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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Civil Engineering

Semester End Examination; June - 2017

Advanced Foundation Design

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a.	List and explain the factors considered to fix the depths of foundation.		8
b.	Mention different types of shallow foundation.		6
c.	A square footing is to be constructed on a deep deposit of sand at a depth of 0.9 m to carry a design load of 300 kN with a factor of safety of 2.5. The ground water table may rise to the ground level during rainy season. Design the plan dimensions of the footing. Assume saturated unit weight of sand as 20.8 kN/m^3, N_γ = 32 and N_q = 34.		6
2 a.	List the conditions under which raft foundation becomes essential.		6
b.	What are the factors that influence the bearing capacity of soils?		6
c.	A combined footing is proposed for two column 300 mm x 300 mm carrying 1000 kN and 600 kN and speed at 4 m centre to centre. The footing cannot be extended beyond the edges of the columns lengthwise. If the allowable bearing pressure of soil is 160 kPa, proportion a combined footing and draw the plan view of foundation with columns.		8

UNIT - II

3 a.	What are the different methods of estimating the pile load capacity?		6
b.	Explain how the pile load capacity is determined by using static formula.		8
c.	A single acting steel hammer weighing 2 kN and falling through a height of 900 mm defines a pile to penetrations of 10 mm, 12 mm, 9 mm, 10 mm and 12 mm during the last five blows. Determine the allowable pile load using engineering news formula.		6
4 a.	Discuss the method of evaluation of settlement of pile group in clay.		6
b.	What is efficiency of pile groups? Explain any one method of determining of same.		6
c.	A group of 25 piles of 50 cm diameter is arranged with a centre to centre spacing of 1.5 m. The piles are 10 m long and are embedded in soft clay with cohesion of 30 kN/m^2. Bearing resistance may be neglected for the piles. Shear mobilisation factor is 0.6. Determine the ultimate load capacity of the pile group.		8

Contd….2

UNIT - III

5	a.	Describe the various components of a well foundation with neat sketches indicating the function of each.	10
	b.	Discuss the various kinds of forces likely to act on a well foundation.	10
6	a.	Explain the different methods of constructions of drilled piers with neat sketches.	8
	b.	What are the advantage and disadvantages of drilled piers?	6
	c.	What is grip length? What is its importance in well foundation?	6

UNIT - IV

7	a.	Draw a neat sketch of pneumatic caisson and label the parts. List the advantages and disadvantages of pneumatic Caisson.	10
	b.	An open Caisson, 20 m deep is of cylindrical shape with external diameter of 9 m and internal diameter of 6 m respectively. If the water level is 2 m below the top of the Caisson. Determine the minimum thickness of the seal required. Check for perimeter shear also. Assume, σ_c = 2400 kN/m^2 and γ_c = 24 kN/m^3 for concrete Allowable perimeter shear stress = 650 kN/m^2	10
8	a.	Name the simple index tests by which we can identify the potential expensive nature soil. Explain any two in brief.	10
	b.	What are the basic preventive measures that are taken to minimize the likely potential damage to the building on expensive soils?	10

UNIT - V

9	a.	List the general criteria for design of machine foundation.	6
	b.	Explain vibrations isolation.	6
	c.	Response occurs at a frequency of 24 Hz in vertical vibration of a test block of 1m x 1m x 1m. Determine the co-efficient of elastic uniform compression. The height oscillator is 620 N and force produced by it is 1000 N at a frequency of 12 Hz. Compute complitude in the vertical direction at 12 Hz.	8
10	a.	Explain Block Resonance Test.	10
	b.	Explain Barkan's method of design of machine foundation. What are its limitations?	10

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