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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, May 2013
(2008 Scheme)
08.806.4 : Elective – IV : ADVANCED FOUNDATION ENGINEERING (C)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part **A**, and **one** question from **each** Module in Part **B**. Use of Brom's chart and Meyerhof's bearing capacity tables are **permitted**.*

PART – A

I. a) Write down the expression for ultimate bearing capacity given by Meyerhof and explain the terms. What is the modification given for fluctuation of water table position ?

b) Explain the two methods of modifications given by Meyerhof for evaluating bearing capacity of eccentrically loaded footings.

c) Explain the principle of Poncelet's graphical solution for evaluating active earth pressure.

d) What are the advantages of Culmann's graphical method compared to other methods ?

e) What are the assumptions made in Coulomb's theory of earth pressure ?

f) Sketch the deflected shape of cantilever sheet pile wall in sandy soil. Also give the simplified pressure diagram.

g) What are the advantages of steel sheet pile wall over concrete sheet piles ?

h) Explain with sketches, the methods adopted for improving the ultimate lateral load capacity of piles. **(8×5=40 Marks)**

PART – B

MODULE – I

II. A rectangular footing 2m×3.5m, is placed at a depth of 1.5m below ground surface. Determine by Meyerhof's recommendations, the net safe load that can be supported by the footing with a factor of safety of 2.5 with respect to shear failure. The soil properties are $C' = 20kN/m^2, \phi' = 22°$.

OR

P.T.O.

III. Calculate the net ultimate bearing capacity of a square footing 2m×2m in plan founded at a depth of 1.5m below the ground surface. The load on the footing acts at an angle of 10° to the vertical and is eccentric in the direction of width by 10cm. $\gamma_{sat} = 18kN/m^3, C' = 15kN/m^2$ and $\phi' = 25°$. Water table is at a depth of 1.5m below the ground surface. **20**

MODULE – II

IV. Determine the active thrust on the retaining wall with height 6m, having a vertical back using Culmann's graphical method.

Given $\phi = 35°, \gamma = 20kN/m^3, \beta = 90°$ & $\delta = 0$.

OR

V. A retaining wall, 3.6m high supports a dry cohesionless backfill with a plane ground surface sloping upwards at a surcharge angle of 12°. The back of the wall is inclined to the vertical at a positive batter angle of 10°. The unit weight of the backfill is $19kN/m^3$ and $\phi = 32°$. Assuming wall friction of 15°, determine the total passive pressure by Rehbann's method ? **20**

MODULE – III

VI. A cantilever sheet pile of 6m is embedded in a purely cohesive soil of cohesion 40 kN/m^2 and unit weight $18kN/m^3$. The wall is subjected to a granular soil pressure having angle of internal friction 30° and unit weight 20 kN/m^3. Compute the depth of embedment of the sheet pile.

OR

VII. a) A concrete pile 900 mm diameter and 6m long is installed in a clay soil with cohesion, 120 kPa (N value 12). Estimate the ultimate lateral resistance if the load is applied at a point situated at 4m above the ground level. Use Brom's Approach. **10**

b) Compare the behaviour of short piles and long piles in cohesion soil with sketches. **10**
