Hall Ticket Number :										

Code: 5G673

R-15

IV B.Tech. I Semester Regular Examinations November 2018

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)

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(Assume Required data if any)

UNIT–I

1. a) Indicate the extent of survey to be undertaken and relevant data to be collected for fixing site and waterway of the bridge. 7M

   b) Explain the various types of IRC loadings in the design of highway bridges. 7M

OR

2. A reinforced concrete box culvert of prismatic form with a clear vent way 3.5 m × 3.5m is required for a road crossing. The box culvert has to support a superimposed dead load at 8.5 kN/m^2. Density of soil is 18 kN/m^3 and the angle of repose of soil is 30^0. Adopting M-20 grade concrete and Fe-415 grade steel. Design the box culvert and sketch the details of reinforcement. 14M

UNIT–II

3. a) Explain the analysis or methodology pertaining to dispersion of loads in deck slab spanning in two directions. 7M

   b) Sketch the typical reinforcement details for the deck slab of a reinforced concrete culvert with a clear span of 6.0m. Assume width of roadway is double lane. 7M

OR

4. Design a R.C.C. T-Beam and slab deck to suit the following data.
   Effective span of girders=16m, width of kerbs=600 mm, clear width of road way = 7.5 m, thickness of wearing coat = 80 mm, No of main girders=4m, spacing of main girders = 2.5 m, spacing of cross girders = 4m, Type of loading = IRC class 70R tracked vehicle, materials, M20grade concrete and Fe415 grade HYSD bars. Design the deck slab and draw the details of reinforcement. 14M

UNIT–III

5. Arrive the cross section of a plate girder for railway bridge (single lane) with effective span of 30 m and dead load on the open floor 7.5 kN/m. Equivalent total load for BM calculation per track is 2727 kN and for shear is 2927 kN. 14M

OR

6. Write the advantages of the composite bridge. Briefly explain the behavior of composite bridge. 14M

UNIT–IV

7. a) Explain the forces acting on bearings. 7M

   b) Briefly explain the types of bearings with neat sketches. 7M

OR

8. Design a mild steel rocker bearing for transmitting the super structure reactive load of 1500kN.
   Allowable pressure on bearing block = 5 MPa
   Permissible bending stress = 165 MPa
   Permissible bearing stress = 100 MPa
   Permissible shear stress = 105 MPa 14M

UNIT–V

9. a) Write a short note on
   (i)Types of forces acting on abutments (ii) Bed block 7M

   b) Write a short note on
   (i)Types of wing walls (ii) Types of bridge foundations 7M

OR

10. a) What are the materials used for piers and abutments mention them. 7M

    b) List out the various types forces acting on piers. 7M

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Hall Ticket Number :										

R-15

Code: 5G674

IV B.Tech. I Semester Regular Examinations November 2018

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)

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UNIT–I

1. a) What are different grades of cement? Explain the difference among the same. 6M
   b) What are types of admixtures? Explain the role of them. 8M

OR

2. a) What is the significance of 'fineness modulus? How do you obtain the same for fine aggregate? 8M
   b) How do you obtain the specific gravity for fine and coarse aggregate? 6M

UNIT–II

3. a) Describe the effect of time and temperature on workability of concrete. 6M
   b) What are setting times of concrete? Explain segregation and bleeding of concrete. 8M

OR

4. a) Explain gel-space ratio and maturity of concrete 6M
   b) What are the factors affecting the strength of concrete? Explain the relation between compressive strength and tensile strength of concrete. 8M

UNIT–III

5. a) Explain compressive tests of hardened concrete? Explain the factors affecting the strength. 8M
   b) Explain the Ultrasonic Pulse Velocity test method. 6M

OR

6. a) Define creep of concrete. What are the factors influencing the creep. 8M
   b) Explain modulus of elasticity of concrete and dynamic modulus of elasticity. 6M

UNIT–IV

7. a) Discuss different factors to be considered in the choice of mix proportions? 8M
   b) What is meant by quality control of concrete? 6M

OR

8. Design a concrete mix of M20 grade for a roof slab. Take a Standard deviation of 4.0 MPa. The specific gravity for Coarse Aggregate and Fine Aggregate are 2.73 and 2.60 respectively. The bulk density of coarse aggregate is 1615kg/m3 and fineness modulus of fine aggregate is 2.74. A slump of 60mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using IS code method. Assume any missing data suitably 14M

UNIT–V

9. a) Write short note on Light weight aggregate concrete and its applications. 8M
   b) Write short note on SIFCON and Bacterial concrete. 6M

OR

10. a) Discuss high density concrete and high performance concrete 8M
    b) Explain self consolidating concrete. 6M

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Hall Ticket Number :										

R-15

Code: 5G672

IV B.Tech. I Semester Regular Examinations November 2018

Design & Drawing of Steel Structures

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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PART-A

