both sides b) Concave side only c) Convex side only d) None of the above

15) The river reach upstream of a newly built dam may behave as
a) Aggrading b) Degrading c) Virgin d) None of them

16) Permeable spurs are best suitable for rivers, which
a) Carry heavy suspended load
b) Carry large bed load, but light suspended load
c) Need permanent protection to dikes
d) Need attracting the river current for providing deeper channel
e) Flow in upper hilly reaches

17) Which among the following is not true about Asphaltic concrete lining ?
a) It is fairly cheap
b) It is flexible and readily confirms to subgrade
c) it permits certain type of weed growth
d) It decreases the rugosity coefficient to increase channel efficiency

18) Pick up the incorrect statement from the following.
a) Intensive irrigation should be avoided in areas susceptible to water logging
b) Extensive irrigation should be adopted in areas susceptible to water logging
c) Lift irrigation can help alleviate water-logging susceptibilities
d) None of the above

19) The only statement, which is incorrect in regard to hydropower is
a) The system efficiency of a hydroplant is quite high
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d) The hydraulic turbines takes a lot of time in being put off and on

20) 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) Any of them will do

SLR-VB – 49

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
WATER RESOURCES ENGINEERING – II

Day and Date : Monday, 8-5-2017 Max. 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) Enlist the factors on which rate of silting of an impounding reservoir depends. What is trap efficiency of a reservoir ? **6**
   b) Discuss the various factors which govern the selection of particular type of dam for a particular project. **7**

3. Figure shows the section of a gravity dam (non overflow portion) built of concrete.
   Calculate (neglecting earthquake effects) :
   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 water level in reservoir at M.W.L. **14**

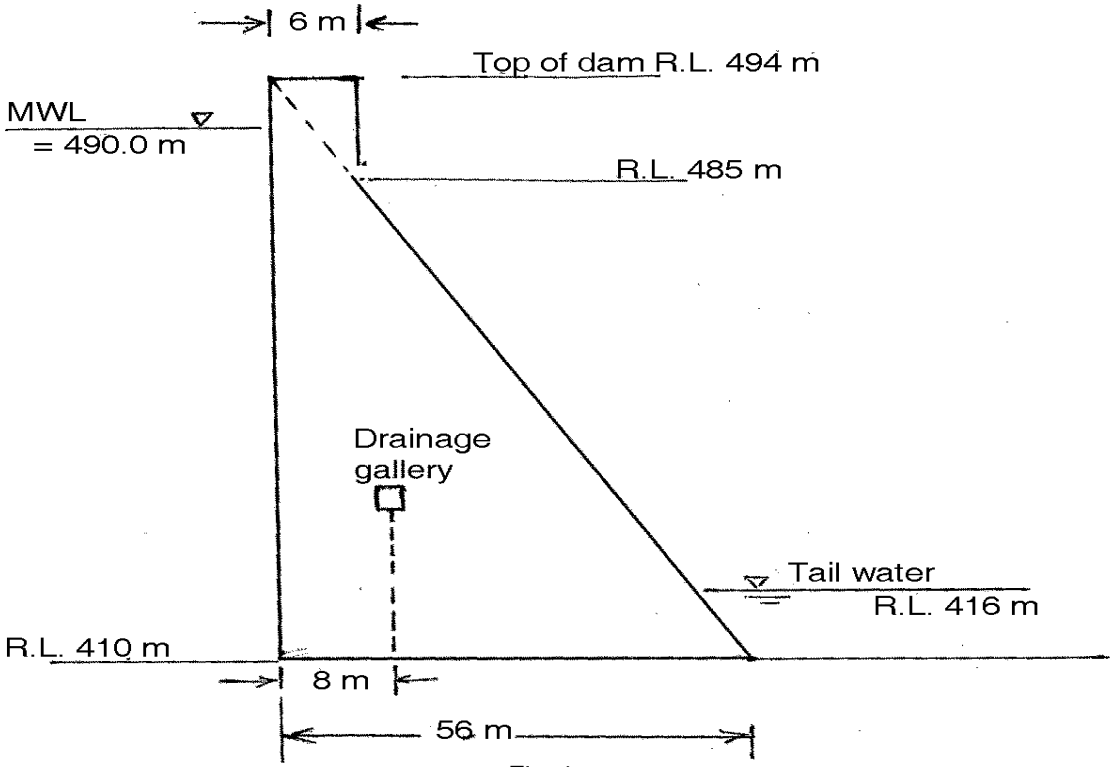

Fig. 1

Set P

4. a) What is meant by elementary profile of a gravity dam and how is it deduced ? What should be maximum height of elementary profile, if safe limit of stress on the masonry should not exceed 1500 kN/m^2. **6**
   b) Enlist and discuss the criteria for safe design of earth dam. **7**

5. a) Explain with help of a sketch, the components and working of a Tainer (Radial) dam gate. **6**
   b) Compute the discharge over an ogee weir with coefficient of discharge equal to 2.4 and head of 2 m. The length of spillway is 100 m. Weir crest is 8 m above the bottom of approach channel having same width as that of spillway. **7**

SECTION – II

6. a) What is meant by "piping" in a hydraulic structure ? What are ill-effects of piping ? What are the precautionary methods to avoid the ill effect of piping ? **6**
   b) Discuss different types alignments of irrigation canals suitable for particular topography and the command area. **7**

7. a) What are the possible causes of water losses in a canal ? What are the methods adopted for reducing such losses ? **6**
   b) What the different types are of cross drainage works that are necessary on a canal alignment ? State briefly the conditions under which each one is used. **7**

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   b) A runoff river plant with an installed capacity of 15000 kW operates at 28% load factor when it serves as a peak load station.
      i) What should be the minimum discharge in the stream, so that it may serve as base load station ? The plant efficiency may be assumed to be 80% when working under a head of 20 m.
      ii) Also calculate the maximum load factor of the plant when discharge in the stream is raised to 35 cumec. **8**

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SLR-VB – 49

Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2017
WATER RESOURCES ENGINEERING – II

Day and Date : Monday, 8-5-2017 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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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) Permeable spurs are best suitable for rivers, which
   a) Carry heavy suspended load
   b) Carry large bed load, but light suspended load
   c) Need permanent protection to dikes
   d) Need attracting the river current for providing deeper channel
   e) Flow in upper hilly reaches

2) Which among the following is not true about Asphaltic concrete lining ?
   a) It is fairly cheap
   b) It is flexible and readily confirms to subgrade
   c) it permits certain type of weed growth
   d) It decreases the rugosity coefficient to increase channel efficiency

3) Pick up the incorrect statement from the following.
   a) Intensive irrigation should be avoided in areas susceptible to water logging
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5) 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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6) The 'surcharge storage' in a dam reservoir is the volume of water stored between
   a) Minimum and maximum reservoir levels
   b) Minimum and normal reservoir levels
   c) Normal and maximum reservoir levels
   d) None of the above

7) The capacity of a storage reservoir can be decided by using
   a) The mass curve of inflow b) The mass curve of outflow
   c) Both a) and b) d) None of the above

P.T.O.

8) The vertical downward earthquake acceleration, $\alpha_y = 0.1g$, acting on a gravity dam, will
   a) Increase the resisting weight of the dam by 10% b) Decrease the resisting weight of the dam by 10%
   c) Increase the uplift by 10% d) None of the above

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   c) Diagonal construction joints for torsion d) None of the above

10) Amongst the following types of dam sections, the thinnest and most economical section is expected for a
   a) Constant angle arch dam b) Shell-arch dam
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11) The base width of a rock fill dam, in comparison to that of an earthen dam, is
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12) When seepage takes place through the body of an earthen dam, it leads to
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   b) Reduction in the shear strength of the dam
   c) Reduction in the developed shear stresses in the dam
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13) If the operating head on an ogee spillway is more than the design head, then
   a) The pressure on the spillway crest will be zero
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   c) The pressure on the spillway crest will be positive
   d) The discharge coefficient of the spillway will be reduced

14) The W.E.S. downstream profile of an ogee spillway can be represented by an equation : $(x/H_d)^n = K(y/H_d)$; where the coefficients K and n for a vertical upstream spillway would respectively be
   a) 2.0 and 1.85 b) 0.5 and 1.85 c) 2.0 and 0.85 d) 0.5 and 0.85

   where (x, y) are the coordinates on the crest profile with crest apex as origin.

15) The most ideal condition for energy dissipation in the design of spillway is the one, when
   a) The tail water rating curve lies above the jump rating curve at all discharges
   b) The tail water rating curve coincides with the jump rating curve at all discharges
   c) The tail water rating curve lies below the jump rating at all discharges
   d) The tail water rating curve either lies above or below the jump rating curve, depending upon the discharge

16) In a barrage project, a divide wall is provided to
   a) Separate the lower crest 'undersluice side' from the higher crest 'weir side'
   b) Separate the higher crest 'undersluice side' from the lower crest 'weir side'
   c) Keep the cross-currents away from the barrage body
   d) Serve none of the above purposes

17) In a hilly district, where watershed line is very high as compared to the head-works , which type of alignment you would recommend for a proposed canal, if cross-drainage is to be avoided
   a) Canal along the ridge line b) Canal along the contour line
   c) Canal across the contour lines d) None of them

18) A ridge canal is also called a
   a) Watershed canal b) Contour canal c) Side slope canal d) None of them

19) Unlined irrigation canals, when aligned on curvilinear routes in plan, will have to be pitched on
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SLR-VB – 49

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
WATER RESOURCES ENGINEERING – II

Day and Date : Monday, 8-5-2017 Max. Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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*2) Draw **neat** labeled sketches **wherever** necessary.*
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SECTION – I

2. a) Enlist the factors on which rate of silting of an impounding reservoir depends. What is trap efficiency of a reservoir ? **6**
   b) Discuss the various factors which govern the selection of particular type of dam for a particular project. **7**

3. Figure shows the section of a gravity dam (non overflow portion) built of concrete.
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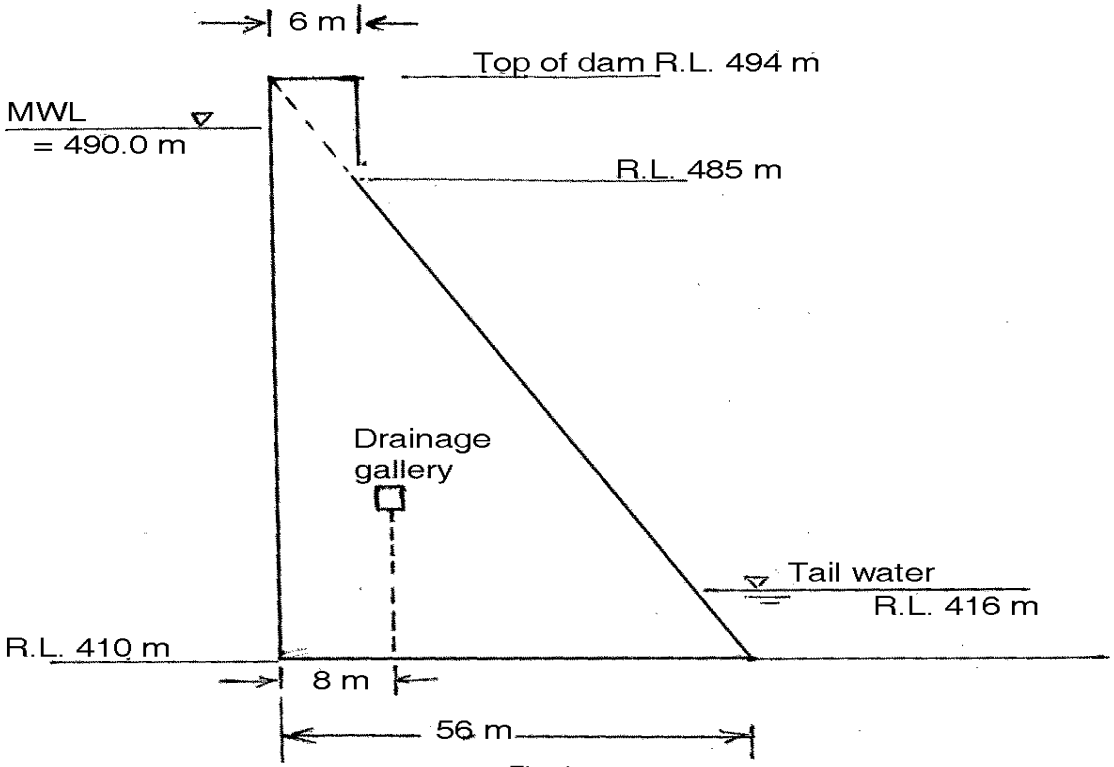

Fig. 1

Set Q

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SECTION – II

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7. a) What are the possible causes of water losses in a canal ? What are the methods adopted for reducing such losses ? **6**
   b) What the different types are of cross drainage works that are necessary on a canal alignment ? State briefly the conditions under which each one is used. **7**

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   b) What is meant by "saline" and "alkaline" soils ? What precautions will you adopt to prevent salinity of irrigated land ? **7**

9. a) Write a short note on selection of suitable type of turbine for a hydroelectric power plant. **6**
   b) A runoff river plant with an installed capacity of 15000 kW operates at 28% load factor when it serves as a peak load station.
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SLR-VB – 49

Seat No.	

Set **R**

B.E. (Civil) (Part – I) Examination, 2017
WATER RESOURCES ENGINEERING – II

Day and Date : Monday, 8-5-2017 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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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

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2) In a hilly district, where watershed line is very high as compared to the head-works , which type of alignment you would recommend for a proposed canal, if cross-drainage is to be avoided
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4) Unlined irrigation canals, when aligned on curvilinear routes in plan, will have to be pitched on
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P.T.O.

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SLR-VB – 49

Seat No.	

B.E. (Civil) (Part) – I Examination, 2017
WATER RESOURCES ENGINEERING – II

Day and Date : Monday, 8-5-2017 Max. 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

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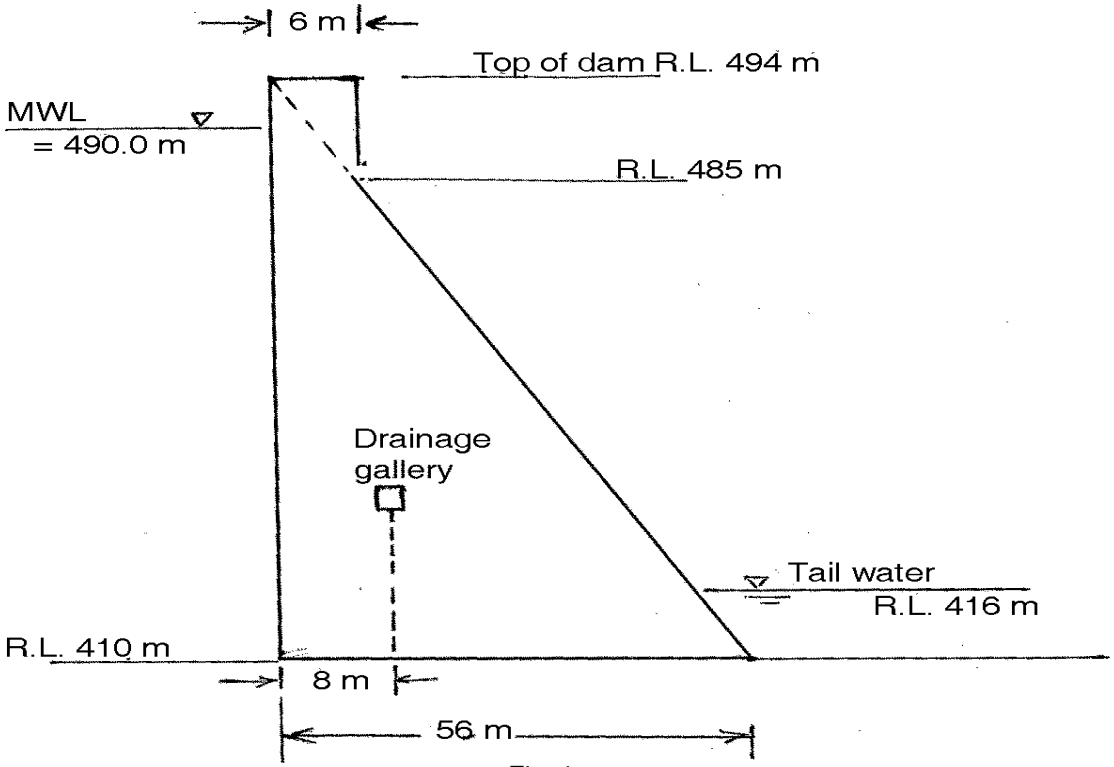

Fig. 1

Set R

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SECTION – II

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SLR-VB – 49

Seat No.	

Set **S**

B.E. (Civil) (Part – I) Examination, 2017
WATER RESOURCES ENGINEERING – II

Day and Date : Monday, 8-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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P.T.O.

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   d) The hydraulic turbines takes a lot of time in being put off and on

15) 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) Any of them will do

16) The 'surcharge storage' in a dam reservoir is the volume of water stored between
   a) Minimum and maximum reservoir levels
   b) Minimum and normal reservoir levels
   c) Normal and maximum reservoir levels
   d) None of the above

17) The capacity of a storage reservoir can be decided by using
   a) The mass curve of inflow b) The mass curve of outflow
   c) Both a) and b) d) None of the above

18) The vertical downward earthquake acceleration, $\alpha_y = 0.1g$, acting on a gravity dam, will
   a) Increase the resisting weight of the dam by 10% b) Decrease the resisting weight of the dam by 10%
   c) Increase the uplift by 10% d) None of the above

19) Transverse joints in concrete gravity dams are the
   a) Horizontal construction joints at each lift height b) Vertical construction joints full of height and width
   c) Diagonal construction joints for torsion d) None of the above

20) Amongst the following types of dam sections, the thinnest and most economical section is expected for a
   a) Constant angle arch dam b) Shell-arch dam
   c) Constant radius arch dam d) Concrete gravity dam

SLR-VB – 49

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
WATER RESOURCES ENGINEERING – II

Day and Date : Monday, 8-5-2017 Max. 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) Enlist the factors on which rate of silting of an impounding reservoir depends. What is trap efficiency of a reservoir ? **6**
   b) Discuss the various factors which govern the selection of particular type of dam for a particular project. **7**

3. Figure shows the section of a gravity dam (non overflow portion) built of concrete.
   Calculate (neglecting earthquake effects) :
   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 water level in reservoir at M.W.L. **14**

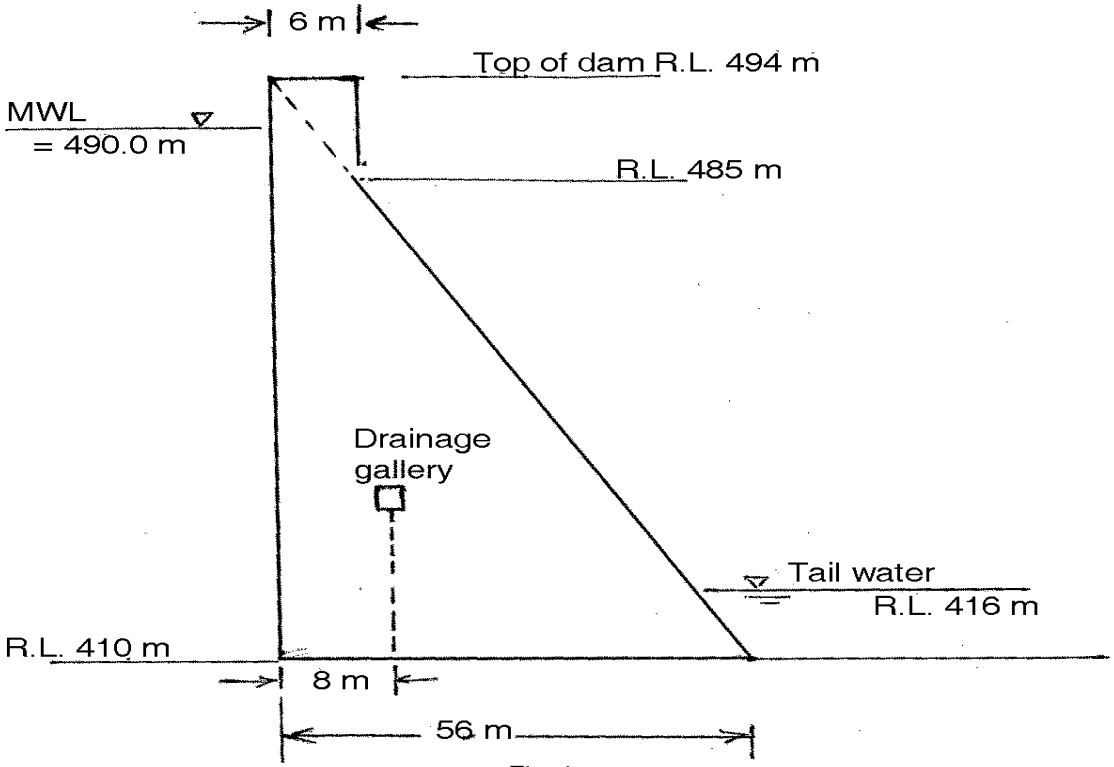

Fig. 1

Set S

4. a) What is meant by elementary profile of a gravity dam and how is it deduced ? What should be maximum height of elementary profile, if safe limit of stress on the masonry should not exceed 1500 kN/m^2. **6**
   b) Enlist and discuss the criteria for safe design of earth dam. **7**

5. a) Explain with help of a sketch, the components and working of a Tainer (Radial) dam gate. **6**
   b) Compute the discharge over an ogee weir with coefficient of discharge equal to 2.4 and head of 2 m. The length of spillway is 100 m. Weir crest is 8 m above the bottom of approach channel having same width as that of spillway. **7**

SECTION – II

6. a) What is meant by "piping" in a hydraulic structure ? What are ill-effects of piping ? What are the precautionary methods to avoid the ill effect of piping ? **6**
   b) Discuss different types alignments of irrigation canals suitable for particular topography and the command area. **7**

7. a) What are the possible causes of water losses in a canal ? What are the methods adopted for reducing such losses ? **6**
   b) What the different types are of cross drainage works that are necessary on a canal alignment ? State briefly the conditions under which each one is used. **7**

8. a) What is meant by 'river-training' and what are the different objectives served by it ? **6**
   b) What is meant by "saline" and "alkaline" soils ? What precautions will you adopt to prevent salinity of irrigated land ? **7**

9. a) Write a short note on selection of suitable type of turbine for a hydroelectric power plant. **6**
   b) A runoff river plant with an installed capacity of 15000 kW operates at 28% load factor when it serves as a peak load station.
      i) What should be the minimum discharge in the stream, so that it may serve as base load station ? The plant efficiency may be assumed to be 80% when working under a head of 20 m.
      ii) Also calculate the maximum load factor of the plant when discharge in the stream is raised to 35 cumec. **8**

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SLR-VB – 50

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Tuesday, 9-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) ***Use*** *of non-programmable calculator is* ***permitted****.*
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 correction answer :

1) The flow in open channel may be characterised as laminar when
   a) Re < 500 b) Re > 2000
   c) 500 < Re > 2000 d) None

2) Specific force represents the sum of pressure force and
   a) Datum head b) Momentum flux per unit weight
   c) Momentum flux and datum head d) None

3) The momentum correction factor β is given as
   a) $\frac{1}{V^3A}\int V^3dA$ b) $\frac{1}{V^2A}\int V^2dA$ c) $\frac{1}{VA}\int VdA$ d) $\frac{1}{V^3A}\int V^2dA$

4) In a rectangular channel the alternate depths are 1.0 m and 2.0 m respectively. The specific energy head in meter is **2**
   a) 3.0 b) 3.38 c) 2.33 d) 1.33

5) At critical depth
   a) Discharge is minimum for given specific force
   b) Discharge is maximum for given specific force
   c) Discharge is minimum for given specific energy
   d) Discharge is maximum for given specific energy

6) For a triangular channel of side slopes M horizontal : 1 vertical the Froude's number is
   a) $\frac{m}{\sqrt{g}\,y}$ b) $\frac{V\sqrt{2}}{gy}$ c) $\frac{V}{\sqrt{2gy}}$ d) $\frac{V^3}{gy}$

7) If the Froude's number is 9.2 then the jump is known as
   a) Steady b) Oscillating c) Undular d) None
8) The difference between total head line and piezometric head represents
   a) Velocity head b) Pressure head
   c) Elevation of bed of channel d) None
9) The mean velocity in Lacey's regime channel is proportional to
   a) $S_0^{1/3}$ b) $S_0^{1/2}$ c) $R^{1/3}$ d) $R^{4/3}$
10) In GVF, if dy/dx is positive then dE/dx will be
   a) Zero b) Negative if $y > y_c$
   c) Positive if $y > y_c$ d) Always negative
11) Velocity of flow is measured by
   a) Orificemeter b) Venturimeter
   c) Current meter d) Pivot point method
12) The momentum equation in 'X' direction, when the flow is steady is $\sum FX =$
   a) $\rho\theta\,(Vx_2 - Vx_1)$ b) $\rho/\theta\,(Vx_2 - Vx_1)$
   c) $\rho\theta^2\,(Vx_2 - Vx_1)$ d) None
13) Extreme condition of the Meander's is called as
   a) Island b) Spurs c) Cut-off d) Leavee
14) Bed load is the term used to describe combination of
   a) Contact load and wash load b) Contact load and saltation load
   c) Contact load and suspended load d) Only bed material load
15) For the trapezoidal section
   a) Shape is of half hexagon b) Depth of flow equal to half bed width
   c) Side slope equal to 45° d) None
16) Shield's diagram is a plot of non-dimensional shear stress τ_c against
   a) Relative depth b) Reynolds number
   c) Froude's number d) Shear Reynold's number
17) The dimension of shear stress (τ) is
   a) $ML^{-1}T^{-1}$ b) $ML^{-1}T^{-2}$ c) $ML^{-2}T^{-2}$ d) MLT^{-1}
18) Which of the following is not a dimensionless number
   a) Darcy-Weibach friction factor 'f' b) Coefficient of drag C_D
   c) Mannings coefficient 'n' d) Coefficient of velocity C_V
19) If Froude's law of similitude exist between a model and prototype then the force ratio $F_r =$
   a) Lr^3 b) $Lr\,\rho_r$ c) $Lr^3\,\rho_r$ d) $Lr^3\,\rho_r^{-1}$

SLR-VB – 50

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) ***Use*** *of non-programmable calculator is* ***permitted****.*

SECTION – I

2. Attempt **any four** : **(6×4=24)**
   a) What is specific energy curve ? Draw a neat sketch and show all details.
   b) Derive the modified GVF equation and draw a neat sketch and show all details.
   c) Define kinetic energy corrections factor (α) and momentum correction factor (β) and derive their expressions.
   d) A flow of 6.0 m^3/s is passing at a depth of 1.5 m through a rectangular channel of width 2.5 m. If 'α' is 1.1. Determine specific energy of flow also determine the value of the depth alternate to the existing depth. If 'α' = 1.0 (assumed for alternate depth flow).
   e) For a hydraulic jump in a rectangular channel the velocity and depth after the jump are known to be 0.80 m and 1.75 m respectively. Calculate depth before the jump, the energy loss and the power dissipated per meter width.

3. Attempt **any two** : **(8×2=16)**
   a) Explain most economical section of open channel and show, length of one of the sloping side = $\frac{1}{2}$ of top width for trapezoidal section.
   b) A discharge of 840 m^3/s flows down a spillway and then passes on a 60 m. wide concrete apron (n = 0.014) the velocity of water at the toe of spillway is 10 m/s. A tail water depth of 4.40 m the channel below, causes a hydraulic jump on the horizontal apron. Determine :
      a) Depth before the jump
      b) Length of jump
      c) Energy loss in the jump
      d) Specific force at the toe.

c) A very wide rectangular channel carries a discharge of 3.0 m^3/s/m width at a depth of 2.0 m. due to obstruction the water level raises by 2.0 m. Locate the point up stream of the weir where the depth is 3.0 m. Assume bed slope as 0.0002 and 'C' = 50. Use step method and classify water surface profile.

SECTION – II

4. Attempt **any four** : **(6×4=24)**

a) Explain the mechanics of sediment transport and sheild's method for design of channel.

b) What do you understand by river training works ? Explain its types with examples.

c) A channel section has to be design for following data :

discharge = 30 cumecs, silt factor = 1.0, slide slope = 0.5 : 1, also find longitudinal slope by using Lacey's theory.

d) Explain 'similitude' and what are its types ? And derive the equation for Froude's number.

e) Draw a neat sketch of current meter and explain its working in detail.

5. Attempt **any two** : **(8×2=16)**

a) The pressure drop in a flow meter in which oil flows at an upstream velocity of 0.9 m/s is to be estimated by model studies. A 1 : 6 scale model using water is used. If the pressure drop in the model is 450 Pa, what will be the pressure drop in prototype ? If the prototype discharge is 200 L/S what is the model discharge ? Take density and viscosity for prototype as, 900 kg/m^3 and 0.104 Pa.S. and 998 kg/m^3; 1×10^{-3} pa.S. for model.

b) Write short notes on (**any two**) :

1) 'Reynold's model law' and where it is used ?
2) 'River Meandering' and its causes.
3) Cut-off and spurs (Draw neat sketch).

c) Design a channel section by using 'Kennedy's theory' from following data :

i) Discharge = 28 cumecs
ii) Kutter's N = 0.0024
iii) m = 1, side slope 0.5 : 1, B/D = 7.6.

Also find bed slope.

SLR-VB – 50

Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Tuesday, 9-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) ***Use*** *of non-programmable calculator is* ***permitted****.*
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 correction answer :

1) At critical depth
   a) Discharge is minimum for given specific force
   b) Discharge is maximum for given specific force
   c) Discharge is minimum for given specific energy
   d) Discharge is maximum for given specific energy

2) For a triangular channel of side slopes M horizontal : 1 vertical the Froude's number is

   a) $\frac{m}{\sqrt{g}\,y}$ b) $\frac{V\sqrt{2}}{gy}$ c) $\frac{V}{\sqrt{2gy}}$ d) $\frac{V^3}{gy}$

3) If the Froude's number is 9.2 then the jump is known as
   a) Steady b) Oscillating c) Undular d) None

4) The difference between total head line and piezometric head represents
   a) Velocity head b) Pressure head
   c) Elevation of bed of channel d) None

5) The mean velocity in Lacey's regime channel is proportional to

   a) $S_0^{1/3}$ b) $S_0^{1/2}$ c) $R^{1/3}$ d) $R^{4/3}$

6) In GVF, if dy/dx is positive then dE/dx will be
   a) Zero b) Negative if $y > y_c$
   c) Positive if $y > y_c$ d) Always negative

P.T.O.

7) Velocity of flow is measured by
   a) Orificemeter b) Venturimeter
   c) Current meter d) Pivot point method

8) The momentum equation in 'X' direction, when the flow is steady is $\sum FX =$
   a) $\rho\theta\,(Vx_2 - Vx_1)$ b) $\rho/\theta\,(Vx_2 - Vx_1)$
   c) $\rho\theta^2\,(Vx_2 - Vx_1)$ d) None

9) Extreme condition of the Meander's is called as
   a) Island b) Spurs c) Cut-off d) Leavee

10) Bed load is the term used to describe combination of
   a) Contact load and wash load b) Contact load and saltation load
   c) Contact load and suspended load d) Only bed material load

11) For the trapezoidal section
   a) Shape is of half hexagon b) Depth of flow equal to half bed width
   c) Side slope equal to 45° d) None

12) Shield's diagram is a plot of non-dimensional shear stress τ_c against
   a) Relative depth b) Reynolds number
   c) Froude's number d) Shear Reynold's number

13) The dimension of shear stress (τ) is
   a) $ML^{-1}T^{-1}$ b) $ML^{-1}T^{-2}$ c) $ML^{-2}T^{-2}$ d) MLT^{-1}

14) Which of the following is not a dimensionless number
   a) Darcy-Weibach friction factor 'f' b) Coefficient of drag C_D
   c) Mannings coefficient 'n' d) Coefficient of velocity C_V

15) If Froude's law of similitude exist between a model and prototype then the force ratio F_r =
   a) Lr^3 b) $Lr\rho_r$ c) $Lr^3\rho_r$ d) $Lr^3\rho_r^{-1}$

16) The flow in open channel may be characterised as laminar when
   a) Re < 500 b) Re > 2000
   c) 500 < Re > 2000 d) None

17) Specific force represents the sum of pressure force and
   a) Datum head b) Momentum flux per unit weight
   c) Momentum flux and datum head d) None

18) The momentum correction factor β is given as
   a) $\frac{1}{V^3A}\int V^3dA$ b) $\frac{1}{V^2A}\int V^2dA$ c) $\frac{1}{VA}\int VdA$ d) $\frac{1}{V^3A}\int V^2dA$

19) In a rectangular channel the alternate depths are 1.0 m and 2.0 m respectively. The specific energy head in meter is
   a) 3.0 b) 3.38 c) 2.33 d) 1.33

2

SLR-VB – 50

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
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SECTION – I

2. Attempt **any four** : **(6×4=24)**
   a) What is specific energy curve ? Draw a neat sketch and show all details.
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   c) Define kinetic energy corrections factor (α) and momentum correction factor (β) and derive their expressions.
   d) A flow of 6.0 m^3/s is passing at a depth of 1.5 m through a rectangular channel of width 2.5 m. If 'α' is 1.1. Determine specific energy of flow also determine the value of the depth alternate to the existing depth. If 'α' = 1.0 (assumed for alternate depth flow).
   e) For a hydraulic jump in a rectangular channel the velocity and depth after the jump are known to be 0.80 m and 1.75 m respectively. Calculate depth before the jump, the energy loss and the power dissipated per meter width.

3. Attempt **any two** : **(8×2=16)**
   a) Explain most economical section of open channel and show, length of one of the sloping side = $\frac{1}{2}$ of top width for trapezoidal section.
   b) A discharge of 840 m^3/s flows down a spillway and then passes on a 60 m. wide concrete apron (n = 0.014) the velocity of water at the toe of spillway is 10 m/s. A tail water depth of 4.40 m the channel below, causes a hydraulic jump on the horizontal apron. Determine :
      a) Depth before the jump
      b) Length of jump
      c) Energy loss in the jump
      d) Specific force at the toe.

c) A very wide rectangular channel carries a discharge of 3.0 m^3/s/m width at a depth of 2.0 m. due to obstruction the water level raises by 2.0 m. Locate the point up stream of the weir where the depth is 3.0 m. Assume bed slope as 0.0002 and 'C' = 50. Use step method and classify water surface profile.

SECTION – II

4. Attempt **any four** : **(6×4=24)**

a) Explain the mechanics of sediment transport and sheild's method for design of channel.

b) What do you understand by river training works ? Explain its types with examples.

c) A channel section has to be design for following data :

discharge = 30 cumecs, silt factor = 1.0, slide slope = 0.5 : 1, also find longitudinal slope by using Lacey's theory.

d) Explain 'similitude' and what are its types ? And derive the equation for Froude's number.

e) Draw a neat sketch of current meter and explain its working in detail.

5. Attempt **any two** : **(8×2=16)**

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b) Write short notes on (**any two**) :

1) 'Reynold's model law' and where it is used ?
2) 'River Meandering' and its causes.
3) Cut-off and spurs (Draw neat sketch).

c) Design a channel section by using 'Kennedy's theory' from following data :

i) Discharge = 28 cumecs
ii) Kutter's N = 0.0024
iii) m = 1, side slope 0.5 : 1, B/D = 7.6.

Also find bed slope.

SLR-VB – 50

Seat No.	

Set R

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Tuesday, 9-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
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3) ***Use*** *of non-programmable calculator is* ***permitted****.*
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 correction answer :

1) In GVF, if dy/dx is positive then dE/dx will be
   a) Zero b) Negative if $y > y_c$
   c) Positive if $y > y_c$ d) Always negative

2) Velocity of flow is measured by
   a) Orificemeter b) Venturimeter
   c) Current meter d) Pivot point method

3) The momentum equation in 'X' direction, when the flow is steady is $\sum FX =$
   a) $\rho\theta\,(Vx_2 - Vx_1)$ b) $\rho/\theta\,(Vx_2 - Vx_1)$
   c) $\rho\theta^2\,(Vx_2 - Vx_1)$ d) None

4) Extreme condition of the Meander's is called as
   a) Island b) Spurs c) Cut-off d) Leavee

5) Bed load is the term used to describe combination of
   a) Contact load and wash load b) Contact load and saltation load
   c) Contact load and suspended load d) Only bed material load

6) For the trapezoidal section
   a) Shape is of half hexagon b) Depth of flow equal to half bed width
   c) Side slope equal to 45° d) None

7) Shield's diagram is a plot of non-dimensional shear stress τ_c against
   a) Relative depth b) Reynolds number
   c) Froude's number d) Shear Reynold's number

P.T.O.

8) The dimension of shear stress (τ) is
   a) $ML^{-1}T^{-1}$ b) $ML^{-1}T^{-2}$ c) $ML^{-2}T^{-2}$ d) MLT^{-1}

9) Which of the following is not a dimensionless number
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   a) Re < 500 b) Re > 2000
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   a) Datum head b) Momentum flux per unit weight
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13) The momentum correction factor β is given as
   a) $\frac{1}{V^3A}\int V^3dA$ b) $\frac{1}{V^2A}\int V^2dA$ c) $\frac{1}{VA}\int VdA$ d) $\frac{1}{V^3A}\int V^2dA$

14) In a rectangular channel the alternate depths are 1.0 m and 2.0 m respectively. The specific energy head in meter is **2**
   a) 3.0 b) 3.38 c) 2.33 d) 1.33

15) At critical depth
   a) Discharge is minimum for given specific force
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   c) Discharge is minimum for given specific energy
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16) For a triangular channel of side slopes M horizontal : 1 vertical the Froude's number is
   a) $\frac{m}{\sqrt{g}\,y}$ b) $\frac{V\sqrt{2}}{gy}$ c) $\frac{V}{\sqrt{2gy}}$ d) $\frac{V^3}{gy}$

17) If the Froude's number is 9.2 then the jump is known as
   a) Steady b) Oscillating c) Undular d) None

18) The difference between total head line and piezometric head represents
   a) Velocity head b) Pressure head
   c) Elevation of bed of channel d) None

19) The mean velocity in Lacey's regime channel is proportional to
   a) $S_0^{1/3}$ b) $S_0^{1/2}$ c) $R^{1/3}$ d) $R^{4/3}$

SLR-VB – 50

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) ***Use*** *of non-programmable calculator is* ***permitted****.*

SECTION – I

2. Attempt **any four** : **(6×4=24)**
   a) What is specific energy curve ? Draw a neat sketch and show all details.
   b) Derive the modified GVF equation and draw a neat sketch and show all details.
   c) Define kinetic energy corrections factor (α) and momentum correction factor (β) and derive their expressions.
   d) A flow of 6.0 m^3/s is passing at a depth of 1.5 m through a rectangular channel of width 2.5 m. If 'α' is 1.1. Determine specific energy of flow also determine the value of the depth alternate to the existing depth. If 'α' = 1.0 (assumed for alternate depth flow).
   e) For a hydraulic jump in a rectangular channel the velocity and depth after the jump are known to be 0.80 m and 1.75 m respectively. Calculate depth before the jump, the energy loss and the power dissipated per meter width.

3. Attempt **any two** : **(8×2=16)**
   a) Explain most economical section of open channel and show, length of one of the sloping side = $\frac{1}{2}$ of top width for trapezoidal section.
   b) A discharge of 840 m^3/s flows down a spillway and then passes on a 60 m. wide concrete apron (n = 0.014) the velocity of water at the toe of spillway is 10 m/s. A tail water depth of 4.40 m the channel below, causes a hydraulic jump on the horizontal apron. Determine :
      a) Depth before the jump
      b) Length of jump
      c) Energy loss in the jump
      d) Specific force at the toe.

c) A very wide rectangular channel carries a discharge of 3.0 m^3/s/m width at a depth of 2.0 m. due to obstruction the water level raises by 2.0 m. Locate the point up stream of the weir where the depth is 3.0 m. Assume bed slope as 0.0002 and 'C' = 50. Use step method and classify water surface profile.

