IV B.Tech. I Semester Supplementary 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/m². Density of soil is 18 kN/m³ 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= 16 m,   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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Code: 4G674

R-14

IV B.Tech. I Semester Supplementary 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 compression 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 4MPa. 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   14

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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Code: 4G67C

IV B.Tech. I Semester Supplementary Examinations November 2018

Construction Technology and Project Management

(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) List the documents required for actual project implementation.

   b) What is the difference between record and document?

OR

2. a) How do you maintain the construction records? Explain it

   b) List of records/documents the owners must have at starting of the project and at the end of the project

UNIT–II

3. a) Differentiate between confined excavation and sloped excavation

   b) Mention the types of dredgers deployed for dredging operation and explain about water injection dredger

OR

4. a) What are the factors that contribute to the selection of drilling method and equipment?

   b) What is pre splitting? When is pre splitting done?

UNIT–III

5. a) What is the role of decision making in project management?

   b) Outline the techniques for analyzing operation research.

OR

6. a) Explain steps involved in development of bar chart

   b) Explain following terms:

      (i) Project planning. (ii) Project scheduling. (iii) Project controlling and monitoring

UNIT–IV

7. Write short notes on the following:
      i) Event and activity.
      ii) Network rules and graphical guidelines for network.
      iii) Work breakdown structure.

OR

8. a) What are steps involved in development of network.

   b) Explain about the development of PERT network problems

UNIT–V

9. The network diagram for a certain project is shown in fig .Determine the expected time for each of the path, which path is critical.
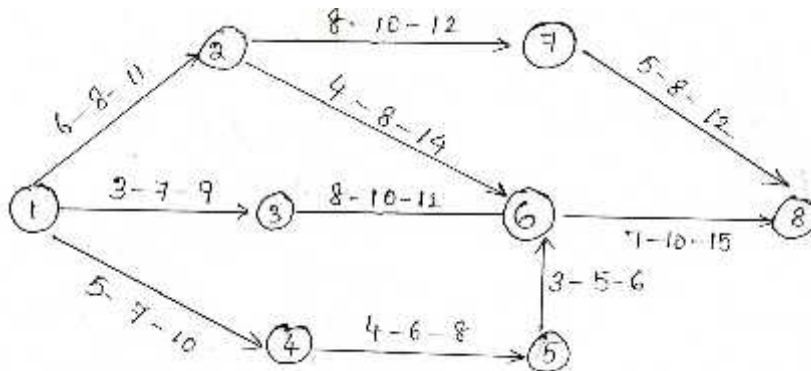
OR

10. a) Difference between the Frequency distribution and Probably Distribution in detail

    b) Describe about Latest Allowable Occurrence Time.

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Code: 4G672

R-14

IV B.Tech. I Semester Supplementary Examinations November 2018
Finite Element Methods in Civil 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.   Determine the maximum deflection for a simply supported beam subjected to uniformly distributed load throughout the span using Rayleigh-Ritz method of functional approximation.

OR

2.   Derive Stress-Strain relationship matrix of a 3D element.

UNIT–II

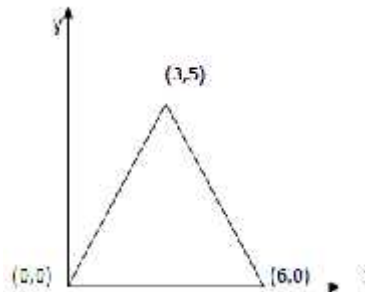3.   Determine the Shape functions for a one dimensional linear element.

OR

4.   Explain briefly about the following terms.
     (i) Convergence requirements
     (ii) Compatibility requirements and
     (iii) Geometric invariance

UNIT–III

5.   Determine the element stiffness matrix for the triangular element as shown in figure, under plane stress condition. Assume that E=200 Gpa, μ=0.25 and t=1mm.

