

Hall Ticket Number :

Code : 1G671

R-11

IV B.Tech. I Semester Regular & Supplementary Examinations Nov/Dec 2015

Geotechnical Engineering-II

(*Civil Engineering*)

Max. Marks: 70

Time: 03 Hours

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

1. What do you understand by site investigation? What are the different purposes for which site investigations are done?
2. How a slope is analysed using Swedish circle method? Derive an expression for the factor of safety?
3. Discuss Culmann's method for the determination of active earth pressure.
4. What are different types of retaining walls? What are the basic principles of the design of retaining walls?
5. What are the assumptions made in the derivation of Terzaghi's bearing capacity theory? Derive an equation for the ultimate bearing for a strip footing.
6. Describe the standard penetration test. What are the various corrections? What is the importance of the test in Geo Technical Engineering?
7. How do you estimate the load carrying capacity of a pile? Describe them in brief.
8. Describe the procedure for construction of wells. Discuss the causes and remedies for tilts and shifts.

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Code : 1G67A

R-11

IV B.Tech. I Semester Regular & Supplementary Examinations Nov/Dec 2015

Air Pollution and Control

(Civil Engineering)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Explain the classification of air pollutants
b) Give an account of notable air pollution disasters occurred during 20th and 21th centuries.
2. a) What are the factors to be considered for studying the effects of air pollutants on human beings? List out various effects of air pollutants on human beings.
b) Explain the different types of material damages caused by air pollution.
3. a) What are major air pollutants generated from combustion of coal and oil? How air - fuel ratio influence in formation of pollutants.
b) Find stoichiometric air fuel ratio for combustion of methane if it is to be burnt in 150% stoichiometric air? Find the AFR?
4. a) Describe various meteorological parameters influencing the air pollution.
b) Describe a typical wind rose diagram and explain how it is useful in air pollution studies
5. a) With help of a neat sketch, explain the working principle of cyclone.
b) Explain principle and operation of fabric filters.
6. a) What is a temperature inversion? Explain its harmful effects.
b) What is Gaussian plume Model? Mention its assumptions and limitations
7. a) Explain the various In -plant control measures for control of sulphur dioxide.
b) Discuss the role of recycling and process modification in control of gaseous pollutants.
8. a) Explain various methods to monitor SO₂ concentration in ambient atmosphere.
b) Write a critical note on emission standards of various air pollutants

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Bridge Engineering
(Civil Engineering)

Max. Marks: 70

Time: 03 Hours

Answer any five questions
All Questions carry equal marks (14 Marks each)

1. Explain all the design loads to be considered for bridges. 14M
2. Design a pipe culvert through a road embankment of height 5.8 m. The side slope of the embankment is 1.5:1. The maximum discharge is 5 m³/s. The safe velocity is 3 m/s. Culvert is subjected to a a live load of IRC class AA tracked vehicle. Assume bell-mouthed entry. Take $C_e=1.5$ and $C_s=0.010$. Assume the unit weight of soil to be 18,000 N/m³. Use M25 concrete and Fe415 steel. Road width is 7.5 m and formation width is 10 m. 14M
3. Design a reinforced concrete deck slab for the following data:
Clear width of roadway = 7.5 m
Clear span = 5.5 m
Use M25 grade of concrete and Fe 415 steel 14M
4. Design the RCC tee beam girder for following data.
Clear width of road way = 7.5 m
Effective Span = 18 m
Spacing of cross-girders = 3 m
Live load: IRC class AA tracked vehicle
Average thickness of wearing coat = 100 mm
Concrete mix: M25 grade
Steel: Fe415 grade HYSD bars 14M
5. Design the cross sectional details at mid-span of a deck type plate girder Railway Bridge for a broad gauge main line loading over an effective span of 24 m.
Spacing of plate girders = 2 m c/c
Weight of stock rails = 0.4 kN/m
Weight of guard rails = 0.25 kN/m
Weight of fastenings = 0.25 kN/m of track
Sleepers (Timber) = 250 mm x 150 mm x 2.8 m @ 0.4 m c/c.
Density of sleepers = 7.4 kN/m³ 14M
6. A composite bridge deck with reinforced concrete slab and steel plate girders has to cover a span of 18 m.
Clear width of road way = 7.5 m
Footpath: 1 m on both sides
Spacing of main girders = 2 m
Materials : concrete M25 grade and Fe415 grade steel, rolled steel sections with Yield stress of 250 N/mm².
Design the steel plate girder with shear connectors. 14M
7. Design a Rocker bearing for a plate girder bridge for the following details.
Vertical Load (DL+LL+IL) = 1140 kN
Vertical Load due to wind = 190 kN
Lateral Load at centre of the pin due to wind = 64 kN
Longitudinal Load = 225 kN 14M
8. Verify the stability of the abutment of a bridge with the following details.
Top width = 1.5 m
Height = 4 m
Back batter = 1 in 6
Front face is vertical.
Material: Stone masonry
Unit weight of soil = 18 kN/m³ and Angle of repose = 30°
Live load: IRC Class AA Tracked vehicle 14M

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IV B.Tech. I Semester Regular & Supplementary Examinations Nov/Dec 2015

Concrete Technology
(Civil Engineering)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. Write the chemical composition of Ordinary Portland Cement and explain the importance of Bogue's compounds. 14M
2. Classify the aggregates on the basis of their source. Distinguish between well graded and gap graded aggregates. 14M
3. What is segregation? How it affects concrete behaviour? How segregation can be minimized? How compaction affects the strength of concrete? 14M
4. Write short notes on curing of concrete. How curing influences strength of concrete? 14M
5. What is meant by non-destructive testing of concrete? Write the various types of non-destructive tests on concrete. Explain any one method of NDT. 14M
6. Discuss about the factors influencing creep and shrinkage of concrete. 14M
7. Write the step wise procedures for proportioning a concrete mix using ACI method and IS 10262 method. 14M
8. Discuss about light weight aggregate concrete and high performance concrete. 14M

