Hall Ticket Number :										

R-15

Code: 5G673

IV B.Tech. I Semester Regular & Supplementary Examinations November 2019

Bridge Engineering

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. **Explain** with neat sketches IRC class loadings on a bridge. 14M

OR

2. a) **Illustrate** with a neat sketch half section & half elevation of a box culvert. 6M

   b) **Explain** in detail the design procedure of a box culvert. 8M

UNIT–II

3. A road bridge deck consists of an RCC slab continuous over Tee beams spaced 2m.apart & cross girders spaced 5m c/c. Thickness of wearing coat=100mm. Type of loading is IRC classAA tracked vehicle. Using M-20 concrete & Fe415 HYSD bars, **Solve** for the bending moments & dimensions of the slab. 14M

OR

4. A composite deck consisting of RCC slab on steel girders has the following details: Span of the bridge=15m. Road=Two lane highway, Kerbs=500mm. on either sides. Number of girders=4. Spacing of girders=2.5m c/c. Materials: M-40 concrete & Fe415 steel. **Solve** for dead load, live load & bending moments for the slab. Use Pigeaud's curves. 14M

UNIT–III

5. A plate girder deck for a BG track has the following data: Effective span=15m. Dead load of sleepers,rails & fittings=12KN/m. EULL for BM calculations/track=1650 KN. EULL for SF calculations=1850 KN/m. **Solve** for:

   a) Economic depth, b) Dimensions of flange, c) Dimensions of intermediate stiffners. 14M

OR

6. a) **Explain** with neat sketches types of shear Connectors adopted in a composite bridge. 7M

   b) **Explain** with neat sketches various components of a plate girder bridge. 7M

UNIT–IV

7. A steel rocker bearing has to transmit a vertical load of 1100 KN & an horizontal reaction of 120 KN at the support of a bridge girder. Assuming the permissible stresses as per IRC:83-1982, **solve** for the dimensions of the bearing. Consider, permissible compressive stress in concrete=40N/mm^2 , permissible bending stress in steel=160 N/mm^2 , permissible shear stress in steel=105 N/mm^2 , permissible bearing stress in steel plate=185 N/mm^2 14M

OR

8. An elastomeric pad bearing used for supporting a Tee beam girder of a bridge & has the following data: Maximum dead load reaction per bearing=325 KN. Maximum live load reaction per bearing=725 KN. Longitudinal force due to friction per bearing=50KN. Effective span of the girder=15m. Estimated rotation at bearing of the girder due to dead & live loads=0.0025 Radians. Concrete for Tee beams & bed blocks M-20 grade. Total estimated shear strain due to creep shrinkage & temperature=6.24X10^{-4} . **Solve** the given data for obtaining the dimensions of the bearing. 14M

UNIT–V

9. a) **Explain** with neat sketches various types of wing walls used in a bridge. 7M

   b) **Explain** briefly the various loads that have to be considered for the stability analysis of a pier. 7M

OR

10. a) **Explain** with a neat sketch the components of a well foundation used in a bridge. 8M

    b) **Explain** briefly the design parameters for an abutment. 6M

****

Hall Ticket Number :										

R-15

Code: 5G674

IV B.Tech. I Semester Regular & Supplementary Examinations November 2019

Concrete Technology

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. Write short note on chemical composition of cement. Describe the manufacturing process of Portland cement with the help of flow diagram. 14M

OR

2. a) What is hydration? Discuss the factors on which rate of hydration depend? 7M

   b) What is grading of aggregate? What is the importance of grading of aggregates? 7M

UNIT–II

3. a) What are the properties of fresh concrete? Explain the slump test method with neat sketch. 7M

   b) State Abram's law. What are the various parameters which control the strength of concrete? 7M

OR

4. a) Explain the following important properties of concrete; workability consistency, water cement ratio. 7M

   b) Discuss the effect of water cement ratio and gel/space ratio on the development of the strength of concrete 7M

