Roll No.

Total No. of Pages : 02

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M.Tech.(Soil Mechanics & Foundation Engineering) (2016 & Onwards) (Sem.–1)

ADVANCE FOUNDATION ENGINEERING

Subject Code : CESE-2

M.Code: 37208

Time: 3 Hrs.

Max. Marks: 100

INSTRUCTIONS TO CANDIDATES :

- 1. Attempt any FIVE questions out of EIGHT question.
- 2. Each question carries TWENTY marks.
- 1. Calculate the ultimate Bearing capacity of a rectangular footing of sides 1.75m*3.5m when a load inclined at an angle of 10 degree to the vertical acts on the footing. The footing is embedded 1m below ground level and groundwater is very deep below the footing. The soil is saturated and has $\gamma_{sat} = 1.8$ gm/c.c. The rate of loading is very slow and drained conditions prevail C = 1t/m³, ϕ ' = 25degree. Calculate the ultimate Bearing Capacity if
 - a) load is eccentric in the direction of B by 10 cm and is inclined away from the centre in the direction of B. 10
 - b) load is eccentric in the direction of L by 15 cm and is inclined.
- 2. a) Compare the method of finding the frictional resistance of pile in clay and in sand. 10
 - b) Discuss the method of conducting maintained pile load test. How will you find safe load from the test? 10
- 3. A concrete pile of diameter 30 cm and length 8 m is driven in a sandy deposit having $r = 1.98t/m^3$ above WT and $\phi = 37.5$ degrees. The water table exists at a depth of 2.5m below GL. The value of submerged unit weight below WT is $1t/m^3$. Compute the value of safe load the pile can carry with a FOS = 2.5m; take N_v= 75, K_s = 0.9 and tan δ = 0.45. take critical depth as 20 times the diameter of the pile.
- 4. Discuss briefly the salient points for the design and construction of foundations for reciprocating machines as per I.S specifications. 20
- 5. Explain in detail and stepwise the method of computing primary consolidation settlement of a shallow foundation resting in an OC clay deposit. 20

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- 6. a) Name the different types of M/c foundations. Explain with figures.
 - b) Determine the frequency of vibrations under free vibrations in the vertical direction. 8
- 7. The following data refers to well foundation :
 - a) Net downward load including self weight = 12000KN
 - b) Height of point application of horizontal force above scour level= 4m
 - c) Depth of well below scour level = 10m
 - d) External dia= 7m
 - e) Internal dia = 5m
 - f) Vertical subgrade reaction = $3*10^4$ KN/m³.
 - g) Horizontal deformation of well cap at scour level $(P_1) = 20 \text{ mm}$
 - h) Poisson's ratio = 0.5
 - i) Allowable soil pressure = 600 KN/m^2

Assuming the well to rotate about its base, determine the base pressure and lateral load per unit length of well. Take $\gamma_{sat} = 20 \text{ KN/m}^3$ and $\phi = 30^\circ$. 20

- 8. a) What are the different types of Cellular coffer dams? Discuss their relative advantages and disadvantages. 10
 - b) Explain the design of Cellular coffer dam. 10

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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