Hall Ticket Number :										

Code: 4G673

R-14

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017

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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UNIT–I

1. Explain all the loading systems recommended by IRC for road bridges with neat sketches. 14M

OR

2. Design a reinforced concrete box culvert with inside dimensions of 3m height and 4.5 m width. The box culvert has to carry a super imposed load of 10 kN/m^2 and a live load of 50 kN/m^2 . The density of the earth is 18 kN / m^3. Angle of repose of soil is 30 degrees. Adopt M20 grade concrete and Fe-415 grade for steel. 14M

UNIT–II

3. Explain the steps involved in the analysis and design of deck slab bridges using effective width method in detail. 14M

OR

4. Design a reinforced concrete slab culvert for a national high way of two lane carriage way, 1m width foot path on either side, 6m clear span, 80mm wearing coat, 0.4m width of bearing. Adopt M25 grade concrete and Fe 415 steel, IRC class AA tracked vehicle loading system. 14M

UNIT–III

5. Design a deck type welded plate girder bridge with an effective span of the girder 30m, dead load 7.5 kN/m, equivalent total live load for bending moment calculations per track 2727 kN, total live load for shear calculations per track 2927 kN, Top of rail level 108, side slopes of embankment 1.5:1, foundation level 100.50, width of abutment 4m, Adopt rolled steel sections and steel plates with an yield stress of 236 N/mm^2 confirming to IS 226 and IRC 24. 14M

OR

6. Discuss the merits and demerits of composite bridges. 14M

UNIT–IV

7. Explain the working principle of a steel roller cum rocker bearing. Also sketch the arrangement of the bearing neatly. 14M

OR

8. Design a steel rocker bearing for transmitting a vertical reaction of 1000 kN and a horizontal reaction of 100 kN at the support of a bridge girder, assuming the following permissible stresses according to IRC:83-1982.. Permissible compressive stress in concrete bed block = 4 N/mm^2, permissible bending stress in steel plate = 160 N/mm^2, permissible bearing stress in steel plate =185 N/mm^2, permissible shear stress in steel = 105 N/mm^2. Sketch the details of the rocker bearing. 14M

UNIT–V

9. Explain various types of wing walls with neat sketches. 14M

OR

10. Verify the stability of the abutment of a bridge with the following details. Top width 1.5m, height 4m, back butter : 1 in 6, front face of the abutment is vertical, material : stone masonry, unit weight of soil : 18 kN/m^3 , angle of repose ; 30 degrees, super structure : T – beam bridge of span 15m, Loading : IRC class AA, assume suitable dimensions for the components of the super structure. 14M

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Hall Ticket Number :										

Code: 4G674

R-14

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017

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) Explain the difference between various grades of ordinary Portland cement? 8M
   b) What do you understand by the bulking of sand? How does it affect quantity of sand of volume batching? 6M

OR

2. a) Explain type of admixtures and its effect on concrete? 7M
   b) Explain about grading zones of sand? 7M

UNIT–II

3. a) What do you understand by workability of concrete? Describe any one test for it? 8M
   b) Explain factors affecting the setting time of the concrete? 6M

OR

4. Explain maturity of concrete and its effects on strength of concrete. What do you understand by nominal grade of concrete? Also explain curing of concrete**.** 14M

UNIT–III

5. a) Discuss compressive strength test of concrete? 7M
   b) Describe in brief the rebound hammer method of non-destructive testing of concrete? 7M

OR

6. a) Describe creeps of concrete and factors influencing creep of concrete? 6M
   b) Write short notes on segregation and bleeding of concrete? 8M

UNIT–IV

7. a) What do you understand by target mean strength and find target mean strength of M25 grade after 28 days 8M
   b) Explain the term durability and various factors affecting durability of concrete? 6M

OR

8. a) Discuss quality control of concrete in mix design? 7M
   b) Write the recommendation and guidance of mix design as per IS 10262:1982? 7M

UNIT–V

9. a) Discuss high density concrete? 7M
   b) Explain fiber reinforced concrete with examples? 7M

OR

10. a) Discuses high performance concrete? 7M
    b) Write short note on self-compacting concrete? 7M

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Hall Ticket Number :										

Code: 4G67C

R-14

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017

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) Discuss about the need and advantages of construction schedule. 7M

   b) Explain the method of preparation of a bar chart for the construction of a machine foundation. 7M

OR

2. a) Write about the preparation and maintenance of construction records. 7M

   b) How do you ensure quality of construction at site? 7M

UNIT–II

3. a) Briefly explain about the working characteristics of different rock drills. 7M

   b) Why is accident prevention programme essential in a construction project? What essential steps are to be taken in a safety programme for construction? 7M

OR

4. a) Discuss about the effects of blasting on environment. 7M

   b) What is meant by smooth blasting? List out the circumstances where it is required. 7M

UNIT–III

5. a) Briefly explain the terms project planning, scheduling and controlling 7M

   b) Discuss about the role of decision making in project management. 7M

OR

6. a) List out and discuss about the rules to be followed for developing networks. 7M

   b) How does Fulkerson's rule simplify the numbering procedure of events? 7M

UNIT–IV

7. a) Explain the terms earliest expected time, float, free float and forward pass. 7M

   b) Differentiate between critical and non critical activities. What is meant by critical path? 7M