SECTION – II

4. Attempt **any four** : **(6×4=24)**

a) Explain the mechanics of sediment transport and sheild's method for design of channel.

b) What do you understand by river training works ? Explain its types with examples.

c) A channel section has to be design for following data :

discharge = 30 cumecs, silt factor = 1.0, slide slope = 0.5 : 1, also find longitudinal slope by using Lacey's theory.

d) Explain 'similitude' and what are its types ? And derive the equation for Froude's number.

e) Draw a neat sketch of current meter and explain its working in detail.

5. Attempt **any two** : **(8×2=16)**

a) The pressure drop in a flow meter in which oil flows at an upstream velocity of 0.9 m/s is to be estimated by model studies. A 1 : 6 scale model using water is used. If the pressure drop in the model is 450 Pa, what will be the pressure drop in prototype ? If the prototype discharge is 200 L/S what is the model discharge ? Take density and viscosity for prototype as, 900 kg/m^3 and 0.104 Pa.S. and 998 kg/m^3; 1×10^{-3} pa.S. for model.

b) Write short notes on (**any two**) :

1) 'Reynold's model law' and where it is used ?
2) 'River Meandering' and its causes.
3) Cut-off and spurs (Draw neat sketch).

c) Design a channel section by using 'Kennedy's theory' from following data :

i) Discharge = 28 cumecs
ii) Kutter's N = 0.0024
iii) m = 1, side slope 0.5 : 1, B/D = 7.6.

Also find bed slope.

SLR-VB – 50

Seat No.	

Set S

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Tuesday, 9-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) ***Use*** *of non-programmable calculator is* ***permitted****.*
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 correction answer :

1) For the trapezoidal section
   a) Shape is of half hexagon
   b) Depth of flow equal to half bed width
   c) Side slope equal to 45°
   d) None

2) Shield's diagram is a plot of non-dimensional shear stress τ_c against
   a) Relative depth
   b) Reynolds number
   c) Froude's number
   d) Shear Reynold's number

3) The dimension of shear stress (τ) is
   a) $ML^{-1}T^{-1}$ b) $ML^{-1}T^{-2}$ c) $ML^{-2}T^{-2}$ d) MLT^{-1}

4) Which of the following is not a dimensionless number
   a) Darcy-Weibach friction factor 'f'
   b) Coefficient of drag C_D
   c) Mannings coefficient 'n'
   d) Coefficient of velocity C_V

5) If Froude's law of similitude exist between a model and prototype then the force ratio F_r =
   a) Lr^3 b) $Lr\,\rho_r$ c) $Lr^3\,\rho_r$ d) $Lr^3\,\rho_r^{-1}$

6) The flow in open channel may be characterised as laminar when
   a) Re < 500
   b) Re > 2000
   c) 500 < Re > 2000
   d) None

7) Specific force represents the sum of pressure force and
   a) Datum head
   b) Momentum flux per unit weight
   c) Momentum flux and datum head
   d) None

P.T.O.

8) The momentum correction factor β is given as

a) $\frac{1}{V^3A}\int V^3dA$ b) $\frac{1}{V^2A}\int V^2dA$ c) $\frac{1}{VA}\int VdA$ d) $\frac{1}{V^3A}\int V^2dA$

9) In a rectangular channel the alternate depths are 1.0 m and 2.0 m respectively. The specific energy head in meter is **2**

a) 3.0 b) 3.38 c) 2.33 d) 1.33

10) At critical depth

a) Discharge is minimum for given specific force
b) Discharge is maximum for given specific force
c) Discharge is minimum for given specific energy
d) Discharge is maximum for given specific energy

11) For a triangular channel of side slopes M horizontal : 1 vertical the Froude's number is

a) $\frac{m}{\sqrt{g\,y}}$ b) $\frac{V\sqrt{2}}{gy}$ c) $\frac{V}{\sqrt{2gy}}$ d) $\frac{V^3}{gy}$

12) If the Froude's number is 9.2 then the jump is known as

a) Steady b) Oscillating c) Undular d) None

13) The difference between total head line and piezometric head represents

a) Velocity head b) Pressure head
c) Elevation of bed of channel d) None

14) The mean velocity in Lacey's regime channel is proportional to

a) $S_0^{1/3}$ b) $S_0^{1/2}$ c) $R^{1/3}$ d) $R^{4/3}$

15) In GVF, if dy/dx is positive then dE/dx will be

a) Zero b) Negative if $y > y_c$
c) Positive if $y > y_c$ d) Always negative

16) Velocity of flow is measured by

a) Orificemeter b) Venturimeter
c) Current meter d) Pivot point method

17) The momentum equation in 'X' direction, when the flow is steady is $\sum FX =$

a) $\rho\theta\,(Vx_2 - Vx_1)$ b) $\rho/\theta\,(Vx_2 - Vx_1)$

c) $\rho\theta^2\,(Vx_2 - Vx_1)$ d) None

18) Extreme condition of the Meander's is called as

a) Island b) Spurs c) Cut-off d) Leavee

19) Bed load is the term used to describe combination of

a) Contact load and wash load b) Contact load and saltation load
c) Contact load and suspended load d) Only bed material load

———————

SLR-VB – 50

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : OPEN CHANNEL AND RIVER HYDRAULICS

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*
3) ***Use*** *of non-programmable calculator is* ***permitted****.*

SECTION – I

2. Attempt **any four** : **(6×4=24)**
   a) What is specific energy curve ? Draw a neat sketch and show all details.
   b) Derive the modified GVF equation and draw a neat sketch and show all details.
   c) Define kinetic energy corrections factor (α) and momentum correction factor (β) and derive their expressions.
   d) A flow of 6.0 m^3/s is passing at a depth of 1.5 m through a rectangular channel of width 2.5 m. If 'α' is 1.1. Determine specific energy of flow also determine the value of the depth alternate to the existing depth. If 'α' = 1.0 (assumed for alternate depth flow).
   e) For a hydraulic jump in a rectangular channel the velocity and depth after the jump are known to be 0.80 m and 1.75 m respectively. Calculate depth before the jump, the energy loss and the power dissipated per meter width.

3. Attempt **any two** : **(8×2=16)**
   a) Explain most economical section of open channel and show, length of one of the sloping side = $\frac{1}{2}$ of top width for trapezoidal section.
   b) A discharge of 840 m^3/s flows down a spillway and then passes on a 60 m. wide concrete apron (n = 0.014) the velocity of water at the toe of spillway is 10 m/s. A tail water depth of 4.40 m the channel below, causes a hydraulic jump on the horizontal apron. Determine :
      a) Depth before the jump
      b) Length of jump
      c) Energy loss in the jump
      d) Specific force at the toe.

c) A very wide rectangular channel carries a discharge of 3.0 m^3/s/m width at a depth of 2.0 m. due to obstruction the water level raises by 2.0 m. Locate the point up stream of the weir where the depth is 3.0 m. Assume bed slope as 0.0002 and 'C' = 50. Use step method and classify water surface profile.

SECTION – II

4. Attempt **any four** : **(6×4=24)**

a) Explain the mechanics of sediment transport and sheild's method for design of channel.

b) What do you understand by river training works ? Explain its types with examples.

c) A channel section has to be design for following data :

discharge = 30 cumecs, silt factor = 1.0, slide slope = 0.5 : 1, also find longitudinal slope by using Lacey's theory.

d) Explain 'similitude' and what are its types ? And derive the equation for Froude's number.

e) Draw a neat sketch of current meter and explain its working in detail.

5. Attempt **any two** : **(8×2=16)**

a) The pressure drop in a flow meter in which oil flows at an upstream velocity of 0.9 m/s is to be estimated by model studies. A 1 : 6 scale model using water is used. If the pressure drop in the model is 450 Pa, what will be the pressure drop in prototype ? If the prototype discharge is 200 L/S what is the model discharge ? Take density and viscosity for prototype as, 900 kg/m^3 and 0.104 Pa.S. and 998 kg/m^3; 1×10^{-3} pa.S. for model.

b) Write short notes on (**any two**) :

1) 'Reynold's model law' and where it is used ?
2) 'River Meandering' and its causes.
3) Cut-off and spurs (Draw neat sketch).

c) Design a channel section by using 'Kennedy's theory' from following data :

i) Discharge = 28 cumecs
ii) Kutter's N = 0.0024
iii) m = 1, side slope 0.5 : 1, B/D = 7.6.

Also find bed slope.

SLR-VB – 51

Seat No.	

Set P

B.E. (Civil) (Part – I) Examination, 2017
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Tuesday, 9-5-2017 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) Photochemical smog reduces _____ considerably.
a) compatibility b) visibility c) electricity d) all of above

2) In cyclone gas flow reverses from _____ part.
a) Vortex finder b) Conical c) Cylindrical d) Outlet

3) Scrubbers can remove _____.
a) Gases b) Particulates c) Both a) and b) d) Mercury

4) Velocity of gas flow in gravity settler should be less than _____ m/s.
a) 0.3 b) 0.5 c) 3.1 d) 10

5) First step in removal of particles in ESP is _____.
a) Ionization of gas b) Charging of particles
c) Collection of particles d) Charge neutralization

6) If stack is having cross sectional area of 5 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) ESP can give particulate removal efficiency up to _____ %.
a) 90 b) 95 c) 97 d) 99.99

9) Packed bed tower is a type of _____.
a) Stack monitoring kit b) Dry collector
c) Wet collector d) Bag house filter

10) For ambient air monitoring _____ is used.
a) Stack monitoring kit b) Auto exhaust analyser
c) High volume sampler d) All of above

11) PAN is a _____ pollutant.
a) Natural b) Primary c) Secondary d) None of these

12) Molecular mass of SO_2 is _____ grams/mole.
a) 44 b) 64 c) 34 d) 28

13) _____ are solving air pollution problem, but creating water pollution.
a) Dry collectors b) Wet collector c) ESP d) Cyclone

14) Thickness of atmosphere is approximately _____ km.
a) 1000 b) 100 c) 50 d) 500

15) _____ prevents upward movement of air pollutants if it exists in atmosphere.
a) DALR b) Wind
c) Clouds d) An inversion (Stable condition)

16) Concentration of pollutant in stack emissions can be measured by _____.
a) High volume sampler b) Stack monitoring kit
c) Thermometer d) Hygrometer

17) As per NAAQS (old), standard for PM_{10} for eco-sensitive area considering annual average is _____ micrograms/m^3.
a) 60 b) 100 c) 8 d) 80

18) When Velocity of stack gas (V_g) is equal to velocity of suction (V_s) in stack gas sampling probe the then condition is termed as _____.
a) Under Isokinetic Sampling b) Over Isokinetic Sampling
c) Isokinetic Sampling d) None of these

19) Effective stack height is sum of _____ and plume rise.
a) Plume length b) Physical stack height
c) MMD d) Wind speed

20) Relative humidity can be measured by using _____
a) Hydrometer b) Hygroscope c) Hygrometer d) Anemometer

_____

SLR-VB – 51

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Tuesday, 9-5-2017 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) Assume suitable data ***whenever*** *required.*
3) Figure to the ***right*** *indicates* ***full*** *marks.*
4) ***Use*** *of non programmable calculator is* ***allowed****.*

SECTION – I

2. a) Define air pollution. Discuss importance of air quality. **5**

   b) Give detailed classification of sources of air pollution. **8**

3. a) Discuss general effects of different air pollutant on human health. **5**

   b) A factory uses 2,00,000 Litre of fuel oil per month. The exhaust gases from factory contain the following quantities of pollutant per ML per year : **8**
      i) Particulate matter = 3 tonnes
      ii) Sulphur dioxide = 59.7 tonnes
      iii) Hydrocarbon = 0.37 tonnes
      iv) Carbon monoxide = 0.52 tonnes

   Determine the safe height of chimney required for safe dispersion of pollutants.

4. a) Explain plume behaviour with neat sketches. **7**

   b) A thermal power plant burns 6 tonnes of coal per hour having 4% Sulphur. The effective stack height is 80 m. The average wind speed at stack top is 6.5 m/sec. The atmosphere is moderately to slightly stable.

   Find :
      i) GL conc. of SO_2 at 3 km downwind
      ii) GL concentration of SO_2 at 3 km downwind and 0.4 km crosswind.

   Assume σy = 280 m and σz = 170 m **6**

5. Write short notes on **any three** of the following : **14**
   i) Stability conditions.
   ii) Types of inversion.
   iii) Global warming.
   iv) Gaussian dispersion equation.

SECTION – II

Note that Q.No. **6** is **compulsory**; solve **any two** questions from Q.No. **7** to Q.No. **9**.

6. a) Give national ambient air quality standards (2009) for major pollutants. **5**

   b) Define air pollution index. Explain any one method of determining API with the help of illustrative example. **7**

7. a) Explain working of ESP with neat sketch . **5**

   b) An ESP with overall spacing of 0.23 cm and mean gas velocity 1.5 m/sec has collector plate area of 6000 m^2 gives efficiency of 97% in treating 200 m^3/sec of gas. To achieve 98% and 99% efficiency what should be plate area required ? **9**

8. a) List out various methods used in gaseous pollution control. Explain catalytic incineration. **5**

   b) Give design steps for 'Bag house filter'.

   Determine number of bags necessary to treat 16 m^3/s of SPM laden gas. If air to cloth ratio is 10 m/min. Take size of bags as 0.25 m in diameter and 7 m long. **9**

9. Write short notes on **any three** following : **14**
   1) Gravity settling chamber.
   2) Functions of central pollution control board.
   3) Spray tower Scrubbers.
   4) Isokinetic sampling.

_____

SLR-VB – 51

Seat No.	

Set Q

B.E. (Civil) (Part – I) Examination, 2017
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Tuesday, 9-5-2017 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) Concentration of pollutant in stack emissions can be measured by _____.
   a) High volume sampler b) Stack monitoring kit
   c) Thermometer d) Hygrometer

2) As per NAAQS (old), standard for PM_{10} for eco-sensitive area considering annual average is _____ micrograms/m^3.
   a) 60 b) 100 c) 8 d) 80

3) When Velocity of stack gas (V_g) is equal to velocity of suction (V_s) in stack gas sampling probe the then condition is termed as _____.
   a) Under Isokinetic Sampling b) Over Isokinetic Sampling
   c) Isokinetic Sampling d) None of these

4) Effective stack height is sum of _____ and plume rise.
   a) Plume length b) Physical stack height
   c) MMD d) Wind speed

5) Relative humidity can be measured by using _____
   a) Hydrometer b) Hygroscope c) Hygrometer d) Anemometer

6) Photochemical smog reduces _____ considerably.
   a) compatibility b) visibility c) electricity d) all of above

P.T.O.

7) In cyclone gas flow reverses from _____ part.
a) Vortex finder b) Conical c) Cylindrical d) Outlet

8) Scrubbers can remove _____.
a) Gases b) Particulates c) Both a) and b) d) Mercury

9) Velocity of gas flow in gravity settler should be less than _____ m/s.
a) 0.3 b) 0.5 c) 3.1 d) 10

10) First step in removal of particles in ESP is _____.
a) Ionization of gas b) Charging of particles
c) Collection of particles d) Charge neutralization

11) If stack is having cross sectional area of 5 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) ESP can give particulate removal efficiency up to _____ %.
a) 90 b) 95 c) 97 d) 99.99

14) Packed bed tower is a type of _____.
a) Stack monitoring kit b) Dry collector
c) Wet collector d) Bag house filter

15) For ambient air monitoring _____ is used.
a) Stack monitoring kit b) Auto exhaust analyser
c) High volume sampler d) All of above

16) PAN is a _____ pollutant.
a) Natural b) Primary c) Secondary d) None of these

17) Molecular mass of SO_2 is _____ grams/mole.
a) 44 b) 64 c) 34 d) 28

18) _____ are solving air pollution problem, but creating water pollution.
a) Dry collectors b) Wet collector c) ESP d) Cyclone

19) Thickness of atmosphere is approximately _____ km.
a) 1000 b) 100 c) 50 d) 500

20) _____ prevents upward movement of air pollutants if it exists in atmosphere.
a) DALR b) Wind
c) Clouds d) An inversion (Stable condition)

_____

SLR-VB – 51

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Tuesday, 9-5-2017 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) Assume suitable data ***whenever*** *required.*
3) Figure to the ***right*** *indicates* ***full*** *marks.*
4) ***Use*** *of non programmable calculator is* ***allowed****.*

SECTION – I

2. a) Define air pollution. Discuss importance of air quality. **5**

   b) Give detailed classification of sources of air pollution. **8**

3. a) Discuss general effects of different air pollutant on human health. **5**

   b) A factory uses 2,00,000 Litre of fuel oil per month. The exhaust gases from factory contain the following quantities of pollutant per ML per year : **8**
      i) Particulate matter = 3 tonnes
      ii) Sulphur dioxide = 59.7 tonnes
      iii) Hydrocarbon = 0.37 tonnes
      iv) Carbon monoxide = 0.52 tonnes

   Determine the safe height of chimney required for safe dispersion of pollutants.

4. a) Explain plume behaviour with neat sketches. **7**

   b) A thermal power plant burns 6 tonnes of coal per hour having 4% Sulphur. The effective stack height is 80 m. The average wind speed at stack top is 6.5 m/sec. The atmosphere is moderately to slightly stable.

   Find :
      i) GL conc. of SO_2 at 3 km downwind
      ii) GL concentration of SO_2 at 3 km downwind and 0.4 km crosswind.

   Assume σy = 280 m and σz = 170 m **6**

5. Write short notes on **any three** of the following : **14**
   i) Stability conditions.
   ii) Types of inversion.
   iii) Global warming.
   iv) Gaussian dispersion equation.

SECTION – II

Note that Q.No. **6** is **compulsory**; solve **any two** questions from Q.No. **7** to Q.No. **9**.

6. a) Give national ambient air quality standards (2009) for major pollutants. **5**

   b) Define air pollution index. Explain any one method of determining API with the help of illustrative example. **7**

7. a) Explain working of ESP with neat sketch . **5**

   b) An ESP with overall spacing of 0.23 cm and mean gas velocity 1.5 m/sec has collector plate area of 6000 m^2 gives efficiency of 97% in treating 200 m^3/sec of gas. To achieve 98% and 99% efficiency what should be plate area required ? **9**

8. a) List out various methods used in gaseous pollution control. Explain catalytic incineration. **5**

   b) Give design steps for 'Bag house filter'.

   Determine number of bags necessary to treat 16 m^3/s of SPM laden gas. If air to cloth ratio is 10 m/min. Take size of bags as 0.25 m in diameter and 7 m long. **9**

9. Write short notes on **any three** following : **14**
   1) Gravity settling chamber.
   2) Functions of central pollution control board.
   3) Spray tower Scrubbers.
   4) Isokinetic sampling.

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Set Q

SLR-VB – 51

Seat No.	

Set R

B.E. (Civil) (Part – I) Examination, 2017
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Tuesday, 9-5-2017 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) PAN is a _____ pollutant.
a) Natural b) Primary c) Secondary d) None of these

2) Molecular mass of SO_2 is _____ grams/mole.
a) 44 b) 64 c) 34 d) 28

3) _____ are solving air pollution problem, but creating water pollution.
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a) 1000 b) 100 c) 50 d) 500

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6) Concentration of pollutant in stack emissions can be measured by _____.
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7) As per NAAQS (old), standard for PM_{10} for eco-sensitive area considering annual average is _____ micrograms/m^3.
a) 60 b) 100 c) 8 d) 80

P.T.O.

8) When Velocity of stack gas (V_g) is equal to velocity of suction (V_s) in stack gas sampling probe the then condition is termed as _____.
   a) Under Isokinetic Sampling b) Over Isokinetic Sampling
   c) Isokinetic Sampling d) None of these

9) Effective stack height is sum of _____ and plume rise.
   a) Plume length b) Physical stack height
   c) MMD d) Wind speed

10) Relative humidity can be measured by using _____
   a) Hydrometer b) Hygroscope c) Hygrometer d) Anemometer

11) Photochemical smog reduces _____ considerably.
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12) In cyclone gas flow reverses from _____ part.
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13) Scrubbers can remove _____.
   a) Gases b) Particulates c) Both a) and b) d) Mercury

14) Velocity of gas flow in gravity settler should be less than _____ m/s.
   a) 0.3 b) 0.5 c) 3.1 d) 10

15) First step in removal of particles in ESP is _____.
   a) Ionization of gas b) Charging of particles
   c) Collection of particles d) Charge neutralization

16) If stack is having cross sectional area of 5 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) ESP can give particulate removal efficiency up to _____ %.
   a) 90 b) 95 c) 97 d) 99.99

19) Packed bed tower is a type of _____.
   a) Stack monitoring kit b) Dry collector
   c) Wet collector d) Bag house filter

20) For ambient air monitoring _____ is used.
   a) Stack monitoring kit b) Auto exhaust analyser
   c) High volume sampler d) All of above

_____

SLR-VB – 51

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Tuesday, 9-5-2017 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) Assume suitable data ***whenever*** *required.*
3) Figure to the ***right*** *indicates* ***full*** *marks.*
4) ***Use*** *of non programmable calculator is* ***allowed****.*

SECTION – I

2. a) Define air pollution. Discuss importance of air quality. **5**

   b) Give detailed classification of sources of air pollution. **8**

3. a) Discuss general effects of different air pollutant on human health. **5**

   b) A factory uses 2,00,000 Litre of fuel oil per month. The exhaust gases from factory contain the following quantities of pollutant per ML per year : **8**
      i) Particulate matter = 3 tonnes
      ii) Sulphur dioxide = 59.7 tonnes
      iii) Hydrocarbon = 0.37 tonnes
      iv) Carbon monoxide = 0.52 tonnes

   Determine the safe height of chimney required for safe dispersion of pollutants.

4. a) Explain plume behaviour with neat sketches. **7**

   b) A thermal power plant burns 6 tonnes of coal per hour having 4% Sulphur. The effective stack height is 80 m. The average wind speed at stack top is 6.5 m/sec. The atmosphere is moderately to slightly stable.

   Find :
      i) GL conc. of SO_2 at 3 km downwind
      ii) GL concentration of SO_2 at 3 km downwind and 0.4 km crosswind.

   Assume σy = 280 m and σz = 170 m **6**

5. Write short notes on **any three** of the following : **14**
   i) Stability conditions.
   ii) Types of inversion.
   iii) Global warming.
   iv) Gaussian dispersion equation.

SECTION – II

Note that Q.No. **6** is **compulsory**; solve **any two** questions from Q.No. **7** to Q.No. **9**.

6. a) Give national ambient air quality standards (2009) for major pollutants. **5**

   b) Define air pollution index. Explain any one method of determining API with the help of illustrative example. **7**

7. a) Explain working of ESP with neat sketch . **5**

   b) An ESP with overall spacing of 0.23 cm and mean gas velocity 1.5 m/sec has collector plate area of 6000 m^2 gives efficiency of 97% in treating 200 m^3/sec of gas. To achieve 98% and 99% efficiency what should be plate area required ? **9**

8. a) List out various methods used in gaseous pollution control. Explain catalytic incineration. **5**

   b) Give design steps for 'Bag house filter'.

   Determine number of bags necessary to treat 16 m^3/s of SPM laden gas. If air to cloth ratio is 10 m/min. Take size of bags as 0.25 m in diameter and 7 m long. **9**

9. Write short notes on **any three** following : **14**
   1) Gravity settling chamber.
   2) Functions of central pollution control board.
   3) Spray tower Scrubbers.
   4) Isokinetic sampling.

SLR-VB – 51

Seat No.	

Set S

B.E. (Civil) (Part – I) Examination, 2017
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Tuesday, 9-5-2017 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 5 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) ESP can give particulate removal efficiency up to _____ %.
   a) 90 b) 95 c) 97 d) 99.99

4) Packed bed tower is a type of _____.
   a) Stack monitoring kit b) Dry collector
   c) Wet collector d) Bag house filter

5) For ambient air monitoring _____ is used.
   a) Stack monitoring kit b) Auto exhaust analyser
   c) High volume sampler d) All of above

6) PAN is a _____ pollutant.
   a) Natural b) Primary c) Secondary d) None of these

7) Molecular mass of SO_2 is _____ grams/mole.
   a) 44 b) 64 c) 34 d) 28

P.T.O.

8) _____ are solving air pollution problem, but creating water pollution.
a) Dry collectors b) Wet collector c) ESP d) Cyclone

9) Thickness of atmosphere is approximately _____ km.
a) 1000 b) 100 c) 50 d) 500

10) _____ prevents upward movement of air pollutants if it exists in atmosphere.
a) DALR b) Wind
c) Clouds d) An inversion (Stable condition)

11) Concentration of pollutant in stack emissions can be measured by _____.
a) High volume sampler b) Stack monitoring kit
c) Thermometer d) Hygrometer

12) As per NAAQS (old), standard for PM_{10} for eco-sensitive area considering annual average is _____ micrograms/m^3.
a) 60 b) 100 c) 8 d) 80

13) When Velocity of stack gas (V_g) is equal to velocity of suction (V_s) in stack gas sampling probe the then condition is termed as _____.
a) Under Isokinetic Sampling b) Over Isokinetic Sampling
c) Isokinetic Sampling d) None of these

14) Effective stack height is sum of _____ and plume rise.
a) Plume length b) Physical stack height
c) MMD d) Wind speed

15) Relative humidity can be measured by using _____
a) Hydrometer b) Hygroscope c) Hygrometer d) Anemometer

16) Photochemical smog reduces _____ considerably.
a) compatibility b) visibility c) electricity d) all of above

17) In cyclone gas flow reverses from _____ part.
a) Vortex finder b) Conical c) Cylindrical d) Outlet

18) Scrubbers can remove _____.
a) Gases b) Particulates c) Both a) and b) d) Mercury

19) Velocity of gas flow in gravity settler should be less than _____ m/s.
a) 0.3 b) 0.5 c) 3.1 d) 10

20) First step in removal of particles in ESP is _____.
a) Ionization of gas b) Charging of particles
c) Collection of particles d) Charge neutralization

_____

SLR-VB – 51

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
AIR POLLUTION AND CONTROL (Elective – I)

Day and Date : Tuesday, 9-5-2017 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) Assume suitable data ***whenever*** *required.*
3) Figure to the ***right*** *indicates* ***full*** *marks.*
4) ***Use*** *of non programmable calculator is* ***allowed****.*

SECTION – I

2. a) Define air pollution. Discuss importance of air quality. **5**

   b) Give detailed classification of sources of air pollution. **8**

3. a) Discuss general effects of different air pollutant on human health. **5**

   b) A factory uses 2,00,000 Litre of fuel oil per month. The exhaust gases from factory contain the following quantities of pollutant per ML per year : **8**
      i) Particulate matter = 3 tonnes
      ii) Sulphur dioxide = 59.7 tonnes
      iii) Hydrocarbon = 0.37 tonnes
      iv) Carbon monoxide = 0.52 tonnes

   Determine the safe height of chimney required for safe dispersion of pollutants.

4. a) Explain plume behaviour with neat sketches. **7**

   b) A thermal power plant burns 6 tonnes of coal per hour having 4% Sulphur. The effective stack height is 80 m. The average wind speed at stack top is 6.5 m/sec. The atmosphere is moderately to slightly stable.

   Find :
      i) GL conc. of SO_2 at 3 km downwind
      ii) GL concentration of SO_2 at 3 km downwind and 0.4 km crosswind.

   Assume σy = 280 m and σz = 170 m **6**

5. Write short notes on **any three** of the following : **14**
   i) Stability conditions.
   ii) Types of inversion.
   iii) Global warming.
   iv) Gaussian dispersion equation.

SECTION – II

Note that Q.No. **6** is **compulsory**; solve **any two** questions from Q.No. **7** to Q.No. **9**.

6. a) Give national ambient air quality standards (2009) for major pollutants. **5**

   b) Define air pollution index. Explain any one method of determining API with the help of illustrative example. **7**

7. a) Explain working of ESP with neat sketch . **5**

   b) An ESP with overall spacing of 0.23 cm and mean gas velocity 1.5 m/sec has collector plate area of 6000 m^2 gives efficiency of 97% in treating 200 m^3/sec of gas. To achieve 98% and 99% efficiency what should be plate area required ? **9**

8. a) List out various methods used in gaseous pollution control. Explain catalytic incineration. **5**

   b) Give design steps for 'Bag house filter'.

   Determine number of bags necessary to treat 16 m^3/s of SPM laden gas. If air to cloth ratio is 10 m/min. Take size of bags as 0.25 m in diameter and 7 m long. **9**

9. Write short notes on **any three** following : **14**
   1) Gravity settling chamber.
   2) Functions of central pollution control board.
   3) Spray tower Scrubbers.
   4) Isokinetic sampling.

SLR-VB – 52

Seat No.	

Set P

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : DESIGN OF FOUNDATIONS

Day and Date : Tuesday, 9-5-2017 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) Make suitable assumption, if necessary and mention it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Use** of electronic calculator and relevant I.S. codes are **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) Three piles are arranged in triangular form, efficiency of this pile group by Feld's rule is **2**
a) 33.33% b) 50% c) 75% d) 87.5%

2) A pile of 0.4 m diameter and length 11 m is embedded in deposit of clay having cohesion = 90 kN/m^2. The skin friction capacity of the pile for an adhesion factor of 0.6 is **2**
a) 671 kN b) 565 kN c) 746 kN d) 400 kN

3) The negative skin friction on pile develops when **1**
a) The soil in which it is driven is sandy soil
b) The surrounding soil settles more than pile
c) The ground water table rises
d) The soil near the tip is clay

4) Maximum settlement for raft foundation on clay is limited to **1**
a) 40 – 65 mm b) 65 – 100 mm c) 40 – 120 mm d) 65 – 165 mm

5) The natural frequency of the system increases with **1**
a) increase in stiffness of the system b) decrease in mass of system
c) both a and b d) neither a or b

6) The rotation of block foundation about X axis is known as **1**
a) Yawing b) Pitching
c) Rocking d) None of the above

P.T.O.

7) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is **1**
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

8) With increase in the size of footing the bearing capacity of footing on clay **1**
   a) Increases b) Decreases
   c) Remains same d) None of these

9) Bored piles are _____ piles. **1**
   a) Large displacement b) Non displacement
   c) Small displacement d) None of the above

10) Resonance in machine foundation occurs when frequency ratio is **1**
   a) zero b) less than 1 c) greater than 1 d) equal to one

11) The standard penetration test is most suitable for **1**
   a) Cohesion less soil b) Cohesive soil
   c) Both d) None of the above

12) The bearing capacity of soil supporting a footing of size 2m × 2m will not be affected by the presence of water table located at a depth _____ below base of footing. **1**
   a) 1.0 m b) 1.5 m c) 2.0 m d) 0.5 m

13) The floating caisson is **1**
   a) Open at top closed at bottom b) Closed at top open at bottom
   c) Open at top and bottom both d) None of the above

14) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is **1**
   a) 1/1.5 b) $\frac{1}{2}$ c) 1/2.5 d) 1/4

15) The air pressure in the air lock of a pneumatic caisson is limited to **1**
   a) 200 kpa b) 300 kpa c) 400 kpa d) 600 kpa

16) Permissible settlement is maximum in case of **1**
   a) isolated footing on clay b) rafts on clay
   c) isolated footing on sand d) rafts on sand

17) The maximum unit pressure which soil can withstand without rupture in shear is called **1**
   a) Allowable bearing pressure b) Safe bearing capacity
   c) Ultimate bearing capacity d) None of the above

18) When the allowable soil pressure is low and expected differential settlement for spread footing is high, the best choice is _____ foundation. **1**
   a) Raft b) Trapezoidal
   c) Rectangular d) None of the above

_____

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Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : DESIGN OF FOUNDATIONS

Day and Date : Tuesday, 9-5-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Make suitable assumption, if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of electronic calculator and relevant I.S. codes are **allowed**.*
*4) Q.No. **6** in Section **I** and Q.No. **10** in Section **II** is **compulsory.** Answer **any two** from remaining in **each** Section.*

SECTION – I

2. A) Explain various types of shear failure of soil. **5**

   B) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kn/m^3. The shear strength parameters are c = 0 and $\Phi = 35°$. Determine F.O.S. w.r.t. shear failure for the water table 4 m below G.L ? Use Terzaghi's equation. **7**

3. A) Explain plate load test. **5**

   B) Explain in which situation raft foundation is needed ? What are the IS Code provision for it ? **7**

4. A) A footing 4m × 2m in plan transmits a pressure of 150 kN/m^2 on a cohesive soil having $E = 6 \times 10^4$ kN/m^2 and $\mu = 0.50$. Determine the immediate settlement of the footing at the centre. Assuming it to be a flexible footing and rigid footing. **7**

   B) Write note on standard penetration test. **5**

5. A) With neat sketches describe various types of raft foundations. **7**

   B) Explain I.S. code method for determination of bearing capacity of soil. **5**

6. Write note on **any four** : **16**
   a) Characteristics of B.C. soil
   b) Soil exploration
   c) Effect of water table on bearing capacity
   d) Settlement in raft foundation
   e) Boussinesq equation for vertical stress distribution.

SECTION – II

7. A) Explain types of piles with neat sketch. **4**

   B) A group of 9 piles with 3 piles in row were driven into a soft clay extending from ground level up to a great depth. The dia. and the length of piles were 30 cm and 10 m respectively. The unconfined compressive strength of the clay is 70 kpa. If the piles are placed at 90 cm c/c, compute the allowable load on the pile group on the of shear failure criteria. Take factor of safety = 2.5. For $\varphi u = 0$, Nc = 9. **8**

8. A) Explain natural frequency of machine foundation. **6**

   B) Discuss various forces acting on well foundation. **6**

9. A) Resonance occurs at a frequency of 20 cps in vertical vibration of a test block 1m × 1m × 1m. Calculate the coefficient of elastic uniform compression. **7**

   B) Draw the sketch of block foundation with all 6 degrees of freedom. **5**
   (3 translation and 3 rotation)

10. Write note on **any four** : **16**
    a) Methods of underpinning
    b) Box caisson
    c) Pile cap
    d) Vibration absorbers
    e) Criteria for satisfaction performance of machine foundation.

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SLR-VB – 52

Seat No.	

Set Q

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : DESIGN OF FOUNDATIONS

Day and Date : Tuesday, 9-5-2017 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) Make suitable assumption, if necessary and mention it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Use** of electronic calculator and relevant I.S. codes are **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) Bored piles are _____ piles. **1**
a) Large displacement b) Non displacement
c) Small displacement d) None of the above

2) Resonance in machine foundation occurs when frequency ratio is **1**
a) zero b) less than 1 c) greater than 1 d) equal to one

3) The standard penetration test is most suitable for **1**
a) Cohesion less soil b) Cohesive soil
c) Both d) None of the above

4) The bearing capacity of soil supporting a footing of size 2m × 2m will not be affected by the presence of water table located at a depth _____ below base of footing. **1**
a) 1.0 m b) 1.5 m c) 2.0 m d) 0.5 m

5) The floating caisson is **1**
a) Open at top closed at bottom b) Closed at top open at bottom
c) Open at top and bottom both d) None of the above

6) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is **1**
a) 1/1.5 b) $\frac{1}{2}$ c) 1/2.5 d) 1/4

7) The air pressure in the air lock of a pneumatic caisson is limited to **1**
a) 200 kpa b) 300 kpa c) 400 kpa d) 600 kpa

P.T.O.

8) Permissible settlement is maximum in case of **1**
   a) isolated footing on clay b) rafts on clay
   c) isolated footing on sand d) rafts on sand

9) The maximum unit pressure which soil can withstand without rupture in shear is called **1**
   a) Allowable bearing pressure b) Safe bearing capacity
   c) Ultimate bearing capacity d) None of the above

10) When the allowable soil pressure is low and expected differential settlement for spread footing is high, the best choice is _____ foundation. **1**
   a) Raft b) Trapezoidal
   c) Rectangular d) None of the above

11) Three piles are arranged in triangular form, efficiency of this pile group by Feld's rule is **2**
   a) 33.33% b) 50% c) 75% d) 87.5%

12) A pile of 0.4 m diameter and length 11 m is embedded in deposit of clay having cohesion = 90 kN/m^2. The skin friction capacity of the pile for an adhesion factor of 0.6 is **2**
   a) 671 kN b) 565 kN c) 746 kN d) 400 kN

13) The negative skin friction on pile develops when **1**
   a) The soil in which it is driven is sandy soil
   b) The surrounding soil settles more than pile
   c) The ground water table rises
   d) The soil near the tip is clay

14) Maximum settlement for raft foundation on clay is limited to **1**
   a) 40 – 65 mm b) 65 – 100 mm c) 40 – 120 mm d) 65 – 165 mm

15) The natural frequency of the system increases with **1**
   a) increase in stiffness of the system b) decrease in mass of system
   c) both a and b d) neither a or b

16) The rotation of block foundation about X axis is known as **1**
   a) Yawing b) Pitching
   c) Rocking d) None of the above

17) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is **1**
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

18) With increase in the size of footing the bearing capacity of footing on clay **1**
   a) Increases b) Decreases
   c) Remains same d) None of these

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SLR-VB – 52

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : DESIGN OF FOUNDATIONS

Day and Date : Tuesday, 9-5-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Make suitable assumption, if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of electronic calculator and relevant I.S. codes are **allowed**.*
*4) Q.No. **6** in Section **I** and Q.No. **10** in Section **II** is **compulsory.** Answer **any two** from remaining in **each** Section.*

SECTION – I

2. A) Explain various types of shear failure of soil. **5**

   B) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kn/m^3. The shear strength parameters are c = 0 and $\Phi = 35°$. Determine F.O.S. w.r.t. shear failure for the water table 4 m below G.L ? Use Terzaghi's equation. **7**

3. A) Explain plate load test. **5**

   B) Explain in which situation raft foundation is needed ? What are the IS Code provision for it ? **7**

4. A) A footing 4m × 2m in plan transmits a pressure of 150 kN/m^2 on a cohesive soil having $E = 6 \times 10^4$ kN/m^2 and $\mu = 0.50$. Determine the immediate settlement of the footing at the centre. Assuming it to be a flexible footing and rigid footing. **7**

   B) Write note on standard penetration test. **5**

5. A) With neat sketches describe various types of raft foundations. **7**

   B) Explain I.S. code method for determination of bearing capacity of soil. **5**

6. Write note on **any four** : **16**
   a) Characteristics of B.C. soil
   b) Soil exploration
   c) Effect of water table on bearing capacity
   d) Settlement in raft foundation
   e) Boussinesq equation for vertical stress distribution.

SECTION – II

7. A) Explain types of piles with neat sketch. **4**

   B) A group of 9 piles with 3 piles in row were driven into a soft clay extending from ground level up to a great depth. The dia. and the length of piles were 30 cm and 10 m respectively. The unconfined compressive strength of the clay is 70 kpa. If the piles are placed at 90 cm c/c, compute the allowable load on the pile group on the of shear failure criteria. Take factor of safety = 2.5. For $\varphi u = 0$, Nc = 9. **8**

8. A) Explain natural frequency of machine foundation. **6**

   B) Discuss various forces acting on well foundation. **6**

9. A) Resonance occurs at a frequency of 20 cps in vertical vibration of a test block 1m × 1m × 1m. Calculate the coefficient of elastic uniform compression. **7**

   B) Draw the sketch of block foundation with all 6 degrees of freedom. **5**
   (3 translation and 3 rotation)

10. Write note on **any four** : **16**
    a) Methods of underpinning
    b) Box caisson
    c) Pile cap
    d) Vibration absorbers
    e) Criteria for satisfaction performance of machine foundation.

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SLR-VB – 52

Seat No.	