OR

6.   Derive the shape functions for a 3-noded triangular element.

UNIT–IV

7.   Explain briefly about Lagrangian and Serendipity elements

OR

8.   Determine the shape functions for a four noded Iso-parametric quadrilateral element.

UNIT–V

9.   Evaluate the integral I= cos /2 x dx using one point, two-point and three-point Gauss rule and compare with exact solution

OR

10. Explain briefly about Static condensation of elements.

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R-14

Code: 4G671

IV B.Tech. I Semester Supplementary Examinations November 2018
Geotechnical Engineering-II
(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 do you understand by site investigation? What are the different purposes for which site investigations are done?

   b) Describe the salient features of a good sub soil investigation report?

OR

2. a) A SPT was conducted in a dense sand deposit at a depth of 22 m, and a value of 48 was observed for N. The density of the sand was 15 kN/m^2. What is the value of N, corrected for overburden pressure?

   b) Discuss standard penetration test. What is the importance of test in geotechnical engineering?

UNIT–II

3. a) Explain briefly Taylor's stability number with neat sketches?

   b) An embankment 10 m high is inclined at 35° to the horizontal. A stability analysis by the method of slices gave the following forces: N = 900 KN, T = 420 KN, U =200 KN. If the length of the failure arc is 23 m, find the factor of safety. The soil has c = 20 KN/m^2 and   = 15°

OR

4. a) What are the assumptions in Coulomb's theory? Derive the expressions for active pressure and passive pressure.

   b) Describe the construction procedure by graphical technique of earth pressure by Rebhan's method?

UNIT–III

5. a) What is meant by Earth Retaining structures? Briefly explain types of Retaining wall in Detail?

   b) A 4 m high Retaining wall with vertical back face was constructed to retain a back fill of loose sand with a horizontal top surface flushed to the top of the wall. Laboratory investigations revealed that sand had the following properties ø=20^0, G= 2.365, e=1.05, S= 0.the back of retaining wall is relatively smooth. Compute the total active earth pressure exerted by compute the total active earth pressure exerted by the back fill using any suitable theory. A few months after construction the fill was thoroughly compacted and consequently its ø-value increase to 32^0. However the top surface of the backfill was depressed by 80 cm. determine the percentage change in the total active earth pressure?

OR

6. a) What are the types of shallow foundations? Explain them with neat sketches.

   b) Explain the types of shear failure experienced by shallow foundations and mention the parameters to decide type of shear failure?

UNIT–IV

7. a) The size of square footing must be restricted to 1.75 m x 1.75 m the footing has to carry a net load of 1000 KN coming from the super structure. The foundation soil has the following properties. Density of soil is 1.86 g/cc, cohesion of soil=0, the angle of internal friction = 20^0. For ø= 20^0, N_C = 11.8, N_q = 3.9, N = 1.7. Determine the minimum depth at which footing has to carry having F.S is 2.5.

   b) Compute the safe bearing capacity of a square footing 1.5 m × 1.5 m, located at a depth of 1 m below the ground level in a soil of average density 20 kN/m3. = 20°, Nc = 17.7, N q = 7.4, and N = 5.0. Assume a suitable factor of safety and that the water table is very deep. Also compute the reduction in safe bearing capacity of the footing if the water table rises to the ground level.

OR

8. a) What are the assumptions made in Terzaghi's analysis of bearing capacity of a continuous footing?

   b) The footing of a column is 2.25 m square and is founded at a depth of 1 m on a cohesive soil of unit weight 17.5 kN/m³. What is the safe load for this footing if cohesion = 30 kN/m2; angle of internal friction is zero and factor of safety is 3. Terzaghi's factors for = 0° are Nc = 5.7, N q = 1, and N = 0.

UNIT–V

9. a) A 4x4 pile group in square pattern consists of 400mmx400mmx20 m long concrete piles placed at 1 m centre to centre. The soil profile consists of 8 m of soft clay (C = 25 Kpa, adhesion factor = 0.9) underlain by 20 m of medium stiff clay (C = 50kPa, adhesion factor = 0.8).Estimate the safe bearing capacity of the pile group with a F.S of 3.0

   b) How do you estimate the pile load capacity by pile load test?

OR

10. a) What are the measures to rectify tilts and shifts?

    b) State the problems associated with well sinking and its remedial measures?

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IV B.Tech. I Semester Supplementary 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   14M
    permitted on main line. Deficiency in cant is 7.6 cm.

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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