UNIT–III

5. a) Write a brief note on Flexure strength test of Concrete. 7M

   b) Discuss ultrasonic test method for hardened concrete. 7M

OR

6. a) Describe the role of aggregate in creep of concrete 7M

   b) What is shrinkage? What factors promote shrinkage? What precautions will you take to reduce it? 7M

UNIT–IV

7. Design a concrete mix for characteristic strength of 30MPa at 28 days with a standard deviation of 4MPa.The specific gravity of FA and CA are 2.60 and 2.70 respectively. A slump of 50mm is necessary. The specific gravity of cement is 3.15.Assuming the necessary data design the mix as per IS code method. 14M

OR

8. a) Identify the factors that have influence on durability of concrete? 7M

   b) Describe quality control of concrete?

UNIT–V

9. Explain the following,
   a) Cellular concrete
   b) Polymer concrete
   c) Light weight aggregate concrete
   d) SIFCON 14M

OR

10. a) Difference between High performance concrete and high density concrete. 7M

    b) What is the need to study fiber reinforced concrete and explain briefly the factors effecting properties of fiber reinforced concrete? 7M

****

Hall Ticket Number :										

R-15

Code: 5G672

IV B.Tech. I Semester Regular & Supplementary Examinations November 2019

Design and Drawing of Steel Structures

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

PART-A

Answer *any One* questions from the following (1 x 28 = 28 Marks)

1. Design the welded plate girder of 30 m span to support a live load of 75 kN/m uniformly distributed over the span. Adopt permissible stresses as per IS 800-2007. Draw the longitudinal, cross section and plan of the girder.

OR

2. Design a laced column 10 m long to carry a factored axial load of 1100 kN. The column is restrained in position but not in direction at both the ends. Provide a single lacing system with bolted connection. Design the lacing system with welded connections for channels back to back. Draw the
   (a) Plan
   (b) Sectional elevation
   (c) Cross section of the column.

PART-B

Answer *any Three* questions from the following (3 x 14 = 42 Marks)

3. a) Explain the phenomenon of load transfer in high strength friction grip bolts.
   b) How the strength of bolted connections is calculated.
4. a) Explain the web buckling and web crippling in beams.
   b) Design a plate girder 24 m in span and laterally restrained throughout. It has to support a uniformly distributed load of 100 kN/m throughout the span exclusive of self-weight. Design the plate girder without intermediate transfer stiffeners. Also design the cross section, end load bearing stiffener and connections.
5. a) A tension member carrying a tension of 160 kN consists of two angles. Design the member
      (i) If the angles are connected on opposite side of gusset plate.
      (ii) The angle are connected on the same side of the gusset plate.
   b) Design the simply supported beam of beam of 8 m span for carrying a U.D.L of 40 kN/m if the beam is restrained against torsion and ends of compression flanges are fully restrained against lateral bending.
6. a) Explain the types of trusses with a neat sketches.
   b) Design a gusset base for the column section consisting of SC250 with two cover plates 300 x 25 mm carrying an axial load of 2500 kN. SBC of of soil is 250 kN/m^2 and permissible bearing pressure of concrete is 4000 kN/m^2.
7. a) The principal rafter in a tubular truss carries a load of 180 kN. A tie member meeting with at 45^0 to it carries a load of 1000 kN. The panel length of rafter is 2.4 m and that of the tie member is 2.5 m. Design the members using 240 steel tubes are used.
   b) Explain the step by step procedure how to design a gantry girder.