Set R

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : DESIGN OF FOUNDATIONS

Day and Date : Tuesday, 9-5-2017 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) Make suitable assumption, if necessary and mention it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Use** of electronic calculator and relevant I.S. codes are **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is **1**
a) 1/1.5 b) $\frac{1}{2}$ c) 1/2.5 d) 1/4

2) The air pressure in the air lock of a pneumatic caisson is limited to **1**
a) 200 kpa b) 300 kpa c) 400 kpa d) 600 kpa

3) Permissible settlement is maximum in case of **1**
a) isolated footing on clay b) rafts on clay
c) isolated footing on sand d) rafts on sand

4) The maximum unit pressure which soil can withstand without rupture in shear is called **1**
a) Allowable bearing pressure b) Safe bearing capacity
c) Ultimate bearing capacity d) None of the above

5) When the allowable soil pressure is low and expected differential settlement for spread footing is high, the best choice is _____ foundation. **1**
a) Raft b) Trapezoidal
c) Rectangular d) None of the above

6) Three piles are arranged in triangular form, efficiency of this pile group by Feld's rule is **2**
a) 33.33% b) 50% c) 75% d) 87.5%

7) A pile of 0.4 m diameter and length 11 m is embedded in deposit of clay having cohesion = 90 kN/m^2. The skin friction capacity of the pile for an adhesion factor of 0.6 is **2**
a) 671 kN b) 565 kN c) 746 kN d) 400 kN

P.T.O.

8) The negative skin friction on pile develops when **1**
   a) The soil in which it is driven is sandy soil
   b) The surrounding soil settles more than pile
   c) The ground water table rises
   d) The soil near the tip is clay

9) Maximum settlement for raft foundation on clay is limited to **1**
   a) 40 – 65 mm b) 65 – 100 mm c) 40 – 120 mm d) 65 – 165 mm

10) The natural frequency of the system increases with **1**
   a) increase in stiffness of the system b) decrease in mass of system
   c) both a and b d) neither a or b

11) The rotation of block foundation about X axis is known as **1**
   a) Yawing b) Pitching
   c) Rocking d) None of the above

12) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is **1**
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

13) With increase in the size of footing the bearing capacity of footing on clay **1**
   a) Increases b) Decreases
   c) Remains same d) None of these

14) Bored piles are _____ piles. **1**
   a) Large displacement b) Non displacement
   c) Small displacement d) None of the above

15) Resonance in machine foundation occurs when frequency ratio is **1**
   a) zero b) less than 1 c) greater than 1 d) equal to one

16) The standard penetration test is most suitable for **1**
   a) Cohesion less soil b) Cohesive soil
   c) Both d) None of the above

17) The bearing capacity of soil supporting a footing of size 2m × 2m will not be affected by the presence of water table located at a depth _____ below base of footing. **1**
   a) 1.0 m b) 1.5 m c) 2.0 m d) 0.5 m

18) The floating caisson is **1**
   a) Open at top closed at bottom b) Closed at top open at bottom
   c) Open at top and bottom both d) None of the above

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SLR-VB – 52

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : DESIGN OF FOUNDATIONS

Day and Date : Tuesday, 9-5-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Make suitable assumption, if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of electronic calculator and relevant I.S. codes are **allowed**.*
*4) Q.No. **6** in Section **I** and Q.No. **10** in Section **II** is **compulsory.** Answer **any two** from remaining in **each** Section.*

SECTION – I

2. A) Explain various types of shear failure of soil. **5**

   B) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kn/m^3. The shear strength parameters are c = 0 and $\Phi = 35°$. Determine F.O.S. w.r.t. shear failure for the water table 4 m below G.L ? Use Terzaghi's equation. **7**

3. A) Explain plate load test. **5**

   B) Explain in which situation raft foundation is needed ? What are the IS Code provision for it ? **7**

4. A) A footing 4m × 2m in plan transmits a pressure of 150 kN/m^2 on a cohesive soil having $E = 6 \times 10^4$ kN/m^2 and $\mu = 0.50$. Determine the immediate settlement of the footing at the centre. Assuming it to be a flexible footing and rigid footing. **7**

   B) Write note on standard penetration test. **5**

5. A) With neat sketches describe various types of raft foundations. **7**

   B) Explain I.S. code method for determination of bearing capacity of soil. **5**

6. Write note on **any four** : **16**
   a) Characteristics of B.C. soil
   b) Soil exploration
   c) Effect of water table on bearing capacity
   d) Settlement in raft foundation
   e) Boussinesq equation for vertical stress distribution.

SECTION – II

7. A) Explain types of piles with neat sketch. **4**

   B) A group of 9 piles with 3 piles in row were driven into a soft clay extending from ground level up to a great depth. The dia. and the length of piles were 30 cm and 10 m respectively. The unconfined compressive strength of the clay is 70 kpa. If the piles are placed at 90 cm c/c, compute the allowable load on the pile group on the of shear failure criteria. Take factor of safety = 2.5. For $\varphi u = 0$, Nc = 9. **8**

8. A) Explain natural frequency of machine foundation. **6**

   B) Discuss various forces acting on well foundation. **6**

9. A) Resonance occurs at a frequency of 20 cps in vertical vibration of a test block 1m × 1m × 1m. Calculate the coefficient of elastic uniform compression. **7**

   B) Draw the sketch of block foundation with all 6 degrees of freedom. **5**
   (3 translation and 3 rotation)

10. Write note on **any four** : **16**
    a) Methods of underpinning
    b) Box caisson
    c) Pile cap
    d) Vibration absorbers
    e) Criteria for satisfaction performance of machine foundation.

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SLR-VB – 52

Seat No.	

Set S

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : DESIGN OF FOUNDATIONS

Day and Date : Tuesday, 9-5-2017 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) Make suitable assumption, if necessary and mention it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Use** of electronic calculator and relevant I.S. codes are **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) The rotation of block foundation about X axis is known as **1**
   a) Yawing b) Pitching
   c) Rocking d) None of the above

2) During the process of well sinking, in order to overcome skin friction and loss in weight of the well due to buoyancy, the term that is applied is **1**
   a) Kentiledge b) Bed rock
   c) Cutting edge d) Steining

3) With increase in the size of footing the bearing capacity of footing on clay **1**
   a) Increases b) Decreases
   c) Remains same d) None of these

4) Bored piles are _____ piles. **1**
   a) Large displacement b) Non displacement
   c) Small displacement d) None of the above

5) Resonance in machine foundation occurs when frequency ratio is **1**
   a) zero b) less than 1 c) greater than 1 d) equal to one

6) The standard penetration test is most suitable for **1**
   a) Cohesion less soil b) Cohesive soil
   c) Both d) None of the above

7) The bearing capacity of soil supporting a footing of size 2m × 2m will not be affected by the presence of water table located at a depth _____ below base of footing. **1**
   a) 1.0 m b) 1.5 m c) 2.0 m d) 0.5 m

P.T.O.

8) The floating caisson is **1**

a) Open at top closed at bottom b) Closed at top open at bottom
c) Open at top and bottom both d) None of the above

9) In under reamed pile construction, the ratio of shaft diameter to bulb diameter is **1**

a) 1/1.5 b) $\frac{1}{2}$ c) 1/2.5 d) 1/4

10) The air pressure in the air lock of a pneumatic caisson is limited to **1**

a) 200 kpa b) 300 kpa c) 400 kpa d) 600 kpa

11) Permissible settlement is maximum in case of **1**

a) isolated footing on clay b) rafts on clay
c) isolated footing on sand d) rafts on sand

12) The maximum unit pressure which soil can withstand without rupture in shear is called **1**

a) Allowable bearing pressure b) Safe bearing capacity
c) Ultimate bearing capacity d) None of the above

13) When the allowable soil pressure is low and expected differential settlement for spread footing is high, the best choice is _____ foundation. **1**

a) Raft b) Trapezoidal
c) Rectangular d) None of the above

14) Three piles are arranged in triangular form, efficiency of this pile group by Feld's rule is **2**

a) 33.33% b) 50% c) 75% d) 87.5%

15) A pile of 0.4 m diameter and length 11 m is embedded in deposit of clay having cohesion = 90 kN/m^2. The skin friction capacity of the pile for an adhesion factor of 0.6 is **2**

a) 671 kN b) 565 kN c) 746 kN d) 400 kN

16) The negative skin friction on pile develops when **1**

a) The soil in which it is driven is sandy soil
b) The surrounding soil settles more than pile
c) The ground water table rises
d) The soil near the tip is clay

17) Maximum settlement for raft foundation on clay is limited to **1**

a) 40 – 65 mm b) 65 – 100 mm c) 40 – 120 mm d) 65 – 165 mm

18) The natural frequency of the system increases with **1**

a) increase in stiffness of the system b) decrease in mass of system
c) both a and b d) neither a or b

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SLR-VB – 52

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
Elective – I : DESIGN OF FOUNDATIONS

Day and Date : Tuesday, 9-5-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Make suitable assumption, if necessary and mention it **clearly**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of electronic calculator and relevant I.S. codes are **allowed**.*
*4) Q.No. **6** in Section **I** and Q.No. **10** in Section **II** is **compulsory.** Answer **any two** from remaining in **each** Section.*

SECTION – I

2. A) Explain various types of shear failure of soil. **5**

   B) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kn/m^3. The shear strength parameters are c = 0 and $\Phi = 35°$. Determine F.O.S. w.r.t. shear failure for the water table 4 m below G.L ? Use Terzaghi's equation. **7**

3. A) Explain plate load test. **5**

   B) Explain in which situation raft foundation is needed ? What are the IS Code provision for it ? **7**

4. A) A footing 4m × 2m in plan transmits a pressure of 150 kN/m^2 on a cohesive soil having $E = 6 \times 10^4$ kN/m^2 and $\mu = 0.50$. Determine the immediate settlement of the footing at the centre. Assuming it to be a flexible footing and rigid footing. **7**

   B) Write note on standard penetration test. **5**

5. A) With neat sketches describe various types of raft foundations. **7**

   B) Explain I.S. code method for determination of bearing capacity of soil. **5**

6. Write note on **any four** : **16**
   a) Characteristics of B.C. soil
   b) Soil exploration
   c) Effect of water table on bearing capacity
   d) Settlement in raft foundation
   e) Boussinesq equation for vertical stress distribution.

SECTION – II

7. A) Explain types of piles with neat sketch. **4**

   B) A group of 9 piles with 3 piles in row were driven into a soft clay extending from ground level up to a great depth. The dia. and the length of piles were 30 cm and 10 m respectively. The unconfined compressive strength of the clay is 70 kpa. If the piles are placed at 90 cm c/c, compute the allowable load on the pile group on the of shear failure criteria. Take factor of safety = 2.5. For $\varphi u = 0$, Nc = 9. **8**

8. A) Explain natural frequency of machine foundation. **6**

   B) Discuss various forces acting on well foundation. **6**

9. A) Resonance occurs at a frequency of 20 cps in vertical vibration of a test block 1m × 1m × 1m. Calculate the coefficient of elastic uniform compression. **7**

   B) Draw the sketch of block foundation with all 6 degrees of freedom. **5**
   (3 translation and 3 rotation)

10. Write note on **any four** : **16**
    a) Methods of underpinning
    b) Box caisson
    c) Pile cap
    d) Vibration absorbers
    e) Criteria for satisfaction performance of machine foundation.

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SLR-VB – 53

Seat No.	

Set P

B.E. (Civil) Part – I Examination, 2017
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Tuesday, 9-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) IS codes and non programmable calculator is ***allowed****.*
3) ***Assume*** *suitable data if necessary and mention it clearly before the solution.*
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 alternative : **20**

i) The maximum area of tension reinforcement in beams shall not exceed **1**
a) 0.15% b) 1.5% c) 4% d) 1%

ii) The thickness of flat slab for interior panel may be taken as **1**
a) Min 125 mm b) L/40 without drops
c) (a) and (b) d) None of the above

iii) The permissible shear stress in the flat slab is taken as _____ √fck. **1**
a) 0.16 b) 0.25 c) 0.30 d) 0.20

iv) If two columns carry unequal loads, then which type of footing is provided ? **1**
a) Combined rectangular footing b) Combined trapezoidal footing
c) Strap footing d) Raft footing

v) The thickness of flat slab with drops, the span to effective depth ratio for continuous slab shall be taken as **1**
a) 20 b) 26 c) 40 d) 07

vi) The permissible tensile stress in the reinforcement for Fe415 near water face is taken as **1**
a) 115 N/mm^2 b) 125 N/mm^2 c) 150 N/mm^2 d) 205 N/mm^2

P.T.O.

vii) In case of circular tanks with flexible joints between walls and the base the hoop tension per meter height is given by **2**

a) T = whd/2 b) T = whd/3
c) T = whd/4 d) None of the above

viii) The thickness of wall in case of water tanks should not be less than **2**

a) 150 mm b) 30 mm per meter depth + 50 mm
c) Both (a) and (b) d) None of the above

ix) Modular ratio for M30 and Fe415 steel is **1**

a) 13.33 b) 9.33 c) 18.67 d) 11

x) The minimum percentage of vertical steel in case of water tanks should not be less than **1**

a) 0.3 b) 0.2 c) 0.15 d) 0.12

xi) For circular slab of radius R subjected to UDL q per unit area over entire surface, the radial bending moment coefficient at center for fixed supported slab is **1**

a) 3/16 b) 0 c) 1/16 d) – 2/16

xii) For circular slab of radius R subjected to UDL q per unit area over entire surface, the deflection coefficient for fixed supported slab is **2**

a) 5/64 b) 1/64 c) 3/64 d) 0

xiii) As per IS 456-2000 the spacing of beams in case grid slab should not be greater than **1**

a) 1.5 m b) 2.0 m c) 1.0 m d) 2.5 m

xiv) As per IS 456-2000 the width of beams in case of grid slab should not be less than **1**

a) 65 mm b) 50 mm
c) 75 mm d) None of the above

xv) The width of the rib in case of grid slab should not be less than **1**

a) 1/4 (d) b) 1/5 (d) c) 1/3 (d) d) 1/6 (d)

xvi) The coefficient of circumferential moments at support in case of circular fixed supported slab is **1**

a) 3/16 b) – 2/16 c) 0 d) 1/16

xvii) The meridional thrust is given by formula **1**

a) $wR/(1 + \cos\theta)$ b) $wR/(1 + 2\cos\theta)$
c) $wR/(1 - \cos\theta)$ d) $wR/(1 - 2\cos\theta)$

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SLR-VB – 53

Seat No.	

B.E. (Civil) Part – I Examination, 2017
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Tuesday, 9-5-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any two*** *questions from* ***each*** *Section.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) IS codes and non programmable calculator is ***allowed****.*

4) ***Assume*** *suitable data if necessary and mention it clearly before the solution.*

SECTION – I

2. A reinforced concrete grid slab is to be designed to cover a floor area of 12 m × 18 m. The spacing of the ribs is mutually perpendicular directions 1.5 m c/c. Live load on floor is 3 KN/m^2. Adopt M20 grade of concrete and Fe415 grade HYSD bars. Assume ends are simply supported. Analyse the grid floor by IS 456 : 2000 method and design suitable reinforcements in grid floor. **20**

3. Combined footing is to be provided for column of size 400 mm × 400 mm and 600 mm × 600 mm carrying loads of 600 KN and 1000 KN. The center to center distance of the column is 4 m. The property line is at a distance of 0.3 m from the column carrying 600 KN. The length of the footing is restricted to 5 m. The SBC of soil is 150 KN/m^2. **20**

4. A reinforce concrete column 400 mm × 400 mm carrying a load of 600 KN is supported on three piles 400 mm × 400 mm in section. The center to center distance between the piles is 1.5 m. Design a suitable pile cap. Use M20 grade of concrete and Fe415 grade of steel. **20**

SECTION – II

5. Design a flat bottom circular elevated water tank of diameter 10 m and total height of 4 m which is to be supported by ring beam of 7.5 m diameter. The ring beam is to be supported by six columns equally spaced. Use M25 concrete and Fe415 steel. Design the following components. **20**

   i) Top dome

   ii) Top ring beam

   iii) Cylindrical wall.

6. Design an open rectangular tank of size 3 m × 8 m × 3 m deep resting on a firm ground. Use M25 grade of concrete and Fe415 steel. Approximate method may be used for analysis. **20**

7. Design a circular underground water tank has internal diameter 10 m, the maximum depth of water being 4 m. The walls are restrained at the base. Use M20 and mild steel. **20**

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SLR-VB – 53

Seat No.	

Set Q

B.E. (Civil) Part – I Examination, 2017
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Tuesday, 9-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) IS codes and non programmable calculator is **allowed**.*
*3) **Assume** suitable data if necessary and mention it clearly before the solution.*
*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 alternative : **20**

i) The permissible shear stress in the flat slab is taken as _____ √fck. **1**
a) 0.16 b) 0.25 c) 0.30 d) 0.20

ii) If two columns carry unequal loads, then which type of footing is provided ? **1**
a) Combined rectangular footing b) Combined trapezoidal footing
c) Strap footing d) Raft footing

iii) The thickness of flat slab with drops, the span to effective depth ratio for continuous slab shall be taken as **1**
a) 20 b) 26 c) 40 d) 07

iv) The permissible tensile stress in the reinforcement for Fe415 near water face is taken as **1**
a) 115 N/mm^2 b) 125 N/mm^2 c) 150 N/mm^2 d) 205 N/mm^2

v) In case of circular tanks with flexible joints between walls and the base the hoop tension per meter height is given by **2**
a) T = whd/2 b) T = whd/3
c) T = whd/4 d) None of the above

P.T.O.

vi) The thickness of wall in case of water tanks should not be less than **2**
a) 150 mm b) 30 mm per meter depth + 50 mm
c) Both (a) and (b) d) None of the above

vii) Modular ratio for M30 and Fe415 steel is **1**
a) 13.33 b) 9.33 c) 18.67 d) 11

viii) The minimum percentage of vertical steel in case of water tanks should not be less than **1**
a) 0.3 b) 0.2 c) 0.15 d) 0.12

ix) For circular slab of radius R subjected to UDL q per unit area over entire surface, the radial bending moment coefficient at center for fixed supported slab is **1**
a) 3/16 b) 0 c) 1/16 d) – 2/16

x) For circular slab of radius R subjected to UDL q per unit area over entire surface, the deflection coefficient for fixed supported slab is **2**
a) 5/64 b) 1/64 c) 3/64 d) 0

xi) As per IS 456-2000 the spacing of beams in case grid slab should not be greater than **1**
a) 1.5 m b) 2.0 m c) 1.0 m d) 2.5 m

xii) As per IS 456-2000 the width of beams in case of grid slab should not be less than **1**
a) 65 mm b) 50 mm
c) 75 mm d) None of the above

xiii) The width of the rib in case of grid slab should not be less than **1**
a) 1/4 (d) b) 1/5 (d) c) 1/3 (d) d) 1/6 (d)

xiv) The coefficient of circumferential moments at support in case of circular fixed supported slab is **1**
a) 3/16 b) – 2/16 c) 0 d) 1/16

xv) The meridional thrust is given by formula **1**
a) $wR/(1 + \cos\theta)$ b) $wR/(1 + 2\cos\theta)$
c) $wR/(1 - \cos\theta)$ d) $wR/(1 - 2\cos\theta)$

xvi) The maximum area of tension reinforcement in beams shall not exceed **1**
a) 0.15% b) 1.5% c) 4% d) 1%

xvii) The thickness of flat slab for interior panel may be taken as **1**
a) Min 125 mm b) L/40 without drops
c) (a) and (b) d) None of the above

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SLR-VB – 53

Seat No.	

B.E. (Civil) Part – I Examination, 2017
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Tuesday, 9-5-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any two*** *questions from* ***each*** *Section.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) IS codes and non programmable calculator is ***allowed****.*

4) ***Assume*** *suitable data if necessary and mention it clearly before the solution.*

SECTION – I

2. A reinforced concrete grid slab is to be designed to cover a floor area of 12 m × 18 m. The spacing of the ribs is mutually perpendicular directions 1.5 m c/c. Live load on floor is 3 KN/m^2. Adopt M20 grade of concrete and Fe415 grade HYSD bars. Assume ends are simply supported. Analyse the grid floor by IS 456 : 2000 method and design suitable reinforcements in grid floor. **20**

3. Combined footing is to be provided for column of size 400 mm × 400 mm and 600 mm × 600 mm carrying loads of 600 KN and 1000 KN. The center to center distance of the column is 4 m. The property line is at a distance of 0.3 m from the column carrying 600 KN. The length of the footing is restricted to 5 m. The SBC of soil is 150 KN/m^2. **20**

4. A reinforce concrete column 400 mm × 400 mm carrying a load of 600 KN is supported on three piles 400 mm × 400 mm in section. The center to center distance between the piles is 1.5 m. Design a suitable pile cap. Use M20 grade of concrete and Fe415 grade of steel. **20**

SECTION – II

5. Design a flat bottom circular elevated water tank of diameter 10 m and total height of 4 m which is to be supported by ring beam of 7.5 m diameter. The ring beam is to be supported by six columns equally spaced. Use M25 concrete and Fe415 steel. Design the following components. **20**

   i) Top dome

   ii) Top ring beam

   iii) Cylindrical wall.

6. Design an open rectangular tank of size 3 m × 8 m × 3 m deep resting on a firm ground. Use M25 grade of concrete and Fe415 steel. Approximate method may be used for analysis. **20**

7. Design a circular underground water tank has internal diameter 10 m, the maximum depth of water being 4 m. The walls are restrained at the base. Use M20 and mild steel. **20**

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SLR-VB – 53

Seat No.	

Set R

B.E. (Civil) Part – I Examination, 2017
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Tuesday, 9-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) IS codes and non programmable calculator is ***allowed****.*
3) ***Assume*** *suitable data if necessary and mention it clearly before the solution.*
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 alternative : **20**

i) In case of circular tanks with flexible joints between walls and the base the hoop tension per meter height is given by **2**
a) T = whd/2 b) T = whd/3
c) T = whd/4 d) None of the above

ii) The thickness of wall in case of water tanks should not be less than **2**
a) 150 mm b) 30 mm per meter depth + 50 mm
c) Both (a) and (b) d) None of the above

iii) Modular ratio for M30 and Fe415 steel is **1**
a) 13.33 b) 9.33 c) 18.67 d) 11

iv) The minimum percentage of vertical steel in case of water tanks should not be less than **1**
a) 0.3 b) 0.2 c) 0.15 d) 0.12

v) For circular slab of radius R subjected to UDL q per unit area over entire surface, the radial bending moment coefficient at center for fixed supported slab is **1**
a) 3/16 b) 0 c) 1/16 d) – 2/16

P.T.O.

vi) For circular slab of radius R subjected to UDL q per unit area over entire surface, the deflection coefficient for fixed supported slab is **2**
a) 5/64 b) 1/64 c) 3/64 d) 0

vii) As per IS 456-2000 the spacing of beams in case grid slab should not be greater than **1**
a) 1.5 m b) 2.0 m c) 1.0 m d) 2.5 m

viii) As per IS 456-2000 the width of beams in case of grid slab should not be less than **1**
a) 65 mm b) 50 mm
c) 75 mm d) None of the above

ix) The width of the rib in case of grid slab should not be less than **1**
a) 1/4 (d) b) 1/5 (d) c) 1/3 (d) d) 1/6 (d)

x) The coefficient of circumferential moments at support in case of circular fixed supported slab is **1**
a) 3/16 b) – 2/16 c) 0 d) 1/16

xi) The meridional thrust is given by formula **1**
a) $wR/(1 + \cos\theta)$ b) $wR/(1 + 2\cos\theta)$
c) $wR/(1 - \cos\theta)$ d) $wR/(1 - 2\cos\theta)$

xii) The maximum area of tension reinforcement in beams shall not exceed **1**
a) 0.15% b) 1.5% c) 4% d) 1%

xiii) The thickness of flat slab for interior panel may be taken as **1**
a) Min 125 mm b) L/40 without drops
c) (a) and (b) d) None of the above

xiv) The permissible shear stress in the flat slab is taken as _____ $\sqrt{fck}$. **1**
a) 0.16 b) 0.25 c) 0.30 d) 0.20

xv) If two columns carry unequal loads, then which type of footing is provided ? **1**
a) Combined rectangular footing b) Combined trapezoidal footing
c) Strap footing d) Raft footing

xvi) The thickness of flat slab with drops, the span to effective depth ratio for continuous slab shall be taken as **1**
a) 20 b) 26 c) 40 d) 07

xvii) The permissible tensile stress in the reinforcement for Fe415 near water face is taken as **1**
a) 115 N/mm^2 b) 125 N/mm^2 c) 150 N/mm^2 d) 205 N/mm^2

_____

SLR-VB – 53

Seat No.	

B.E. (Civil) Part – I Examination, 2017
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Tuesday, 9-5-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any two*** *questions from* ***each*** *Section.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) IS codes and non programmable calculator is ***allowed****.*

4) ***Assume*** *suitable data if necessary and mention it clearly before the solution.*

SECTION – I

2. A reinforced concrete grid slab is to be designed to cover a floor area of 12 m × 18 m. The spacing of the ribs is mutually perpendicular directions 1.5 m c/c. Live load on floor is 3 KN/m^2. Adopt M20 grade of concrete and Fe415 grade HYSD bars. Assume ends are simply supported. Analyse the grid floor by IS 456 : 2000 method and design suitable reinforcements in grid floor. **20**

3. Combined footing is to be provided for column of size 400 mm × 400 mm and 600 mm × 600 mm carrying loads of 600 KN and 1000 KN. The center to center distance of the column is 4 m. The property line is at a distance of 0.3 m from the column carrying 600 KN. The length of the footing is restricted to 5 m. The SBC of soil is 150 KN/m^2. **20**

4. A reinforce concrete column 400 mm × 400 mm carrying a load of 600 KN is supported on three piles 400 mm × 400 mm in section. The center to center distance between the piles is 1.5 m. Design a suitable pile cap. Use M20 grade of concrete and Fe415 grade of steel. **20**

SECTION – II

5. Design a flat bottom circular elevated water tank of diameter 10 m and total height of 4 m which is to be supported by ring beam of 7.5 m diameter. The ring beam is to be supported by six columns equally spaced. Use M25 concrete and Fe415 steel. Design the following components. **20**

   i) Top dome

   ii) Top ring beam

   iii) Cylindrical wall.

6. Design an open rectangular tank of size 3 m × 8 m × 3 m deep resting on a firm ground. Use M25 grade of concrete and Fe415 steel. Approximate method may be used for analysis. **20**

7. Design a circular underground water tank has internal diameter 10 m, the maximum depth of water being 4 m. The walls are restrained at the base. Use M20 and mild steel. **20**

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SLR-VB – 53

Seat No.	

Set S

B.E. (Civil) Part – I Examination, 2017
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Tuesday, 9-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) IS codes and non programmable calculator is ***allowed****.*
3) ***Assume*** *suitable data if necessary and mention it clearly before the solution.*
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 alternative : **20**

i) The coefficient of circumferential moments at support in case of circular fixed supported slab is **1**
a) 3/16 b) – 2/16 c) 0 d) 1/16

ii) The meridional thrust is given by formula **1**
a) $wR/(1 + \cos\theta)$ b) $wR/(1 + 2\cos\theta)$
c) $wR/(1 - \cos\theta)$ d) $wR/(1 - 2\cos\theta)$

iii) The maximum area of tension reinforcement in beams shall not exceed **1**
a) 0.15% b) 1.5% c) 4% d) 1%

iv) The thickness of flat slab for interior panel may be taken as **1**
a) Min 125 mm b) L/40 without drops
c) (a) and (b) d) None of the above

v) The permissible shear stress in the flat slab is taken as _____ $\sqrt{fck}$. **1**
a) 0.16 b) 0.25 c) 0.30 d) 0.20

vi) If two columns carry unequal loads, then which type of footing is provided ? **1**
a) Combined rectangular footing b) Combined trapezoidal footing
c) Strap footing d) Raft footing

P.T.O.

vii) The thickness of flat slab with drops, the span to effective depth ratio for continuous slab shall be taken as **1**

a) 20 b) 26 c) 40 d) 07

viii) The permissible tensile stress in the reinforcement for Fe415 near water face is taken as **1**

a) 115 N/mm^2 b) 125 N/mm^2 c) 150 N/mm^2 d) 205 N/mm^2

ix) In case of circular tanks with flexible joints between walls and the base the hoop tension per meter height is given by **2**

a) T = whd/2 b) T = whd/3

c) T = whd/4 d) None of the above

x) The thickness of wall in case of water tanks should not be less than **2**

a) 150 mm b) 30 mm per meter depth + 50 mm

c) Both (a) and (b) d) None of the above

xi) Modular ratio for M30 and Fe415 steel is **1**

a) 13.33 b) 9.33 c) 18.67 d) 11

xii) The minimum percentage of vertical steel in case of water tanks should not be less than **1**

a) 0.3 b) 0.2 c) 0.15 d) 0.12

xiii) For circular slab of radius R subjected to UDL q per unit area over entire surface, the radial bending moment coefficient at center for fixed supported slab is **1**

a) 3/16 b) 0 c) 1/16 d) – 2/16

xiv) For circular slab of radius R subjected to UDL q per unit area over entire surface, the deflection coefficient for fixed supported slab is **2**

a) 5/64 b) 1/64 c) 3/64 d) 0

xv) As per IS 456-2000 the spacing of beams in case grid slab should not be greater than **1**

a) 1.5 m b) 2.0 m c) 1.0 m d) 2.5 m

xvi) As per IS 456-2000 the width of beams in case of grid slab should not be less than **1**

a) 65 mm b) 50 mm

c) 75 mm d) None of the above

xvii) The width of the rib in case of grid slab should not be less than **1**

a) 1/4 (d) b) 1/5 (d) c) 1/3 (d) d) 1/6 (d)

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SLR-VB – 53

Seat No.	

B.E. (Civil) Part – I Examination, 2017
ADVANCED DESIGN OF CONCRETE STRUCTURES (Elective – I)

Day and Date : Tuesday, 9-5-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Solve* ***any two*** *questions from* ***each*** *Section.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) IS codes and non programmable calculator is ***allowed****.*

4) ***Assume*** *suitable data if necessary and mention it clearly before the solution.*

SECTION – I

2. A reinforced concrete grid slab is to be designed to cover a floor area of 12 m × 18 m. The spacing of the ribs is mutually perpendicular directions 1.5 m c/c. Live load on floor is 3 KN/m^2. Adopt M20 grade of concrete and Fe415 grade HYSD bars. Assume ends are simply supported. Analyse the grid floor by IS 456 : 2000 method and design suitable reinforcements in grid floor. **20**

3. Combined footing is to be provided for column of size 400 mm × 400 mm and 600 mm × 600 mm carrying loads of 600 KN and 1000 KN. The center to center distance of the column is 4 m. The property line is at a distance of 0.3 m from the column carrying 600 KN. The length of the footing is restricted to 5 m. The SBC of soil is 150 KN/m^2. **20**

4. A reinforce concrete column 400 mm × 400 mm carrying a load of 600 KN is supported on three piles 400 mm × 400 mm in section. The center to center distance between the piles is 1.5 m. Design a suitable pile cap. Use M20 grade of concrete and Fe415 grade of steel. **20**

SECTION – II

5. Design a flat bottom circular elevated water tank of diameter 10 m and total height of 4 m which is to be supported by ring beam of 7.5 m diameter. The ring beam is to be supported by six columns equally spaced. Use M25 concrete and Fe415 steel. Design the following components. **20**

   i) Top dome

   ii) Top ring beam

   iii) Cylindrical wall.

6. Design an open rectangular tank of size 3 m × 8 m × 3 m deep resting on a firm ground. Use M25 grade of concrete and Fe415 steel. Approximate method may be used for analysis. **20**

7. Design a circular underground water tank has internal diameter 10 m, the maximum depth of water being 4 m. The walls are restrained at the base. Use M20 and mild steel. **20**

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SLR-VB – 54

Seat No.	

Set **P**

B.E. (Civil) (Part – I) Examination, 2017
(Elective – I) MANAGERIAL TECHNIQUES

Day and Date : Tuesday, 9-5-2017 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) Q. **2** and Q. **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*4) Assume suitable data if necessary but mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **(20×1=20)**

1) Work study examines
   a) method b) duration of work
   c) both a) and b) d) none of the above

2) Work study is also recognised as
   a) Time study b) Motion study
   c) Both a) and b) d) None of the above

3) 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

4) In process charts, the symbol used for storage is
   a) Circle b) Square
   c) Arrow d) Triangle

5) Two hand process chart is commonly used for
   a) repetitive operations b) short operations
   c) both a) and b) d) none of the above

6) The following chart(s) record the movements
   a) operation process chart b) flow process chart
   c) both a) and b) d) none of the above

7) Which of the following is a scale plan ?
   a) String diagram b) Flow process chart
   c) Operation process chart d) All of the above

P.T.O.

8) A _____ is based on film analysis.
   a) SIMO chart b) Flow process chart
   c) String diagram d) Operation flow chart

9) In SIMO chart, the movements are recorded against time measured in
   a) Minutes b) Seconds c) Micro seconds d) Winks

10) Total Quality Management (TQM) focuses on
   a) Employee b) Customer c) Both a) and b) d) None of the above

11) The cost reduction technique in comparison to the worth of a product is known as
   a) Reverse engineering b) Value engineering
   c) Material engineering d) Quality engineering

12) Value analysis examines the
   a) Design of every component b) Method of manufacturing
   c) Material used d) All of the above

13) Value analysis is normally applied to
   a) New products b) Old products c) Future products d) Both a) and b)

14) Value can be defined as the combination of _____ which ensures the ultimate economy and satisfaction of the customer.
   a) Efficiency, quality, service and price
   b) Efficiency, quality, service and size
   c) Economy, quality, service and price
   d) Efficiency, material, service and price

15) Value is the cost directly proportionate to
   a) Price b) Function
   c) Product material d) All of the above

16) The price paid by the buyer is
   a) Cost value b) Use value c) Esteem value d) Exchange value

17) The cost incurred by the manufacturer beyond use value is called
   a) Cost value b) Esteem value c) Exchange value d) None of the above

18) Value analysis is a _____ process.
   a) Remedial b) Preventive c) Continuous d) None of the above

19) Value analysis should be applied when the following symptom(s) is (are) present
   a) Rate of return on investment is reducing
   b) Reduction in sales of the product
   c) Firm is unable to meet delivery promises
   d) All of the above

20) The costs those which neither contributes to function nor the appearance of the product is called
   a) Extra cost b) Unnecessary cost
   c) Esteem cost d) Exchange cost

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SLR-VB – 54

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
(Elective – I) MANAGERIAL TECHNIQUES

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. **2** and Q. **6** are **compulsory**.*
*2) Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*3) Assume suitable data if necessary but mention it **clearly**.*

SECTION – I

2. a) Explain work study and its applications to Civil Engineering works. **6**
   b) Write notes on : **8**
      I) Recording Techniques.
      II) Process Charts.

3. a) Explain Time Study. **5**
   b) Write notes on : **8**
      I) Job evaluation and Wages.
      II) Analytical estimation.

4. a) Explain Total Quality Management. **5**
   b) Write notes on : **8**
      I) 5S techniques
      II) Kaizen.

5. a) Explain implementation strategies in TQM. **5**
   b) Write notes on the contribution of : **8**
      I) Deming
      II) Juran.

SECTION – II

6. a) Explain work sampling techniques. **6**
   b) Write notes on : **8**
      I) Normal distribution
      II) Poisson distribution.

7. a) Explain Reliability Analysis. **5**
   b) Write notes on : **8**
      I) Failure probability
      II) Reliability applications to Civil Engineering.

8. a) Explain Value Analysis as a cost reduction technique. **5**
   b) Write notes on : **8**
      I) Value Analysis Procedure.
      II) Value Control.

9. a) Random numbers and application. **5**
   b) Write notes on the contribution of : **8**
      I) Reliability Design
      II) Types of Value.

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Seat No.	

Set **Q**

B.E. (Civil) (Part – I) Examination, 2017
(Elective – I) MANAGERIAL TECHNIQUES

Day and Date : Tuesday, 9-5-2017 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) Q. **2** and Q. **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*4) Assume suitable data if necessary but mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **(20×1=20)**

1) The price paid by the buyer is
a) Cost value b) Use value c) Esteem value d) Exchange value

2) The cost incurred by the manufacturer beyond use value is called
a) Cost value b) Esteem value c) Exchange value d) None of the above

3) Value analysis is a _____ process.
a) Remedial b) Preventive c) Continuous d) None of the above

4) Value analysis should be applied when the following symptom(s) is (are) present
a) Rate of return on investment is reducing
b) Reduction in sales of the product
c) Firm is unable to meet delivery promises
d) All of the above

5) The costs those which neither contributes to function nor the appearance of the product is called
a) Extra cost b) Unnecessary cost
c) Esteem cost d) Exchange cost

6) Work study examines
a) method b) duration of work
c) both a) and b) d) none of the above

7) Work study is also recognised as
a) Time study b) Motion study
c) Both a) and b) d) None of the above

P.T.O.

8) 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

9) In process charts, the symbol used for storage is
   a) Circle b) Square
   c) Arrow d) Triangle

10) Two hand process chart is commonly used for
   a) repetitive operations b) short operations
   c) both a) and b) d) none of the above

11) The following chart(s) record the movements
   a) operation process chart b) flow process chart
   c) both a) and b) d) none of the above

12) Which of the following is a scale plan ?
   a) String diagram b) Flow process chart
   c) Operation process chart d) All of the above

13) A _____ is based on film analysis.
   a) SIMO chart b) Flow process chart
   c) String diagram d) Operation flow chart

14) In SIMO chart, the movements are recorded against time measured in
   a) Minutes b) Seconds c) Micro seconds d) Winks

15) Total Quality Management (TQM) focuses on
   a) Employee b) Customer c) Both a) and b) d) None of the above

16) The cost reduction technique in comparison to the worth of a product is known as
   a) Reverse engineering b) Value engineering
   c) Material engineering d) Quality engineering

17) Value analysis examines the
   a) Design of every component b) Method of manufacturing
   c) Material used d) All of the above

18) Value analysis is normally applied to
   a) New products b) Old products c) Future products d) Both a) and b)

19) Value can be defined as the combination of _____ which ensures the ultimate economy and satisfaction of the customer.
   a) Efficiency, quality, service and price
   b) Efficiency, quality, service and size
   c) Economy, quality, service and price
   d) Efficiency, material, service and price

20) Value is the cost directly proportionate to
   a) Price b) Function
   c) Product material d) All of the above

_____

SLR-VB – 54

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
(Elective – I) MANAGERIAL TECHNIQUES

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *and Q.* ***6*** *are* ***compulsory****.*
2) Attempt ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *and* ***any two*** *out of Q.* ***7*** *to Q.* ***9****.*
3) Assume suitable data if necessary but mention it ***clearly****.*

SECTION – I

2. a) Explain work study and its applications to Civil Engineering works. **6**
   b) Write notes on : **8**
      I) Recording Techniques.
      II) Process Charts.

3. a) Explain Time Study. **5**
   b) Write notes on : **8**
      I) Job evaluation and Wages.
      II) Analytical estimation.

4. a) Explain Total Quality Management. **5**
   b) Write notes on : **8**
      I) 5S techniques
      II) Kaizen.

5. a) Explain implementation strategies in TQM. **5**
   b) Write notes on the contribution of : **8**
      I) Deming
      II) Juran.

SECTION – II

6. a) Explain work sampling techniques. **6**
   b) Write notes on : **8**
      I) Normal distribution
      II) Poisson distribution.

7. a) Explain Reliability Analysis. **5**
   b) Write notes on : **8**
      I) Failure probability
      II) Reliability applications to Civil Engineering.

8. a) Explain Value Analysis as a cost reduction technique. **5**
   b) Write notes on : **8**
      I) Value Analysis Procedure.
      II) Value Control.

9. a) Random numbers and application. **5**
   b) Write notes on the contribution of : **8**
      I) Reliability Design
      II) Types of Value.

SLR-VB – 54

Seat No.	

Set **R**

B.E. (Civil) (Part – I) Examination, 2017
(Elective – I) MANAGERIAL TECHNIQUES

Day and Date : Tuesday, 9-5-2017 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) Q. **2** and Q. **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*4) Assume suitable data if necessary but mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **(20×1=20)**

1) The cost reduction technique in comparison to the worth of a product is known as
   a) Reverse engineering b) Value engineering
   c) Material engineering d) Quality engineering

2) Value analysis examines the
   a) Design of every component b) Method of manufacturing
   c) Material used d) All of the above

3) Value analysis is normally applied to
   a) New products b) Old products c) Future products d) Both a) and b)

4) Value can be defined as the combination of _____ which ensures the ultimate economy and satisfaction of the customer.
   a) Efficiency, quality, service and price
   b) Efficiency, quality, service and size
   c) Economy, quality, service and price
   d) Efficiency, material, service and price

5) Value is the cost directly proportionate to
   a) Price b) Function
   c) Product material d) All of the above

6) The price paid by the buyer is
   a) Cost value b) Use value c) Esteem value d) Exchange value

7) The cost incurred by the manufacturer beyond use value is called
   a) Cost value b) Esteem value c) Exchange value d) None of the above

P.T.O.

