Civil

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Reg. No. : ....

Name : ....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.806.4 : Elective – IV : ADVANCED FOUNDATION ENGINEERING (C)

Time : 3 Hours Max. Marks : 100

Instructions: *1) Answer **all** questions from Part – **A** and **one** question from **each** Module in Part – **B**.*

*2) **Use** of Brom's chart and Meyeshof's bearing capacity lables are **permitted**.*

PART – A

I. a) Explain Meyerhof's bearing capacity theory for a strip footing.

b) Explain the approach proposed by Meherhof for footings subjected to moments.

c) What is the approximate percentage of reduction of bearing capacity of a footing in pure sand because of submergence ?

d) What are the steps involved in the design of gravity retaining walls ?

e) Explain Culmann's graphical construction for stratified backfill ?

f) Explain with sketches the different types of sheet pile structures.

g) Comment on the influence of earthquake forces on the earth pressure for granular soils.

h) Write the equation for evaluating the lateral load capacity of a vertical pile as given by Brom's method in cohesionless soil. (8×5=40 Marks)

P.T.O.

PART – B

Module – I

II. A square foundation of 1.5 m×1.5 m is founded at 1 m depth on a cohesive friction soil. Cu = 15.6 kPa, γ_{sat} = 19 kN/m^3, $\phi_u = 33°$. Determine the net safe load on the footing by Meyerhof's method, if the F.S with respect to shear failure is 3.0. The water table is at a depth of 1.5 m below the ground level. 20

OR

III. Calculate the net ultimate bearing capacity of a rectangular footing 2 m×4 m in plan founded at a depth of 1.5 m below the ground surface. The load on the footing acts at an angle of 15° to the vertical and is eccentric in the direction of width by 15 cm. γ_{sat} = 18 kN/m^3, $c' = 15$ kN/m^2 and $\phi' = 25°$. Water table is at a depth of 2 m below the ground surface. 20

Module – II

IV. A vertical retaining wall 10 m high supports a cohesionless soil (γ = 18 kN/m^3). The upper surface of the back fill rises from the crest of the wall at an angle of 15° with the horizontal. Determine the total active pressure by Culmann's method. Take $\phi = 30°$ and $\delta = 20°$. 20

OR

V. Design a gravity retaining wall 7 m high with vertical back to retain a dry cohesionless backfill of unit weight 20 kN/m^3 and $\phi = 30°$. The wall is to be 1 m wide at the top and 3 m wide at the bottom. The wall is to constructed of rubble masonry having unit weight of 22 kN/m^3. Use Rankine's theory. 20

Module – III

VI. The height of a cantilever sheet pile from the top of the dredge level is 9 m. The water level in the backfill is at 2 m from top. Find the depth of penetration required for a factor of safety equal to 1. Assume that above the water table, the soil is dry. The other properties of soil are γ_{sat} = 20 kN/m^3, $K_A = 0.33$, $K_P = 3.0$, $G_S = 2.6$. 20

OR

VII. a) Explain Brom's approach for determining the ultimate lateral resistance of vertical piles. 10

b) What are the different methods to improve lateral stability of piles. 10