****

Hall Ticket Number :										

R-15

Code: 5G671

IV B.Tech. I Semester Regular & Supplementary Examinations November 2019

Foundation Engineering

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) Explain the pressure meter test with a neat sketch. 7M

   b) Explain with neat sketch static cone penetrations test. Discuss the applicability test. How do you estimate the shear parameters of soil from the test? 7M

OR

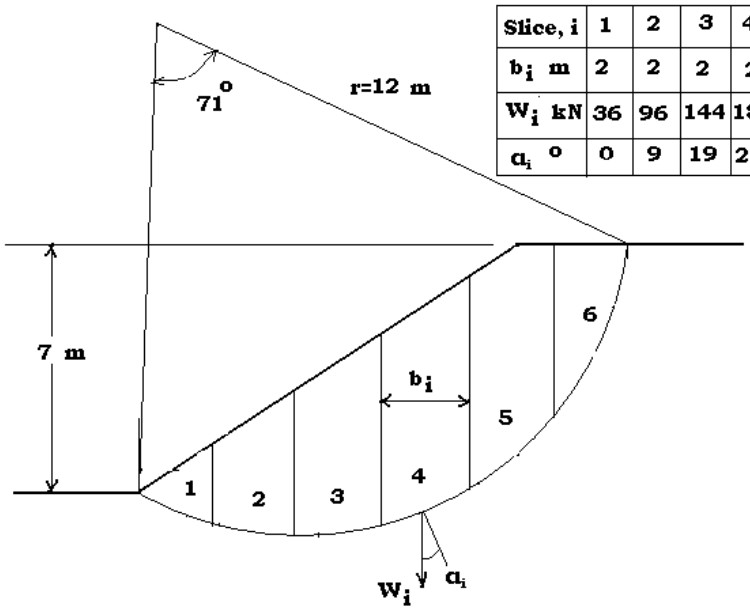
2. a) Explain the standard penetration test. Explain the corrections to be applied for standard penetration test N value. Write the limitations of standard penetration test. 7M

   b) Describe the salient features of a good sub-soil investigation report. 7M

UNIT–II

3. a) Explain the Coulomb's earth pressure theory with a neat sketch. 7M

   b) Figure shows a trial slip surface through a soil mass (c=20 kN/m^3, Φ=30^o, γ=20 kN/m^3). Determine the factor of safety using standard method of slices.



Slice, i	1	2	3	4	5	6
b_i m	2	2	2	2	2	2
W_i kN	36	96	144	180	160	72
a_i °	0	9	19	29	42	55

7M

OR

4. a) Derive the expression factor of safety of infinite slope for a c-Φ soil with neat sketch considering various field conditions. 7M

   b) A retaining wall with a vertical back 6 m high supports cohesion less backfill (with unit weight 19.6 kN/m^2). The upper surface of the backfill rises at an angle of 10^o with the horizontal from the crest of the wall. The angle of internal friction for the soil is 30^o and angle of wall friction is 20^o. Find the total active earth pressure per meter length of the wall using Rebhann's graphical method and mark the direction, point of application of the resultant earth pressure. 7M

UNIT–III

5. a) Explain with neat sketch estimation of bearing capacity of soils by Meyerhoff's method. 7M

   b) A masonry retaining wall of trapezoidal section has its top width equal to 0.75m and height 6 m. Its face which is in contact with the retained earth is vertical. The earth retained is level at top. The soil weights 16 kN/m^3 and its $\Phi=30^o$. The masonry weighs 24 kN/m^3. Determine the minimum width of the base to avoid tensile stresses and also determine the maximum and minimum compressive stresses for this base width. If the coefficient of friction between base and soil is 0.60, check the stability of the retaining wall against sliding. 7M

OR

6. a) List the assumptions in Terzaghi bearing capacity theory. Explain the effect of water table on bearing capacity. 7M

   b) A water tank column foundation has to carry a gross allowable load of 1805 kN (including self weight). Given: D_f=1.5 m, γ=15.9 kN/m^3, ϕ=30°, and c=10 kN/m^2. Use Terzaghi's equation to determine the size of the foundation (B). Assume local shear failure.