OR

8. a) Differentiate between probability distribution and Beta distribution. 8M

   b) How is resource allocation made in a project? 6M

UNIT–V

9. Estimate:

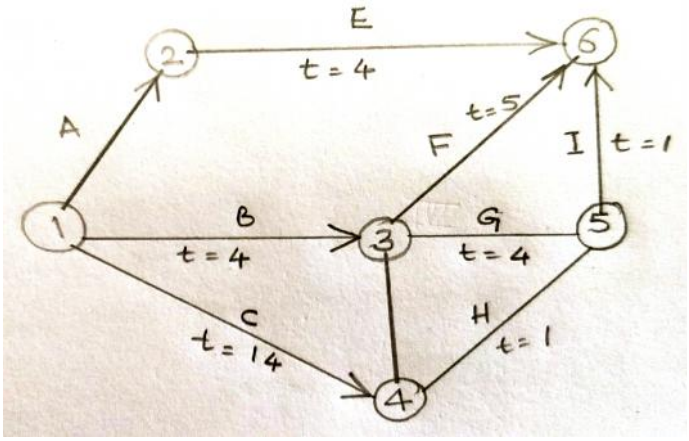
a) Earliest event time and latest event time

b) Earliest and latest start and finish times

c) total float and free float and

d) critical path for the project shown.

The estimated duration of different activities involved are given.



14M

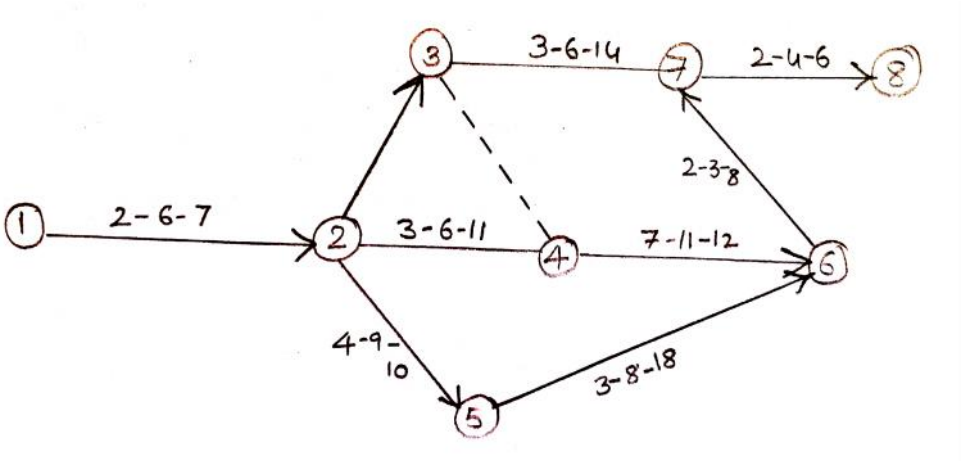
OR

10 Network shown below with three time estimates of each activity marked. Determine:

a) Critical path.

b) Probability of completion of project in 40 days.

c) Time duration that will provide 95% of completion



14M

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Hall Ticket Number :										

Code: 4G672

R-14

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017

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. a) Explain the concept of FEM. Write the advantages and disadvantages of FEM. 7M
   b) What is potential energy? Derive the principle of minimum potential energy. 7M

OR

2. a) State Hooke's law. Explain the constitutive relations for linear elastic
   i) An-isotropic solid **ii**) Orthotropic solid and **iii**) Isotropic solid 7M
   b) Explain the Plane strain condition. Write the constitutive relation and give examples. 7M

UNIT–II

3. a) Explain the modeling of 1-D elements in detail. And also write the notation of forces. 7M
   b) Derive the shape functions for a CST element. 7M

OR

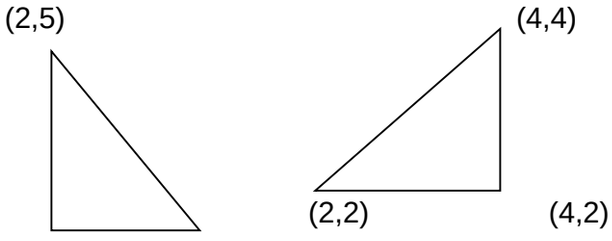
4. a) Derive the stiffness matrix and nodal load vectors for a two noded 1-D element 7M
   b) Explain the **i**) Convergence requirements **ii**) Geometric invariance 7M

UNIT–III

5. Derive the strain displacement matrix, stiffness matrix and nodal load vectors for a 2-D 4-noded rectangular element. 14M

OR

6. Determine the shape functions, strain displacement matrix and the stiffness matrix for the elements shown in figure (i) and (ii). Assume plane strain conditions. Take E-210 Gpa, poisson's ratio=0.3 and t=10mm.



