Hall Ticket Number :										

R-11 / R-13

Code: 1G673

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

Bridge Engineering

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks each**)

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1. a) Explain about the investigations carried out while planning and design of major bridges. 10M

   b) Briefly discuss about the seismic forces on bridges. 4M

2. Design a reinforced concrete box culvert with inside dimensions of 3 m height and 4.5 width. The box culvert has to carry a superimposed dead load of 10 kN/m^2 and a live load of 50 kN/m^2. The density of the earth is 18 kN/m^2. Angle of repose of soil is 300. Adopt M-20 grade concrete and Fe-415 grade tor steel. Sketch the details of reinforcements in the box culvert. 14M

3. Design a deck slab for the following particulars. Clear Span=5.5 m; Width of the foot path 1 m on either side; Wearing coat = 100 mm; Loading = IRC Class AA; Materials= M35 concrete and Fe 415 Steel 14M

4. A T-beam bridge has to be provided across a channel having the following data. Design the bridge deck (up to Longitudinal girders).

   Flood discharge= 30 m^3/s; Bed width = 12 m; side slope = 1:1; Bed level = 50 m; HFL = 51.25 m; Maximum allowable afflux=1.5 m; Hard rock available at 48 m, Road formation level = 54 m; Road = NH (2 lanes); Foot path = 1 m wide on either side; Loading= IRC Class AA; Materials= M40 & Fe 415; No. of longitudinal girders = 3 14M

5. Using the following particulars to design a plate girder bridge for a broad gauge track.

   Span= 20m; Top level of the railway embankment=115m; Bed level of the stream = 100m; Ground level suitable for foundation = 98m; stream bund top level = 101.50m. 14M

6. What are the different types of shear connectors used in the composite bridges? Briefly explain about them with the help of neat sketches. 14M

7. 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 typical details of rocker bearing. 14M

8. a) Draw the sketch of abutment showing typical details along with its structural components. 7M

   b) Briefly explain about the various forces acting on the piers and abutments. 7M

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Code: 1G674

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

Concrete Technology

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks each**)

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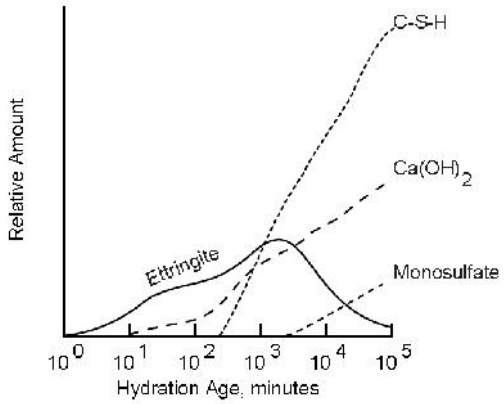
1. a) Draw the schematic depiction of the process of manufacturing cement. 4M

   b) Mention the oxide and compound compositions of cement. 3M

   c) Why does flash set occur in cement hydration and how could you rectify it? 3M

   d) Analyse and discuss the figure shown below.



4M

2. a) Mention any two important characteristics of aggregates and their influence on concrete. 4M

   b) What is bulking of sand? Mention its influence on concrete mix. 3M

   c) Why is grading of aggregate important with respect to the properties of concrete? 4M

   d) Why is the use of sea water not recommended in concrete making? 3M

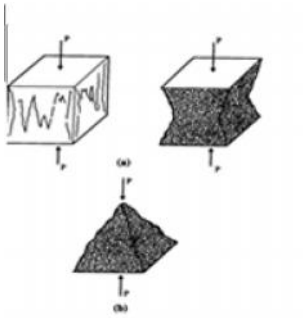
3. a) Discuss the effects of using fly ash, silica fume, slag, rice husk ash and metakaoline on fresh concrete properties. 8M

   b) How would you obtain a workable concrete mix? Explain. 6M

4. a) Discuss the stress-strain curve for concrete with suitable sketches. 5M

   b) Why capping of cylindrical concrete specimen is needed? Mention the materials used for capping. 4M

   c) Discuss any two factors affecting the measured compressive strength of concrete.



5M

5. Discuss any seven factors affecting the measured compressive strength of concrete. 14M

6. a) What are the various factors affecting Creep and shrinkage of concrete? 7M

   b) How does strength of concrete influence the modulus of elasticity of concrete? 7M

7. Assume that you are a Concrete Technologist working with L & T. The company got a contract to build world tallest building in Mumbai. You got an assignment to design the concrete using any standard codes for the following specifications. 30 % of cement should be replaced by Slag as desired by the company.