Angle of Internal friction, Φ^o	Terzaghi's Bearing capacity factors		
	N_c	N_q	N_γ
15	12.9	4.4	2.5
20	17.7	7.4	5.0
25	25.1	12.7	9.7
30	37.2	22.5	19.7

7M

UNIT–IV

7. a) List the methods commonly used for calculation of settlement of foundations. Explain the determination of safe bearing pressure based on N- value. 7M

   b) A plate load test was conducted with a 30 cm square plate on a sand deposit and the following results were obtained.

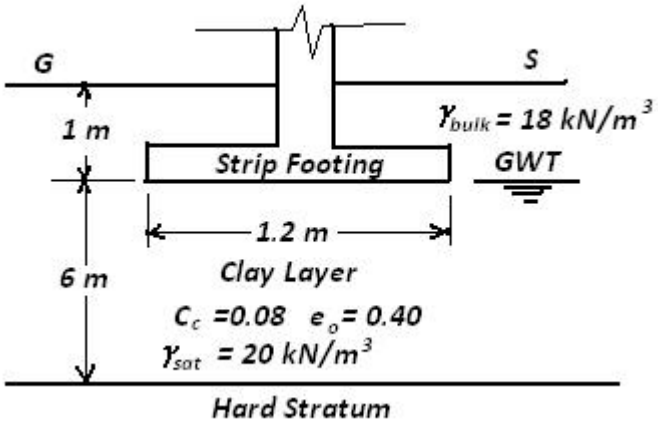
Load intensity on plate, KN/m^2	2	3	5	10	20	30	40	50
Settlement in mm	0.3	0.5	1.0	3.0	8.0	20.0	37.0	60.0

Determine i) Ultimate bearing capacity ii) Allowable bearing capacity and iii) expected settlement of a 2.5 X 3.0 m footing with load equal to 2/3 of allowable bearing capacity. 7M

OR

8. a) Explain the estimation of bearing capacity and settlement of foundations from plate load test data. 7M

   b) Figure shows the geometry of a strip footing supporting the load bearing walls of a three storied building and the properties of the clay layer. If the pressure acting on the footing is 40kPa, find the consolidation settlement of the footing. If the elastic modulus and the Poisson's ratio of the clay layer are respectively 50 MPa & 0.4 and if the influence factor for the strip footing is 1.75, find the elastic settlement of the footing.



7M

UNIT–V

9. a) Explain with neat sketch estimation of load carrying capacity of piles based on static pile formulae. 7M

   b) A square pile group of 9 piles of 25 cm diameter is arranged with a pile spacing of 1 m. The length of piles is 9 m. Unit cohesion of clay is 75kN/m^2. Neglecting bearing at the tip of the piles, determine group capacity. Assume adhesion factor of 0.75. 7M

OR

10. a) Explain the estimation of settlement of pile groups. 7M

    b) Enumerate and reflect through sketches the various components of a foundation well. Discuss briefly the function of each of these components. 7M

****

Hall Ticket Number :										

R-15

Code: 5G675

IV B.Tech. I Semester Regular & Supplementary Examinations November 2019

Prestressed Concrete

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) Enumerate the general principles of pre-tensioning. 7M

   b) Explain the Gifford – Udall system with neat sketch. 7M

OR

2. a) Describe the need for high strength concrete and high tensile steel in pre- stressed concrete. 7M

   b) Explain the methods of pre-stressing. 7M

UNIT–II

3. Explain the following .

   (i) Loss due to shrinkage of concrete. 7M

   (ii) Relaxation of steel. 7M

OR

4. A post tensioned cable of a beam 10 m long is initially tensioned to a stress of 1000N/mm^2 at one end. If the tendons are curved so that the slope is 1 in 15 at each end with an area of 600mm^2 , calculate the loss of pre stress due to friction, with the co-efficient of friction between duct and cable as 0.55, and friction co-efficient for wave effect as 0.0015/m. During anchoring, if there is a slip of 3mm at the jacking end, calculate the final force in the cable and the percentage loss of pre stress due to friction and slip. 14M

UNIT–III

5. A continuous pre stressed concrete beam ABC (AB=BC=10 m) has a uniform rectangular cross section with a width of 150mm and depth of 300mm.The cable carrying an effective pre stressing force of 400 kN is parallel to the axis of the beam and located at 100 mm from the soffit.