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Finite Element Methods

(Civil Engineering)

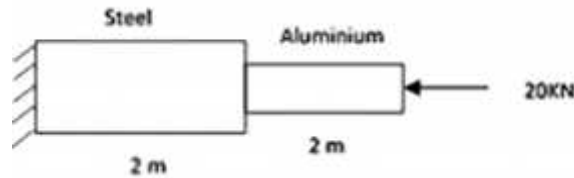
Max. Marks: 70

Time: 03 Hours

Answer any five questions

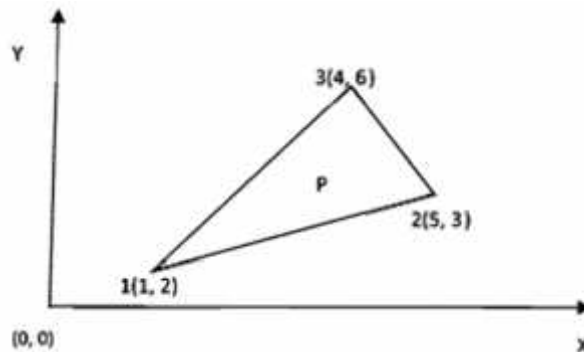
All Questions carry equal marks (14 Marks each)

1. Explain the basic steps involved in FEM. 14M
2. Explain the stress- strain relations for plane stress, plane strain and axis-symmetric stress conditions. 14M
3. For the bar assemblages shown in figure, determine the nodal displacements.

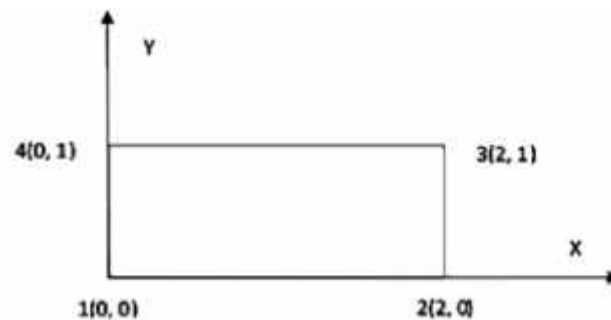


Take $E_{st} = 200 \text{ GPa}$, $A_{st} = 4 \times 10^{-4} \text{ m}^2$, $E_{Al} = 70 \text{ GPa}$, $A_{Al} = 2 \times 10^{-4} \text{ m}^2$ 14M

4. a) What is the constant strain triangular (CST) element? State its properties and applications. 07M
- b) The nodal coordinates of the triangular element are shown in figure. At the interior point P the x- coordinate is 3.3 and the shape function at node 1 i.e $N_1=0.3$. Determine the shape functions at nodes 2 and 3. Also find y coordinate of the point P.



5. Determine the stiffness matrix for the CST element. 1(20, 30), 2(80, 30), 3(50, 120) are the coordinates of CST element in mm. $E=210 \text{ Gpa}$, thickness $t= 10 \text{ mm}$ and Poisson's ratio is 0.25. Assume plane stress conditions. 14M
6. The nodal displacements of a four node quadrilateral element shown in figure are given as: $U= [0, 0, 0.003, 0.004, 0.006, 0.004, 0, 0]^T \text{ cm}$. Take $E=2 \times 10^5 \text{ N/mm}^2$, Poisson's ratio= 0.25, Determine (i) Jacobian matrix (ii) Strain-displacement matrix (iii) Element stresses. Assume plane stress condition.



7. Discuss the finite element modeling of Axi-symmetric solids subjected to Axi-symmetric loading with triangular element. 14M
8. a) Explain following using Guassian quadrature approach.
 - i) 1 point method
 - ii) 2 point method
 - iii) 3 point method
 07M
- b) Evaluate $I = \int_{-1}^{+1} \left[3e^x + x^2 + \frac{1}{x+2} \right] dx$. Use 1 point, 2 point and 3 point methods. 07M

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IV B.Tech. I Semester Regular & Supplementary Examinations Nov/Dec 2015

Railway Docks and Harbor Engineering

(Civil Engineering)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. Define gauge of a railway track. Enumerate different gauges used in India and discuss their suitability at different locations with reasons. 14M
2. a) What is cant deficiency? A 5° curve diverges from a 3° main curve in reverse direction in the layout of a B.G. yard. If the speed on the branch line is restricted to 35km.p.h. , determine the restricted speed on the main line. 2M
5M
b) Draw a neat diagram of simple right –hand or left – hand turnout and show its various component parts. 7M
3. a) Describe the factors that influence the selection of site for a Railway station. 7M
b) Write explanatory notes on:
i. Catch-sidings 3M
ii. Classification of railway stations 4M
4. What is the necessity of railway tunnels? Draw a sketch to illustrate a single track railway tunnel. 14M
5. Write an explanatory notes on
i. Greek harbours 4M
ii. Roman harbours 4M
iii. Historical development of Bombay Port 6M
6. a) Define harbour. How the harbours are classified? 7M
b) Classify different types of breakwaters. Under what condition a rubble mound breakwater is preferred. 7M
7. a) Write short notes on the following;
i. Dolphins
ii. Pier
iii. Fenders
iv. Tetrapad 8M
b) Differentiate between jetty and a wharf. 6M
8. a) What is dredging? Classify different types of dredging works. 7M
b) List different types of dredgers. Explain the function any one. 7M