14M

UNIT–IV

7. Derive the Jacobian matrix, strain displacement matrix and stiffness matrix for a 2-D 4-noded Iso-parametric quadrilateral element. 14M

OR

8. a) What are lagrangian and Serendipity elements? Explain. 7M
   b) Compare lagrangian and Serendipity elements. 7M

UNIT–V

9. Numerically evaluate the following integrals:
   i) $\int (6x+ 2x^4)\, dx$ **ii**) $\iint 9x^2y^4\, dx\, dy$
   Where $-1 \leq x \geq +1$ and $-1 \leq y \geq +1$ 14M

OR

10. a) Explain Assembly of elements in solution techniques 7M
    b) Explain the role of generalized co-ordinates in FEM 7M

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Hall Ticket Number :										

Code: 4G671

R-14

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017

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 soil exploration? What are the various purposes of soil explorations? 7M

   b) What are various stages in sub-surface exploration? 7M

OR

2. a) What are the various types of soil samples taken while soil explorations? 7M

   b) Write Short note on SPT test. 7M

UNIT–II

3. A 15 m high rigid wall with smooth vertical back retains the soil mass of moist cohesionless soil with horizontal backfill. γ= 16kN/m^3 , ϕ= 32^0 , k_0 =0.45
   i. Compute the total lateral earth pressure at rest and its location.
   ii. if the water table rises to the ground surface, what will be the difference in Earth pressure? 14M

OR

4. a) Write the various assumptions of Rankine earth pressure theory. 7M

   b) Explain Swedish circle method for stability analysis of slopes. 7M

UNIT–III

5. A 5 m high smooth retaining wall with vertical retains a cohesive backfill having c=30 kN/m2, γ= 18kN/m^3 and ϕ= 20^0. Calculate the depth of tension crack and the total active thrust, assuming the tension crack has fully developed. The backfill surface is horizontal. 14M

OR

6. a) What are the various types of retaining wall structures, describe with neat sketches? 7M

   b) A square shallow footing has dimensions 2mx2m and a depth of 2m. Determine the ultimate bearing capacity in pure clay with an unconfined strength of 150kN/m^2, γ= 16kN/m^3 and ϕ= 0^0. 7M

UNIT–IV

7. a) Write the major stages of plate load test for settlement analysis of soil. 7M

   b) A 500 mm square bearing plate settles by 10 mm in the plate load test on cohessionless soil, when the intensity of loading is 200kg/m2. Estimate the settlement of the footing of size 2m x 2m under the same intensity of loading. 7M

OR

8. a) Define (i) Gross pressure intensity. (ii) Net pressure intensity (iii) Ultimate bearing capacity (iv) Net ultimate bearing capacity. 7M

   b) Write a short note on Terzaghi's method of finding ultimate bearing capacity of soil. 7M

UNIT–V

9. a) Draw a neat sketch of typical cross section of a well foundation. 7M

   b) A precast concrete pile is being driven with a 35kN hammer having a free fall of 90 cm. if the penetration in the last five blows is 30 cm, determine the allowable load carrying capacity of the pile according to engineering news formula. Take c=2.5 for drop hammer. 7M

OR

10. a) Why we use pile foundation? Classify the piles based on the mechanism of load transfer. 7M

    b) What do you understand by well foundation? What are the functions of well foundation? 7M

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Hall Ticket Number :										

Code: 4G676

R-14

IV B.Tech. I Semester Regular Examinations Nov/Dec 2017

Railway Docks and Harbor 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) Define "Permanent way" and draw its cross section on an embankment, neatly showing the components. 7M

   b) What is a sleeper? Explain the requirements of a sleeper in order to make the permanent way ideal. 7M

OR

2. a) What is gradient? Explain the classification of gradients. 10M

   b) If the ruling gradient is 1 in 150 on a particular section of Broad Guage and at the same time, a curve of 3^0 is situated on this ruling gradient, what should be the allowable rulin gradient 4M

UNIT–II

3. a) Define a Railway Station. What are the purposes of a railway station? 7M

   b) Describe the factors that influence the site selection for a railway station. 7M

OR

4. Explain the necessity of railway tunnels? Draw a sketch to illustrate a single track railway tunnel. 14M

UNIT–III

5. a) Write an explanatory notes on the following

      (i) Mediterranean Harbours

      (ii) Cretan Harbours 8M

   b) Explain about, historical development of Bombay Port. 6M

OR

6. a) Give the classification of Harbours. Justify the answer with neat sketches. 8M

   b) Discuss the factors to be considered in the design and construction of Dock walls? 6M

UNIT–IV

7. a) Write a note on different types of jetties. 8M

   b) What is Landing stage? Explain the importance of floating landing stage in docks and harbours. 6M

OR

8. Give in detail information about the following.

   (i) Fenders

   (ii) Dolphins

   (iii) Wharves 14M

UNIT–V

9. a) Describe the types of dredgers used in dredging operation? Explain their features? 10M

   b) Describe the various types of maintenance works needed in a harbor? 4M

OR

10. a) How do you protect timber piles 7M

    b) Explain about, Maintenance of Fresh water. 7M

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