

B.Tech Degree VI Semester Examination, April 2010**CE 604 A/B GEOTECHNICAL ENGINEERING II**
(2006 Scheme)

Time: 3 Hours

Maximum Marks: 100

PART – A
(Answer ALL questions)

(8 x 5 = 40)

- I. (a) How will you fix the depth of boring in a site investigation process.
 (b) Differentiate between ultimate bearing capacity and allowable bearing capacity.
 (c) Explain the functions and requirements of a good foundation.
 (d) Describe with sketches how the contact pressure vary under rigid and flexible foundations in different types of soil.
 (e) Explain the term negative skin friction. Under what circumstances it can occur and how it can be eliminated.
 (f) With the help of sketches explain pneumatic caissons.
 (g) Illustrate the active, passive and at rest conditions of earth pressure in soil.
 (h) Differentiate between cantilever sheet pile walls and anchored sheet pile walls.

PART – B

(4 x 15 = 60)

- II. Discuss in detail the standard penetration test used in soil investigation. Discuss the corrections to be applied to the test results and how it can be used for assessing the bearing capacity of soil.
- OR**
- III. Calculate the safe bearing capacity of a square footing 1.3m x 1.3m, located at a depth of 0.75m below the ground level in a soil of average density 20 kN/m³, $\phi = 20^\circ$, $N_c = 17.7$, $N_q = 7.4$ and $N_r = 5$. Assume a suitable factor of safety and that the water table is very deep. Also compute the reduction in safe bearing capacity of the footing if the water table rises to the ground level.
- IV. Describe the steps involved in the design of a trapezoidal combined footing.
- OR**
- V. A clay layer 20m thick has a saturated unit weight of 18 kN/m³. Ground water table is at a depth of 2m below the ground surface. It is proposed to construct an RCC foundation, length 48m width 12m, on top of the layer, transmitting a uniform pressure of 180 kN/m². Determine the settlement under its center. E for clay is 33 MN/m² obtained from triaxial test. Initial void ratio = 0.69. Change in void ratio = 0.02. Steinbrenner's coefficient is given as 1.92 and also take $\mu = 0.5$.
- VI. Describe the pile load tests to determine the pile capacity and also describe a method to separate skin friction and the point resistance.
- OR**
- VII. In a 16 pile group, the pile diameter is 0.4m and the center to center spacing of piles in the square group is 1.5m. If $C_u = 60$ kN/m² determine whether the failure would occur as a block failure or when the piles act individually neglect the bearing at the tip of the pile. Also determine the safe load that can be carried by this group.
- VIII. Derive the expression for obtaining the depth of embedment of a cantilever sheet pile in cohesive soil, showing the pressure diagram used for it.
- OR**
- IX. A retaining wall with a vertical back 5m high supports a cohesionless backfill of unit weight of 19 kN/m³. The upper surface of this backfill rises at an angle of 10° with the horizontal from the crest of the wall. The angle of internal friction for the soil is 30° and the angle of wall friction is 20° . Determine the total active pressure per linear meter of the wall. Use Rebhann's graphical method.