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

1. Design a gantry girder for an industrial building to carry an electric overhead traveling crane with the following data. Crane capacity is 300 kN. Weight of crane excluding crab is 200 kN. Weight of crab is 5 kN. Span of crane between rails is18 m. Minimum hook approach is1.0 m. Wheel base is 3.0 m. Span of gantry girder is 9 m. Weight of rail section is 30 kg/m. and Draw to Scale the longitudinal and cross sections. 28M

2. A column in an industrial building has to carry a total load axial load of 1500kN. Its length is 5.25m and is effectively restrained in position as well as direction at both the ends. Design a double I section for the column. Design a single lacing system for the column. Draw to Scale the plan and elevation. 28M

PART-B

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

3. Design a suitable section for a beam of effective span 6m and carrying a superimposed load of 30kN/m including its self-weight. Assume that the compression flange is fully restrained against lateral buckling. Apply necessary checks. 14M

4. a) What is a tension member? Explain practically where tension members are exist with neat sketches. 7M

   b) Design a tension member to carry a load of 280 kN. The two angles placed back to back with long legs out standing are desirable. The length of the member is 3.5m. 7M

5. a) explain the modes of failures of bolted connections 7M

   b) A member of a truss consists of two angles ISA 100*100*6mm placed back to back. It carries an ultimate load of 300KN and is connected to a gusset plate 8mm thick placed in between two connected legs. Determine the number of full threaded M20 bolts of grade 4.6 required for this joint. End distance and pitch distance to bolt holes are respectively are 30mm and 40mm. Partial safety factor for bolt is 1.25 7M

6. Design an I-section purlin for an industrial building to support a galvanized corrugated sheet roof for the following data.

   Spacing of the truss c/c = 6m
   Span of truss = 12m
   Slope of truss = 30^o
   Spacing of purlins c/c = 1.5m
   Intensity of wind pressure = $2kN/m^2$
   Weight of galvanized sheets = $130N/m^2$
   Grade of steel = Fe410 14M

7. Discuss the advantages and disadvantages of welded connections over the bolted connections and explain about different types of welded Connections 14M

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Hall Ticket Number :										

R-15

Code: 5G671

IV B.Tech. I Semester Regular Examinations November 2018

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)

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UNIT–I

1. a) What are the objectives of soil exploration? And also state different types of samples. 7M

   b) Explain the plate load test for determining bearing capacity and settlement. 7M

OR

2. a) Explain the terms area ratio, inside clearance and outside clearance as applied to a sampler. Why they are provided? 7M

   b) Describe the method of conducting static cone penetration test. 7M

UNIT–II

3. a) What are the types of failure of slopes and explain the importance of stability number. 7M

   b) An embankment is constructed at an angle of 60^o to the horizontal. The cohesion of embankment soil is 40 kN/m^2, angle of shearing resistance is zero and unit weight is 18 kN/m^3. Calculate the safe height of the embankment for a factor of safety of 1.5. Assume the stability number as 0.91. 7M

OR

4. a) Explain the Culmann's graphical method for determination of active earth pressure in cohesionless soils. 7M

   b) A retaining wall is 7 m high, with its back face smooth and vertical. It retains sand with its surface horizontal. Determine the Rankine's total active earth pressure when the fill is dry and submerged. Take γ = 18 kN/m^3, $\varphi = 30^o$ and γ_{sat} = 21 kN/m^3. 7M

UNIT–III

5. Explain the different types of retaining walls with neat sketches and their suitability. 14M

OR

6. a) Derive the Terzaghi's bearing capacity equation for shallow foundation. 7M

   b) What is ultimate bearing capacity of a square footing 1.5 m x 1.5 m located at a depth of 1.2 m in a soil for which c = 25 kN/m^2, $\varphi = 15^o$ and γ = 17 kN/m^3. Terzaghi's bearing capacity factors are N_c = 10.98 , N_q = 3.94 , N_γ = 1.42. The water table is very deep. 7M

UNIT–IV

7. a) Explain the allowable bearing pressure and allowable settlements of shallow foundations. 7M

   b) Discuss the methods for the estimation of safe bearing pressure based on Standard Penetration number. 7M

OR

8. a) How do you estimate the bearing capacity of soil using the Meyerhof's theory? 8M

   b) A strip footing of 2 m wide is to be laid at a depth of 1.5 m in pure cohesive soil with unit weight 19 kN/m^3 and cohesion 150 kN/m^2. Determine the ultimate bearing capacity from (i) Terzaghi's theory (ii) Skempton's theory. 6M

UNIT–V

9. a) Explain the dynamic formulae to determine the load carrying capacity of piles. 7M

   b) A concreter pile, 400 mm diameter, is driven into a medium dense sand having $\varphi = 35^o$, γ = 21 kN/m^3 , K = 1.0 , tan δ = 0.70, N_q = 60 for a depth of 8 m. Estimate the safe load, taking a factor of safety of 3.0. 7M