8) Value analysis is a _____ process.
a) Remedial b) Preventive c) Continuous d) None of the above

9) Value analysis should be applied when the following symptom(s) is (are) present
a) Rate of return on investment is reducing
b) Reduction in sales of the product
c) Firm is unable to meet delivery promises
d) All of the above

10) The costs those which neither contributes to function nor the appearance of the product is called
a) Extra cost b) Unnecessary cost
c) Esteem cost d) Exchange cost

11) Work study examines
a) method b) duration of work
c) both a) and b) d) none of the above

12) Work study is also recognised as
a) Time study b) Motion study
c) Both a) and b) d) None of the above

13) 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

14) In process charts, the symbol used for storage is
a) Circle b) Square
c) Arrow d) Triangle

15) Two hand process chart is commonly used for
a) repetitive operations b) short operations
c) both a) and b) d) none of the above

16) The following chart(s) record the movements
a) operation process chart b) flow process chart
c) both a) and b) d) none of the above

17) Which of the following is a scale plan ?
a) String diagram b) Flow process chart
c) Operation process chart d) All of the above

18) A _____ is based on film analysis.
a) SIMO chart b) Flow process chart
c) String diagram d) Operation flow chart

19) In SIMO chart, the movements are recorded against time measured in
a) Minutes b) Seconds c) Micro seconds d) Winks

20) Total Quality Management (TQM) focuses on
a) Employee b) Customer c) Both a) and b) d) None of the above

_____

SLR-VB – 54

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
(Elective – I) MANAGERIAL TECHNIQUES

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q.* ***2*** *and Q.* ***6*** *are* ***compulsory****.*
2) Attempt ***any two*** *out of Q.* ***3*** *to Q.* ***5*** *and* ***any two*** *out of Q.* ***7*** *to Q.* ***9****.*
3) Assume suitable data if necessary but mention it ***clearly****.*

SECTION – I

2. a) Explain work study and its applications to Civil Engineering works. **6**
   b) Write notes on : **8**
      I) Recording Techniques.
      II) Process Charts.

3. a) Explain Time Study. **5**
   b) Write notes on : **8**
      I) Job evaluation and Wages.
      II) Analytical estimation.

4. a) Explain Total Quality Management. **5**
   b) Write notes on : **8**
      I) 5S techniques
      II) Kaizen.

5. a) Explain implementation strategies in TQM. **5**
   b) Write notes on the contribution of : **8**
      I) Deming
      II) Juran.

SECTION – II

6. a) Explain work sampling techniques. **6**
   b) Write notes on : **8**
      I) Normal distribution
      II) Poisson distribution.

7. a) Explain Reliability Analysis. **5**
   b) Write notes on : **8**
      I) Failure probability
      II) Reliability applications to Civil Engineering.

8. a) Explain Value Analysis as a cost reduction technique. **5**
   b) Write notes on : **8**
      I) Value Analysis Procedure.
      II) Value Control.

9. a) Random numbers and application. **5**
   b) Write notes on the contribution of : **8**
      I) Reliability Design
      II) Types of Value.

SLR-VB – 54

Seat No.	

Set **S**

B.E. (Civil) (Part – I) Examination, 2017
(Elective – I) MANAGERIAL TECHNIQUES

Day and Date : Tuesday, 9-5-2017 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) Q. **2** and Q. **6** are **compulsory**. Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*4) Assume suitable data if necessary but mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **(20×1=20)**

1) The following chart(s) record the movements
   a) operation process chart b) flow process chart
   c) both a) and b) d) none of the above

2) Which of the following is a scale plan ?
   a) String diagram b) Flow process chart
   c) Operation process chart d) All of the above

3) A _____ is based on film analysis.
   a) SIMO chart b) Flow process chart
   c) String diagram d) Operation flow chart

4) In SIMO chart, the movements are recorded against time measured in
   a) Minutes b) Seconds c) Micro seconds d) Winks

5) Total Quality Management (TQM) focuses on
   a) Employee b) Customer c) Both a) and b) d) None of the above

6) The cost reduction technique in comparison to the worth of a product is known as
   a) Reverse engineering b) Value engineering
   c) Material engineering d) Quality engineering

7) Value analysis examines the
   a) Design of every component b) Method of manufacturing
   c) Material used d) All of the above

8) Value analysis is normally applied to
   a) New products b) Old products c) Future products d) Both a) and b)

P.T.O.

9) Value can be defined as the combination of _____ which ensures the ultimate economy and satisfaction of the customer.
   a) Efficiency, quality, service and price
   b) Efficiency, quality, service and size
   c) Economy, quality, service and price
   d) Efficiency, material, service and price

10) Value is the cost directly proportionate to
   a) Price b) Function
   c) Product material d) All of the above

11) The price paid by the buyer is
   a) Cost value b) Use value c) Esteem value d) Exchange value

12) The cost incurred by the manufacturer beyond use value is called
   a) Cost value b) Esteem value c) Exchange value d) None of the above

13) Value analysis is a _____ process.
   a) Remedial b) Preventive c) Continuous d) None of the above

14) Value analysis should be applied when the following symptom(s) is (are) present
   a) Rate of return on investment is reducing
   b) Reduction in sales of the product
   c) Firm is unable to meet delivery promises
   d) All of the above

15) The costs those which neither contributes to function nor the appearance of the product is called
   a) Extra cost b) Unnecessary cost
   c) Esteem cost d) Exchange cost

16) Work study examines
   a) method b) duration of work
   c) both a) and b) d) none of the above

17) Work study is also recognised as
   a) Time study b) Motion study
   c) Both a) and b) d) None of the above

18) 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

19) In process charts, the symbol used for storage is
   a) Circle b) Square
   c) Arrow d) Triangle

20) Two hand process chart is commonly used for
   a) repetitive operations b) short operations
   c) both a) and b) d) none of the above

_____

SLR-VB – 54

Seat No.	

B.E. (Civil) (Part – I) Examination, 2017
(Elective – I) MANAGERIAL TECHNIQUES

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. **2** and Q. **6** are **compulsory**.*
*2) Attempt **any two** out of Q. **3** to Q. **5** and **any two** out of Q. **7** to Q. **9**.*
*3) Assume suitable data if necessary but mention it **clearly**.*

SECTION – I

2. a) Explain work study and its applications to Civil Engineering works. **6**
   b) Write notes on : **8**
      I) Recording Techniques.
      II) Process Charts.

3. a) Explain Time Study. **5**
   b) Write notes on : **8**
      I) Job evaluation and Wages.
      II) Analytical estimation.

4. a) Explain Total Quality Management. **5**
   b) Write notes on : **8**
      I) 5S techniques
      II) Kaizen.

5. a) Explain implementation strategies in TQM. **5**
   b) Write notes on the contribution of : **8**
      I) Deming
      II) Juran.

SECTION – II

6. a) Explain work sampling techniques. **6**
   b) Write notes on : **8**
      I) Normal distribution
      II) Poisson distribution.

7. a) Explain Reliability Analysis. **5**
   b) Write notes on : **8**
      I) Failure probability
      II) Reliability applications to Civil Engineering.

8. a) Explain Value Analysis as a cost reduction technique. **5**
   b) Write notes on : **8**
      I) Value Analysis Procedure.
      II) Value Control.

9. a) Random numbers and application. **5**
   b) Write notes on the contribution of : **8**
      I) Reliability Design
      II) Types of Value.

SLR-VB – 59

Seat No.	

Set P

B.E. (Civil) (Part – II) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Tuesday, 16-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 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** are **not allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) In prestressed concrete section the _____ section is effective.
   a) Above N.A. b) Below N.A.
   c) Partially above and below d) Entire section

2) The safe stress in steel at service is _____ fck.
   a) 0.4 b) 0.5 c) 0.6 d) 0.7

3) High strength of concrete is necessary for pre stressed concrete work because _____
   a) Large pre stressing force is applied
   b) Bursting stress is more
   c) High bond stress is required
   d) All of above

4) The prestressed concrete beam is suitable for _____
   a) Large spans b) Short spans
   c) Both large spans and short spans d) None of these

5) For footing the minimum cover for the reinforcement shall be _____
   a) 30 mm b) 50 mm c) 25 mm d) 40 mm

6) If R and T are rise and tread of a stair spanning horizontally, the steps are supported by a wall on one side and by a stringer beam on the other side, the steps designed as beams of width
   a) R + T b) $\sqrt{R2 + T2}$ c) T – R d) R – T

P.T.O.

7) 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

8) The stability of retaining wall is checked for which of the following condition
   a) Overturning about toe b) Overturning about heal
   c) Both of above d) None of these

9) In design of rectangular P.S.C. beam the eccentricity of tendons is given by
   a) 2Md + MI/2p b) Md + 2MI/2p c) 2Md + 2MI/p d) None of above

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) 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

12) If W is weight of a retaining wall and P is the horizontal earth pressure, the factor of safety against sliding, is
   a) 1 b) 1.5 c) 1.25 d) 2

13) The number of treads in a flight is equal to
   a) Risers in the flight b) Risers plus one
   c) Risers minus one d) None of these

14) Yield Line Theory result in _____
   a) Elastic solution b) Lower bound solution
   c) Upper bound solution d) Unique solution

15) For stairs spanning horizontally, the minimum waist provided is
   a) 4 cm b) 6 cm c) 8 cm d) 12 cm

16) Cantilever retaining walls can safely be used for a height not more than _____
   a) 3 m b) 5 m c) 4 m d) 6 m

17) The permissible tensile stress in concrete is _____ $\sqrt{fck}$.
   a) 0.125 b) 0.129 c) 0.126 d) 0.127

18) The design of a retaining wall assumes that the retained earth
   a) is dry b) is free from moisture
   c) is not cohesive d) none

19) The minimum head room over a stair must be
   a) 200 cm b) 210 cm c) 205 cm d) 230 cm

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

_____

SLR-VB – 59

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Tuesday, 16-5-2017 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 is* ***allowed****.*
3) ***Draw*** *neat sketch's where required and assume* ***suitable*** *data* ***if required*** *and state* ***it clearly****.*

SECTION – I

II. Design an open well type stair for a college building using the following data :
Floor to floor height is = 3.5 m,
No. of flights per floor = 3
Size of steps = 150 mm riser and 300 mm tread
Landing are supported all around by walls and by beams of width 300 mm at floor levels, thickness of wall is 300 mm. Use M_{20} concrete and Fe_{415} steel. **13**

III. Design the stem slab of a cantilever retaining wall, if the overall height of wall is 5 m. SBC of soil is 180 kN/m^2, angle of repose of the soil is 30° and unit weight of soil 18 kN/m^2, super imposed load due to traffic is 11,000 N/m^2, width of the slab base is 3.2 m, toe projection is 0.8 m. Use M_{25} concrete and Fe_{500} steel. **14**

IV. Design a circular water tank resting on firm ground is fixed at base and free at top with following details :

Dia. of tank 3.5 m, depth of water 2.8 m, the wall and bae are not monolithic with each other, specific weight of water 9810 N/m^3. Use M_{25} concrete and Fe_{500} steel. Assume free board of 300 mm and solve by IS code method. **13**

V. Design a rectangular footing for column axially loaded of size 230 mm × 525 mm carrying 1050 kN load. The SBC of soil is 200 kN/m^2. Use M_{20} concrete and Fe_{415} steel. Sketch the details of reinforcement. **13**

SECTION – II

VI. A post tensioned concrete beam 250 mm × 400 mm has a span of 12 m. The beam is prestressed by steel wires of area 350 mm^2 provided at a uniform eccentricity of 60 mm with an initial prestress of 1200 N/mm^2. Determine the percentage loss of stress in the wires. Take E_s = 210 kN/mm^2, E_c = 35 kN/mm^2, Ultimate creep strain = 22×10^{-6} mm/mm per N/mm^2, Shrinkage of concrete = 215×10^{-6}, Relaxation of steel stress = 5% of the initial stress. Anchorage slip = 1.25 mm, Friction coefficient for wave effect = K = 0.00015 m. **13**

VII. 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 1000 kN. **13**

VIII. Design PSC I section beam for the following span = 15 m, superimposed load of 34 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 is 1000 MPa, total loss of stress 20%, ultimate stress in steel 1500 MPa. **14**

IX. A Fig. 1 shows a prestresses concrete beam 400 mm wide and 800 mm deep. Determine the horizontal, vertical and shear stress at a distance of 400 mm from the end on horizontal section. Constants are given below :

i) through the centre and

ii) at the level of the edge of the anchor plate.

Note that the anchor plate is 300 mm wide and 200 mm deep. The prestressing force is 1000 kN. Find also the principal tensile stresses at the above sections. **13**

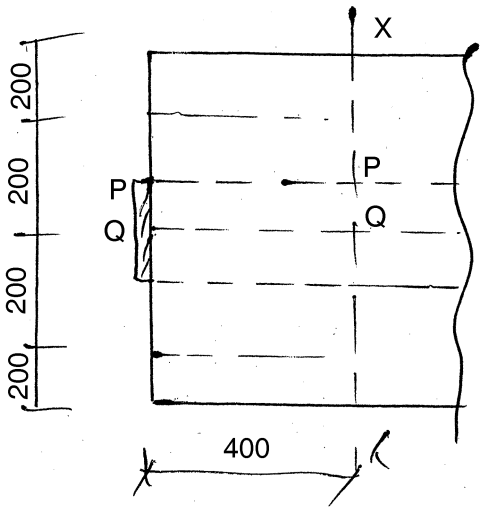

Fig. 1

K_z	K_q
– 5	1.25

constants

SLR-VB – 59

Seat No.	

Set Q

B.E. (Civil) (Part – II) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Tuesday, 16-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 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** are **not allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) Cantilever retaining walls can safely be used for a height not more than _____
a) 3 m b) 5 m c) 4 m d) 6 m

2) The permissible tensile stress in concrete is _____ √fck.
a) 0.125 b) 0.129 c) 0.126 d) 0.127

3) The design of a retaining wall assumes that the retained earth
a) is dry b) is free from moisture
c) is not cohesive d) none

4) The minimum head room over a stair must be
a) 200 cm b) 210 cm c) 205 cm d) 230 cm

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

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P.T.O.

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   a) Large spans b) Short spans
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10) For footing the minimum cover for the reinforcement shall be _____
   a) 30 mm b) 50 mm c) 25 mm d) 40 mm

11) If R and T are rise and tread of a stair spanning horizontally, the steps are supported by a wall on one side and by a stringer beam on the other side, the steps designed as beams of width
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   c) Risers minus one d) None of these

19) Yield Line Theory result in _____
   a) Elastic solution b) Lower bound solution
   c) Upper bound solution d) Unique solution

20) For stairs spanning horizontally, the minimum waist provided is
   a) 4 cm b) 6 cm c) 8 cm d) 12 cm

_____

SLR-VB – 59

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Tuesday, 16-5-2017 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 is* ***allowed****.*
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SECTION – I

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V. Design a rectangular footing for column axially loaded of size 230 mm × 525 mm carrying 1050 kN load. The SBC of soil is 200 kN/m^2. Use M_{20} concrete and Fe_{415} steel. Sketch the details of reinforcement. **13**

SECTION – II

VI. A post tensioned concrete beam 250 mm × 400 mm has a span of 12 m. The beam is prestressed by steel wires of area 350 mm^2 provided at a uniform eccentricity of 60 mm with an initial prestress of 1200 N/mm^2. Determine the percentage loss of stress in the wires. Take E_s = 210 kN/mm^2, E_c = 35 kN/mm^2, Ultimate creep strain = 22×10^{-6} mm/mm per N/mm^2, Shrinkage of concrete = 215×10^{-6}, Relaxation of steel stress = 5% of the initial stress. Anchorage slip = 1.25 mm, Friction coefficient for wave effect = K = 0.00015 m. **13**

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Note that the anchor plate is 300 mm wide and 200 mm deep. The prestressing force is 1000 kN. Find also the principal tensile stresses at the above sections. **13**

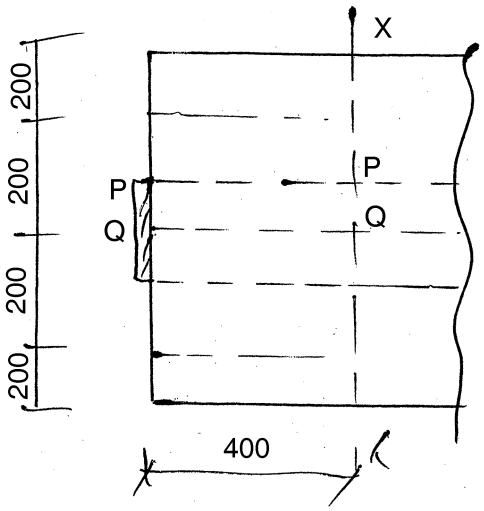

Fig. 1

K_z	K_q
– 5	1.25

constants

SLR-VB – 59

Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Tuesday, 16-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 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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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) 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

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a) 1 b) 1.5 c) 1.25 d) 2

3) The number of treads in a flight is equal to
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_____

SLR-VB – 59

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Tuesday, 16-5-2017 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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SECTION – II

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VIII. Design PSC I section beam for the following span = 15 m, superimposed load of 34 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 is 1000 MPa, total loss of stress 20%, ultimate stress in steel 1500 MPa. **14**

IX. A Fig. 1 shows a prestresses concrete beam 400 mm wide and 800 mm deep. Determine the horizontal, vertical and shear stress at a distance of 400 mm from the end on horizontal section. Constants are given below :

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Note that the anchor plate is 300 mm wide and 200 mm deep. The prestressing force is 1000 kN. Find also the principal tensile stresses at the above sections. **13**

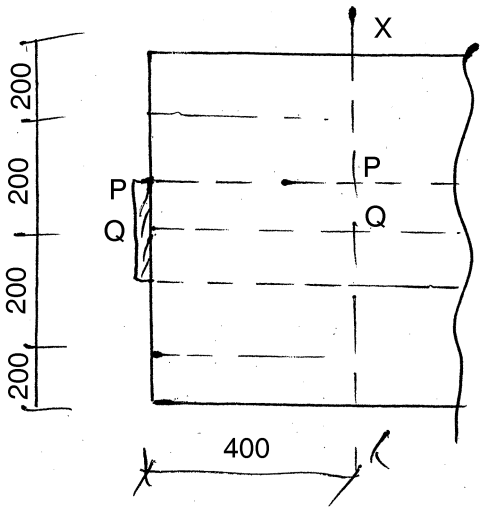

Fig. 1

K_z	K_q
– 5	1.25

constants

SLR-VB – 59

Seat No.	

Set S

B.E. (Civil) (Part – II) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Tuesday, 16-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 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** are **not allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) If R and T are rise and tread of a stair spanning horizontally, the steps are supported by a wall on one side and by a stringer beam on the other side, the steps designed as beams of width
a) R + T b) √R2 + T2 c) T – R d) R – T

2) 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

3) The stability of retaining wall is checked for which of the following condition
a) Overturning about toe b) Overturning about heal
c) Both of above d) None of these

4) In design of rectangular P.S.C. beam the eccentricity of tendons is given by
a) 2Md + MI/2p b) Md + 2MI/2p c) 2Md + 2MI/p d) None of above

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) 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

7) If W is weight of a retaining wall and P is the horizontal earth pressure, the factor of safety against sliding, is
a) 1 b) 1.5 c) 1.25 d) 2

P.T.O.

8) The number of treads in a flight is equal to
   a) Risers in the flight b) Risers plus one
   c) Risers minus one d) None of these

9) Yield Line Theory result in _____
   a) Elastic solution b) Lower bound solution
   c) Upper bound solution d) Unique solution

10) For stairs spanning horizontally, the minimum waist provided is
   a) 4 cm b) 6 cm c) 8 cm d) 12 cm

11) Cantilever retaining walls can safely be used for a height not more than _____
   a) 3 m b) 5 m c) 4 m d) 6 m

12) The permissible tensile stress in concrete is _____ $\sqrt{fck}$.
   a) 0.125 b) 0.129 c) 0.126 d) 0.127

13) The design of a retaining wall assumes that the retained earth
   a) is dry b) is free from moisture
   c) is not cohesive d) none

14) The minimum head room over a stair must be
   a) 200 cm b) 210 cm c) 205 cm d) 230 cm

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) In prestressed concrete section the _____ section is effective.
   a) Above N.A. b) Below N.A.
   c) Partially above and below d) Entire section

17) The safe stress in steel at service is _____ fck.
   a) 0.4 b) 0.5 c) 0.6 d) 0.7

18) High strength of concrete is necessary for pre stressed concrete work because _____
   a) Large pre stressing force is applied
   b) Bursting stress is more
   c) High bond stress is required
   d) All of above

19) The prestressed concrete beam is suitable for _____
   a) Large spans b) Short spans
   c) Both large spans and short spans d) None of these

20) For footing the minimum cover for the reinforcement shall be _____
   a) 30 mm b) 50 mm c) 25 mm d) 40 mm

_____

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
DESIGN OF CONCRETE STRUCTURES – II

Day and Date : Tuesday, 16-5-2017 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 is* ***allowed****.*
3) ***Draw*** *neat sketch's where required and assume* ***suitable*** *data* ***if required*** *and state* ***it clearly****.*

SECTION – I

II. Design an open well type stair for a college building using the following data :
Floor to floor height is = 3.5 m,
No. of flights per floor = 3
Size of steps = 150 mm riser and 300 mm tread
Landing are supported all around by walls and by beams of width 300 mm at floor levels, thickness of wall is 300 mm. Use M_{20} concrete and Fe_{415} steel. **13**

III. Design the stem slab of a cantilever retaining wall, if the overall height of wall is 5 m. SBC of soil is 180 kN/m^2, angle of repose of the soil is 30° and unit weight of soil 18 kN/m^2, super imposed load due to traffic is 11,000 N/m^2, width of the slab base is 3.2 m, toe projection is 0.8 m. Use M_{25} concrete and Fe_{500} steel. **14**

IV. Design a circular water tank resting on firm ground is fixed at base and free at top with following details :

Dia. of tank 3.5 m, depth of water 2.8 m, the wall and bae are not monolithic with each other, specific weight of water 9810 N/m^3. Use M_{25} concrete and Fe_{500} steel. Assume free board of 300 mm and solve by IS code method. **13**

V. Design a rectangular footing for column axially loaded of size 230 mm × 525 mm carrying 1050 kN load. The SBC of soil is 200 kN/m^2. Use M_{20} concrete and Fe_{415} steel. Sketch the details of reinforcement. **13**

SECTION – II

VI. A post tensioned concrete beam 250 mm × 400 mm has a span of 12 m. The beam is prestressed by steel wires of area 350 mm^2 provided at a uniform eccentricity of 60 mm with an initial prestress of 1200 N/mm^2. Determine the percentage loss of stress in the wires. Take E_s = 210 kN/mm^2, E_c = 35 kN/mm^2, Ultimate creep strain = 22×10^{-6} mm/mm per N/mm^2, Shrinkage of concrete = 215×10^{-6}, Relaxation of steel stress = 5% of the initial stress. Anchorage slip = 1.25 mm, Friction coefficient for wave effect = K = 0.00015 m. **13**

VII. 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 1000 kN. **13**

VIII. Design PSC I section beam for the following span = 15 m, superimposed load of 34 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 is 1000 MPa, total loss of stress 20%, ultimate stress in steel 1500 MPa. **14**

IX. A Fig. 1 shows a prestresses concrete beam 400 mm wide and 800 mm deep. Determine the horizontal, vertical and shear stress at a distance of 400 mm from the end on horizontal section. Constants are given below :

i) through the centre and

ii) at the level of the edge of the anchor plate.

Note that the anchor plate is 300 mm wide and 200 mm deep. The prestressing force is 1000 kN. Find also the principal tensile stresses at the above sections. **13**

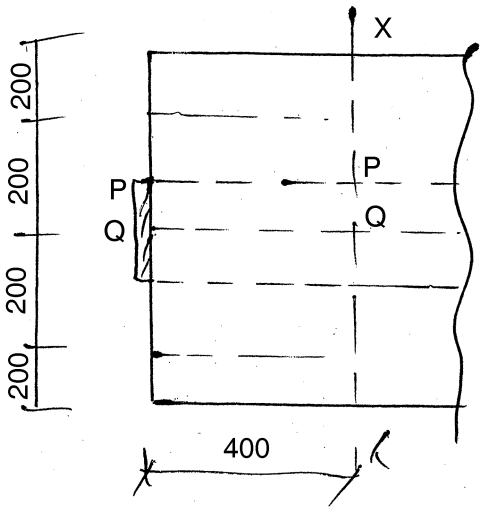

Fig. 1

K_z	K_q
– 5	1.25

constants

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Seat No.	

Set P

B.E. (Civil) (Part – II) Examination, 2017
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Thursday, 18-5-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **Use** single answerbook 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.*

*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. A) Match '**A**' group items with '**B**' group items : **10**

'A' Group

1) Zoning _____

2) Lewis Mumford _____

3) Nonprofit making use of land _____

4) Ebenezer Howard _____

5) Aim of town planning _____

6) Development and Redevelopment _____

7) Slum housing _____

8) Horizontal growth _____

9) MRTP Act, 1966 _____

10) Tool of planning _____

P.T.O.

'B' Group

Regional planning ; town planning law ; town growth according to direction ; haphazard and poor living condition ; town planning ; beauty-convenience-environment and health ; concept of garden city ; Roads and Amenities ; six stages in town growth ; land use classification.

B) Fill in the gaps with correct words : **10**

1) Transit mixers are used for _____ concrete work on site.
2) Modern construction industry is a _____ intensive industry.
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) For Handling of Precast structural member's _____ machine is used.
8) _____ are used for transportation of materials like cement, steel, tiles etc. to the site.
9) For Road construction, the purpose of drum dryer is to heat and dry the aggregates of the _____ mix.
10) A Latis boom crane predominantly handles _____ loads.

_____

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **Use** single answerbook 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 the most significant cash flows affecting ownership cost of equipment's.
   b) Explain the various types of construction equipment's.
   c) Discuss the factors affecting output of construction equipment's.
   d) Discuss on equipment-intensive operations in construction industry.
   e) Explain Hoe and its major components.
   f) Explain safety measures in construction and prevention of accidents.
   g) Write a short note on importance of Precast Construction Technology.

SECTION – II
(**Town Planning**)

3. Attempt **any five** questions : **(5×8=40)**
   a) What is meant by the term town planning ? And state the objects of town planning.
   b) Describe the guiding principles of Rural Development.
   c) Discuss the necessity and types of Town Surveying.
   d) Explain the role of town planning in view of smart city development of Solapur City.
   e) Explain "Garden City" suggested by Sir Ebenezer Howard.
   f) Explain in detail MRTP Act and its provisions.
   g) Discuss various types of zoning and its importance.

Set P

Set P

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Seat No.	

Set **Q**

B.E. (Civil) (Part – II) Examination, 2017
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Thursday, 18-5-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **Use** single answerbook 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.*

*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. A) Match '**A**' group items with '**B**' group items : **10**

'A' Group

1) MRTP Act, 1966 _____

2) Tool of planning _____

3) Slum housing _____

4) Horizontal growth _____

5) Zoning _____

6) Lewis Mumford _____

7) Nonprofit making use of land _____

8) Ebenezer Howard _____

9) Aim of town planning _____

10) Development and Redevelopment _____

P.T.O.

'B' Group

Regional planning ; town planning law ; town growth according to direction ; haphazard and poor living condition ; town planning ; beauty-convenience-environment and health ; concept of garden city ; Roads and Amenities ; six stages in town growth ; land use classification.

B) 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) For Handling of Precast structural member's _____ machine is used.
4) _____ are used for transportation of materials like cement, steel, tiles etc. to the site.
5) Transit mixers are used for _____ concrete work on site.
6) Modern construction industry is a _____ intensive industry.
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.

_____

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **Use** single answerbook 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 the most significant cash flows affecting ownership cost of equipment's.
   b) Explain the various types of construction equipment's.
   c) Discuss the factors affecting output of construction equipment's.
   d) Discuss on equipment-intensive operations in construction industry.
   e) Explain Hoe and its major components.
   f) Explain safety measures in construction and prevention of accidents.
   g) Write a short note on importance of Precast Construction Technology.

SECTION – II
(**Town Planning**)

3. Attempt **any five** questions : **(5×8=40)**
   a) What is meant by the term town planning ? And state the objects of town planning.
   b) Describe the guiding principles of Rural Development.
   c) Discuss the necessity and types of Town Surveying.
   d) Explain the role of town planning in view of smart city development of Solapur City.
   e) Explain "Garden City" suggested by Sir Ebenezer Howard.
   f) Explain in detail MRTP Act and its provisions.
   g) Discuss various types of zoning and its importance.

Set Q

Set Q

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Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2017
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Thursday, 18-5-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **Use** single answerbook 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.*

*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. A) Match '**A**' group items with '**B**' group items : **10**

'A' Group

1) Aim of town planning _____

2) Development and Redevelopment _____

3) MRTP Act, 1966 _____

4) Tool of planning _____

5) Nonprofit making use of land _____

6) Ebenezer Howard _____

7) Zoning _____

8) Lewis Mumford _____

9) Slum housing _____

10) Horizontal growth _____

P.T.O.

'B' Group

Regional planning ; town planning law ; town growth according to direction ; haphazard and poor living condition ; town planning ; beauty-convenience-environment and health ; concept of garden city ; Roads and Amenities ; six stages in town growth ; land use classification.

B) Fill in the gaps with correct words : **10**

1) The functioning of Pneumatic tired rollers is based on _____ action.
2) _____ are hauling equipment for horizontal movement of materials.
3) For Road construction, the purpose of drum dryer is to heat and dry the aggregates of the _____ mix.
4) A Latis boom crane predominantly handles _____ loads.
5) _____ are used to press soil particles together for earth compaction.
6) _____ means removal of material in thin layers.
7) Transit mixers are used for _____ concrete work on site.
8) Modern construction industry is a _____ intensive industry.
9) For Handling of Precast structural member's _____ machine is used.
10) _____ are used for transportation of materials like cement, steel, tiles etc. to the site.

_____

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **Use** single answerbook 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 the most significant cash flows affecting ownership cost of equipment's.
   b) Explain the various types of construction equipment's.
   c) Discuss the factors affecting output of construction equipment's.
   d) Discuss on equipment-intensive operations in construction industry.
   e) Explain Hoe and its major components.
   f) Explain safety measures in construction and prevention of accidents.
   g) Write a short note on importance of Precast Construction Technology.

SECTION – II
(**Town Planning**)

3. Attempt **any five** questions : **(5×8=40)**
   a) What is meant by the term town planning ? And state the objects of town planning.
   b) Describe the guiding principles of Rural Development.
   c) Discuss the necessity and types of Town Surveying.
   d) Explain the role of town planning in view of smart city development of Solapur City.
   e) Explain "Garden City" suggested by Sir Ebenezer Howard.
   f) Explain in detail MRTP Act and its provisions.
   g) Discuss various types of zoning and its importance.

Set R

Set R

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Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2017
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Thursday, 18-5-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **Use** single answerbook 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.*

*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. A) Match '**A**' group items with '**B**' group items : **10**

'A' Group

1) Nonprofit making use of land _____

2) Ebenezer Howard _____

3) Aim of town planning _____

4) Development and Redevelopment _____

5) Slum housing _____

6) Horizontal growth _____

7) MRTP Act, 1966 _____

8) Tool of planning _____

9) Zoning _____

10) Lewis Mumford _____

P.T.O.

'B' Group

Regional planning ; town planning law ; town growth according to direction ; haphazard and poor living condition ; town planning ; beauty-convenience-environment and health ; concept of garden city ; Roads and Amenities ; six stages in town growth ; land use classification.

B) Fill in the gaps with correct words : **10**

1) _____ are used to press soil particles together for earth compaction.
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 Handling of Precast structural member's _____ machine is used.
6) _____ are used for transportation of materials like cement, steel, tiles etc. to the site.
7) For Road construction, the purpose of drum dryer is to heat and dry the aggregates of the _____ mix.
8) A Latis boom crane predominantly handles _____ loads.
9) Transit mixers are used for _____ concrete work on site.
10) Modern construction industry is a _____ intensive industry.

_____

SLR-VB – 60

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
CONSTRUCTION PRACTICES AND TOWN PLANNING

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **Use** single answerbook 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 the most significant cash flows affecting ownership cost of equipment's.
   b) Explain the various types of construction equipment's.
   c) Discuss the factors affecting output of construction equipment's.
   d) Discuss on equipment-intensive operations in construction industry.
   e) Explain Hoe and its major components.
   f) Explain safety measures in construction and prevention of accidents.
   g) Write a short note on importance of Precast Construction Technology.

SECTION – II
(**Town Planning**)

3. Attempt **any five** questions : **(5×8=40)**
   a) What is meant by the term town planning ? And state the objects of town planning.
   b) Describe the guiding principles of Rural Development.
   c) Discuss the necessity and types of Town Surveying.
   d) Explain the role of town planning in view of smart city development of Solapur City.
   e) Explain "Garden City" suggested by Sir Ebenezer Howard.
   f) Explain in detail MRTP Act and its provisions.
   g) Discuss various types of zoning and its importance.

Set S

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Seat No.	

Set **P**

B.E. (Civil) (Part – II) Degree Examination, 2017
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Saturday, 20-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Notes**: 1) Attempt **any three** questions from **each** Section.*
*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 : 20

1. Multiple choice questions : **20**

1) An impact roller is least suitable for compacting
   a) Unsaturated clay b) Wet sand
   c) Dry sand d) Rubber fill

2) Modified compaction test is different from Standard Compaction Test because of the use of a different
   a) Mould size b) Hammer shape
   c) Type of compaction d) Compactive effort

3) In hydraulic modification of soil
   a) Soil is grouted b) Soil is reinforced
   c) Soil is heated d) Pore water is removed

4) Which one of the following is not an objective of ground improvement ?
   a) Reduce erodibility b) Reduce compressibility
   c) Increase strain d) Increase strength

5) Which soil requires more water content for compaction to achieve maximum dry density ?
   a) Clay b) Silt c) Sand d) Gravel

6) Stone column is a column
   a) Used to support stones
   b) Made from boulders
   c) Used to support slabs
   d) Used to improve soil by increasing its permeability

7) Area replacement ratio in case of stone column is
   a) Ratio of area of column to area of zone of influence
   b) Ratio of square of diameter of column to the square of diameter of zone of influence
   c) Ratio of square of radius of column to the square of radius of zone of influence
   d) All of these

8) Vitrification of soil is to limit
   a) Increase the strength of soil
   b) The contamination by radio active elements
   c) Settlement of soils
   d) None of these

P.T.O.

9) The Geofoams and Geocomposites Act as
   a) Catalysts for ground improvement
   b) Retarders for ground improvement
   c) Accelerators for ground improvement
   d) Both a) and c)

10) The factor that affects the electro osmosis process in soils is
   a) Cation–Anion distribution within the pore water
   b) Water-Cation distribution within the soil
   c) Both a) and b)
   d) None

11) Activity is defined as the ratio of
   a) Percentage of clay sized particles to plasticity index of the soil
   b) Percentage of plasticity index to the clay sized particles of the soil
   c) Percentage of fine grained to coarse grained soil particles
   d) None of these

12) Foundation strengthening consisting of Loess soil by chemical stabilization is by using
   a) Aluminum and phosphate ions b) Calcium chloride
   c) Sodium silicate d) Ammonium chloride

13) A micropile is the one
   a) Which is having a diameter less than 300 mm
   b) Can be at any angle to the vertical
   c) Which cause minimal vibration and noise during installation
   d) All of these

14) Acrylic resin is a type of
   a) Suspension grout b) Cementations grout
   c) Chemical grout d) None

15) The dewatering methods is
   a) Ditch and Sump method b) Well point method
   c) Vacuum dewatering method d) All of the above

16) The best laboratory simulation of the effect of a rubber tired roller on clay is obtained in
   a) Standard compaction test b) Modified compaction test
   c) Static compaction d) Repeated triaxial test

17) Usual grout materials are
   a) Cement b) Bentonite
   c) Sodium silicate gels d) All of these

18) The resonance frequency of vibratory compaction is usually around
   a) 5-10 Hz b) 10-15 Hz c) 15-20 H d) None of these

19) Frequency of rapid impact compaction is about
   a) 40-80- times a minute b) 80-120 times a minute
   c) 120-150- times a minute d) None of these

20) Electrokinetic stabilization method is more suitable for
   a) Clays b) Silts c) Sands d) Active clays

———————

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Seat No.	

B.E. (Civil) (Part – II) Degree Examination, 2017
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Saturday, 20-5-2017 Marks : 80
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.*

SECTION – I

2. a) What are the factors to be considered in the selection of suitable ground improvement technique ? **7**
   b) What are the objectives of ground improvement techniques ? **6**
3. a) What are the construction type classification of micropiles ? Discuss in brief. **7**
   b) Explain briefly the methods of insitu densification of cohesive soils. **6**
4. a) What is the purpose of dewatering during construction and post construction stage ? Discuss. **7**
   b) What are the advantages and limitations of Vacuum dewatering system ? **6**
5. Write short notes on : **(3.5×4=14)**
   a) Geotechnical problems of lateritic soils
   b) Rapid impact compaction
   c) Method of seepage analysis for two dimensional flow
   d) Preloading with sand drains in cohesive soils.

SECTION – II

6. a) Discuss various methods of slope stabilization, in brief. **7**
   b) Discuss the thermal modification methods of soil. **6**
7. a) List the physico-chemical modification methods. **6**
   b) Explain lime stabilization mechanism in brief. **7**
8. a) List the factors governing design of reinforced earth walls. **6**
   b) How the load gets transferred from soil to reinforcement in case of reinforced earth ? **7**
9. Write short notes on : **(3.5×4=14)**
   a) Soil dowels
   b) Stone columns
   c) Soil nailing
   d) Cement stabilization.

_____

Set P

SLR-VB – 62

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) Degree Examination, 2017
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Saturday, 20-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Notes: *1) Attempt **any three** questions from **each** Section.*
*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 : 20

1. Multiple choice questions : **20**

1) The best laboratory simulation of the effect of a rubber tired roller on clay is obtained in
   a) Standard compaction test b) Modified compaction test
   c) Static compaction d) Repeated triaxial test

2) Usual grout materials are
   a) Cement b) Bentonite
   c) Sodium silicate gels d) All of these

3) The resonance frequency of vibratory compaction is usually around
   a) 5-10 Hz b) 10-15 Hz c) 15-20 H d) None of these

4) Frequency of rapid impact compaction is about
   a) 40-80- times a minute b) 80-120 times a minute
   c) 120-150- times a minute d) None of these

5) Electrokinetic stabilization method is more suitable for
   a) Clays b) Silts c) Sands d) Active clays

6) An impact roller is least suitable for compacting
   a) Unsaturated clay b) Wet sand
   c) Dry sand d) Rubber fill

7) Modified compaction test is different from Standard Compaction Test because of the use of a different
   a) Mould size b) Hammer shape
   c) Type of compaction d) Compactive effort

8) In hydraulic modification of soil
   a) Soil is grouted b) Soil is reinforced
   c) Soil is heated d) Pore water is removed

9) Which one of the following is not an objective of ground improvement ?
   a) Reduce erodibility b) Reduce compressibility
   c) Increase strain d) Increase strength

10) Which soil requires more water content for compaction to achieve maximum dry density ?
   a) Clay b) Silt c) Sand d) Gravel

P.T.O.