   Grade : **M30**

   Exposure Condition : **Extreme**

   Slump @ Site : **150**

   Nominal Maximum Size Aggregate : **20mm – Angular Shaped**

   Fine Aggregate : M-**Sand**

   Admixture HRWR : **with around 20% Water Reducing Capacity**

   Cement : **53 Grade OPC**

   Specific gravity of 20 mm : **2.78**

   Specific gravity of 12.5 mm : **2.75**

   Specific gravity of M-sand : **2.60**

   Specific gravity of Slag: **2.1**

   Water absorption of M-sand **: 4%** 14M

8. a) What is the principal advantage of using fiber-reinforced concrete? Explain how the concrete acquires this property. 6M

   b) Compare the technologies of producing latex- modified concrete and polymer-impregnated concrete. 4M

   c) Mention the circumstances in which you will recommend the following

   (i) Self compacting Concrete, (ii) Polymer Concrete, (iii) Fiber reinforced concrete (iv) Light weight concrete 4M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G67C

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

Construction Technology and Project Management

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks each**)

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1. a) Explain safety guidelines in construction activities? 7M
   b) Describe the construction records? 7M
2. Discuss the role of Infrastructure development in Indian Economy? 14M
3. a) Explain earthwork excavation? 5M
   b) Discuss the ground water control methods? 9M
4. a) Explain various equipment used for blasting and their selection criteria? 8M
   b) Discuss environmental effects of blasting? 6M
5. a) Discuss the stages in development of bar chart? 7M
   b) Discuss the shortcomings of bar charts and the remedial measures? 7M
6. a) Explain forward, backward and combined planning? 7M
   b) Discuss event oriented diagrams and activity oriented diagrams? 7M
7. The details of network for a construction project are given below. Draw the network diagram and Calculate **a**) Expected time of completion of each activity, **b**) Earliest expected time for each event, **c**) Latest allowable occurrence time for each event. 14M

Activity	Optimistic Time	Most likely Time	Pessimistic Time
1 - 2	6	9	`8
1 - 3	5	8	17
2 - 4	4	7	22
3 - 4	4	7	16
2 - 6	4	7	10
3 - 7	2	5	8
4 - 5	4	10	22
5 - 6	0	0	0
5 - 7	0	0	0
6 - 8	3	5	13
7 - 9	4	9	20
8 - 10	5	8	17
9 - 10	4	7	16
5 - 10	6	11	20

8. A project consists of nine activities and the details about them are given below in the table. Draw the project network; identify critical path and determine-duration of the project. Also determine total float, free float and independent float for each activity. 14M

Activity	Predecessor	Duration (weeks)
A	-	3
B	-	4
C	-	14
D	B	3
E	A	5
F	B	6
G	B	4
H	C,D	1
I	G,H	1

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Hall Ticket Number :										

R-11 / R-13

Code: 1G672

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

Finite Element Methods in Civil Engineering

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks each**)

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1. a) Explain the concepts of FEM and outline the procedure. 7M

   b) Discuss the advantages and disadvantages of FEM over Finite difference method (FDM) 7M

2. a) Give constitutive laws for three dimensional problems of

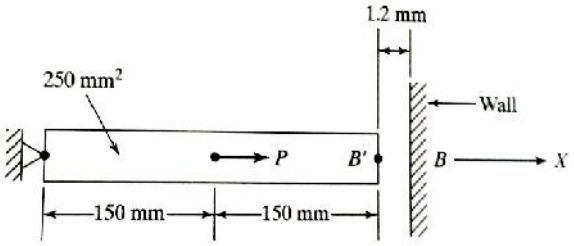
   (i) Orthotropic materials

   (ii) Isotropic materials. 7M

   b) Derive strain displacement relationship matrix for an Axi-symmetric element. 7M

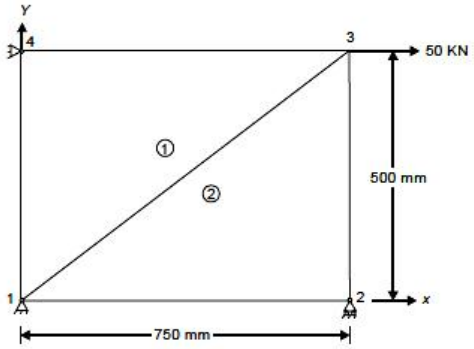
3. a) What is shape function? What is characteristic of a shape function? 4M

   b) In Fig.1, a load P = 30X103 N is applied as shown. Determine the displacement field, stress and support reactions in the body. Take E = 20x103 N/mm2.



