



Reg. No. :

Name :

**Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)**

Branch : Civil Engineering

08.705.3 Elective – III : DEEP FOUNDATIONS (C)

Time : 3 Hours

Max. Marks : 100

Instruction : Answer ***all*** questions from Part – ***A*** and ***one full*** question from ***each*** Module of Part – ***B***.

PART – A

1. a) What are the situations under which pile foundations are used ?
- b) List the methods by which the load carrying capacity of a single pile can be determined. Explain the principle of static formula.
- c) What are the different types of pile load tests conducted on a single pile ?
- d) Explain the procedure for determining the allowable load from pile load test data.
- e) Define and explain efficiency of pile groups in sand and clay.
- f) Give brief note on settlement of pile groups.
- g) What are the advantages and disadvantages of drilled piers ?
- h) What are the criteria for determining the grip length of well foundations ?

Give Specifications.

(8×5=40 Marks)

P.T.O.



PART – B
Module – I

2. In a two layered cohesive soil, bored piles of 400 mm are installed. The top layer has a thickness of 5 m and the bottom one is of considerable depth. The undrained shear strength of top layer is 45 kPa and that of bottom is 100 kPa. Determine length of the bored pile required to carry a safe load of 380 kN, allowing a factor of safety of 2. 20

OR

3. A 12 m long 300 mm × 300 mm precast concrete pile is driven into a sand stratum by a single acting steam hammer. The weight of the cast-iron hammer ram is 14 kN and the stroke is 750 mm. The pile showed a driving resistance of 5 blows/25 mm penetration. Estimate the safe load for a factor of safety 3 using modified Hiley formula. Take $C = 0.00508$ m, efficiency of hammer 90% and $e = 0.45$, $\gamma_c = 23.5$ kN/m³. 20

Module – II

4. A nine pile group is placed in a square pattern with centre to centre spacing of 0.9 m. The dia and length of pile are 300 mm and 11.5 m, respily. The piles are driven into a sand deposit having $\phi = 32^\circ$ and $\gamma = 18.5$ kN/m³. The sand deposit extends to a depth of 12.5 m followed by a 5 m depth of clay having $e_0 = 0.85$ and $C_c = 0.32$. Determine the pile group efficiency and the settlement of the group if it carries a safe load of 4500 kN. Allow a factor of safety 2. 20

OR

5. a) How will you determine the allowable soil pressure for a belled pier in sand ? 10
- b) A drilled pier of 1 m dia has a total depth of 15m. The diameter of the bell is 2 m and its height is 1 m. If the undrained cohesion of clay is 80 kPa, $\gamma = 20$ kN/m³ and $\alpha = 0.3$ determine the allowable load. 10



Module – III

6. a) Derive an expression for the minimum steining thickness of a well foundation for sinking with its own weight. **10**
- b) What are the forces acting on the bottom plug of a well foundation ? Derive an expression for the thickness of the same. **10**

OR

7. A Well foundation has the following particulars. Outer diameter 5 m, inner dia 3 m. Depth below scour level = 12 m, Moment = 5000 kN-m. Horizontal force acting at 8 m above the scour level = 600 kN, factor of safety 2. Assuming that the well tilts about a certain point above the base, compute the total allowable equivalent resisting force due to earth pressure. Take $\gamma_{\text{sat}} = 20 \text{ kN/m}^3$. $\phi = 32^\circ$. Use Terzaghi's Analysis. **20**
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