



(Pages 2)

1685

Reg. No. : .....

Name : .....

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

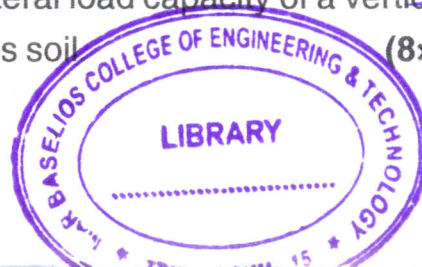
Time : 3 Hours

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  $1.5 \text{ m} \times 1.5 \text{ m}$  is founded at  $1 \text{ m}$  depth on a cohesive friction soil.  $C_u = 15.6 \text{ kPa}$ ,  $\gamma_{\text{sat}} = 19 \text{ kN/m}^3$ ,  $\phi_u = 33^\circ$ . 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  $1.5 \text{ m}$  below the ground level. 20

OR

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

## Module – II

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

OR

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

## Module – III

- VI. The height of a cantilever sheet pile from the top of the dredge level is  $9 \text{ m}$ . The water level in the backfill is at  $2 \text{ m}$  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  $\gamma_{\text{sat}} = 20 \text{ kN/m}^3$ ,  $K_A = 0.33$ ,  $K_P = 3.0$ ,  $G_S = 2.6$ . 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