11) Stone column is a column
   a) Used to support stones
   b) Made from boulders
   c) Used to support slabs
   d) Used to improve soil by increasing its permeability

12) Area replacement ratio in case of stone column is
   a) Ratio of area of column to area of zone of influence
   b) Ratio of square of diameter of column to the square of diameter of zone of influence
   c) Ratio of square of radius of column to the square of radius of zone of influence
   d) All of these

13) Vitrification of soil is to limit
   a) Increase the strength of soil
   b) The contamination by radio active elements
   c) Settlement of soils
   d) None of these

14) The Geofoams and Geocomposites Act as
   a) Catalysts for ground improvement
   b) Retarders for ground improvement
   c) Accelerators for ground improvement
   d) Both a) and c)

15) The factor that affects the electro osmosis process in soils is
   a) Cation–Anion distribution within the pore water
   b) Water-Cation distribution within the soil
   c) Both a) and b)
   d) None

16) Activity is defined as the ratio of
   a) Percentage of clay sized particles to plasticity index of the soil
   b) Percentage of plasticity index to the clay sized particles of the soil
   c) Percentage of fine grained to coarse grained soil particles
   d) None of these

17) Foundation strengthening consisting of Loess soil by chemical stabilization is by using
   a) Aluminum and phosphate ions
   b) Calcium chloride
   c) Sodium silicate
   d) Ammonium chloride

18) A micropile is the one
   a) Which is having a diameter less than 300 mm
   b) Can be at any angle to the vertical
   c) Which cause minimal vibration and noise during installation
   d) All of these

19) Acrylic resin is a type of
   a) Suspension grout
   b) Cementations grout
   c) Chemical grout
   d) None

20) The dewatering methods is
   a) Ditch and Sump method
   b) Well point method
   c) Vacuum dewatering method
   d) All of the above

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Seat No.	

B.E. (Civil) (Part – II) Degree Examination, 2017
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Saturday, 20-5-2017 Marks : 80
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.*

SECTION – I

2. a) What are the factors to be considered in the selection of suitable ground improvement technique ? **7**
   b) What are the objectives of ground improvement techniques ? **6**
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   b) Explain briefly the methods of insitu densification of cohesive soils. **6**
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5. Write short notes on : **(3.5×4=14)**
   a) Geotechnical problems of lateritic soils
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   c) Method of seepage analysis for two dimensional flow
   d) Preloading with sand drains in cohesive soils.

SECTION – II

6. a) Discuss various methods of slope stabilization, in brief. **7**
   b) Discuss the thermal modification methods of soil. **6**
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   b) How the load gets transferred from soil to reinforcement in case of reinforced earth ? **7**
9. Write short notes on : **(3.5×4=14)**
   a) Soil dowels
   b) Stone columns
   c) Soil nailing
   d) Cement stabilization.

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Set Q

SLR-VB – 62

Seat No.	

Set **R**

B.E. (Civil) (Part – II) Degree Examination, 2017
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Saturday, 20-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Notes** : 1) Attempt **any three** questions from **each** Section.*
*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.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Multiple choice questions : **20**

1) Activity is defined as the ratio of
   a) Percentage of clay sized particles to plasticity index of the soil
   b) Percentage of plasticity index to the clay sized particles of the soil
   c) Percentage of fine grained to coarse grained soil particles
   d) None of these

2) Foundation strengthening consisting of Loess soil by chemical stabilization is by using
   a) Aluminum and phosphate ions b) Calcium chloride
   c) Sodium silicate d) Ammonium chloride

3) A micropile is the one
   a) Which is having a diameter less than 300 mm
   b) Can be at any angle to the vertical
   c) Which cause minimal vibration and noise during installation
   d) All of these

4) Acrylic resin is a type of
   a) Suspension grout b) Cementations grout
   c) Chemical grout d) None

5) The dewatering methods is
   a) Ditch and Sump method b) Well point method
   c) Vacuum dewatering method d) All of the above

6) The best laboratory simulation of the effect of a rubber tired roller on clay is obtained in
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   a) 5-10 Hz b) 10-15 Hz c) 15-20 H d) None of these

P.T.O.

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   a) 40-80- times a minute
   b) 80-120 times a minute
   c) 120-150- times a minute
   d) None of these

10) Electrokinetic stabilization method is more suitable for
   a) Clays b) Silts c) Sands d) Active clays

11) An impact roller is least suitable for compacting
   a) Unsaturated clay
   b) Wet sand
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   a) Soil is grouted
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   a) Reduce erodibility
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   c) Increase strain
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   a) Used to support stones
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17) Area replacement ratio in case of stone column is
   a) Ratio of area of column to area of zone of influence
   b) Ratio of square of diameter of column to the square of diameter of zone of influence
   c) Ratio of square of radius of column to the square of radius of zone of influence
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19) The Geofoams and Geocomposites Act as
   a) Catalysts for ground improvement
   b) Retarders for ground improvement
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20) The factor that affects the electro osmosis process in soils is
   a) Cation–Anion distribution within the pore water
   b) Water-Cation distribution within the soil
   c) Both a) and b)
   d) None

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Seat No.	

B.E. (Civil) (Part – II) Degree Examination, 2017
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Saturday, 20-5-2017 Marks : 80
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.*

SECTION – I

2. a) What are the factors to be considered in the selection of suitable ground improvement technique ? **7**
   b) What are the objectives of ground improvement techniques ? **6**
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   b) Explain briefly the methods of insitu densification of cohesive soils. **6**
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   b) What are the advantages and limitations of Vacuum dewatering system ? **6**
5. Write short notes on : **(3.5×4=14)**
   a) Geotechnical problems of lateritic soils
   b) Rapid impact compaction
   c) Method of seepage analysis for two dimensional flow
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SECTION – II

6. a) Discuss various methods of slope stabilization, in brief. **7**
   b) Discuss the thermal modification methods of soil. **6**
7. a) List the physico-chemical modification methods. **6**
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8. a) List the factors governing design of reinforced earth walls. **6**
   b) How the load gets transferred from soil to reinforcement in case of reinforced earth ? **7**
9. Write short notes on : **(3.5×4=14)**
   a) Soil dowels
   b) Stone columns
   c) Soil nailing
   d) Cement stabilization.

Set R

SLR-VB – 62

Seat No.	

Set **S**

B.E. (Civil) (Part – II) Degree Examination, 2017
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Saturday, 20-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Notes: *1) Attempt **any three** questions from **each** Section.*
*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 : 20

1. Multiple choice questions : **20**

1) Stone column is a column
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   b) Water-Cation distribution within the soil
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   c) Percentage of fine grained to coarse grained soil particles
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P.T.O.

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   c) Sodium silicate d) Ammonium chloride

8) A micropile is the one
   a) Which is having a diameter less than 300 mm
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   a) Mould size b) Hammer shape
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   c) Increase strain d) Increase strength

20) Which soil requires more water content for compaction to achieve maximum dry density ?
   a) Clay b) Silt c) Sand d) Gravel

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Seat No.	

B.E. (Civil) (Part – II) Degree Examination, 2017
GROUND IMPROVEMENT TECHNIQUES (Elective – II)

Day and Date : Saturday, 20-5-2017 Marks : 80
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.*

SECTION – I

2. a) What are the factors to be considered in the selection of suitable ground improvement technique ? **7**
   b) What are the objectives of ground improvement techniques ? **6**
3. a) What are the construction type classification of micropiles ? Discuss in brief. **7**
   b) Explain briefly the methods of insitu densification of cohesive soils. **6**
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   a) Geotechnical problems of lateritic soils
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   c) Method of seepage analysis for two dimensional flow
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SECTION – II

6. a) Discuss various methods of slope stabilization, in brief. **7**
   b) Discuss the thermal modification methods of soil. **6**
7. a) List the physico-chemical modification methods. **6**
   b) Explain lime stabilization mechanism in brief. **7**
8. a) List the factors governing design of reinforced earth walls. **6**
   b) How the load gets transferred from soil to reinforcement in case of reinforced earth ? **7**
9. Write short notes on : **(3.5×4=14)**
   a) Soil dowels
   b) Stone columns
   c) Soil nailing
   d) Cement stabilization.

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Set S

SLR-VB – 63

Seat No.	

Set P

B.E. (Part – II) (Civil) Examination, 2017
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Saturday, 20-5-2017 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) For highway geometric design purposes the speed used is
a) 15^{th} Percentile b) 50^{th} Percentile c) 85^{th} Percentile d) 98^{th} Percentile

2) Select the correct statement.
a) Traffic volume should always be more than traffic capacity.
b) Traffic capacity should always be more than traffic volume.
c) Spot speed is the average speed of a vehicle at a specified section.
d) 85^{th} percentile speed is more than 98^{th} percentile speed.

3) On a right angled road intersection with two way traffic, the total number of conflict point are
a) 6 b) 11 c) 18 d) 24

4) The length of the vehicle affects
a) width of traffic lanes
b) extra width of pavement and minimum turning radius
c) width of shoulders and parking facilities
d) clearance to be provided under structures such as over bridges, under-bridges etc.

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 maximum width a vehicle as recommended by IRC is
a) 1.85 m b) 2.44 m c) 3.85 m d) 3.5 m

8) The diagram which shows the approximate path of vehicles and pedestrians involved in accidents is known as
   a) Spot maps b) Pie charts c) Condition diagram d) Collision diagram

9) Unevenness of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump Integrator
   c) Photometer d) Pedometer

10) The diagram which shows all important physical conditions of an accident location like roadway limits, bridges, trees and all details of roadway conditions is known as
   a) Pie chart b) Spot maps
   c) Condition diagram d) Collision diagram

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) Pssing allowed on one side
   c) Passing allowed on both side
   d) Passing allowed only for left side vehicle

13) When the speed of traffic flow becomes zero, then
   a) Traffic density attains maximum value whereas traffic volume becomes zero
   b) Traffic density and traffic volume both attain maximum value
   c) Traffic density and traffic volume both become zero
   d) Traffic density becomes zero whereas traffic volume attains maximum value

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) Dead slow is a
   a) Regulatory sign b) Warning sign
   c) Informatory sign d) None of the above

16) Centre line markings are used
   a) To designate traffic lanes
   b) In roadways meant for two way traffic
   c) To indicate that overtaking is not permitted
   d) To designate proper lateral placement of vehicles before turning to different directions

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) Maximum number of vehicles can be parked with
   a) Parallel parking b) 30° angle parking
   c) 45° angle parking d) 90° angle parking

20) Reaction time of driver
   a) increases with increase in speed b) decreases with increase in speed
   c) is same for all speeds d) none of the above

SLR-VB – 63

Seat No.	

B.E. (Part – II) (Civil) Examination, 2017
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Saturday, 20-5-2017 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.

SECTION – I

2. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**
   a) Briefly explain various road user characteristics and state how it affects driving conditions.
   b) Define the term Spot Speed, with neat sketch explain enoscope method of determination of spot speed study.
   c) Mention the causes of traffic accidents. Explain each of them.
   d) 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.

3. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**
   a) Write a short note on moving car observer method with its advantages.
   b) Discuss various types of parking, their advantages and disadvantages.
   c) Write a short note on :
      i) Level of Service
      ii) Flow and Density Relationship.

SECTION – II

4. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**
   a) With neat sketch explain the different types of regulatory signs.
   b) Discuss the advantages and disadvantages of one way street.
   c) Discuss briefly, fixed signals and vehicle actuated signals.

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 with pedestrian crossing by Webster's method. Sketch the phase diagram with the signal phase and cycle timings.

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) Explain the importance and applications of ITS in traffic engineering.

c) Indicate and explain how the spacing of street lighting is decided.

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Seat No.	

Set Q

B.E. (Part – II) (Civil) Examination, 2017
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Saturday, 20-5-2017 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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4) Assume any ***missing*** *data suitably.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Centre line markings are used
   a) To designate traffic lanes
   b) In roadways meant for two way traffic
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   d) To designate proper lateral placement of vehicles before turning to different directions

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
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4) Maximum number of vehicles can be parked with
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   c) 45° angle parking d) 90° angle parking

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6) For highway geometric design purposes the speed used is
   a) 15^{th} Percentile b) 50^{th} Percentile c) 85^{th} Percentile d) 98^{th} Percentile

7) Select the correct statement.
   a) Traffic volume should always be more than traffic capacity.
   b) Traffic capacity should always be more than traffic volume.
   c) Spot speed is the average speed of a vehicle at a specified section.
   d) 85^{th} percentile speed is more than 98^{th} percentile speed.

8) On a right angled road intersection with two way traffic, the total number of conflict point are
   a) 6 b) 11 c) 18 d) 24

P.T.O.

9) The length of the vehicle affects
   a) width of traffic lanes
   b) extra width of pavement and minimum turning radius
   c) width of shoulders and parking facilities
   d) clearance to be provided under structures such as over bridges, under-bridges etc.

10) The maximum length allowed for tractor and trailer combination vehicle is
   a) 18 m b) 20 m c) 16 m d) 12 m

11) 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

12) The maximum width a vehicle as recommended by IRC is
   a) 1.85 m b) 2.44 m c) 3.85 m d) 3.5 m

13) The diagram which shows the approximate path of vehicles and pedestrians involved in accidents is known as
   a) Spot maps b) Pie charts c) Condition diagram d) Collision diagram

14) Unevenness of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump Integrator
   c) Photometer d) Pedometer

15) The diagram which shows all important physical conditions of an accident location like roadway limits, bridges, trees and all details of roadway conditions is known as
   a) Pie chart b) Spot maps
   c) Condition diagram d) Collision diagram

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) Pssing allowed on one side
   c) Passing allowed on both side
   d) Passing allowed only for left side vehicle

18) When the speed of traffic flow becomes zero, then
   a) Traffic density attains maximum value whereas traffic volume becomes zero
   b) Traffic density and traffic volume both attain maximum value
   c) Traffic density and traffic volume both become zero
   d) Traffic density becomes zero whereas traffic volume attains maximum value

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) Dead slow is a
   a) Regulatory sign b) Warning sign
   c) Informatory sign d) None of the above

SLR-VB – 63

Seat No.	

B.E. (Part – II) (Civil) Examination, 2017
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Saturday, 20-5-2017 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.

SECTION – I

2. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**
   a) Briefly explain various road user characteristics and state how it affects driving conditions.
   b) Define the term Spot Speed, with neat sketch explain enoscope method of determination of spot speed study.
   c) Mention the causes of traffic accidents. Explain each of them.
   d) 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.

3. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**
   a) Write a short note on moving car observer method with its advantages.
   b) Discuss various types of parking, their advantages and disadvantages.
   c) Write a short note on :
      i) Level of Service
      ii) Flow and Density Relationship.

SECTION – II

4. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**
   a) With neat sketch explain the different types of regulatory signs.
   b) Discuss the advantages and disadvantages of one way street.
   c) Discuss briefly, fixed signals and vehicle actuated signals.

Set Q

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 with pedestrian crossing by Webster's method. Sketch the phase diagram with the signal phase and cycle timings.

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) Explain the importance and applications of ITS in traffic engineering.

c) Indicate and explain how the spacing of street lighting is decided.

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SLR-VB – 63

Seat No.	

Set R

B.E. (Part – II) (Civil) Examination, 2017
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Saturday, 20-5-2017 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) Pssing allowed on one side
c) Passing allowed on both side
d) Passing allowed only for left side vehicle

3) When the speed of traffic flow becomes zero, then
a) Traffic density attains maximum value whereas traffic volume becomes zero
b) Traffic density and traffic volume both attain maximum value
c) Traffic density and traffic volume both become zero
d) Traffic density becomes zero whereas traffic volume attains maximum value

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) Dead slow is a
a) Regulatory sign b) Warning sign
c) Informatory sign d) None of the above

6) Centre line markings are used
a) To designate traffic lanes
b) In roadways meant for two way traffic
c) To indicate that overtaking is not permitted
d) To designate proper lateral placement of vehicles before turning to different directions

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

9) Maximum number of vehicles can be parked with
   a) Parallel parking b) 30° angle parking
   c) 45° angle parking d) 90° angle parking

10) Reaction time of driver
   a) increases with increase in speed b) decreases with increase in speed
   c) is same for all speeds d) none of the above

11) For highway geometric design purposes the speed used is
   a) 15^{th} Percentile b) 50^{th} Percentile c) 85^{th} Percentile d) 98^{th} Percentile

12) Select the correct statement.
   a) Traffic volume should always be more than traffic capacity
   b) Traffic capacity should always be more than traffic volume
   c) Spot speed is the average speed of a vehicle at a specified section
   d) 85^{th} percentile speed is more than 98^{th} percentile speed

13) On a right angled road intersection with two way traffic, the total number of conflict point are
   a) 6 b) 11 c) 18 d) 24

14) The length of the vehicle affects
   a) width of traffic lanes
   b) extra width of pavement and minimum turning radius
   c) width of shoulders and parking facilities
   d) clearance to be provided under structures such as over bridges, under-bridges etc.

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
   c) Traffic numbers d) All the above

17) The maximum width a vehicle as recommended by IRC is
   a) 1.85 m b) 2.44 m c) 3.85 m d) 3.5 m

18) The diagram which shows the approximate path of vehicles and pedestrians involved in accidents is known as
   a) Spot maps b) Pie charts c) Condition diagram d) Collision diagram

19) Unevenness of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump Integrator
   c) Photometer d) Pedometer

20) The diagram which shows all important physical conditions of an accident location like roadway limits, bridges, trees and all details of roadway conditions is known as
   a) Pie chart b) Spot maps
   c) Condition diagram d) Collision diagram

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Seat No.	

B.E. (Part – II) (Civil) Examination, 2017
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Saturday, 20-5-2017 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.

SECTION – I

2. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**
   a) Briefly explain various road user characteristics and state how it affects driving conditions.
   b) Define the term Spot Speed, with neat sketch explain enoscope method of determination of spot speed study.
   c) Mention the causes of traffic accidents. Explain each of them.
   d) 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.

3. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**
   a) Write a short note on moving car observer method with its advantages.
   b) Discuss various types of parking, their advantages and disadvantages.
   c) Write a short note on :
      i) Level of Service
      ii) Flow and Density Relationship.

SECTION – II

4. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**
   a) With neat sketch explain the different types of regulatory signs.
   b) Discuss the advantages and disadvantages of one way street.
   c) Discuss briefly, fixed signals and vehicle actuated signals.

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 with pedestrian crossing by Webster's method. Sketch the phase diagram with the signal phase and cycle timings.

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) Explain the importance and applications of ITS in traffic engineering.

c) Indicate and explain how the spacing of street lighting is decided.

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Seat No.	

Set S

B.E. (Part – II) (Civil) Examination, 2017
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Saturday, 20-5-2017 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 maximum width a vehicle as recommended by IRC is
   a) 1.85 m b) 2.44 m c) 3.85 m d) 3.5 m

3) The diagram which shows the approximate path of vehicles and pedestrians involved in accidents is known as
   a) Spot maps b) Pie charts c) Condition diagram d) Collision diagram

4) Unevenness of the pavement surface is measured by
   a) Portable skid resistance tester b) Bump Integrator
   c) Photometer d) Pedometer

5) The diagram which shows all important physical conditions of an accident location like roadway limits, bridges, trees and all details of roadway conditions is known as
   a) Pie chart b) Spot maps
   c) Condition diagram d) Collision diagram

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) Pssing allowed on one side
   c) Passing allowed on both side
   d) Passing allowed only for left side vehicle

8) When the speed of traffic flow becomes zero, then
   a) Traffic density attains maximum value whereas traffic volume becomes zero
   b) Traffic density and traffic volume both attain maximum value
   c) Traffic density and traffic volume both become zero
   d) Traffic density becomes zero whereas traffic volume attains maximum value

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) Dead slow is a
   a) Regulatory sign b) Warning sign
   c) Informatory sign d) None of the above

11) Centre line markings are used
   a) To designate traffic lanes
   b) In roadways meant for two way traffic
   c) To indicate that overtaking is not permitted
   d) To designate proper lateral placement of vehicles before turning to different directions

12) Equivalent factor of passenger car unit (PCU) for a passenger car is
   a) 1.0 b) 2.0 c) 0.5 d) 10

13) Desire lines are plotted in
   a) Traffic volume studies b) Speed studies
   c) Accident studies d) Origin and Destination studies

14) Maximum number of vehicles can be parked with
   a) Parallel parking b) 30° angle parking
   c) 45° angle parking d) 90° angle parking

15) Reaction time of driver
   a) increases with increase in speed b) decreases with increase in speed
   c) is same for all speeds d) none of the above

16) For highway geometric design purposes the speed used is
   a) 15^{th} Percentile b) 50^{th} Percentile c) 85^{th} Percentile d) 98^{th} Percentile

17) Select the correct statement.
   a) Traffic volume should always be more than traffic capacity.
   b) Traffic capacity should always be more than traffic volume.
   c) Spot speed is the average speed of a vehicle at a specified section.
   d) 85^{th} percentile speed is more than 98^{th} percentile speed.

18) On a right angled road intersection with two way traffic, the total number of conflict point are
   a) 6 b) 11 c) 18 d) 24

19) The length of the vehicle affects
   a) width of traffic lanes
   b) extra width of pavement and minimum turning radius
   c) width of shoulders and parking facilities
   d) clearance to be provided under structures such as over bridges, under-bridges etc.

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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Seat No.	

B.E. (Part – II) (Civil) Examination, 2017
TRAFFIC ENGINEERING AND CONTROL (Elective – II)

Day and Date : Saturday, 20-5-2017 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.

SECTION – I

2. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**
   a) Briefly explain various road user characteristics and state how it affects driving conditions.
   b) Define the term Spot Speed, with neat sketch explain enoscope method of determination of spot speed study.
   c) Mention the causes of traffic accidents. Explain each of them.
   d) 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.

3. Answer **any two** questions (**each** carry **8** marks) : **(2×8=16)**
   a) Write a short note on moving car observer method with its advantages.
   b) Discuss various types of parking, their advantages and disadvantages.
   c) Write a short note on :
      i) Level of Service
      ii) Flow and Density Relationship.

SECTION – II

4. Answer **any three** questions (**each** carry **8** marks) : **(3×8=24)**
   a) With neat sketch explain the different types of regulatory signs.
   b) Discuss the advantages and disadvantages of one way street.
   c) Discuss briefly, fixed signals and vehicle actuated signals.

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 with pedestrian crossing by Webster's method. Sketch the phase diagram with the signal phase and cycle timings.

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) Explain the importance and applications of ITS in traffic engineering.

c) Indicate and explain how the spacing of street lighting is decided.

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SLR-VB – 64

Seat No.	

Set P

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Saturday, 20-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

Choose the correct alternative :

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) 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

6. Which of the following is not risk in Infrastructure ?
   a) Demand risk
   b) Economic risk
   c) Agricultural risk
   d) Political risk

7. Which of the following is principle of Public Private Partnership ?
   a) Ownership by stakeholder
   b) Flexibility
   c) Simplicity in usage and management
   d) All of the above

8. Which of the following is not the principle 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. 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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SLR-VB – 64

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Saturday, 20-5-2017 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) Write a short note on project closure activities. **4**
   b) Draw and explain a schematic diagram of work flow of five phase project management. **10**
6. a) Write a note on BOT (Toll) model. **4**
   b) Explain the BOT (annuity) model. **9**
7. a) Write in brief on risk management in Public Private Partnership. **4**
   b) Explain the role of asset management in risk reduction. **9**
8. a) Write short note on technology and innovation. **4**
   b) What are the main advantages of adopting sustainability principles for building and infrastructure ? **9**

Set P

Set P

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Seat No.	

Set Q

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Saturday, 20-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

Choose the correct alternative :

1. Which of the following is not one of the key challenges for sustainability ?
   a) Water b) Energy
   c) Waste d) Rural development

2. What is meant by the term OBA contract ?
   a) Output Based Assistance b) Output Build Aid
   c) Operate Build Assistance d) Output Based Aid

3. Which of the following is principle of Public Private Partnership ?
   a) Ownership by stakeholder
   b) Flexibility
   c) Simplicity in usage and management
   d) All of the above

4. Which of the following is not the principle 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

P.T.O.

6. 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

7. 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

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 risk in Infrastructure ?
   a) Demand risk
   b) Economic risk
   c) Agricultural risk
   d) Political risk

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Saturday, 20-5-2017 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) Write a short note on project closure activities. **4**
   b) Draw and explain a schematic diagram of work flow of five phase project management. **10**
6. a) Write a note on BOT (Toll) model. **4**
   b) Explain the BOT (annuity) model. **9**
7. a) Write in brief on risk management in Public Private Partnership. **4**
   b) Explain the role of asset management in risk reduction. **9**
8. a) Write short note on technology and innovation. **4**
   b) What are the main advantages of adopting sustainability principles for building and infrastructure ? **9**

Set Q

Set Q

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Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Saturday, 20-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

Choose the correct alternative :

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 risk in Infrastructure ?
   a) Demand risk b) Economic risk
   c) Agricultural risk d) Political risk

3. Which of the following is not one of the key challenges for sustainability ?
   a) Water b) Energy
   c) Waste d) Rural development

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 principle of Public Private Partnership ?
   a) Ownership by stakeholder
   b) Joint venture
   c) Simplicity in usage and management
   d) Flexibility

P.T.O.

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

7. 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

8. 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

9. Which of the following is principle of Public Private Partnership ?
   a) Ownership by stakeholder
   b) Flexibility
   c) Simplicity in usage and management
   d) All of the above

10. Which of the following is not the principle aspect of sustainable development ?
   a) Energy
   b) Environmental
   c) Social
   d) Economic

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Saturday, 20-5-2017 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) Write a short note on project closure activities. **4**
   b) Draw and explain a schematic diagram of work flow of five phase project management. **10**
6. a) Write a note on BOT (Toll) model. **4**
   b) Explain the BOT (annuity) model. **9**
7. a) Write in brief on risk management in Public Private Partnership. **4**
   b) Explain the role of asset management in risk reduction. **9**
8. a) Write short note on technology and innovation. **4**
   b) What are the main advantages of adopting sustainability principles for building and infrastructure ? **9**

Set R

Set R

SLR-VB – 64

Seat No.	

Set S

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Saturday, 20-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

Choose the correct alternative :

1. 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

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 risk in Infrastructure ?
   a) Demand risk b) Economic risk
   c) Agricultural risk d) Political risk

5. Which of the following is principle of Public Private Partnership ?
   a) Ownership by stakeholder
   b) Flexibility
   c) Simplicity in usage and management
   d) All of the above

P.T.O.

6. Which of the following is not the principle aspect of sustainable development ?
   a) Energy
   b) Environmental
   c) Social
   d) Economic

7. Which of the following is not one of the key challenges for sustainability ?
   a) Water
   b) Energy
   c) Waste
   d) Rural development

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. 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

10. 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

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : INFRASTRUCTURAL ENGINEERING

Day and Date : Saturday, 20-5-2017 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) Write a short note on project closure activities. **4**
   b) Draw and explain a schematic diagram of work flow of five phase project management. **10**
6. a) Write a note on BOT (Toll) model. **4**
   b) Explain the BOT (annuity) model. **9**
7. a) Write in brief on risk management in Public Private Partnership. **4**
   b) Explain the role of asset management in risk reduction. **9**
8. a) Write short note on technology and innovation. **4**
   b) What are the main advantages of adopting sustainability principles for building and infrastructure ? **9**

Set S

Set S

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Seat No.	

Set P

B.E. (Civil) (Part – II) Examination, 2017
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Saturday, 20-5-2017 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**.*
*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** indicate **full** marks.*
*4) Assume suitable data **wherever** necessary and mention it **clearly**.*
*5) Use of non programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) 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

2) Mechanical size reduction operation includes
   a) Shredding b) Grinding c) Milling d) All of above

3) The volume of municipal wastes can be reduced by more than 90 percent by
   a) Incineration b) Landfilling
   c) Composting 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) The final functional element in solid waste management system is
   a) Transfer and transportation
   b) Collection
   c) Processing and recovery
   d) Disposal

6) Composting process is affected due to
   a) Temperature
   b) Moisture content
   c) C/N ratio
   d) All of above

7) The biomedical waste management act were enacted in
   a) 1988 b) 1996 c) 1976 d) 1998

8) The anaerobic method of mechanical composting is
   a) Indore method
   b) Mangalore method
   c) Bangalore method
   d) None of these

9) Characteristics of hazardous waste includes
   a) Ignitibility and Corrosivity
   b) Reactivity and toxicity
   c) Both a) and b)
   d) None of the above

10) Leachate is coloured liquid that comes out of
   a) Septic tank
   b) Sanitary landfills
   c) Aerated lagoons
   d) None of these

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SLR-VB – 66

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Saturday, 20-5-2017 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 **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 100kg 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 the functional elements of municipal solid waste management with flow diagram. **6**

3. A) Explain theory of composting in brief. **6**

B) Describe the effect of following on composting process. **7**
i) C/N ratio ii) Temperature iii) Moisture content iv) pH v) Particle size.

4. A) Write in brief MSW (Management and Handling) Rule. **5**

   B) Write advantages and disadvantages of Incineration treatment. **4**

   C) Write a note on recovery of Bio-gas energy from organic solid waste. **4**

5. A) State and explain briefly the various methods of handling and processing of solid waste. **6**

   B) Write a note on status of solid waste management in India. **7**

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) Write a detailed note on "Waste minimization". **7**

   B) Explain natural and manmade hazards with examples. **6**

8. A) Draw a cross section of sanitary landfill and explain the essential components. **7**

   B) Write site selection criteria for sanitary landfilling. **6**

9. A) Explain storage and transportation of hazardous waste. **7**

   B) Explain in details any one hazard episode. **6**

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SLR-VB – 66

Seat No.	

Set Q

B.E. (Civil) (Part – II) Examination, 2017
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Saturday, 20-5-2017 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**.*
*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** indicate **full** marks.*
*4) Assume suitable data **wherever** necessary and mention it **clearly**.*
*5) Use of non programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) Characteristics of hazardous waste includes
   a) Ignitibility and Corrosivity
   b) Reactivity and toxicity
   c) Both a) and b)
   d) None of the above

2) Leachate is coloured liquid that comes out of
   a) Septic tank b) Sanitary landfills
   c) Aerated lagoons d) None of these

3) The biomedical waste management act were enacted in
   a) 1988 b) 1996 c) 1976 d) 1998

P.T.O.

4) The anaerobic method of mechanical composting is
   a) Indore method b) Mangalore method
   c) Bangalore method d) None of these

5) 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

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) Substances that emit ionizing radiation are defined as
   a) Hazardous waste b) Biological wastes
   c) Flammable wastes d) Radioactive wastes

9) The final functional element in solid waste management system is
   a) Transfer and transportation
   b) Collection
   c) Processing and recovery
   d) Disposal

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-VB – 66

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Saturday, 20-5-2017 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 **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 100kg 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 the functional elements of municipal solid waste management with flow diagram. **6**

3. A) Explain theory of composting in brief. **6**

B) Describe the effect of following on composting process. **7**
i) C/N ratio ii) Temperature iii) Moisture content iv) pH v) Particle size.

4. A) Write in brief MSW (Management and Handling) Rule. **5**

   B) Write advantages and disadvantages of Incineration treatment. **4**

   C) Write a note on recovery of Bio-gas energy from organic solid waste. **4**

5. A) State and explain briefly the various methods of handling and processing of solid waste. **6**

   B) Write a note on status of solid waste management in India. **7**

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) Write a detailed note on "Waste minimization". **7**

   B) Explain natural and manmade hazards with examples. **6**

8. A) Draw a cross section of sanitary landfill and explain the essential components. **7**

   B) Write site selection criteria for sanitary landfilling. **6**

9. A) Explain storage and transportation of hazardous waste. **7**

   B) Explain in details any one hazard episode. **6**

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SLR-VB – 66

Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2017
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Saturday, 20-5-2017 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**.*
*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** indicate **full** marks.*
*4) Assume suitable data **wherever** necessary and mention it **clearly**.*
*5) Use of non programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) The final functional element in solid waste management system is
   a) Transfer and transportation
   b) Collection
   c) Processing and recovery
   d) Disposal

2) Composting process is affected due to
   a) Temperature
   b) Moisture content
   c) C/N ratio
   d) All of above

3) Characteristics of hazardous waste includes
   a) Ignitibility and Corrosivity
   b) Reactivity and toxicity
   c) Both a) and b)
   d) None of the above

P.T.O.

4) Leachate is coloured liquid that comes out of
   a) Septic tank b) Sanitary landfills
   c) Aerated lagoons d) None of these

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) Substances that emit ionizing radiation are defined as
   a) Hazardous waste b) Biological wastes
   c) Flammable wastes d) Radioactive wastes

7) 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

8) Mechanical size reduction operation includes
   a) Shredding b) Grinding c) Milling d) All of above

9) The biomedical waste management act were enacted in
   a) 1988 b) 1996 c) 1976 d) 1998

10) The anaerobic method of mechanical composting is
   a) Indore method b) Mangalore method
   c) Bangalore method d) None of these

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SLR-VB – 66

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Saturday, 20-5-2017 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 **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 100kg 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 the functional elements of municipal solid waste management with flow diagram. **6**

3. A) Explain theory of composting in brief. **6**

B) Describe the effect of following on composting process. **7**
i) C/N ratio ii) Temperature iii) Moisture content iv) pH v) Particle size.

4. A) Write in brief MSW (Management and Handling) Rule. **5**
   B) Write advantages and disadvantages of Incineration treatment. **4**
   C) Write a note on recovery of Bio-gas energy from organic solid waste. **4**

5. A) State and explain briefly the various methods of handling and processing of solid waste. **6**
   B) Write a note on status of solid waste management in India. **7**

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) Write a detailed note on "Waste minimization". **7**
   B) Explain natural and manmade hazards with examples. **6**

8. A) Draw a cross section of sanitary landfill and explain the essential components. **7**
   B) Write site selection criteria for sanitary landfilling. **6**

9. A) Explain storage and transportation of hazardous waste. **7**
   B) Explain in details any one hazard episode. **6**

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SLR-VB – 66

Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2017
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Saturday, 20-5-2017 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**.*
*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** indicate **full** marks.*
*4) Assume suitable data **wherever** necessary and mention it **clearly**.*
*5) Use of non programmable calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

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) Substances that emit ionizing radiation are defined as
   a) Hazardous waste b) Biological wastes
   c) Flammable wastes d) Radioactive wastes

3) The final functional element in solid waste management system is
   a) Transfer and transportation
   b) Collection
   c) Processing and recovery
   d) Disposal

4) Composting process is affected due to
   a) Temperature b) Moisture content
   c) C/N ratio d) All of above

5) The biomedical waste management act were enacted in
   a) 1988 b) 1996 c) 1976 d) 1998

6) The anaerobic method of mechanical composting is
   a) Indore method b) Mangalore method
   c) Bangalore method d) None of these

7) Characteristics of hazardous waste includes
   a) Ignitibility and Corrosivity
   b) Reactivity and toxicity
   c) Both a) and b)
   d) None of the above

8) Leachate is coloured liquid that comes out of
   a) Septic tank b) Sanitary landfills
   c) Aerated lagoons d) None of these

9) 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

10) Mechanical size reduction operation includes
   a) Shredding b) Grinding c) Milling d) All of above

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SLR-VB – 66

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
(Elective – II)
SOLID AND HAZARDOUS WASTE MANAGEMENT

Day and Date : Saturday, 20-5-2017 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 **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 100kg 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 the functional elements of municipal solid waste management with flow diagram. **6**

3. A) Explain theory of composting in brief. **6**

B) Describe the effect of following on composting process. **7**
i) C/N ratio ii) Temperature iii) Moisture content iv) pH v) Particle size.

4. A) Write in brief MSW (Management and Handling) Rule. **5**
   B) Write advantages and disadvantages of Incineration treatment. **4**
   C) Write a note on recovery of Bio-gas energy from organic solid waste. **4**

5. A) State and explain briefly the various methods of handling and processing of solid waste. **6**
   B) Write a note on status of solid waste management in India. **7**

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) Write a detailed note on "Waste minimization". **7**
   B) Explain natural and manmade hazards with examples. **6**

8. A) Draw a cross section of sanitary landfill and explain the essential components. **7**
   B) Write site selection criteria for sanitary landfilling. **6**

9. A) Explain storage and transportation of hazardous waste. **7**
   B) Explain in details any one hazard episode. **6**

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SLR-VB – 69

Seat No.	

Set **P**

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : DESIGN OF BRIDGES

Day and Date : Saturday, 20-5-2017 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) *Solve **any three** questions **each** from Section – **I** and Section – **II**.*
3) *Figures to the **right** indicates **full** marks.*
4) *Assume suitable data **if necessary** and mention **it clearly**.*
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) Pigeaud's theory is used to calculate
   a) Bending moment b) Load factor
   c) Effective span d) Impact factor

2) As per crack control criteria of IRC-21, the diameter of bar in slabs shall not exceed
   a) 36 mm b) 32 mm c) 25 mm d) 40 mm

3) The minimum number of cross beams in a bridge should be
   a) 3 b) 5 c) 6 d) None of these

4) The minimum cement content for minor bridges is
   a) 250 kg/mm^3 b) 360 kg/mm^3 c) 400 kg/mm^3 d) 450 kg/mm^3

5) Pigweed's curves are used to calculate
   a) Bending moment coefficients b) Load factor
   c) Impact factor d) Effective span

6) Load factor 'K' by Courbon's theory for uniform MI is given by

   a) $\frac{\sum W}{n}\left[1+\frac{ne I_1 X_1}{\sum I_i X_i^2}\right]$ b) $\frac{\sum W}{n}\left[n+\frac{eX_1}{\sum X^2}\right]$

   c) $\frac{\sum W}{n}\left[1+\frac{neX_1}{\sum X^2}\right]$ d) $\frac{\sum W}{n}\left[n+\frac{eI_1X_1}{\sum I_i X_i^2}\right]$

7) Aqua duct is the classification of bridge according to
   a) Material b) Function
   c) Type of superstructure d) Inter-span relationship

8) Culvert is the type of bridge whose span is
   a) Between 6 m – 60 m b) Above 60 m
   c) Less than 6 m d) None of these

P.T.O.

9) For small bridges, with open foundations, the economical span is approximately equal to _____ time's height of Pier.
   a) 2.0 b) 1.2 c) 1.0 d) 1.5

10) 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

11) Expansion bearing allow
   a) Rotation only
   b) Translation only
   c) Both rotational as well as translation
   d) Restrict rotation as well as translation

12) Simply supported span requires
   a) Fixed bearing at both ends
   b) Expansion bearing at both ends
   c) Fixed bearing at one end and expansion bearing at the other
   d) Either a) or b), both are correct

13) Continuous girder requires
   a) Fixed bearing on all supports
   b) Expansion bearing on all supports
   c) Expansion bearing on all support except at one
   d) Fixed bearing on all support except at one

14) 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 support and fixed bearing at the two abutment

15) In case of curved bridges, suitable bearing is
   a) Fixed bearing
   b) Expansion bearing
   c) Rocker bearing
   d) Steel hinge

16) Following is not type of Expansion bearing
   a) Sliding plate beam
   b) Steel roller-cum-rocker bearing
   c) Elastomeric bearing
   d) Rocker bearing

17) Maximum allowable percentage elongation of elastomeric bearing is
   a) 300 b) 200 c) 400 d) 500

18) 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

19) Braking force is taken as _____ of the design vehicle load.
   a) 0.2 b) 0.4 c) 0.6 d) 0.8

20) 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

_____

SLR-VB – 69

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : DESIGN OF BRIDGES

Day and Date : Saturday, 20-5-2017 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. 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. **3**

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 tacked 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 all the longitudinal girders. Use following additional data,
   a) Carriage way width – 9 m
   b) Span of bridge – 17 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 – 3.0 m
   g) Use M-30 concrete and Fe-415 steel. **13**

5. Write a note on : **(3.5×4=14)**
   a) Economic span length
   b) Selection of type of bridge
   c) Types of bridges
   d) Factors affecting location of piers and abutments.