10M

4. Find the nodal displacements and element stresses in the propped beam shown in Fig. 2. Idealize the beam into two CST elements as shown in the figure. Assume plane stress condition. Take μ = 0.25, E = 2 × 105 N/mm2, Thickness = 15mm.



14M

5. a) Generate the element stiffness and nodal load matrices for 3-node triangular element. 10M

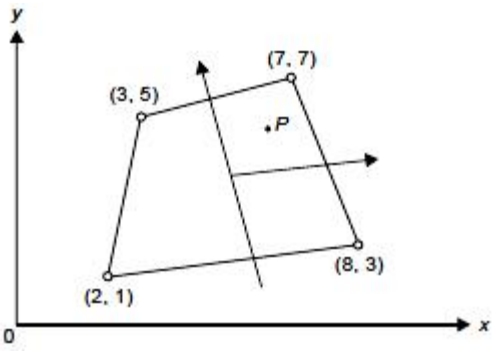
   b) Determine the shape functions for the Constant Strain Triangle (CST). Use polynomial functions. 4M

6. a) Explain the about subparametric, superparametric and isoparametric elements in finite element analysis 6M

   b) State and Prove convergence criteria for isoparametric elements. 8M

7. Derive the finite element formulation of 4- noded iso-parametric axi-symmetric element. 14M

8. a) Determine the Cartesian coordinate of the point P(ξ = 0.5, η = 0.6) shown in Fig



5M

   b) Evaluate the integral: $I = \int_{-2}^{3} (x^2 + 11x - 32)dx$ using one and two point gauss Quadrature. Compare with the exact solution for accuracy. 9M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G671

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

Geotechnical Engineering–II

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks each**)

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1. a) Describe with a neat sketch how will you carry out the wash boring method of soil exploration. What are its merits and demerits? 7M

   b) Compute the area ratio of a sampler with inside diameter 70 mm and thickness 2 mm comment 7M

2. a) What is meant by slope factor of safety? Explain Taylor's stability number and how it is modified for different stability conditions of canal slope. 7M

   b) An embankment is made of soil having $c' = 10$ kN/m^2, $\phi' = 23^0$ and $\gamma = 19$ kN/m^3. The embankment is of 9 m height and has a slope of 30^0. The average pore pressure ratio may be taken as 0.30 for the condition of steady seepage. Using the Bishop's simplified method of slices, determine the factor of safety against shear failure? 7M

3. a) Explain about Coulomb's earth pressure theory? 7M

   b) Explain the Culmann's graphical method. 7M

4. a) What are the types of retaining walls and explain with schematic diagrams? 7M

   b) Explain in-detail about design process of retaining walls? 7M

5. a) Derive the Terzaghi's bearing capacity equation for shallow foundations? 7M

   b) Compute the safe bearing capacity of a continuous footing 1.5 m wide, at a depth of 1.5 m, in a soil with γ = 18 kN/m3, c = 18 kN/m2, and $\varphi = 25°$. Terzaghi's factors of $\varphi = 25°$ are Nc=25, Nq=12.5, and $N\gamma$ = 10. What is the safe load per metre run if the factor of safety is 3? 7M

6. a) Describe the procedure to conduct the plate load test with a sketch and state its limitations 7M

   b) A 1.8 m square column is founded at a depth of 1.8 m in sand, for which the corrected N-value is 24. The water table is at a depth of 2.7 m. Determine the net allowable bearing pressure for a permissible settlement of 40 mm and a factor of safety of 3 against shear failure 7M

7. a) Explain at least two dynamic formulae of piles. 7M

   b) A square group of 9 piles was driven into soft clay extending to a large depth.

   The diameter and length of the piles were 30 cm and 9 m respectively. If the

   Unconfined compression strength of the clay is 90 kN/m^2, and the pile spacing is 90 cm centre to centre, what is the capacity of the group? Assume a factor of safety of 2.5 and adhesion factor of 0.75 7M

8. a) Explain with neat sketch different components of wells and their functions. 7M

   b) Explain with neat sketches different types of caissons based on their method of construction 7M

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