   (i) Determine the secondary and resultant moment at the central support B.

   (ii) If the beam supports an imposed load of 1.5kN/m, calculate the resultant stresses at top and bottom of the beam at B. Assume density of concrete as 24 kN/m^3. 14M

OR

6. Discuss the steps involved in the determination of extreme fibre stresses in pre-stressed concrete pre-tensioned beams. 14M

UNIT–IV

7. A post tensioned pre stressed concrete beam has a simply supported span of 35m. The beam has to support a dead load of 3.5 kN/m, together with an imposed load of 25 kN/m in addition to the self weight. The grade of concrete specified is M-40. The compressive strength of concrete at transfer is 35N/mm^2. The loss ratio is 0.80. The 64 mm cables containing 7–15mm strands with an ultimate load capacity of 1750kN are available, Using IS:1343 provisions, design the cross section of the girder to comply with various limit states. 14M

OR

8. Discuss the steps involved in the design of pre stressed concrete rectangular-section beams as per IS code. 14M

UNIT–V

9. The end block of a pre-stressed concrete beam, rectangular in section, is 200 mm wide and 300mm deep. The pre-stressing force of 150kN is transmitted to concrete by a distribution plate,100mm wide and 50mm deep, concentrically located at the ends. Calculate the position and magnitude of the maximum tensile stress on the horizontal stress through the centre and edge of the anchor plate. Compute the bursting tension on these horizontal planes. 14M

OR

10. Explain with neat sketches the concept of equivalent or symmetric prism in end blocks subjected to forces with multiple anchorages. 14M

****

Hall Ticket Number :										

R-15

Code: 5G676

IV B.Tech. I Semester Regular & Supplementary Examinations November 2019

Railway Docks and Harbour Engineering

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) Define permanent way. What are the ideal requirements of permanent way? 7M

   b) What is meant by wear of rails? How do you classify the wears and discuss various causes of wears. 7M

OR

2. a) Define:

   i) Super elevation. ii) Negative cant. iii) Cant deficiency.
   iv) Grade compensation on curves. 8M

   b) Describe the functions of sleepers, fastenings and fixtures. 6M

UNIT–II

3. a) Give the classification of signals according to their locations in station yards along with suitable sketches. 8M

   b) With neat diagram explain the needle beam method of tunneling in soft soils 6M

OR

4. a) What essential purposes are served by signaling and interlocking? What is meant by route delay interlocking? 7M

   b) With the help of neat sketch, explain the transfer of center line from surface to tunnel. 7M

UNIT–III

5. a) What is a “Harbour”? What are the types of harbours available? Explain with the help of neat sketches. 7M

   b) What are the different methods of mound construction? With the help of neat sketch explain any one method. 7M

OR

6. a) Differentiate between Natural and Artificial harbors. 7M

   b) Define floating dry docks and explain the different types of floating docks. 7M

UNIT–IV

7. a) Distinguish between quays and jetties. 5M

   b) Explain the formation of tides. Explain tidal day, spring tides and neap tides. 9M

OR

8. a) Explain about
   i). Spring Fenders. ii). Uses dolphins. iii). Floating Landing Stages. 7M

   b) Giving neat sketches, describe the purpose for which Quays, Wharves and Jetties are to be provided in ports. 7M

UNIT–V

9. a) With the help of neat sketch explain about the hydraulic Dredger 7M

   b) What are the theories associated with formation of waves and tides? What protective works are needed in a harbour for safety against tides? 7M

OR

10. a) What is dredging? List the modern types of mechanical dredges 5M

    b) Explain in detail about the different maintenance works in the harbors. 9M

****