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 = M20 concrete. **13**

7. Verify the suitability of abutment as shown in the Fig. 1. Use following data :
   Density of soil – 17.5 kN/m^3, Friction angle of soil ($\varnothing$) = 32°.
   Coefficient of friction – 0.6, Live load IRC class AA tracked. **13**

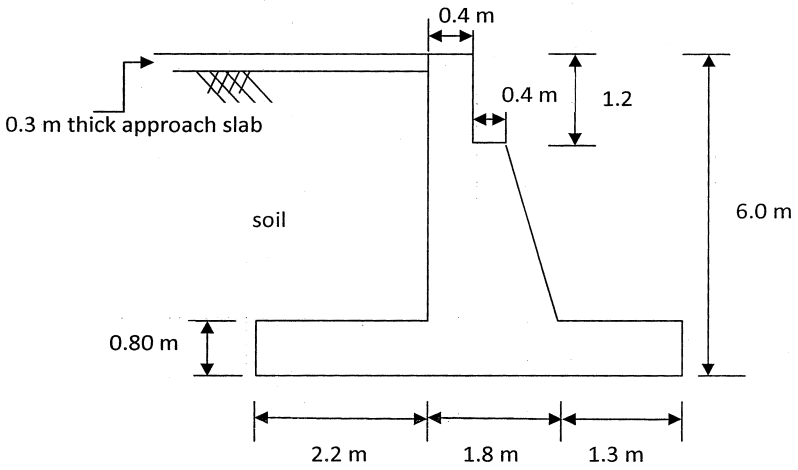

Fig. No. 1

8. A) Write in detail about various types of bearings with neat sketch. **8**
   B) Write a note on Expansion Joints. **5**

9. Write a note on following **(any four)** : **(3.5×4=14)**
   a) Types of bridge pier with their suitability
   b) Functions of bearing
   c) Approach slab
   d) Inspection of bridges
   e) Importance of bridge inspection.

SLR-VB – 69

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : DESIGN OF BRIDGES

Day and Date : Saturday, 20-5-2017 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) *Solve* ***any three*** *questions* ***each*** *from Section –* ***I*** *and Section –* ***II****.*
3) *Figures to the* ***right*** *indicates* ***full*** *marks.*
4) *Assume suitable data* ***if necessary*** *and mention* ***it clearly****.*
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) Following is not type of Expansion bearing
   a) Sliding plate beam b) Steel roller-cum-rocker bearing
   c) Elastomeric bearing d) Rocker bearing

2) Maximum allowable percentage elongation of elastomeric bearing is
   a) 300 b) 200 c) 400 d) 500

3) 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

4) Braking force is taken as _____ of the design vehicle load.
   a) 0.2 b) 0.4 c) 0.6 d) 0.8

5) 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

6) Pigeaud's theory is used to calculate
   a) Bending moment b) Load factor
   c) Effective span d) Impact factor

7) As per crack control criteria of IRC-21, the diameter of bar in slabs shall not exceed
   a) 36 mm b) 32 mm c) 25 mm d) 40 mm

8) The minimum number of cross beams in a bridge should be
   a) 3 b) 5 c) 6 d) None of these

9) The minimum cement content for minor bridges is
   a) 250 kg/mm^3 b) 360 kg/mm^3 c) 400 kg/mm^3 d) 450 kg/mm^3

P.T.O.

10) Pigweed's curves are used to calculate
   a) Bending moment coefficients
   b) Load factor
   c) Impact factor
   d) Effective span

11) Load factor 'K' by Courbon's theory for uniform MI is given by

   a) $\frac{\sum W}{n}\left[1+\frac{neI_1X_1}{\sum I_iX_i^2}\right]$
   b) $\frac{\sum W}{n}\left[n+\frac{eX_1}{\sum X^2}\right]$
   c) $\frac{\sum W}{n}\left[1+\frac{neX_1}{\sum X^2}\right]$
   d) $\frac{\sum W}{n}\left[n+\frac{eI_1X_1}{\sum I_iX_i^2}\right]$

12) Aqua duct is the classification of bridge according to
   a) Material
   b) Function
   c) Type of superstructure
   d) Inter-span relationship

13) Culvert is the type of bridge whose span is
   a) Between 6 m – 60 m
   b) Above 60 m
   c) Less than 6 m
   d) None of these

14) For small bridges, with open foundations, the economical span is approximately equal to _____ time's height of Pier.
   a) 2.0 b) 1.2 c) 1.0 d) 1.5

15) 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

16) Expansion bearing allow
   a) Rotation only
   b) Translation only
   c) Both rotational as well as translation
   d) Restrict rotation as well as translation

17) Simply supported span requires
   a) Fixed bearing at both ends
   b) Expansion bearing at both ends
   c) Fixed bearing at one end and expansion bearing at the other
   d) Either a) or b), both are correct

18) Continuous girder requires
   a) Fixed bearing on all supports
   b) Expansion bearing on all supports
   c) Expansion bearing on all support except at one
   d) Fixed bearing on all support except at one

19) 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 support and fixed bearing at the two abutment

20) In case of curved bridges, suitable bearing is
   a) Fixed bearing
   b) Expansion bearing
   c) Rocker bearing
   d) Steel hinge

SLR-VB – 69

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : DESIGN OF BRIDGES

Day and Date : Saturday, 20-5-2017 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. 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. **3**

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 tacked 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 all the longitudinal girders. Use following additional data,
   a) Carriage way width – 9 m
   b) Span of bridge – 17 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 – 3.0 m
   g) Use M-30 concrete and Fe-415 steel. **13**

5. Write a note on : **(3.5×4=14)**
   a) Economic span length
   b) Selection of type of bridge
   c) Types of bridges
   d) Factors affecting location of piers and abutments.

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 = M20 concrete. **13**

7. Verify the suitability of abutment as shown in the Fig. 1. Use following data :
   Density of soil – 17.5 kN/m^3, Friction angle of soil ($\varnothing$) = 32°.
   Coefficient of friction – 0.6, Live load IRC class AA tracked. **13**

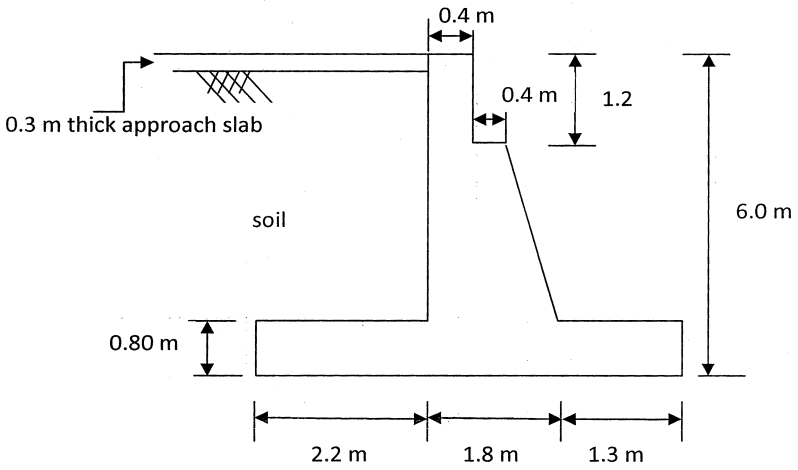

Fig. No. 1

8. A) Write in detail about various types of bearings with neat sketch. **8**
   B) Write a note on Expansion Joints. **5**

9. Write a note on following **(any four)** : **(3.5×4=14)**
   a) Types of bridge pier with their suitability
   b) Functions of bearing
   c) Approach slab
   d) Inspection of bridges
   e) Importance of bridge inspection.

SLR-VB – 69

Seat No.	

Set **R**

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : DESIGN OF BRIDGES

Day and Date : Saturday, 20-5-2017 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) *Solve* ***any three*** *questions* ***each*** *from Section –* ***I*** *and Section –* ***II****.*
3) *Figures to the* ***right*** *indicates* ***full*** *marks.*
4) *Assume suitable data* ***if necessary*** *and mention* ***it clearly****.*
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) Expansion bearing allow
   a) Rotation only
   b) Translation only
   c) Both rotational as well as translation
   d) Restrict rotation as well as translation

2) Simply supported span requires
   a) Fixed bearing at both ends
   b) Expansion bearing at both ends
   c) Fixed bearing at one end and expansion bearing at the other
   d) Either a) or b), both are correct

3) Continuous girder requires
   a) Fixed bearing on all supports
   b) Expansion bearing on all supports
   c) Expansion bearing on all support except at one
   d) Fixed bearing on all support except at one

4) 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 support and fixed bearing at the two abutment

5) In case of curved bridges, suitable bearing is
   a) Fixed bearing
   b) Expansion bearing
   c) Rocker bearing
   d) Steel hinge

6) Following is not type of Expansion bearing
   a) Sliding plate beam
   b) Steel roller-cum-rocker bearing
   c) Elastomeric bearing
   d) Rocker bearing

7) Maximum allowable percentage elongation of elastomeric bearing is
   a) 300 b) 200 c) 400 d) 500

8) 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

9) Braking force is taken as _____ of the design vehicle load.
   a) 0.2 b) 0.4 c) 0.6 d) 0.8

10) 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

11) Pigeaud's theory is used to calculate
   a) Bending moment b) Load factor
   c) Effective span d) Impact factor

12) As per crack control criteria of IRC-21, the diameter of bar in slabs shall not exceed
   a) 36 mm b) 32 mm c) 25 mm d) 40 mm

13) The minimum number of cross beams in a bridge should be
   a) 3 b) 5 c) 6 d) None of these

14) The minimum cement content for minor bridges is
   a) 250 kg/mm^3 b) 360 kg/mm^3 c) 400 kg/mm^3 d) 450 kg/mm^3

15) Pigweed's curves are used to calculate
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16) Load factor 'K' by Courbon's theory for uniform MI is given by

   a) $\frac{\sum W}{n}\left[1+\frac{nel_1X_1}{\sum I_iX_i^2}\right]$ b) $\frac{\sum W}{n}\left[n+\frac{eX_1}{\sum X^2}\right]$

   c) $\frac{\sum W}{n}\left[1+\frac{neX_1}{\sum X^2}\right]$ d) $\frac{\sum W}{n}\left[n+\frac{el_1X_1}{\sum I_iX_i^2}\right]$

17) Aqua duct is the classification of bridge according to
   a) Material b) Function
   c) Type of superstructure d) Inter-span relationship

18) Culvert is the type of bridge whose span is
   a) Between 6 m – 60 m b) Above 60 m
   c) Less than 6 m d) None of these

19) For small bridges, with open foundations, the economical span is approximately equal to _____ time's height of Pier.
   a) 2.0 b) 1.2 c) 1.0 d) 1.5

20) 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

_____

SLR-VB – 69

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : DESIGN OF BRIDGES

Day and Date : Saturday, 20-5-2017 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. 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. **3**

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 tacked 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 all the longitudinal girders. Use following additional data,
   a) Carriage way width – 9 m
   b) Span of bridge – 17 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 – 3.0 m
   g) Use M-30 concrete and Fe-415 steel. **13**

5. Write a note on : **(3.5×4=14)**
   a) Economic span length
   b) Selection of type of bridge
   c) Types of bridges
   d) Factors affecting location of piers and abutments.

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 = M20 concrete. **13**

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   Density of soil – 17.5 kN/m^3, Friction angle of soil ($\varnothing$) = 32°.
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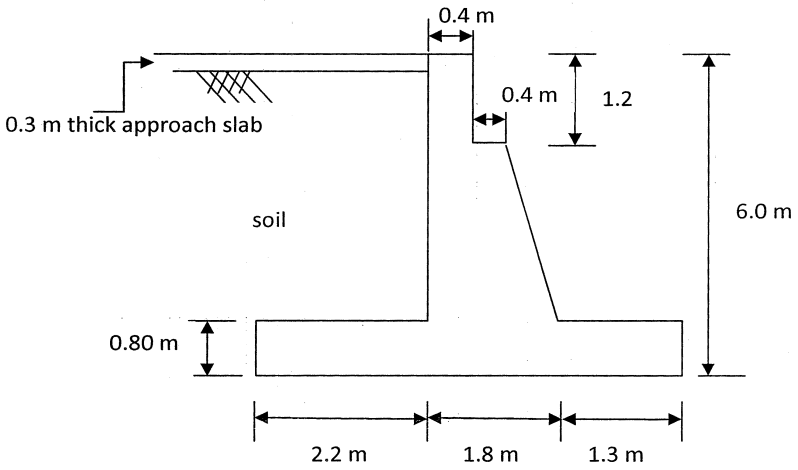

Fig. No. 1

8. A) Write in detail about various types of bearings with neat sketch. **8**
   B) Write a note on Expansion Joints. **5**

9. Write a note on following **(any four)** : **(3.5×4=14)**
   a) Types of bridge pier with their suitability
   b) Functions of bearing
   c) Approach slab
   d) Inspection of bridges
   e) Importance of bridge inspection.

SLR-VB – 69

Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : DESIGN OF BRIDGES

Day and Date : Saturday, 20-5-2017 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) *Solve **any three** questions **each** from Section – **I** and Section – **II**.*
3) *Figures to the **right** indicates **full** marks.*
4) *Assume suitable data **if necessary** and mention **it clearly**.*
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) Load factor 'K' by Courbon's theory for uniform MI is given by

a) $\frac{\sum W}{n}\left[1+\frac{neI_1X_1}{\sum I_iX_i^2}\right]$ b) $\frac{\sum W}{n}\left[n+\frac{eX_1}{\sum X^2}\right]$

c) $\frac{\sum W}{n}\left[1+\frac{neX_1}{\sum X^2}\right]$ d) $\frac{\sum W}{n}\left[n+\frac{eI_1X_1}{\sum I_iX_i^2}\right]$

2) Aqua duct is the classification of bridge according to
   a) Material b) Function
   c) Type of superstructure d) Inter-span relationship

3) Culvert is the type of bridge whose span is
   a) Between 6 m – 60 m b) Above 60 m
   c) Less than 6 m d) None of these

4) For small bridges, with open foundations, the economical span is approximately equal to _____ time's height of Pier.
   a) 2.0 b) 1.2 c) 1.0 d) 1.5

5) 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

6) Expansion bearing allow
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7) Simply supported span requires
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P.T.O.

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   c) Expansion bearing on all supports
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10) In case of curved bridges, suitable bearing is
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17) As per crack control criteria of IRC-21, the diameter of bar in slabs shall not exceed
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   a) Bending moment coefficients
   b) Load factor
   c) Impact factor
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_____

SLR-VB – 69

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – II : DESIGN OF BRIDGES

Day and Date : Saturday, 20-5-2017 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.*
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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**
   B) What is the importance of subsoil exploration in the design of major bridges ? List the data to be obtained from such explorations. **5**
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   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 tacked is used. **13**

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   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. Write a note on : **(3.5×4=14)**
   a) Economic span length
   b) Selection of type of bridge
   c) Types of bridges
   d) Factors affecting location of piers and abutments.

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 = M20 concrete. **13**

7. Verify the suitability of abutment as shown in the Fig. 1. Use following data :
   Density of soil – 17.5 kN/m^3, Friction angle of soil ($\varnothing$) = 32°.
   Coefficient of friction – 0.6, Live load IRC class AA tracked. **13**

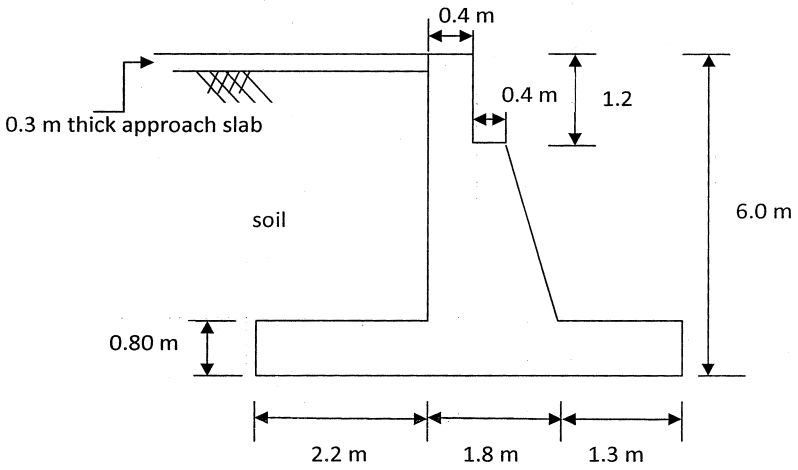

Fig. No. 1

8. A) Write in detail about various types of bearings with neat sketch. **8**
   B) Write a note on Expansion Joints. **5**

9. Write a note on following **(any four)** : **(3.5×4=14)**
   a) Types of bridge pier with their suitability
   b) Functions of bearing
   c) Approach slab
   d) Inspection of bridges
   e) Importance of bridge inspection.

SLR-VB – 70

Seat No.	

Set P

B.E. (Civil) (Part – II) Examination, 2017
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Tuesday, 23-05-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Solve **any two** questions from **each** Section.*
2) *Figures to the **right** indicates **full** marks.*
3) *Use of non-programmable **scientific** calculator is allowed.*
4) *Assume suitable data **if** necessary and **clearly** mention it.*
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 alternatives :

i) For an encased beam, the loading is carried by **1**
   a) Steel section only
   b) Concrete section = 50 percent
   c) Concrete section only
   d) None of the above

ii) The effect of concrete encased of beam is considered for **1**
   a) Increasing the area
   b) Increasing the ry(ry = minor axis)
   c) Increasing the rx(rx = major axis)
   d) No increase in any parameter

iii) Coefficient of dynamic augmentation is applied to account for **1**
   a) Wind force
   b) Seismic forces
   c) Impact of live loads
   d) Racking forces

iv) Sliding plate bearings are suitable for **1**
   a) Spans less than 10 m
   b) Spans over 50 m
   c) Suspension bridges
   d) None of the above

v) The plastic hinge in the member is assumed **1**
   a) When the material in a section reaches the plastic stage
   b) When all fibres in a section reach the yield stress
   c) When the extreme fibre in a section reaches the yield stress
   d) None of the above

vi) The design of a structure which is based on the static method of plastic analysis **1**
   a) Is safe
   b) Is unsafe
   c) Gives no indication of safety
   d) Depends on the mechanism

P.T.O.

vii) The plastic modulus of square section of side D is given by **2**

a) D3/3 b) D3/4 c) D3/6 d) D3/9

viii) The number of possible independent mechanism, n is defined from the following relationship **1**

a) n = (N – r) b) n = (N + r) c) n = (2N – r) d) n = (2N + r)

ix) The collapse load for a cantilever beam subjected to a point load at free end is **1**

a) 2 Mp/L b) Mp/L c) 1.5 Mp/L d) None of the above

x) The shape factor for L section having flange 100 × 10 mm and web 120 × 12 mm is **3**

a) 1.4 b) 1.7

c) 1.15 d) None of the above

xi) The design criterion for plastic design of beams is **1**

a) Mp $\geq$ Mu b) Mp $\geq$ (load factor X Mu)

c) Z.Fyp $\leq$ Mu d) None of the above

xii) The effective width 'b' for a light gauge steel plate is given by **2**

a) $b = 0.9\ t(E/Fy)^{½}$ b) $b = 1.9\ t(E/Fy)^{½}$

c) $b = 2.9\ t(E/Fy)^{½}$ d) $b = 3.9\ t(E/Fy)^{½}$

xiii) 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

xiv) The load factor in plastic design/ultimate strength design can be approximately equal to **1**

a) Ratio of ultimate load to the working load

b) Ratio of plastic load to working load

c) Ratio of limit load to working load

d) Ratio of overload to admissible load

xv) 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

xvi) Which of the following bearings has a lowest coefficient of friction ? **1**

a) Roller bearing

b) Sliding steel on steel

c) Sliding steel on ferrobestos

d) All of the above

SLR-VB – 70

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Tuesday, 23-05-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any two** questions from **each** Section.*
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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 24 m 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 U_2U_3, U_2L_3, U_4L_4 and L_2L_3. And design U_2L_3 by assuming impact factor to be 15%. **20**

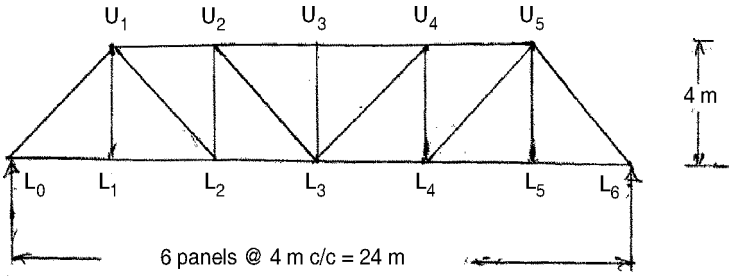

Fig. 1

3. Determine the moments at the ends of the columns and beams in a building frame as shown in Fig. 2 by factor method. **20**

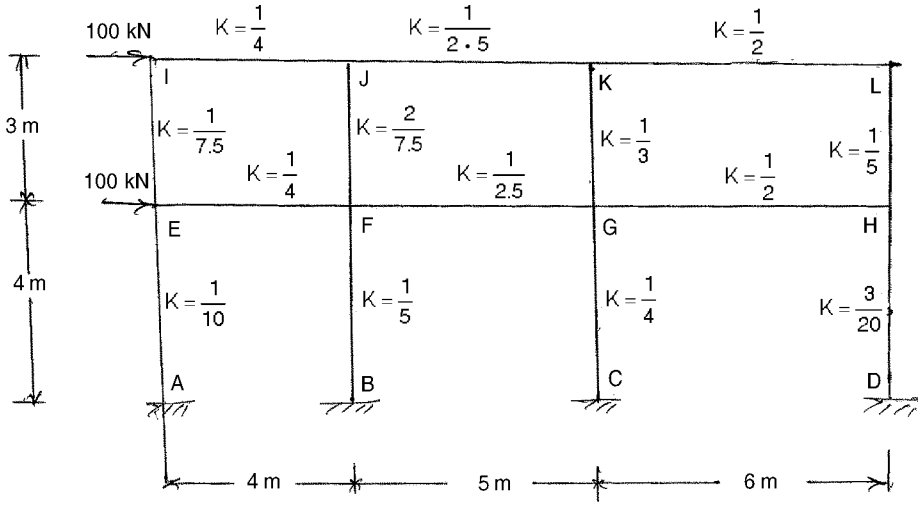

Fig. 2

Set P

4. Two channels 200 mm × 80 mm with bent lips are connected with webs to act as a beam as shown in Fig. 3. The thickness of the plate is 2.5 mm and the depth of the lip is 25 mm. The beam has effective span of 4 m. Determine the allowable load per meter on the beam. Also determine the deflection at the allowable load. The steel has yield point of 235 MPa. Take $E = 2 \times 10^5$ N/mm^2. **20**

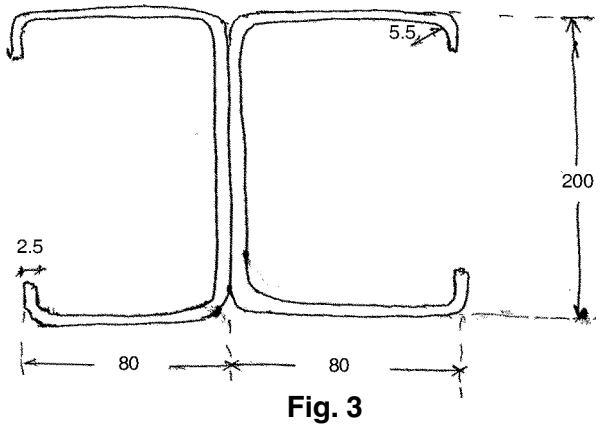

Fig. 3

SECTION – II

5. A propped cantilever carries a uniformly distributed load w over span L. Determine ultimate collapse load Wu, if the plastic moment capacity of the beam is Mp. Use static as well as kinematic method. **20**

6. A portal frame is loaded upto collapse as shown in Fig. 4. Find the value of fully plastic moment of the frame if it is uniform section throughout. Also plot the bending moment diagram. **20**

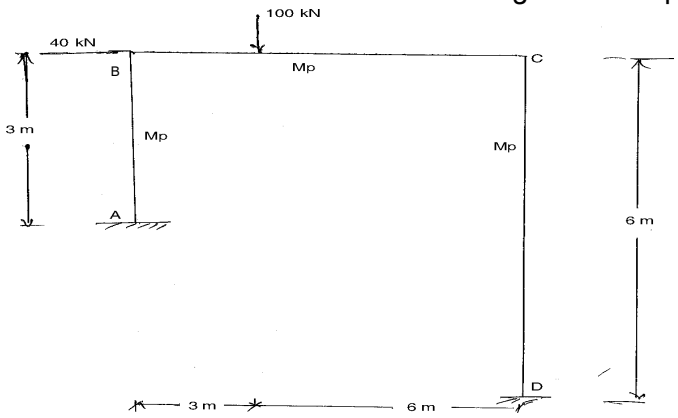

Fig. 4

7. a) A column 4.5 m in length is adequately restrained in position but not restrained in direction at both ends. It consists of ISWB 200 @ 28,8 Kg/m and is encased in M15 concrete, with a cover of 50 mm on all sides. Determine the safe load which the column can carry. Take Fy = 250 MPa. **10**

   b) An encased beam consisting of I joist has an effective span of 9 m and carries UDL of 32 kN/m, inclusive of self weight. The ends of the beam are restrained against torsion with no restraints provided laterally anywhere. Design the encased beam. Take fy = 250 N/mm^2. **10**

———————

Set P

SLR-VB – 70

Seat No.	

Set **Q**

B.E. (Civil) (Part – II) Examination, 2017
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Tuesday, 23-05-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 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

1. Choose the correct alternatives :

i) The plastic hinge in the member is assumed **1**
   a) When the material in a section reaches the plastic stage
   b) When all fibres in a section reach the yield stress
   c) When the extreme fibre in a section reaches the yield stress
   d) None of the above

ii) The design of a structure which is based on the static method of plastic analysis **1**
   a) Is safe b) Is unsafe
   c) Gives no indication of safety d) Depends on the mechanism

iii) The plastic modulus of square section of side D is given by **2**
   a) D3/3 b) D3/4 c) D3/6 d) D3/9

iv) The number of possible independent mechanism, n is defined from the following relationship **1**
   a) n = (N – r) b) n = (N + r) c) n = (2N – r) d) n = (2N + r)

v) The collapse load for a cantilever beam subjected to a point load at free end is **1**
   a) 2 Mp/L b) Mp/L c) 1.5 Mp/L d) None of the above

vi) The shape factor for L section having flange 100 × 10 mm and web 120 × 12 mm is **3**
   a) 1.4 b) 1.7
   c) 1.15 d) None of the above

vii) The design criterion for plastic design of beams is **1**
   a) Mp $\geq$ Mu b) Mp $\geq$ (load factor X Mu)
   c) Z.Fyp $\leq$ Mu d) None of the above

P.T.O.

viii) 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) $b = 3.9\ t(E/Fy)^{1/2}$

ix) 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

x) The load factor in plastic design/ultimate strength design can be approximately equal to **1**

a) Ratio of ultimate load to the working load

b) Ratio of plastic load to working load

c) Ratio of limit load to working load

d) Ratio of overload to admissible load

xi) 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

xii) Which of the following bearings has a lowest coefficient of friction ? **1**

a) Roller bearing

b) Sliding steel on steel

c) Sliding steel on ferrobestos

d) All of the above

xiii) For an encased beam, the loading is carried by **1**

a) Steel section only b) Concrete section = 50 percent

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xiv) The effect of concrete encased of beam is considered for **1**

a) Increasing the area b) Increasing the ry(ry = minor axis)

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xv) Coefficient of dynamic augmentation is applied to account for **1**

a) Wind force b) Seismic forces

c) Impact of live loads d) Racking forces

xvi) Sliding plate bearings are suitable for **1**

a) Spans less than 10 m b) Spans over 50 m

c) Suspension bridges d) None of the above

SLR-VB – 70

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Tuesday, 23-05-2017 Marks : 80
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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 24 m 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 U_2U_3, U_2L_3, U_4L_4 and L_2L_3. And design U_2L_3 by assuming impact factor to be 15%. **20**

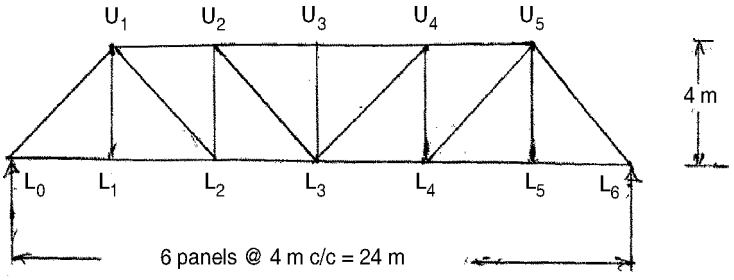

Fig. 1

3. Determine the moments at the ends of the columns and beams in a building frame as shown in Fig. 2 by factor method. **20**

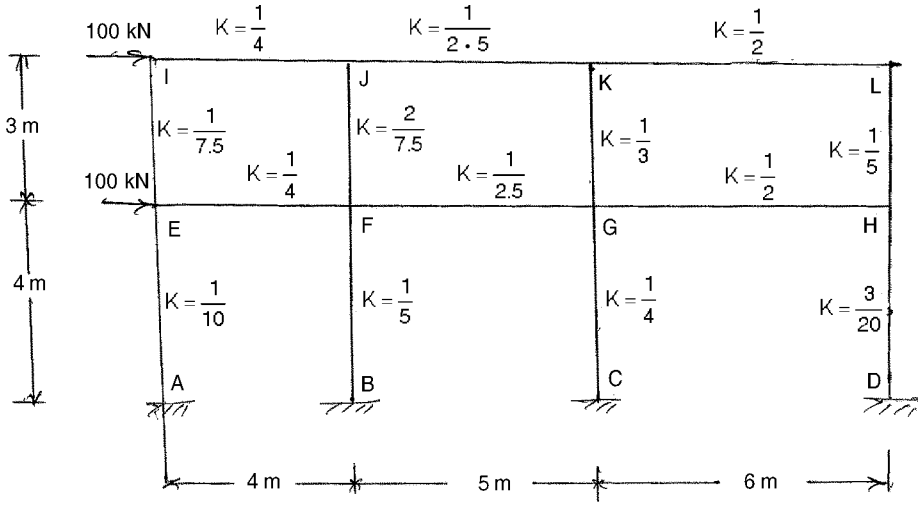

Fig. 2

Set Q

4. Two channels 200 mm × 80 mm with bent lips are connected with webs to act as a beam as shown in Fig. 3. The thickness of the plate is 2.5 mm and the depth of the lip is 25 mm. The beam has effective span of 4 m. Determine the allowable load per meter on the beam. Also determine the deflection at the allowable load. The steel has yield point of 235 MPa. Take $E = 2 \times 10^5$ N/mm^2. **20**

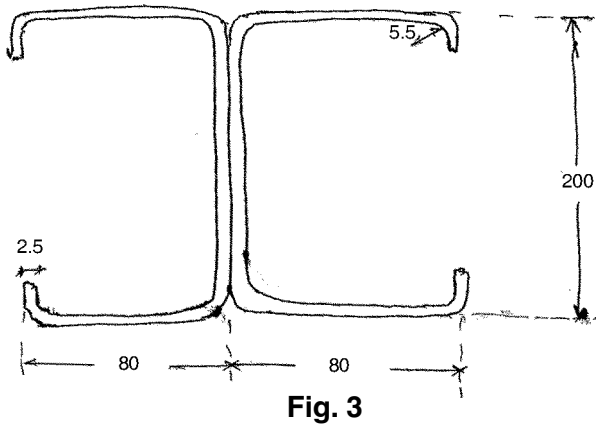

Fig. 3

SECTION – II

5. A propped cantilever carries a uniformly distributed load w over span L. Determine ultimate collapse load Wu, if the plastic moment capacity of the beam is Mp. Use static as well as kinematic method. **20**

6. A portal frame is loaded upto collapse as shown in Fig. 4. Find the value of fully plastic moment of the frame if it is uniform section throughout. Also plot the bending moment diagram. **20**

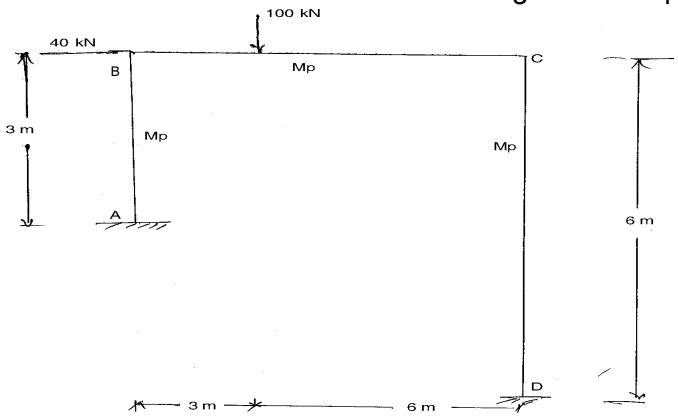

Fig. 4

7. a) A column 4.5 m in length is adequately restrained in position but not restrained in direction at both ends. It consists of ISWB 200 @ 28,8 Kg/m and is encased in M15 concrete, with a cover of 50 mm on all sides. Determine the safe load which the column can carry. Take Fy = 250 MPa. **10**

   b) An encased beam consisting of I joist has an effective span of 9 m and carries UDL of 32 kN/m, inclusive of self weight. The ends of the beam are restrained against torsion with no restraints provided laterally anywhere. Design the encased beam. Take fy = 250 N/mm^2. **10**

———————

Set Q

SLR-VB – 70

Seat No.	

Set **R**

B.E. (Civil) (Part – II) Examination, 2017
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Tuesday, 23-05-2017 Max. Marks : 100
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives :

i) The collapse load for a cantilever beam subjected to a point load at free end is **1**
   a) 2 Mp/L b) Mp/L c) 1.5 Mp/L d) None of the above

ii) The shape factor for L section having flange 100 × 10 mm and web 120 × 12 mm is **3**
   a) 1.4 b) 1.7
   c) 1.15 d) None of the above

iii) The design criterion for plastic design of beams is **1**
   a) Mp $\geq$ Mu b) Mp $\geq$ (load factor X Mu)
   c) Z.Fyp $\leq$ Mu d) None of the above

iv) 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) $b = 3.9\ t(E/Fy)^{1/2}$

v) 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

vi) The load factor in plastic design/ultimate strength design can be approximately equal to **1**
   a) Ratio of ultimate load to the working load
   b) Ratio of plastic load to working load
   c) Ratio of limit load to working load
   d) Ratio of overload to admissible load

P.T.O.

vii) The bending moment at a plastic hinge is **1**

a) Equal to zero
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SLR-VB – 70

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
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Day and Date : Tuesday, 23-05-2017 Marks : 80
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SECTION – I

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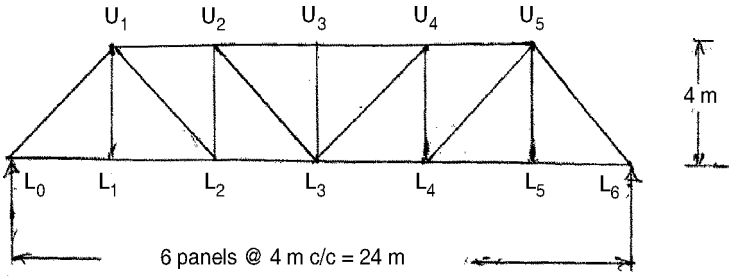

Fig. 1

3. Determine the moments at the ends of the columns and beams in a building frame as shown in Fig. 2 by factor method. **20**

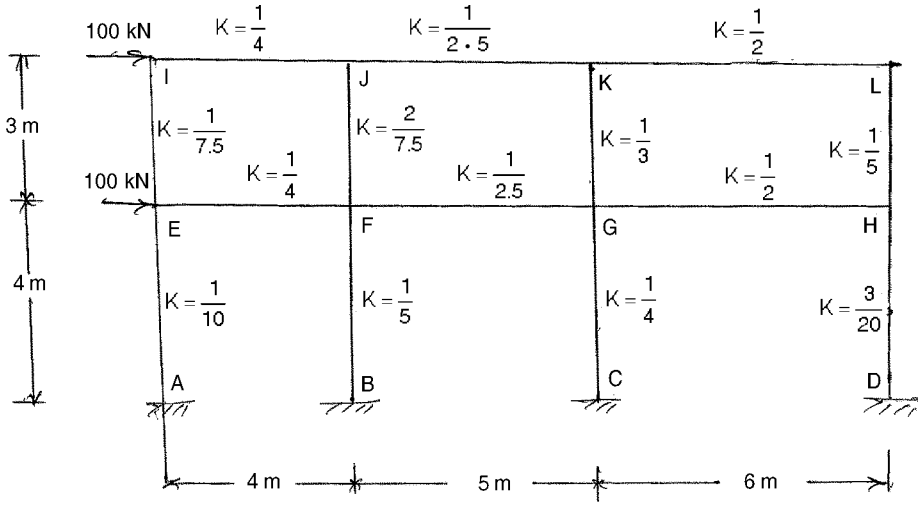

Fig. 2

Set R

4. Two channels 200 mm × 80 mm with bent lips are connected with webs to act as a beam as shown in Fig. 3. The thickness of the plate is 2.5 mm and the depth of the lip is 25 mm. The beam has effective span of 4 m. Determine the allowable load per meter on the beam. Also determine the deflection at the allowable load. The steel has yield point of 235 MPa. Take $E = 2 \times 10^5$ N/mm^2. **20**

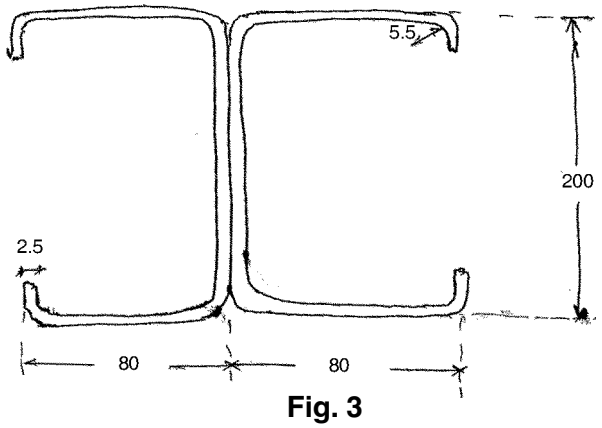

Fig. 3

SECTION – II

5. A propped cantilever carries a uniformly distributed load w over span L. Determine ultimate collapse load Wu, if the plastic moment capacity of the beam is Mp. Use static as well as kinematic method. **20**

6. A portal frame is loaded upto collapse as shown in Fig. 4. Find the value of fully plastic moment of the frame if it is uniform section throughout. Also plot the bending moment diagram. **20**

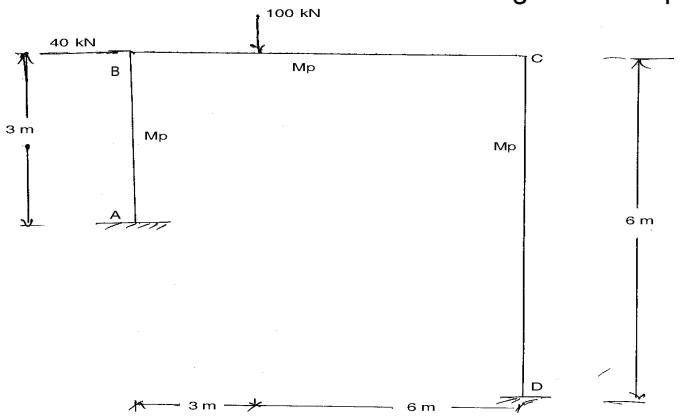

Fig. 4

7. a) A column 4.5 m in length is adequately restrained in position but not restrained in direction at both ends. It consists of ISWB 200 @ 28,8 Kg/m and is encased in M15 concrete, with a cover of 50 mm on all sides. Determine the safe load which the column can carry. Take Fy = 250 MPa. **10**

   b) An encased beam consisting of I joist has an effective span of 9 m and carries UDL of 32 kN/m, inclusive of self weight. The ends of the beam are restrained against torsion with no restraints provided laterally anywhere. Design the encased beam. Take fy = 250 N/mm^2. **10**

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SLR-VB – 70

Seat No.	