OR

10. a) What are the different measures taken for rectification of shifts and tilts? 7M

    b) Explain different shapes of wells with neat sketches? 7M

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Hall Ticket Number :										

R-15

Code: 5G675

IV B.Tech. I Semester Regular Examinations November 2018

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)

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UNIT–I

1. a) Write about pre-tensioning and post-tensioning systems with neat sketches. 7M

   b) What are the advantages and limitations of prestressed concrete? 7M

OR

2. a) Elucidate the need for high strength steel and high strength concrete along with their characteristics. 7M

   b) List the different post-tensioning anchorages along with sketches. 7M

UNIT–II

3. a) What are the types of losses in prestressed concrete? Discuss the loss due to shrinkage of concrete. 7M

   b) A concrete beam of rectangular section of 100 mm width and 300 mm depth is prestressed by 5 wires of 7mm diameter located at an eccentricity of 50mm, the initial stress in the wires being 1250 N/mm^2. Estimate the loss of stress in steel due to creep of concrete using the ultimate creep strain method and the creep coefficient method. Use E_s=210GPa; E_c=35GPa; ε_{cc}=41x10^{-6} mm/mm per N/mm^2; Ø=1.6. 7M

OR

4. A pretensioned beam 250mm wide and 300mm deep is prestressed by 10 wires of 7mm diameter initially stressed to 1200N/mm^2, with their centroids located 100mm from the soffit. Find the maximum stress in concrete immediately after transfer, allowing only for elastic shortening of concrete.

   If the concrete undergoes a further shortening due to creep and shrinkage while there is a relaxation of six percent of steel stress, estimate the final percentage loss in the wires using IS:1343 regulations and the following data: E_s=210GPa; E_c=5700$\sqrt{f\ k}$; f_{cu}=45MPa; Ø=1.6; Total residual shrinkage strain=3x10^{-4}. 14M

UNIT–III

5. A rectangular concrete beam 150mmx300mm deep spans over 8m.It is prestressed by a straight cable carrying an effective prestressing force of 300kN located at an eccentricity of 50mm.The beam supports a LL of 2kN/m. Compute the extreme stresses at the mid-span of the beam. 14M

OR

6. An unsymmetrical I section beam is used to support an imposed load of 2kN/m over a span of 8m.The sectional details are: top flange,300mm wide and 60mm thick; bottom flange,100mm wide,60mm thick; thickness of web=80mm; overall depth of the beam=400mm. At the centre of the span, the effective prestressing force of 100kN is located at 50mm from the soffit of the beam. Estimate the stresses at the centre span section of the beam for: (a)prestress+self weight; (b) prestress+self weight+live load. 14M

UNIT–IV

7. Explain the design procedure of a rectangular prestressed concrete beam section according to the IS Code. 14M

OR

8. A prestressed concrete beam of rectangular section of size 250x600mm is prestressed with a straight cable with constant eccentricity of 100mm.The beam spans over 10m.It carries a load of 10kN/m and the prestressing force in the cable is 1000kN.If the density of concrete is 25kN/m^3,calculate the maximum principal stresses at a cross-section 300mm away from the support. 14M

UNIT–V

9. a) Explain analysis of end blocks by Magnel's method. 7M

   b) Explain about anchorage shear reinforcement, in detail. 7M

OR

10. A prestressed concrete beam 100mm wide and 200mm deep is subjected to an axial prestressing force of 100kN,through distribution plates 100mm wide and 50mm deep at the ends. Compute the position and magnitude of maximum tensile stress and bursting tension, using Guyon's method, for the end block. 14M

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Hall Ticket Number :										

R-15

Code: 5G676

IV B.Tech. I Semester Regular Examinations November 2018

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)

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UNIT–I

1. a) Explain various types of sleeper used in railway track. 7M
   b) What are the requirements of an ideal sleeper? 7M

OR

2. A 5˚ curve branches off from a 3˚ main curve in opposite direction in BG yard . The speed limit on branch curve line is 35 kmph. Determine maximum speed permitted on main line. Deficiency in cant is 7.6 cm. 14M

UNIT–II

3. a) Explain marshalling yard with their functions. 7M
   b) Explain various types of railway stations. 7M

OR

4. Explain various types of tunnels with their advantages and disadvantages 14M

UNIT–III

5. Describe various types of harbours. 14M

OR

6. Exlain the following terms:
   a) Dredging machines
   b) Slipways and Dry docks 14M

UNIT–IV

7. What is Wharf? Explain types of its construction and its advantages. 14M

OR

8. Explain the following:
   (a) Jetties and Dolphins
   (b) Masonary or mass concrete walls 14M

UNIT–V

9. Briefly explain the procedure for maintenance of lock gates and cassions? 14M

OR

10. What are the various types of dredger, explain in brief? 14M

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