Set S

B.E. (Civil) (Part – II) Examination, 2017
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Tuesday, 23-05-2017 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 alternatives :

i) 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

ii) The load factor in plastic design/ultimate strength design can be approximately equal to **1**
   a) Ratio of ultimate load to the working load
   b) Ratio of plastic load to working load
   c) Ratio of limit load to working load
   d) Ratio of overload to admissible load

iii) 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

iv) Which of the following bearings has a lowest coefficient of friction ? **1**
   a) Roller bearing
   b) Sliding steel on steel
   c) Sliding steel on ferrobestos
   d) All of the above

P.T.O.

v) For an encased beam, the loading is carried by **1**

a) Steel section only b) Concrete section = 50 percent

c) Concrete section only d) None of the above

vi) The effect of concrete encased of beam is considered for **1**

a) Increasing the area b) Increasing the ry(ry = minor axis)

c) Increasing the rx(rx = major axis) d) No increase in any parameter

vii) Coefficient of dynamic augmentation is applied to account for **1**

a) Wind force b) Seismic forces

c) Impact of live loads d) Racking forces

viii) Sliding plate bearings are suitable for **1**

a) Spans less than 10 m b) Spans over 50 m

c) Suspension bridges d) None of the above

ix) The plastic hinge in the member is assumed **1**

a) When the material in a section reaches the plastic stage

b) When all fibres in a section reach the yield stress

c) When the extreme fibre in a section reaches the yield stress

d) None of the above

x) The design of a structure which is based on the static method of plastic analysis **1**

a) Is safe b) Is unsafe

c) Gives no indication of safety d) Depends on the mechanism

xi) The plastic modulus of square section of side D is given by **2**

a) D3/3 b) D3/4 c) D3/6 d) D3/9

xii) The number of possible independent mechanism, n is defined from the following relationship **1**

a) n = (N – r) b) n = (N + r) c) n = (2N – r) d) n = (2N + r)

xiii) The collapse load for a cantilever beam subjected to a point load at free end is **1**

a) 2 Mp/L b) Mp/L c) 1.5 Mp/L d) None of the above

xiv) The shape factor for L section having flange 100 × 10 mm and web 120 × 12 mm is **3**

a) 1.4 b) 1.7

c) 1.15 d) None of the above

xv) The design criterion for plastic design of beams is **1**

a) Mp $\geq$ Mu b) Mp $\geq$ (load factor X Mu)

c) Z.Fyp $\leq$ Mu d) None of the above

xvi) 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) $b = 3.9\ t(E/Fy)^{1/2}$

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
ADVANCED DESIGN OF STEEL STRUCTURES (Elective – III)

Day and Date : Tuesday, 23-05-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Solve **any two** questions from **each** Section.*
*2) Figures to the **right** indicates **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 24 m 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 U_2U_3, U_2L_3, U_4L_4 and L_2L_3. And design U_2L_3 by assuming impact factor to be 15%. **20**

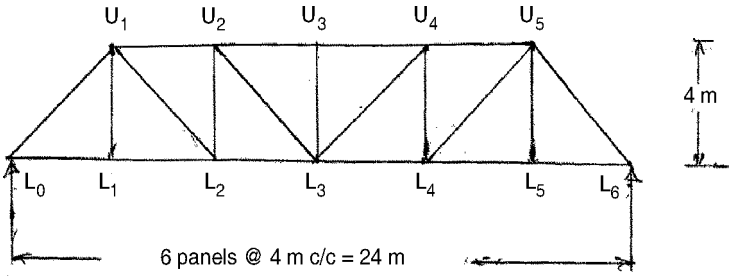

Fig. 1

3. Determine the moments at the ends of the columns and beams in a building frame as shown in Fig. 2 by factor method. **20**

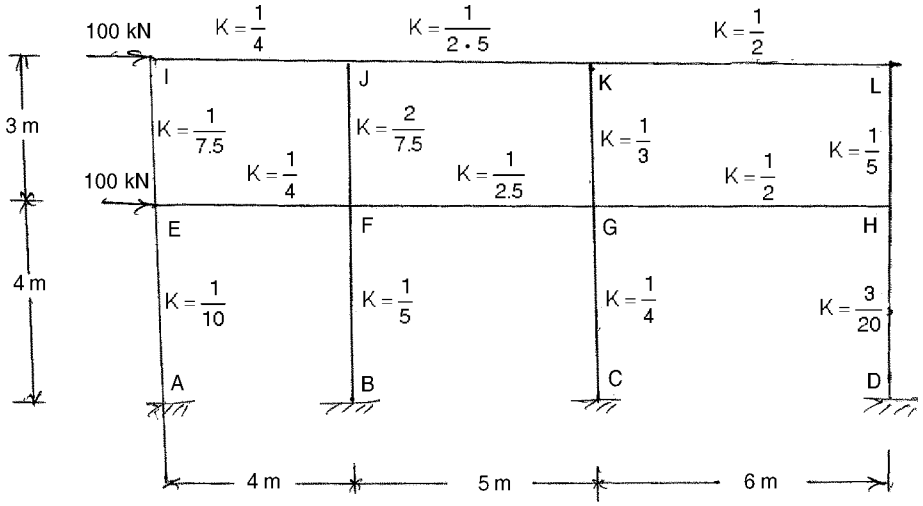

Fig. 2

Set S

4. Two channels 200 mm × 80 mm with bent lips are connected with webs to act as a beam as shown in Fig. 3. The thickness of the plate is 2.5 mm and the depth of the lip is 25 mm. The beam has effective span of 4 m. Determine the allowable load per meter on the beam. Also determine the deflection at the allowable load. The steel has yield point of 235 MPa. Take $E = 2 \times 10^5$ N/mm^2. **20**

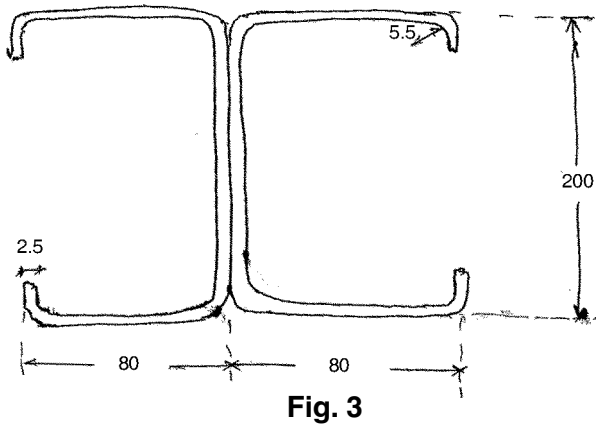

Fig. 3

SECTION – II

5. A propped cantilever carries a uniformly distributed load w over span L. Determine ultimate collapse load Wu, if the plastic moment capacity of the beam is Mp. Use static as well as kinematic method. **20**

6. A portal frame is loaded upto collapse as shown in Fig. 4. Find the value of fully plastic moment of the frame if it is uniform section throughout. Also plot the bending moment diagram. **20**

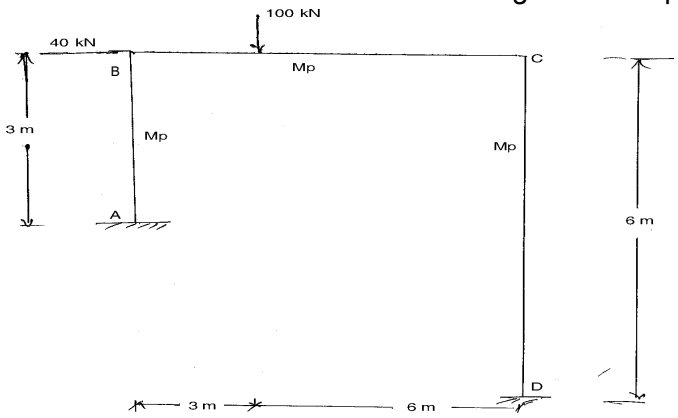

Fig. 4

7. a) A column 4.5 m in length is adequately restrained in position but not restrained in direction at both ends. It consists of ISWB 200 @ 28,8 Kg/m and is encased in M15 concrete, with a cover of 50 mm on all sides. Determine the safe load which the column can carry. Take Fy = 250 MPa. **10**

   b) An encased beam consisting of I joist has an effective span of 9 m and carries UDL of 32 kN/m, inclusive of self weight. The ends of the beam are restrained against torsion with no restraints provided laterally anywhere. Design the encased beam. Take fy = 250 N/mm^2. **10**

———————

Set S

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Seat No.	

Set **P**

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Tuesday, 23-5-2017 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 to the* ***right*** *indicate* ***full*** *marks.*
4) *Assume suitable data* ***wherever*** *necessary and mention it* ***clearly****.*
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 performance of trickling filter depends upon
   a) Settling velocity b) Organic and hydraulic loading
   c) Digestion d) Approach velocity

2) Wasting of sludge controls the _____ time.
   a) Detention b) Hydraulic retention
   c) Mean cell residence d) Volumetric loading

3) _____ may cause due to presence of toxic substance, insufficient aeration, frequent shock loading and excessive rate of supply of substrate.
   a) Stabilization b) Biosorption c) Zone settling d) Sludge bulking

4) _____ improves the drainability of digested sludge by addition of coagulants.
   a) Conditioning b) Thickening c) Dewatering d) Incineration

5) The treatability of an industrial waste is assessed by conducting laboratory test on
   a) N/P ratio b) BOD/COD ratio
   c) BOD/SS ratio d) COD/pH ratio

6) The _____ phase of microorganisms are forced to oxidize for energy.
   a) endogenous growth b) log growth
   c) declining growth d) all of above

7) The biodegradable organics deposited at the bed of stream undergoes _____ decomposition.
   a) Aerobic b) Anaerobic c) Inorganic d) Photosynthesis

8) Malt making and Brewing is one of the process of _____ Industry.
   a) pulp and paper b) sugar industry
   c) distillery industry d) dairy industry

9) _____ constant varies with temperature for effluent waste.
   a) DO saturation b) Ultimate BOD c) Reaeration d) Deoxygenation

10) _____ is suggested for removal of strong colour in pulp and paper industry.
   a) Chemical recovery b) Biological treatment
   c) Lime treatment d) Sedimentation

11) _____ is the process in which nitrates are reduced to nitrogen gas by anaerobic bacteria.
   a) Denitrification b) Oxidation c) Biosorption d) Nitrification

12) _____ chemicals are used in process of chemical oxidation to reduce the BOD loading.
   a) Chlorine and silver b) Chlorine and ozone
   c) Silver and ozone d) Chlorine

13) Carbohydrates and proteins from brewery industries are treated by _____ recovery.
   a) By-product b) Process change
   c) Equalization and proportioning d) Segregation

14) In bleaching operation oxidizing chemical like _____ remove natural coloring materials.
   a) Lime b) Ferrous sulphate
   c) Chromium d) Hypochlorites

15) The _____ residue of sugar mill house is known as bagasses.
   a) Molasses b) Cellulosic c) Fibrous d) Tanned

16) Mercerizing is a process to improve the strength, elasticity, luster of cloth by adding _____ chemical.
   a) Sodium chloride b) Caustic soda
   c) Sodium sulphate d) Sodium nitrate

17) Phosphate removal in aeration tank is accomplished by
   a) Air stripping b) Thermal reduction
   c) Ion exchange d) Chemical precipitation

18) Pulp and paper industry contains presence of lignin derived from _____ material.
   a) Fibrous b) Tanning c) Cellulosic d) Pasteurization

19) Aerobic condition in effluent treatment can be achieved by the use of
   a) dissolved oxygen b) diffused aeration
   c) coagulation d) sludge control

20) _____ is a convenient device for measuring flow in a sewer.
   a) Parshall flume b) Thermometer c) Manometer d) Water meter

_____

SLR-VB – 71

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Tuesday, 23-5-2017 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) *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) Enlist various methods of waste strength reduction. Explain any one in details. **8**

   b) Mention the water quality criteria for fresh water classification. **6**

3. a) A city is discharges 125 cumecs of sewage in a river which is fully saturated with oxygen and flows at minimum rate of 1600 cumecs with a minimum velocity of 0.12 m/sec. if the 5-day BOD of sewage is 300 mg/l, find out where critical DO will occur in river. Assume coefficient of purification (f_s) of river as 4.0 and coefficient of DO as 0.11 and ultimate BOD as 125% of 5 day BOD of the mixture of sewage and river stream. **9**

   b) Explain self purification capacity of stream. **5**

4. a) Explain any one physio-chemical process treatment for removal of dissolved inorganic material. **6**

   b) Discuss the various methods of neutralization of alkaline wastes. **7**

5. Write short note on :

   I) Treatment of removal of color from wastewater. **5**

   II) Relative stability. **4**

   III) Equilization. **4**

Set P

SECTION – II

6. a) Mention the pollution characteristics of industrial wastes and suggest treatment methods for any four industries. **8**

   b) Mention any four industries and also generates toxic chemicals. **4**

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

   a) Dairy industry **7**

   b) Pulp and paper industry. **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) Operation and maintenance requirement.

   II) Effects of tannery waste on receiving stream.

SLR-VB – 71

Seat No.	

Set Q

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Tuesday, 23-5-2017 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 to the* ***right*** *indicate* ***full*** *marks.*
4) *Assume suitable data* ***wherever*** *necessary and mention it* ***clearly****.*
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) Mercerizing is a process to improve the strength, elasticity, luster of cloth by adding _____ chemical.
   a) Sodium chloride b) Caustic soda
   c) Sodium sulphate d) Sodium nitrate

2) Phosphate removal in aeration tank is accomplished by
   a) Air stripping b) Thermal reduction
   c) Ion exchange d) Chemical precipitation

3) Pulp and paper industry contains presence of lignin derived from _____ material.
   a) Fibrous b) Tanning c) Cellulosic d) Pasteurization

4) Aerobic condition in effluent treatment can be achieved by the use of
   a) dissolved oxygen b) diffused aeration
   c) coagulation d) sludge control

5) _____ is a convenient device for measuring flow in a sewer.
   a) Parshall flume b) Thermometer c) Manometer d) Water meter

6) The performance of trickling filter depends upon
   a) Settling velocity b) Organic and hydraulic loading
   c) Digestion d) Approach velocity

7) Wasting of sludge controls the _____ time.
   a) Detention b) Hydraulic retention
   c) Mean cell residence d) Volumetric loading

8) _____ may cause due to presence of toxic substance, insufficient aeration, frequent shock loading and excessive rate of supply of substrate.
a) Stabilization b) Biosorption c) Zone settling d) Sludge bulking

9) _____ improves the drainability of digested sludge by addition of coagulants.
a) Conditioning b) Thickening c) Dewatering d) Incineration

10) The treatability of an industrial waste is assessed by conducting laboratory test on
a) N/P ratio b) BOD/COD ratio
c) BOD/SS ratio d) COD/pH ratio

11) The _____ phase of microorganisms are forced to oxidize for energy.
a) endogenous growth b) log growth
c) declining growth d) all of above

12) The biodegradable organics deposited at the bed of stream undergoes _____ decomposition.
a) Aerobic b) Anaerobic c) Inorganic d) Photosynthesis

13) Malt making and Brewing is one of the process of _____ Industry.
a) pulp and paper b) sugar industry
c) distillery industry d) dairy industry

14) _____ constant varies with temperature for effluent waste.
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15) _____ is suggested for removal of strong colour in pulp and paper industry.
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c) Lime treatment d) Sedimentation

16) _____ is the process in which nitrates are reduced to nitrogen gas by anaerobic bacteria.
a) Denitrification b) Oxidation c) Biosorption d) Nitrification

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a) Chlorine and silver b) Chlorine and ozone
c) Silver and ozone d) Chlorine

18) Carbohydrates and proteins from brewery industries are treated by _____ recovery.
a) By-product b) Process change
c) Equalization and proportioning d) Segregation

19) In bleaching operation oxidizing chemical like _____ remove natural coloring materials.
a) Lime b) Ferrous sulphate
c) Chromium d) Hypochlorites

20) The _____ residue of sugar mill house is known as bagasses.
a) Molasses b) Cellulosic c) Fibrous d) Tanned

_____

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Tuesday, 23-5-2017 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) Enlist various methods of waste strength reduction. Explain any one in details. **8**

   b) Mention the water quality criteria for fresh water classification. **6**

3. a) A city is discharges 125 cumecs of sewage in a river which is fully saturated with oxygen and flows at minimum rate of 1600 cumecs with a minimum velocity of 0.12 m/sec. if the 5-day BOD of sewage is 300 mg/l, find out where critical DO will occur in river. Assume coefficient of purification (f_s) of river as 4.0 and coefficient of DO as 0.11 and ultimate BOD as 125% of 5 day BOD of the mixture of sewage and river stream. **9**

   b) Explain self purification capacity of stream. **5**

4. a) Explain any one physio-chemical process treatment for removal of dissolved inorganic material. **6**

   b) Discuss the various methods of neutralization of alkaline wastes. **7**

5. Write short note on :

   I) Treatment of removal of color from wastewater. **5**

   II) Relative stability. **4**

   III) Equilization. **4**

Set Q

SECTION – II

6. a) Mention the pollution characteristics of industrial wastes and suggest treatment methods for any four industries. **8**

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9. Write short note on : **14**

   I) Operation and maintenance requirement.

   II) Effects of tannery waste on receiving stream.

SLR-VB – 71

Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Tuesday, 23-5-2017 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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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) _____ is the process in which nitrates are reduced to nitrogen gas by anaerobic bacteria.
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19) _____ constant varies with temperature for effluent waste.
   a) DO saturation b) Ultimate BOD c) Reaeration d) Deoxygenation

20) _____ is suggested for removal of strong colour in pulp and paper industry.
   a) Chemical recovery b) Biological treatment
   c) Lime treatment d) Sedimentation

_____

SLR-VB – 71

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Tuesday, 23-5-2017 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) Enlist various methods of waste strength reduction. Explain any one in details. **8**

   b) Mention the water quality criteria for fresh water classification. **6**

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   b) Explain self purification capacity of stream. **5**

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   b) Discuss the various methods of neutralization of alkaline wastes. **7**

5. Write short note on :

   I) Treatment of removal of color from wastewater. **5**

   II) Relative stability. **4**

   III) Equilization. **4**

Set R

SECTION – II

6. a) Mention the pollution characteristics of industrial wastes and suggest treatment methods for any four industries. **8**

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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) Operation and maintenance requirement.

   II) Effects of tannery waste on receiving stream.

SLR-VB – 71

Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Tuesday, 23-5-2017 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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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 _____ phase of microorganisms are forced to oxidize for energy.
   a) endogenous growth b) log growth
   c) declining growth d) all of above

2) The biodegradable organics deposited at the bed of stream undergoes _____ decomposition.
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6) _____ is the process in which nitrates are reduced to nitrogen gas by anaerobic bacteria.
   a) Denitrification b) Oxidation c) Biosorption d) Nitrification

7) _____ chemicals are used in process of chemical oxidation to reduce the BOD loading.
   a) Chlorine and silver b) Chlorine and ozone
   c) Silver and ozone d) Chlorine

8) Carbohydrates and proteins from brewery industries are treated by _____ recovery.
   a) By-product b) Process change
   c) Equalization and proportioning d) Segregation

9) In bleaching operation oxidizing chemical like _____ remove natural coloring materials.
   a) Lime b) Ferrous sulphate
   c) Chromium d) Hypochlorites

10) The _____ residue of sugar mill house is known as bagasses.
   a) Molasses b) Cellulosic c) Fibrous d) Tanned

11) Mercerizing is a process to improve the strength, elasticity, luster of cloth by adding _____ chemical.
   a) Sodium chloride b) Caustic soda
   c) Sodium sulphate d) Sodium nitrate

12) Phosphate removal in aeration tank is accomplished by
   a) Air stripping b) Thermal reduction
   c) Ion exchange d) Chemical precipitation

13) Pulp and paper industry contains presence of lignin derived from _____ material.
   a) Fibrous b) Tanning c) Cellulosic d) Pasteurization

14) Aerobic condition in effluent treatment can be achieved by the use of
   a) dissolved oxygen b) diffused aeration
   c) coagulation d) sludge control

15) _____ is a convenient device for measuring flow in a sewer.
   a) Parshall flume b) Thermometer c) Manometer d) Water meter

16) The performance of trickling filter depends upon
   a) Settling velocity b) Organic and hydraulic loading
   c) Digestion d) Approach velocity

17) Wasting of sludge controls the _____ time.
   a) Detention b) Hydraulic retention
   c) Mean cell residence d) Volumetric loading

18) _____ may cause due to presence of toxic substance, insufficient aeration, frequent shock loading and excessive rate of supply of substrate.
   a) Stabilization b) Biosorption c) Zone settling d) Sludge bulking

19) _____ improves the drainability of digested sludge by addition of coagulants.
   a) Conditioning b) Thickening c) Dewatering d) Incineration

20) The treatability of an industrial waste is assessed by conducting laboratory test on
   a) N/P ratio b) BOD/COD ratio
   c) BOD/SS ratio d) COD/pH ratio

_____

SLR-VB – 71

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : INDUSTRIAL WASTE TREATMENT

Day and Date : Tuesday, 23-5-2017 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) *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) Enlist various methods of waste strength reduction. Explain any one in details. **8**

   b) Mention the water quality criteria for fresh water classification. **6**

3. a) A city is discharges 125 cumecs of sewage in a river which is fully saturated with oxygen and flows at minimum rate of 1600 cumecs with a minimum velocity of 0.12 m/sec. if the 5-day BOD of sewage is 300 mg/l, find out where critical DO will occur in river. Assume coefficient of purification (f_s) of river as 4.0 and coefficient of DO as 0.11 and ultimate BOD as 125% of 5 day BOD of the mixture of sewage and river stream. **9**

   b) Explain self purification capacity of stream. **5**

4. a) Explain any one physio-chemical process treatment for removal of dissolved inorganic material. **6**

   b) Discuss the various methods of neutralization of alkaline wastes. **7**

5. Write short note on :

   I) Treatment of removal of color from wastewater. **5**

   II) Relative stability. **4**

   III) Equilization. **4**

Set S

SECTION – II

6. a) Mention the pollution characteristics of industrial wastes and suggest treatment methods for any four industries. **8**

   b) Mention any four industries and also generates toxic chemicals. **4**

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

   a) Dairy industry **7**

   b) Pulp and paper industry. **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) Operation and maintenance requirement.

   II) Effects of tannery waste on receiving stream.

SLR-VB – 72

Seat No.	

Set **P**

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : WATER POWER ENGINEERING

Day and Date : Tuesday, 23-5-2017 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** sketches **wherever** necessary.*
*4) Assume **suitable** data wherever **necessary**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) Demand factor is defined as
   a) average load/maximum load
   b) connected load/maximum demand
   c) maximum demand/connected load
   d) none of these

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

3) Sediment trop efficiency is low for reservoir with
   a) Large capacity in flow ratio b) Small capacity in flow ratio
   c) Medium capacity in flow ratio d) None

4) Pelton wheel turbine is a
   a) low wheel turbine b) medium head turbine
   c) high head turbine d) none

5) In francis turbine runner, the no. of blades are usually of the order of
   a) 16 – 24 b) 12 – 14 c) 6 – 8 d) 3 – 6

6) Annual depreciation of the plant is proportional to the earning capacity of the plant void.
   a) sinking fund depreciation b) straight line depreciation
   c) reducing balance depreciation d) none of the above

7) Water hammer process in penstock result in
   a) pressure decreases
   b) noise decreases
   c) noise increases, pressure increases, velocity decreases
   d) none

8) Pump storage scheme are used to improve
   a) the load factor
   b) the power factor
   c) the plant capacity factor as well as load factor of the power system
   d) the delivery factor

9) Minimum pressure occours in fall flowing power tunnel at the time of
   a) load rejection b) load acceptance c) head race d) fail race

10) In Kaplan runner the number of blades is generally of the order of
   a) 1 – 2 b) 3 – 6 c) 16 – 24 d) 12 – 16

11) On what factors does the selection of a water turbine depends ?
   a) Speed b) Nature of load c) Working head d) All

12) 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

13) Unit power in a turbine is
   a) p/H^1/2 b) P/H c) P/H ^ 3/2 d) P/H^3/4

14) In high head hydroelectric power plant, the velocity of water flow in penstock is around
   a) 2m/s b) 4m/s c) 8m/s d) 10m/s

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) Downstream of the valve b) Upstream of the valve
   c) Both a) and b) d) None

16) The pumped storage scheme is employed to supply water
   a) during the off-peak hours b) during the peak hours
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17) The flow through penstocks and pressure conducts is generally
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18) 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

19) For harnessing low variable water heads the suitable hydraulic turbine with reaction and adjustable vanes is
   a) Pelton b) Francis c) Impeller d) Kaplan

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

SLR-VB – 72

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : WATER POWER ENGINEERING

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m

Instructions** : 1) Solve **any three** questions from Section – **I** (Que. No. **2** to Que. No. **5)** and **any three** questions from Section – **II** (Que. No. **6** to Que. No. **9)
*2) Draw **neat** sketches **wherever** necessary.*
*3) Assume **suitable** data wherever **necessary.***

SECTION – I

2. a) What do you understand by base load and peak load power plants ? What type of power plants are used as base load and peak load plants and why ? What factors are considered in selecting a plant as base load plant or peak load plant ? **7**

   b) What do you understand by bon-conventional sources of power generation ? What is the scope of these sources in India ? **7**

3. a) Three turbo generators of each capacity 10000 kW have been installed at a power station. During certain period of a load, the load on the plant varies from 12000 KW to 26000 kW. Calculate
   i) Installed capacity ii) Load factor
   iii) Plant factor iv) Utilization factor **7**

   b) Define Hydrograph and explain its importance in the design of storage type hydro electric power plant and explain the effect of time unit on the storage capacity of the catchment are required. **6**

4. a) What do you understand by 'Water Hammer' in pipe line ? Derive the expression for the water hammer pressure in case of rigid pipe and in case of elastic pipe. **6**

   b) What is the function of anchor block ? What are the forces that should be taken into account in their stability analysis ? **7**

5. a) A closed cycle P-5 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 generation are 85% and 88% respectively, calculate the plant efficiency. **7**

   b) What is meant by economic diameter of penstock ? How it can be found ? **6**

SECTION – II

6. a) Which factors are considered in deciding the setting of Pelton wheel ?
   i) in horizontal plane
   ii) in vertical plane ?
   Discuss the advantages of one over the other. **7**

   b) What are the advantages of reaction turbine over the pelton wheel in respect of efficiency, size, cost and maintenance ? **6**

7. a) A pelton wheel has to be designed for the following specification power to be developed = 6000 kW, Net head available = 300 m, speed = 550 rpm, ratio of Jet diameter to wheel diameter = 1/10 Hydraulic efficiency = 0.085, 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**

   b) Explain why the discharge conditions for a high specific speed runner are less favourable than those for a low specific speed runner both being assumed to be running at their points of maximum efficiency. **7**

8. a) A power canal bed width 12 m, assumed in rectangular in shape and steady state depth of flow of 4.0 m. The canal supplies water to a power house with three turbines, each turbine rated at a discharge of 32 m^3/s. If the load in the power house is suddenly thrown off so that two of the turbines have to be shut down, what would be the height of the surge in the canal ? **7**

   b) What do you understand by 'pump storage plant' ? What are the advantages and disadvantages of this power plant ? Where can such schemes to be applied ? **6**

9. a) Describe how ocean tides one generated ? With tidal cycle in view describe how hydropower can be generated ? Also state the limition of tidal power generation. (Draw sketches) **7**

   b) What topographical features are in favour of adopting underground power plant ? What are the different types of underground power stations ? Draw neat layout. **6**

SLR-VB – 72

Seat No.	

Set Q

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : WATER POWER ENGINEERING

Day and Date : Tuesday, 23-5-2017 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** sketches **wherever** necessary.*
*4) Assume **suitable** data wherever **necessary**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) The pumped storage scheme is employed to supply water
   a) during the off-peak hours b) during the peak hours
   c) system base load d) none of the above

2) The flow through penstocks and pressure conducts is generally
   a) laminar b) turbulent c) both a) and b) d) none of these

3) Jet ratio 'm' is defined as the ratio of
   a) Diameter of jet of water to diameter of pelton wheel
   b) Velocity of vane to velocity of jet of water
   c) Velocity of flow to velocity of jet of water
   d) Diameter of pelton wheel to diameter of jet

4) For harnessing low variable water heads the suitable hydraulic turbine with reaction and adjustable vanes is
   a) Pelton b) Francis c) Impeller d) Kaplan

5) The draft tube is provided to
   a) reduce the effect of water hammer
   b) raise the water surface of the stream to create an artificial head
   c) increase the acting head on the water wheel
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6) Demand factor is defined as
   a) average load/maximum load
   b) connected load/maximum demand
   c) maximum demand/connected load
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P.T.O.

7) The load factor for the peak day of the year determines the required
   a) Water storage b) Pondage
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8) Sediment trop efficiency is low for reservoir with
   a) Large capacity in flow ratio b) Small capacity in flow ratio
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9) Pelton wheel turbine is a
   a) low wheel turbine b) medium head turbine
   c) high head turbine d) none

10) In francis turbine runner, the no. of blades are usually of the order of
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11) Annual depreciation of the plant is proportional to the earning capacity of the plant void.
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12) Water hammer process in penstock result in
   a) pressure decreases
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16) On what factors does the selection of a water turbine depends ?
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17) A turbine is called reaction turbine if at the inlet of turbine, the total energy is
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   a) 2m/s b) 4m/s c) 8m/s d) 10m/s

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   a) Downstream of the valve b) Upstream of the valve
   c) Both a) and b) d) None

SLR-VB – 72

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : WATER POWER ENGINEERING

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m

Instructions** : 1) Solve **any three** questions from Section – **I** (Que. No. **2** to Que. No. **5)** and **any three** questions from Section – **II** (Que. No. **6** to Que. No. **9)
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SECTION – I

2. a) What do you understand by base load and peak load power plants ? What type of power plants are used as base load and peak load plants and why ? What factors are considered in selecting a plant as base load plant or peak load plant ? **7**

   b) What do you understand by bon-conventional sources of power generation ? What is the scope of these sources in India ? **7**

3. a) Three turbo generators of each capacity 10000 kW have been installed at a power station. During certain period of a load, the load on the plant varies from 12000 KW to 26000 kW. Calculate
   i) Installed capacity ii) Load factor
   iii) Plant factor iv) Utilization factor **7**

   b) Define Hydrograph and explain its importance in the design of storage type hydro electric power plant and explain the effect of time unit on the storage capacity of the catchment are required. **6**

4. a) What do you understand by 'Water Hammer' in pipe line ? Derive the expression for the water hammer pressure in case of rigid pipe and in case of elastic pipe. **6**

   b) What is the function of anchor block ? What are the forces that should be taken into account in their stability analysis ? **7**

5. a) A closed cycle P-5 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 generation are 85% and 88% respectively, calculate the plant efficiency. **7**

   b) What is meant by economic diameter of penstock ? How it can be found ? **6**

SECTION – II

6. a) Which factors are considered in deciding the setting of Pelton wheel ?
   i) in horizontal plane
   ii) in vertical plane ?
   Discuss the advantages of one over the other. **7**

   b) What are the advantages of reaction turbine over the pelton wheel in respect of efficiency, size, cost and maintenance ? **6**

7. a) A pelton wheel has to be designed for the following specification power to be developed = 6000 kW, Net head available = 300 m, speed = 550 rpm, ratio of Jet diameter to wheel diameter = 1/10 Hydraulic efficiency = 0.085, assume CV = 0.98, speed ratio = 0.46. Find
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   b) Explain why the discharge conditions for a high specific speed runner are less favourable than those for a low specific speed runner both being assumed to be running at their points of maximum efficiency. **7**

8. a) A power canal bed width 12 m, assumed in rectangular in shape and steady state depth of flow of 4.0 m. The canal supplies water to a power house with three turbines, each turbine rated at a discharge of 32 m^3/s. If the load in the power house is suddenly thrown off so that two of the turbines have to be shut down, what would be the height of the surge in the canal ? **7**

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9. a) Describe how ocean tides one generated ? With tidal cycle in view describe how hydropower can be generated ? Also state the limition of tidal power generation. (Draw sketches) **7**

   b) What topographical features are in favour of adopting underground power plant ? What are the different types of underground power stations ? Draw neat layout. **6**

SLR-VB – 72

Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : WATER POWER ENGINEERING

Day and Date : Tuesday, 23-5-2017 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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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) On what factors does the selection of a water turbine depends ?
a) Speed b) Nature of load c) Working head d) All

2) A turbine is called reaction turbine if at the inlet of turbine, the total energy is
a) kinetic b) pressure
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4) In high head hydroelectric power plant, the velocity of water flow in penstock is around
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a) Downstream of the valve b) Upstream of the valve
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6) The pumped storage scheme is employed to supply water
a) during the off-peak hours b) during the peak hours
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P.T.O.

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   a) pressure decreases
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SLR-VB – 72

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : WATER POWER ENGINEERING

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m

Instructions** : 1) Solve **any three** questions from Section – **I** (Que. No. **2** to Que. No. **5)** and **any three** questions from Section – **II** (Que. No. **6** to Que. No. **9)
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SECTION – I

2. a) What do you understand by base load and peak load power plants ? What type of power plants are used as base load and peak load plants and why ? What factors are considered in selecting a plant as base load plant or peak load plant ? **7**

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   b) What is the function of anchor block ? What are the forces that should be taken into account in their stability analysis ? **7**

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   b) What is meant by economic diameter of penstock ? How it can be found ? **6**

SECTION – II

6. a) Which factors are considered in deciding the setting of Pelton wheel ?
   i) in horizontal plane
   ii) in vertical plane ?
   Discuss the advantages of one over the other. **7**

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   b) What topographical features are in favour of adopting underground power plant ? What are the different types of underground power stations ? Draw neat layout. **6**

SLR-VB – 72

Seat No.	

Set S

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : WATER POWER ENGINEERING

Day and Date : Tuesday, 23-5-2017 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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*4) Assume **suitable** data wherever **necessary**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) Annual depreciation of the plant is proportional to the earning capacity of the plant void.
a) sinking fund depreciation b) straight line depreciation
c) reducing balance depreciation d) none of the above

2) Water hammer process in penstock result in
a) pressure decreases
b) noise decreases
c) noise increases, pressure increases, velocity decreases
d) none

3) Pump storage scheme are used to improve
a) the load factor
b) the power factor
c) the plant capacity factor as well as load factor of the power system
d) the delivery factor

4) Minimum pressure occours in fall flowing power tunnel at the time of
a) load rejection b) load acceptance c) head race d) fail race

5) In Kaplan runner the number of blades is generally of the order of
a) 1 – 2 b) 3 – 6 c) 16 – 24 d) 12 – 16

6) On what factors does the selection of a water turbine depends ?
a) Speed b) Nature of load c) Working head d) All

7) 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

8) Unit power in a turbine is
a) p/H^1/2 b) P/H c) P/H ^ 3/2 d) P/H^3/4

P.T.O.

9) In high head hydroelectric power plant, the velocity of water flow in penstock is around
   a) 2m/s b) 4m/s c) 8m/s d) 10m/s

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) Downstream of the valve b) Upstream of the valve
   c) Both a) and b) d) None

11) The pumped storage scheme is employed to supply water
   a) during the off-peak hours b) during the peak hours
   c) system base load d) none of the above

12) The flow through penstocks and pressure conducts is generally
   a) laminar b) turbulent c) both a) and b) d) none of these

13) 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

14) For harnessing low variable water heads the suitable hydraulic turbine with reaction and adjustable vanes is
   a) Pelton b) Francis c) Impeller d) Kaplan

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

16) Demand factor is defined as
   a) average load/maximum load
   b) connected load/maximum demand
   c) maximum demand/connected load
   d) none of these

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

18) Sediment trop efficiency is low for reservoir with
   a) Large capacity in flow ratio b) Small capacity in flow ratio
   c) Medium capacity in flow ratio d) None

19) Pelton wheel turbine is a
   a) low wheel turbine b) medium head turbine
   c) high head turbine d) none

20) In francis turbine runner, the no. of blades are usually of the order of
   a) 16 – 24 b) 12 – 14 c) 6 – 8 d) 3 – 6

SLR-VB – 72

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : WATER POWER ENGINEERING

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m

Instructions** : 1) Solve **any three** questions from Section – **I** (Que. No. **2** to Que. No. **5)** and **any three** questions from Section – **II** (Que. No. **6** to Que. No. **9)
*2) Draw **neat** sketches **wherever** necessary.*
*3) Assume **suitable** data wherever **necessary.***

SECTION – I

2. a) What do you understand by base load and peak load power plants ? What type of power plants are used as base load and peak load plants and why ? What factors are considered in selecting a plant as base load plant or peak load plant ? **7**

   b) What do you understand by bon-conventional sources of power generation ? What is the scope of these sources in India ? **7**

3. a) Three turbo generators of each capacity 10000 kW have been installed at a power station. During certain period of a load, the load on the plant varies from 12000 KW to 26000 kW. Calculate
   i) Installed capacity ii) Load factor
   iii) Plant factor iv) Utilization factor **7**

   b) Define Hydrograph and explain its importance in the design of storage type hydro electric power plant and explain the effect of time unit on the storage capacity of the catchment are required. **6**

4. a) What do you understand by 'Water Hammer' in pipe line ? Derive the expression for the water hammer pressure in case of rigid pipe and in case of elastic pipe. **6**

   b) What is the function of anchor block ? What are the forces that should be taken into account in their stability analysis ? **7**

5. a) A closed cycle P-5 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 generation are 85% and 88% respectively, calculate the plant efficiency. **7**

   b) What is meant by economic diameter of penstock ? How it can be found ? **6**

SECTION – II

6. a) Which factors are considered in deciding the setting of Pelton wheel ?
   i) in horizontal plane
   ii) in vertical plane ?
   Discuss the advantages of one over the other. **7**

   b) What are the advantages of reaction turbine over the pelton wheel in respect of efficiency, size, cost and maintenance ? **6**

7. a) A pelton wheel has to be designed for the following specification power to be developed = 6000 kW, Net head available = 300 m, speed = 550 rpm, ratio of Jet diameter to wheel diameter = 1/10 Hydraulic efficiency = 0.085, 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**

   b) Explain why the discharge conditions for a high specific speed runner are less favourable than those for a low specific speed runner both being assumed to be running at their points of maximum efficiency. **7**

8. a) A power canal bed width 12 m, assumed in rectangular in shape and steady state depth of flow of 4.0 m. The canal supplies water to a power house with three turbines, each turbine rated at a discharge of 32 m^3/s. If the load in the power house is suddenly thrown off so that two of the turbines have to be shut down, what would be the height of the surge in the canal ? **7**

   b) What do you understand by 'pump storage plant' ? What are the advantages and disadvantages of this power plant ? Where can such schemes to be applied ? **6**

9. a) Describe how ocean tides one generated ? With tidal cycle in view describe how hydropower can be generated ? Also state the limition of tidal power generation. (Draw sketches) **7**

   b) What topographical features are in favour of adopting underground power plant ? What are the different types of underground power stations ? Draw neat layout. **6**

SLR-VB – 73

Seat No.	

Set P

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : ADVANCED CONCRETE TECHNOLOGY

Day and Date : Tuesday, 23-5-2017 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 alternatives :

1) In the Vicat's apparatus, the cement paste is said to be of normal consistency, if the rod penetrates by

a) 3 mm b) 5 to 10 mm
c) 23 to 25 mm d) 33 to 35 mm

2) For ordinary Portland cement

a) Initial setting time should not be less than 5 minutes and final setting should not be more than 24 hours
b) Initial setting time should not be less than 30 minutes and final setting should not be more than 600 minutes
c) Initial setting time should not be less than 60 minutes and final setting should not be more than 600 minutes
d) Initial setting time should not be less than 5 minutes and final setting should not be more than 600 minutes

3) If the trial mix gives a higher 28 days compressive strength value than the design value then for the next trial

a) Cement content is reduced b) Water content is increased
c) Water cement ratio is increased d) Proportion of sand is increased

4) Segregation in concrete results in
   a) Porous layers
   b) Honey-combing
   c) Sand streaks
   d) Surface scaling

5) After moulding, the test specimens of trial mix are placed at a temperature of
   a) $10 \pm 2°C$
   b) $15°C \pm 2°C$
   c) $23°C \pm 2°C$
   d) $27°C \pm 2°C$

6) The standard consistency of a cement paste is define as
   A) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the top of the mould
   B) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the top of the mould
   C) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the bottom of the mould
   D) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the bottom of the mould
   a) Only A)
   b) Only B)
   c) Only D)
   d) A) and D) both

7) Aggregate which are suitable for making the concrete may have the angularity no from
   a) 1 to 11
   b) 11 to 111
   c) 0 to 11
   d) 0 to 100

8) For the concrete used for the road having aggregate crushing value restricted up to
   a) 45%
   b) 30%
   c) 50%
   d) 20%

9) Bulk density of standard material (water) is
   a) 1
   b) $1\ kg/m^3$
   c) $1g/cm^3$
   d) $1\ kg/cm^3$

10) True slump shows characteristic of
   a) Homogenous material
   b) Non cohesive material
   c) Segregation
   d) Bleeding

SLR-VB – 73

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : ADVANCED CONCRETE TECHNOLOGY

Day and Date : Tuesday, 23-5-2017 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 non-programmable calculator is **allowed**.*
*4) Assume suitable data **if necessary** and mention it **clearly**.*

SECTION – I

2. a) How is consistence of cement paste measured ? **4**
   b) What is the influence of the fineness modulus on the properties of concrete mixes ? **10**

3. a) What are the broad types of admixtures ? **4**
   b) What would you do if a mixing truck got stuck but the mixer continued to operate ? **9**

4. a) What are the uses of plasticizers ? **4**
   b) What are the workability requirements for concrete to be pumped ? **9**

5. a) Suggest the type of concrete for Industrial flooring. Justify the suggestion. **13**

SECTION – II

6. a) Explain sustainability of concrete industry. **4**
   b) Which is the special process and technology employed for Roller compacted concrete ? **10**

Set P

7. a) What are the particular problems in pumping air-entrained concrete ? **4**

   b) What are the disadvantages of using ready-mixed concrete ? **9**

8. What is the procedure to design the mix for High grade Concrete ? **13**

9. a) What is meant by a crack arrester in concrete ? **4**

   b) What are the various crack repair techniques ? Explain. **9**

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SLR-VB – 73

Seat No.	

Set Q

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : ADVANCED CONCRETE TECHNOLOGY

Day and Date : Tuesday, 23-5-2017 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 alternatives :

1) Bulk density of standard material (water) is
   a) 1 b) 1 kg/m^3
   c) 1g/cm^3 d) 1 kg/cm^3

2) True slump shows characteristic of
   a) Homogenous material b) Non cohesive material
   c) Segregation d) Bleeding

3) Aggregate which are suitable for making the concrete may have the angularity no from
   a) 1 to 11 b) 11 to 111
   c) 0 to 11 d) 0 to 100

4) For the concrete used for the road having aggregate crushing value restricted up to
   a) 45% b) 30%
   c) 50% d) 20%

5) In the Vicat's apparatus, the cement paste is said to be of normal consistency, if the rod penetrates by
   a) 3 mm b) 5 to 10 mm
   c) 23 to 25 mm d) 33 to 35 mm

6) For ordinary Portland cement
   a) Initial setting time should not be less than 5 minutes and final setting should not be more than 24 hours
   b) Initial setting time should not be less than 30 minutes and final setting should not be more than 600 minutes
   c) Initial setting time should not be less than 60 minutes and final setting should not be more than 600 minutes
   d) Initial setting time should not be less than 5 minutes and final setting should not be more than 600 minutes

7) If the trial mix gives a higher 28 days compressive strength value than the design value then for the next trial
   a) Cement content is reduced
   b) Water content is increased
   c) Water cement ratio is increased
   d) Proportion of sand is increased

8) Segregation in concrete results in
   a) Porous layers
   b) Honey-combing
   c) Sand streaks
   d) Surface scaling

9) After moulding, the test specimens of trial mix are placed at a temperature of
   a) $10 \pm 2°C$
   b) $15°C \pm 2°C$
   c) $23°C \pm 2°C$
   d) $27°C \pm 2°C$

10) The standard consistency of a cement paste is define as
   A) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the top of the mould
   B) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the top of the mould
   C) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the bottom of the mould
   D) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the bottom of the mould
   a) Only A)
   b) Only B)
   c) Only D)
   d) A) and D) both

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : ADVANCED CONCRETE TECHNOLOGY

Day and Date : Tuesday, 23-5-2017 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 non-programmable calculator is **allowed**.*
*4) Assume suitable data **if necessary** and mention it **clearly**.*

SECTION – I

2. a) How is consistence of cement paste measured ? **4**
   b) What is the influence of the fineness modulus on the properties of concrete mixes ? **10**

3. a) What are the broad types of admixtures ? **4**
   b) What would you do if a mixing truck got stuck but the mixer continued to operate ? **9**

4. a) What are the uses of plasticizers ? **4**
   b) What are the workability requirements for concrete to be pumped ? **9**

5. a) Suggest the type of concrete for Industrial flooring. Justify the suggestion. **13**

SECTION – II

6. a) Explain sustainability of concrete industry. **4**
   b) Which is the special process and technology employed for Roller compacted concrete ? **10**

Set Q

7. a) What are the particular problems in pumping air-entrained concrete ? **4**

   b) What are the disadvantages of using ready-mixed concrete ? **9**

8. What is the procedure to design the mix for High grade Concrete ? **13**

9. a) What is meant by a crack arrester in concrete ? **4**

   b) What are the various crack repair techniques ? Explain. **9**

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Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : ADVANCED CONCRETE TECHNOLOGY

Day and Date : Tuesday, 23-5-2017 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 alternatives :

1) After moulding, the test specimens of trial mix are placed at a temperature of
   a) $10 \pm 2°C$ b) $15°C \pm 2°C$
   c) $23°C \pm 2°C$ d) $27°C \pm 2°C$

2) The standard consistency of a cement paste is define as
   A) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the top of the mould
   B) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the top of the mould
   C) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the bottom of the mould
   D) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the bottom of the mould
   a) Only A) b) Only B)
   c) Only D) d) A) and D) both

3) Bulk density of standard material (water) is
   a) 1 b) $1\ kg/m^3$
   c) $1g/cm^3$ d) $1\ kg/cm^3$

P.T.O.

4) True slump shows characteristic of
   a) Homogenous material
   b) Non cohesive material
   c) Segregation
   d) Bleeding

5) If the trial mix gives a higher 28 days compressive strength value than the design value then for the next trial
   a) Cement content is reduced
   b) Water content is increased
   c) Water cement ratio is increased
   d) Proportion of sand is increased

6) Segregation in concrete results in
   a) Porous layers
   b) Honey-combing
   c) Sand streaks
   d) Surface scaling

7) In the Vicat's apparatus, the cement paste is said to be of normal consistency, if the rod penetrates by
   a) 3 mm
   b) 5 to 10 mm
   c) 23 to 25 mm
   d) 33 to 35 mm

8) For ordinary Portland cement
   a) Initial setting time should not be less than 5 minutes and final setting should not be more than 24 hours
   b) Initial setting time should not be less than 30 minutes and final setting should not be more than 600 minutes
   c) Initial setting time should not be less than 60 minutes and final setting should not be more than 600 minutes
   d) Initial setting time should not be less than 5 minutes and final setting should not be more than 600 minutes

9) Aggregate which are suitable for making the concrete may have the angularity no from
   a) 1 to 11
   b) 11 to 111
   c) 0 to 11
   d) 0 to 100

10) For the concrete used for the road having aggregate crushing value restricted up to
   a) 45%
   b) 30%
   c) 50%
   d) 20%

SLR-VB – 73

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : ADVANCED CONCRETE TECHNOLOGY

Day and Date : Tuesday, 23-5-2017 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 non-programmable calculator is **allowed**.*
*4) Assume suitable data **if necessary** and mention it **clearly**.*

SECTION – I

2. a) How is consistence of cement paste measured ? **4**
   b) What is the influence of the fineness modulus on the properties of concrete mixes ? **10**

3. a) What are the broad types of admixtures ? **4**
   b) What would you do if a mixing truck got stuck but the mixer continued to operate ? **9**

4. a) What are the uses of plasticizers ? **4**
   b) What are the workability requirements for concrete to be pumped ? **9**

5. a) Suggest the type of concrete for Industrial flooring. Justify the suggestion. **13**

SECTION – II

6. a) Explain sustainability of concrete industry. **4**
   b) Which is the special process and technology employed for Roller compacted concrete ? **10**

Set R

7. a) What are the particular problems in pumping air-entrained concrete ? **4**

   b) What are the disadvantages of using ready-mixed concrete ? **9**

8. What is the procedure to design the mix for High grade Concrete ? **13**

9. a) What is meant by a crack arrester in concrete ? **4**

   b) What are the various crack repair techniques ? Explain. **9**

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Seat No.	

Set S

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : ADVANCED CONCRETE TECHNOLOGY

Day and Date : Tuesday, 23-5-2017 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 alternatives :

1) If the trial mix gives a higher 28 days compressive strength value than the design value then for the next trial
   a) Cement content is reduced
   b) Water content is increased
   c) Water cement ratio is increased
   d) Proportion of sand is increased

2) Segregation in concrete results in
   a) Porous layers
   b) Honey-combing
   c) Sand streaks
   d) Surface scaling

3) After moulding, the test specimens of trial mix are placed at a temperature of
   a) $10 \pm 2°C$
   b) $15°C \pm 2°C$
   c) $23°C \pm 2°C$
   d) $27°C \pm 2°C$

4) The standard consistency of a cement paste is define as
   A) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the top of the mould
   B) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the top of the mould
   C) Consistency which will permit vicat plunger to penetrate to a depth of 33 to 35 mm from the bottom of the mould
   D) Consistency which will permit vicat plunger to penetrate to a depth of 05 to 07 mm from the bottom of the mould
   a) Only A)
   b) Only B)
   c) Only D)
   d) A) and D) both

P.T.O.

5) Aggregate which are suitable for making the concrete may have the angularity no from
   a) 1 to 11 b) 11 to 111
   c) 0 to 11 d) 0 to 100

6) For the concrete used for the road having aggregate crushing value restricted up to
   a) 45% b) 30%
   c) 50% d) 20%

7) Bulk density of standard material (water) is
   a) 1 b) 1 kg/m^3
   c) 1g/cm^3 d) 1 kg/cm^3

8) True slump shows characteristic of
   a) Homogenous material b) Non cohesive material
   c) Segregation d) Bleeding

9) In the Vicat's apparatus, the cement paste is said to be of normal consistency, if the rod penetrates by
   a) 3 mm b) 5 to 10 mm
   c) 23 to 25 mm d) 33 to 35 mm

10) For ordinary Portland cement
   a) Initial setting time should not be less than 5 minutes and final setting should not be more than 24 hours
   b) Initial setting time should not be less than 30 minutes and final setting should not be more than 600 minutes
   c) Initial setting time should not be less than 60 minutes and final setting should not be more than 600 minutes
   d) Initial setting time should not be less than 5 minutes and final setting should not be more than 600 minutes

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SLR-VB – 73

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
Elective – III : ADVANCED CONCRETE TECHNOLOGY

Day and Date : Tuesday, 23-5-2017 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 non-programmable calculator is **allowed**.*
*4) Assume suitable data **if necessary** and mention it **clearly**.*

SECTION – I

2. a) How is consistence of cement paste measured ? **4**
   b) What is the influence of the fineness modulus on the properties of concrete mixes ? **10**

3. a) What are the broad types of admixtures ? **4**
   b) What would you do if a mixing truck got stuck but the mixer continued to operate ? **9**

4. a) What are the uses of plasticizers ? **4**
   b) What are the workability requirements for concrete to be pumped ? **9**

5. a) Suggest the type of concrete for Industrial flooring. Justify the suggestion. **13**

SECTION – II

6. a) Explain sustainability of concrete industry. **4**
   b) Which is the special process and technology employed for Roller compacted concrete ? **10**

Set S

7. a) What are the particular problems in pumping air-entrained concrete ? **4**

   b) What are the disadvantages of using ready-mixed concrete ? **9**

8. What is the procedure to design the mix for High grade Concrete ? **13**

9. a) What is meant by a crack arrester in concrete ? **4**

   b) What are the various crack repair techniques ? Explain. **9**

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Seat No.	

Set **P**

B.E. (Civil) (Part – II) Examination, 2017
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Tuesday, 23-5-2017 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 non-programmable 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 answer : **20**

1) If primal is minimize $30x_1 + 40x_2$ subjected to $6x_1 + 12x_2 \leq 120$ and $8x_1 + 5x_2 \leq 60$, $x_1, x_2 \geq 0$ the dual will have objective function as
   a) $6y_1 + 8y_2$ (Minimize) b) $6y_1 - 8y_2$ (Maximize)
   c) $120y_1 + 60y_2$ (Maximize) d) $120y_1 - 60y_2$ (Maximize)
2) 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
3) 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
4) In artificial variables techniques, the artificial variables are added to the constraints of
   a) $\geq$ and = type b) $\leq$ and = type c) $\geq$, $\leq$ and = type d) All of these
5) In the graphical variables techniques, the artificial variables are added to the constraints of
   a) objective function equation b) constraint equation
   c) linear equation d) all of these
6) 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
7) 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

P.T.O.

8) 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
9) 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 the above
10) 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
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11) The degeneracy occurs in a transportation problem when
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   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
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12) If number of rows exceed number of columns by 2(two), then we add
   a) A dummy row b) Two dummy rows c) A dummy column d) Two dummy columns
13) 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
14) When minimum and maximum criteria match, then
   a) Saddle point exist b) Fair game is resulted
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15) 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
16) 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
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17) 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
18) 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
19) Games with saddle point are _____ in the nature.
   a) Deterministic b) Probabilistic c) Stochastic d) Normative
20) Which of the following is wrong ?
   a) Games without saddle point are probabilistic
   b) Games with saddle points will have pure strategies
   c) games without saddle points use mixed strategies
   d) Games with saddle points can not be solved by dominance rule

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Tuesday, 23-5-2017 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 non-programmable 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) Explain the applications of optimization in civil engineering. **4**

   b) Use simplex method to maximize $Z = 80x_1 + 55x_2$ subject to **8**
   $4x_1 + 2x_2 \leq 40$
   $2x_1 + 4x_2 \leq 32$
   and $x_1 \geq 0, x_2 \geq 0$.

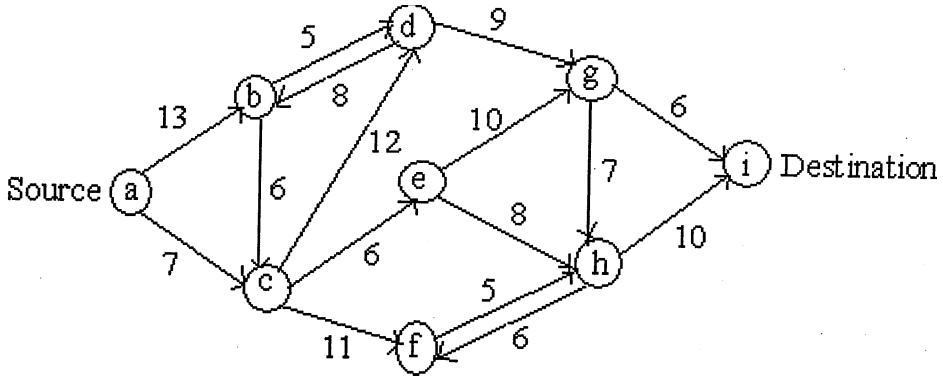
   c) Explain the classification of optimization problems. **4**

3. Use two phase method to solve the following linear programming problem. **12**
   Max $Z = 3x_1 - x_2$ subject to
   $2x_1 + x_2 \geq 2$
   $x_1 + 3x_2 \leq 2$
   $x_2 \leq 4$
   and $x_1 \geq 0, x_2 \geq 0$.

4. Solve by lowest cost entry method and obtain an optimal solution for the following transportation matrix : **12**

	W_1	W_2	W_3	Availability
F_1	50	30	220	1
F_2	90	45	170	3
F_3	250	200	50	4
Requirement	4	2	2	

5. Determine the shortest route for the following network. **12**



SECTION – II

6. a) Solve the following game by graphical method : **8**

	B1	B2
A1	– 2	0
A2	3	– 1
A3	– 3	2
A4	5	– 4

b) Explain decision making under certainty, uncertainty and risk, with the help of suitable example. **8**

7. a) A foundry regularly uses 1,000 folds per day for 250 days in a year. Folds can be purchased in the lots of 1,000 for Rs. 10 per lot or in lots of 10,000 for Rs. 96.10 per lot. Ordering costs are Rs. 10 per order and the holding costs of items in inventory are estimated to be 20% of cost per year.
   1) What is the EOQ and associated annual cost assuming that only lots of 1,000 items are available ?
   2) What is the EOQ and the associated annual cost assuming that only lots of 10,000 items are available ?
   3) Compare the costs of the two answers above and state the optimal ordering policy for these folds assuming that lots of 1,000 or 10,000 items can be ordered. **8**

   b) Explain probabilistic model of inventory management. **4**

8. Write note on : **12**
   a) Gomory's Cutting Plane Method
   b) Dynamic Programming.

9. Write note on : **12**
   a) Artificial neural network
   b) Fuzzy logic.

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Seat No.	

Set **Q**

B.E. (Civil) (Part – II) Examination, 2017
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Tuesday, 23-5-2017 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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*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) 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

2) 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

3) 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

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

5) Which of the following is wrong ?
   a) Games without saddle point are probabilistic
   b) Games with saddle points will have pure strategies
   c) games without saddle points use mixed strategies
   d) Games with saddle points can not be solved by dominance rule

6) If primal is minimize $30x_1 + 40x_2$ subjected to $6x_1 + 12x_2 \leq 120$ and $8x_1 + 5x_2 \leq 60$, $x_1, x_2 \geq 0$ the dual will have objective function as
   a) $6y_1 + 8y_2$ (Minimize) b) $6y_1 - 8y_2$ (Maximize)
   c) $120y_1 + 60y_2$ (Maximize) d) $120y_1 - 60y_2$ (Maximize)

7) 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

8) 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.

9) In artificial variables techniques, the artificial variables are added to the constraints of
   a) $\geq$ and = type b) $\leq$ and = type c) $\geq$, $\leq$ and = type d) All of these
10) In the graphical variables techniques, the artificial variables are added to the constraints of
   a) objective function equation b) constraint equation
   c) linear equation d) all of these
11) 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
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   a) Fair strategy b) Pure strategy c) Mixed strategy d) Value of the game

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Tuesday, 23-5-2017 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 non-programmable 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**.*
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SECTION – I

2. a) Explain the applications of optimization in civil engineering. **4**

   b) Use simplex method to maximize $Z = 80x_1 + 55x_2$ subject to **8**
   $4x_1 + 2x_2 \leq 40$
   $2x_1 + 4x_2 \leq 32$
   and $x_1 \geq 0, x_2 \geq 0$.

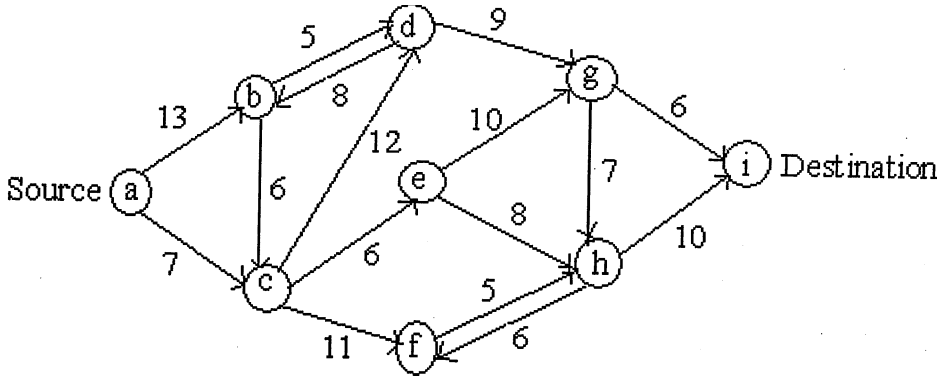
   c) Explain the classification of optimization problems. **4**

3. Use two phase method to solve the following linear programming problem. **12**
   Max $Z = 3x_1 - x_2$ subject to
   $2x_1 + x_2 \geq 2$
   $x_1 + 3x_2 \leq 2$
   $x_2 \leq 4$
   and $x_1 \geq 0, x_2 \geq 0$.

4. Solve by lowest cost entry method and obtain an optimal solution for the following transportation matrix : **12**

	W_1	W_2	W_3	Availability
F_1	50	30	220	1
F_2	90	45	170	3
F_3	250	200	50	4
Requirement	4	2	2	

5. Determine the shortest route for the following network. **12**



SECTION – II

6. a) Solve the following game by graphical method : **8**

	B1	B2
A1	– 2	0
A2	3	– 1
A3	– 3	2
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b) Explain decision making under certainty, uncertainty and risk, with the help of suitable example. **8**

7. a) A foundry regularly uses 1,000 folds per day for 250 days in a year. Folds can be purchased in the lots of 1,000 for Rs. 10 per lot or in lots of 10,000 for Rs. 96.10 per lot. Ordering costs are Rs. 10 per order and the holding costs of items in inventory are estimated to be 20% of cost per year.
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Seat No.	

Set **R**

B.E. (Civil) (Part – II) Examination, 2017
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Tuesday, 23-5-2017 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) 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

2) If number of rows exceed number of columns by 2(two), then we add
   a) A dummy row b) Two dummy rows c) A dummy column d) Two dummy columns

3) 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

4) When minimum and maximum criteria match, then
   a) Saddle point exist b) Fair game is resulted
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5) Predetermined plan of actions based on which the games are played that does not change during the game is said to be
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6) 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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7) If the gain of a player is loss of another player then the game is called
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P.T.O.

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Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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SECTION – I

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   b) Use simplex method to maximize $Z = 80x_1 + 55x_2$ subject to **8**
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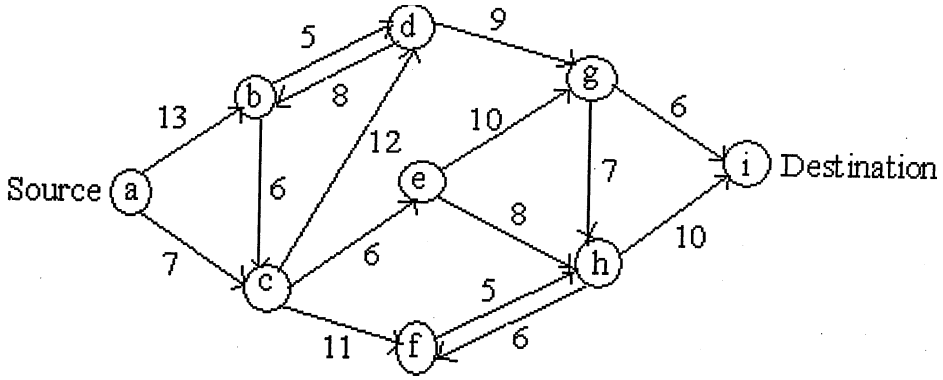

SECTION – II

6. a) Solve the following game by graphical method : **8**

	B1	B2
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Seat No.	

Set **S**

B.E. (Civil) (Part – II) Examination, 2017
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Tuesday, 23-5-2017 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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1) One disadvantage of using N-W-C rule to find initial solution to the transportation problem is that
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P.T.O.

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   c) games without saddle points use mixed strategies
   d) Games with saddle points can not be solved by dominance rule
16) If primal is minimize $30x_1 + 40x_2$ subjected to $6x_1 + 12x_2 \leq 120$ and $8x_1 + 5x_2 \leq 60$, $x_1, x_2 \geq 0$ the dual will have objective function as
   a) $6y_1 + 8y_2$ (Minimize) b) $6y_1 - 8y_2$ (Maximize)
   c) $120y_1 + 60y_2$ (Maximize) d) $120y_1 - 60y_2$ (Maximize)
17) 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
18) 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
19) In artificial variables techniques, the artificial variables are added to the constraints of
   a) $\geq$ and = type b) $\leq$ and = type c) $\geq$, $\leq$ and = type d) All of these
20) In the graphical variables techniques, the artificial variables are added to the constraints of
   a) objective function equation b) constraint equation
   c) linear equation d) all of these

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SLR-VB – 77

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
OPTIMIZATION TECHNIQUES (Elective – III)

Day and Date : Tuesday, 23-5-2017 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 non-programmable 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) Explain the applications of optimization in civil engineering. **4**

   b) Use simplex method to maximize $Z = 80x_1 + 55x_2$ subject to **8**
   $4x_1 + 2x_2 \leq 40$
   $2x_1 + 4x_2 \leq 32$
   and $x_1 \geq 0, x_2 \geq 0$.

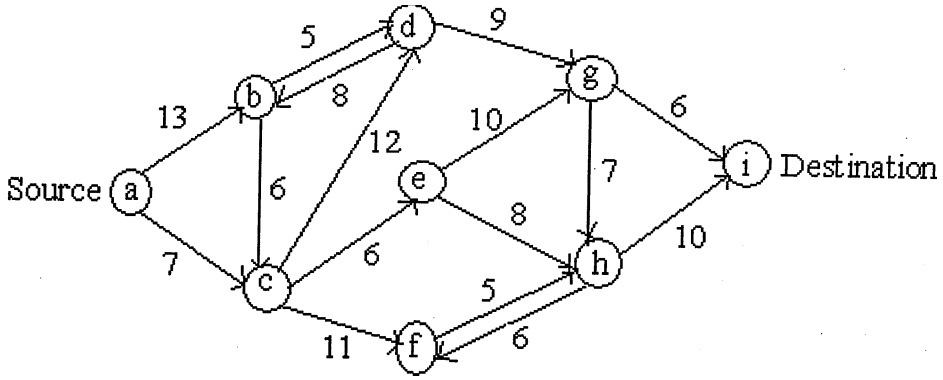
   c) Explain the classification of optimization problems. **4**

3. Use two phase method to solve the following linear programming problem. **12**
   Max $Z = 3x_1 - x_2$ subject to
   $2x_1 + x_2 \geq 2$
   $x_1 + 3x_2 \leq 2$
   $x_2 \leq 4$
   and $x_1 \geq 0, x_2 \geq 0$.

4. Solve by lowest cost entry method and obtain an optimal solution for the following transportation matrix : **12**

	W_1	W_2	W_3	Availability
F_1	50	30	220	1
F_2	90	45	170	3
F_3	250	200	50	4
Requirement	4	2	2	

5. Determine the shortest route for the following network. **12**



SECTION – II

6. a) Solve the following game by graphical method : **8**

	B1	B2
A1	– 2	0
A2	3	– 1
A3	– 3	2
A4	5	– 4

b) Explain decision making under certainty, uncertainty and risk, with the help of suitable example. **8**

7. a) A foundry regularly uses 1,000 folds per day for 250 days in a year. Folds can be purchased in the lots of 1,000 for Rs. 10 per lot or in lots of 10,000 for Rs. 96.10 per lot. Ordering costs are Rs. 10 per order and the holding costs of items in inventory are estimated to be 20% of cost per year.
   1) What is the EOQ and associated annual cost assuming that only lots of 1,000 items are available ?
   2) What is the EOQ and the associated annual cost assuming that only lots of 10,000 items are available ?
   3) Compare the costs of the two answers above and state the optimal ordering policy for these folds assuming that lots of 1,000 or 10,000 items can be ordered. **8**

   b) Explain probabilistic model of inventory management. **4**

8. Write note on : **12**
   a) Gomory's Cutting Plane Method
   b) Dynamic Programming.

9. Write note on : **12**
   a) Artificial neural network
   b) Fuzzy logic.

SLR-VB – 78

Seat No.	

Set P

B.E. (Civil) (Part – II) Examination, 2017
DISASTER MANAGEMENT (Elective – III)

Day and Date : Tuesday, 23-5-2017 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**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) An example of a natural disaster is
   a) disease epidemic b) an outbreak of food poisoning
   c) a hurricane d) mine explosion

2) The primary goal of a disaster preparedness plan is
   a) to protect the population b) to protect valuable resources
   c) to keep communications lines open d) to protect environmental health personnel

3) Priority environmental health concerns during a natural disaster are providing victims with
   a) food, radio, water, portable generator b) food, fuel, refrigeration, shelter
   c) water, food, shelter, sanitation d) water, heat, clothing, medicine

4) The most valuable information to have on hand in case a disaster strikes is
   a) phone numbers and addresses of local, national and international aid societies
   b) knowledge of which areas are likely to be hardest hit and resources and services available in and around these areas
   c) first aid manuals, maps and emergency operations manuals
   d) addresses of all hospitals and clinics throughout the country

5) Environmental sanitation involves
   a) quarantining of areas in which individuals with communicable diseases are residing
   b) collecting, treating and disposing of human waste to prevent risk of disease
   c) hygienic management of dairy and livestock operations
   d) spraying of areas with pesticides to reduce or eliminate disease risk

6) It is important to test the quality of the water because
   a) it might transmit disease
   b) it might clog pipes
   c) it might stain laundry
   d) it might be unacceptable for use in food preparation

7) Educating the public on what to expect in the event of a disaster and what emergency steps to take
   a) would lull the population into a false sense of security
   b) is an unwise use of time and money
   c) would increase the likelihood of survival
   d) could cause unnecessary panic and disorientation

8) The most important use of water is
   a) cleaning b) drinking c) bathing d) washing

9) Relocation of disaster victims in camps
   a) is the preferred way to provide essential services to disaster victims
   b) can result in secondary health emergencies
   c) usually represents the most efficient use of scarce resources
   d) should never be attempted

P.T.O.

10) Once an area has been singled out as requiring priority intervention following a disaster, attention should turn next to
   a) determining high risk factors based on relative incidence of disease
   b) instituting short-term rehabilitation measures
   c) ranking the needs for essential lifeline services in order of priority and providing the requisite manpower
   d) conducting technical surveys to evaluate and plan the restoration of lifeline services

11) Predisaster environmental health measures are intended to reduce or eliminate environmental health hazards, caused or aggrevated in a disaster by
   a) developing evacuation strategies, coordinating transport and distribution of emergency supplies and developing a public education program
   b) developing an emergency operations plan, establishing an immunization program and adopting routine measures to protect lifeline services
   c) developing a public education program, conducting epidemiologic surveys and coordinating transport and stockpiling of emergency relief supplies
   d) developing an emergency operations action plan, adopting routine measures to protect lifeline services and developing a public education program

12) The primary cause of food and water contamination after a disaster is
   a) damage to civil engineering structures, such as dams, pipelines, etc.
   b) large-scale looting of public and private facilities
   c) difficulty in maintaining standards of personal hygiene
   d) interruption of inspection and monitoring activities

13) Alternate sources of drinking water may include all of the following except
   a) drinking water stored in gasoline containers
   b) undamaged wells
   c) breweries
   d) power plants

14) Tent camps should be located
   a) close to the nearest field hospital or emergency care unit
   b) where slope and soil type favor easy drainage
   c) where shelter material and vegetation are easily accessible
   d) where the water table is no deeper than 3 meters

15) Emergency environmental health control measures are carried out
   a) during phase two of a disaster
   b) as soon as a warning is received
   c) after the rescue and accommodation of displaced persons
   d) only by qualified environmental health specialists

16) Potential breeding sites of mosquitos should be identified by
   a) surveying areas where there has been an increase in vector-borne disease
   b) surveying areas that sustained the heaviest flood damage
   c) surveying areas of lush vegetation
   d) surveying campsites and other densely populated areas

17) After mains, reservoirs and wells have been repaired, they should be
   a) monitored weekly for Chlorine residuals
   b) put immediately back into service
   c) cleaned and disinfected
   d) inspected by a qualified environmental health specialist

18) They should be determined before any disinfectant is distributed to individual users
   a) pH b) Chlorine residual c) E.coli count d) taste

19) All relief workers should receive
   a) appropriate technical aides
   b) appropriate antibiotics
   c) appropriate vaccinations
   d) copies of the emergency operations action plan

20) All emergency, consolidation and short-term rehabilitation measures should be carried out within of the occurrence of a disaster
   a) three days b) three weeks c) three months d) six months

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SLR-VB – 78

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
DISASTER MANAGEMENT (Elective – III)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Q. **2** and Q. **6** are **compulsory**. Attempt **any two** out of Q.**3** to Q.**5** and **any two** of Q.**7** to Q.**9**.*

SECTION – I

2. a) Explain Flash Floods with suitable example. **8**
   b) Explain the concept of Environmental disaster. **8**

3. a) Explain Human ecology and its application in geographical researches. **4**
   b) Explain landscape approach and perception approach. **8**

4. a) Write about Seismic Zones in India. **4**
   b) Explain about causes of volcanism. **4**
   c) Causes of landslides. **4**

5. Write short note on : **12**
   a) Hazard Zonation Maps
   b) Land Use Zoning
   c) Retrofitting.

SECTION – II

6. a) Explain Provision of Immediate relief measures to disaster affected people. **8**
   b) What are the measures of adjustments to natural hazards ? **8**

7. a) Explain structured and Non Structured Mitigation. **8**
   b) GIS and GPS applications in disaster mitigation. **4**

8. a) Explain role of National Institute of Disaster Management. **4**
   b) Explain role and responsibilities of District Magistrate. **8**

9. a) Explain Relationship between Disaster and Development. **8**
   b) Local bodies and role of different functionaries. **4**

Set P

Set P

SLR-VB – 78

Seat No.	

Set Q

B.E. (Civil) (Part – II) Examination, 2017
DISASTER MANAGEMENT (Elective – III)

Day and Date : Tuesday, 23-5-2017 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. Choose the correct answer : **(20×1=20)**

1) Potential breeding sites of mosquitos should be identified by
   a) surveying areas where there has been an increase in vector-borne disease
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   a) three days b) three weeks c) three months d) six months

6) An example of a natural disaster is
   a) disease epidemic b) an outbreak of food poisoning
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7) The primary goal of a disaster preparedness plan is
   a) to protect the population b) to protect valuable resources
   c) to keep communications lines open d) to protect environmental health personnel

8) Priority environmental health concerns during a natural disaster are providing victims with
   a) food, radio, water, portable generator b) food, fuel, refrigeration, shelter
   c) water, food, shelter, sanitation d) water, heat, clothing, medicine

9) The most valuable information to have on hand in case a disaster strikes is
   a) phone numbers and addresses of local, national and international aid societies
   b) knowledge of which areas are likely to be hardest hit and resources and services available in and around these areas
   c) first aid manuals, maps and emergency operations manuals
   d) addresses of all hospitals and clinics throughout the country

P.T.O.

10) Environmental sanitation involves
   a) quarantining of areas in which individuals with communicable diseases are residing
   b) collecting, treating and disposing of human waste to prevent risk of disease
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11) It is important to test the quality of the water because
   a) it might transmit disease
   b) it might clog pipes
   c) it might stain laundry
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12) Educating the public on what to expect in the event of a disaster and what emergency steps to take
   a) would lull the population into a false sense of security
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   a) developing evacuation strategies, coordinating transport and distribution of emergency supplies and developing a public education program
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17) The primary cause of food and water contamination after a disaster is
   a) damage to civil engineering structures, such as dams, pipelines, etc.
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   c) difficulty in maintaining standards of personal hygiene
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18) Alternate sources of drinking water may include all of the following except
   a) drinking water stored in gasoline containers b) undamaged wells
   c) breweries d) power plants

19) Tent camps should be located
   a) close to the nearest field hospital or emergency care unit
   b) where slope and soil type favor easy drainage
   c) where shelter material and vegetation are easily accessible
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   d) only by qualified environmental health specialists

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SLR-VB – 78

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
DISASTER MANAGEMENT (Elective – III)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Q. **2** and Q. **6** are **compulsory**. Attempt **any two** out of Q.**3** to Q.**5** and **any two** of Q.**7** to Q.**9**.*

SECTION – I

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SECTION – II

6. a) Explain Provision of Immediate relief measures to disaster affected people. **8**
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Set Q

Set Q

SLR-VB – 78

Seat No.	

Set R

B.E. (Civil) (Part – II) Examination, 2017
DISASTER MANAGEMENT (Elective – III)

Day and Date : Tuesday, 23-5-2017 Total 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-VB – 78

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
DISASTER MANAGEMENT (Elective – III)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Q. **2** and Q. **6** are **compulsory**. Attempt **any two** out of Q.**3** to Q.**5** and **any two** of Q.**7** to Q.**9**.*

SECTION – I

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Set R

Set R

SLR-VB – 78

Seat No.	

Set S

B.E. (Civil) (Part – II) Examination, 2017
DISASTER MANAGEMENT (Elective – III)

Day and Date : Tuesday, 23-5-2017 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. Choose the correct answer : **(20×1=20)**

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   c) after the rescue and accommodation of displaced persons
   d) only by qualified environmental health specialists

11) Potential breeding sites of mosquitos should be identified by
   a) surveying areas where there has been an increase in vector-borne disease
   b) surveying areas that sustained the heaviest flood damage
   c) surveying areas of lush vegetation
   d) surveying campsites and other densely populated areas

12) After mains, reservoirs and wells have been repaired, they should be
   a) monitored weekly for Chlorine residuals
   b) put immediately back into service
   c) cleaned and disinfected
   d) inspected by a qualified environmental health specialist

13) They should be determined before any disinfectant is distributed to individual users
   a) pH
   b) Chlorine residual
   c) E.coli count
   d) taste

14) All relief workers should receive
   a) appropriate technical aides
   b) appropriate antibiotics
   c) appropriate vaccinations
   d) copies of the emergency operations action plan

15) All emergency, consolidation and short-term rehabilitation measures should be carried out within of the occurrence of a disaster
   a) three days
   b) three weeks
   c) three months
   d) six months

16) An example of a natural disaster is
   a) disease epidemic
   b) an outbreak of food poisoning
   c) a hurricane
   d) mine explosion

17) The primary goal of a disaster preparedness plan is
   a) to protect the population
   b) to protect valuable resources
   c) to keep communications lines open
   d) to protect environmental health personnel

18) Priority environmental health concerns during a natural disaster are providing victims with
   a) food, radio, water, portable generator
   b) food, fuel, refrigeration, shelter
   c) water, food, shelter, sanitation
   d) water, heat, clothing, medicine

19) The most valuable information to have on hand in case a disaster strikes is
   a) phone numbers and addresses of local, national and international aid societies
   b) knowledge of which areas are likely to be hardest hit and resources and services available in and around these areas
   c) first aid manuals, maps and emergency operations manuals
   d) addresses of all hospitals and clinics throughout the country

20) Environmental sanitation involves
   a) quarantining of areas in which individuals with communicable diseases are residing
   b) collecting, treating and disposing of human waste to prevent risk of disease
   c) hygienic management of dairy and livestock operations
   d) spraying of areas with pesticides to reduce or eliminate disease risk

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SLR-VB – 78

Seat No.	

B.E. (Civil) (Part – II) Examination, 2017
DISASTER MANAGEMENT (Elective – III)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Q. **2** and Q. **6** are **compulsory**. Attempt **any two** out of Q.**3** to Q.**5** and **any two** of Q.**7** to Q.**9**.*

SECTION – I

2. a) Explain Flash Floods with suitable example. **8**
   b) Explain the concept of Environmental disaster. **8**

3. a) Explain Human ecology and its application in geographical researches. **4**
   b) Explain landscape approach and perception approach. **8**

4. a) Write about Seismic Zones in India. **4**
   b) Explain about causes of volcanism. **4**
   c) Causes of landslides. **4**

5. Write short note on : **12**
   a) Hazard Zonation Maps
   b) Land Use Zoning
   c) Retrofitting.

SECTION – II

6. a) Explain Provision of Immediate relief measures to disaster affected people. **8**
   b) What are the measures of adjustments to natural hazards ? **8**

7. a) Explain structured and Non Structured Mitigation. **8**
   b) GIS and GPS applications in disaster mitigation. **4**

8. a) Explain role of National Institute of Disaster Management. **4**
   b) Explain role and responsibilities of District Magistrate. **8**

9. a) Explain Relationship between Disaster and Development. **8**
   b) Local bodies and role of different functionaries. **4**

Set S

Set S