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Total No. of Questions: 09

Total No. of Pages: 02

**B.Tech.(CE)(Sem.6)**  
**FOUNDATION ENGINEERING**  
**Subject Code: BTCE-603**  
**Paper ID: A2290**

Time: 03 Hrs.

Max. Marks: 60

**INSTRUCTIONS TO CANDIDATES:**

1. Section A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. Section B contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. Section C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION A**

1. Write briefly:
  - a) Differentiate between representative and non representative sample.
  - b) What factors influence the bearing capacity of a footing on cohesion less soil?
  - c) Define skempton's pore pressure parameters.
  - d) Differentiate between active and passive earth pressure.
  - e) What are the major criterions for design of foundations?
  - f) Differentiate between safe bearing capacity and safe allowable bearing pressure.
  - g) Differentiate between uniform and differential settlement.
  - h) Distinguish between seepage and discharge velocities through soil.
  - i) What are the various forces acting on a well foundation?
  - j) If  $w = 40\%$ ,  $G = 2.71$ . Calculate  $\gamma_{sat}$ ,  $\gamma_{dry}$  in  $kN/m^3$  where "w" is water content percentage and "G" is the specific gravity.

**SECTION B**

2. What do you understand by the term tilt and shift in well foundation? Illustrate with the help of diagrams.
3. A rectangular foundation  $2m \times 3m$  transmits a pressure of  $360 kN/m^2$  to the underlying soil. Determine the vertical stress at a point 1 meter vertically below a point lying outside the loaded area, 1 meter away from a short edge and 0.5 meter away from a long edge.

4. Discuss the tri-axial shear strength test in detail. Also enumerate advantages of this test.
5. Explain in detail the various factors that help to decide the depth and number of bore holes required for sub soil exploration.
6. A cohesive soil has a unit weight  $19.2 \text{ kN/m}^3$ , unit cohesion =  $12 \text{ kN/m}^2$  and  $\Phi = 10^\circ$ . Calculate the critical depth of vertical excavation that can be made without any lateral support.

### SECTION C

7. Write short notes on the following
  - a) Comparison of SPT and DCPT
  - b) Electrical resistivity method
  - c) Floating foundation.
8. The results of 2 drained tri-axial tests on saturated clay are given as  
Specimen 1 =  $\sigma_3 = 69 \text{ kN/m}^2$ ,  $\sigma_d = 213 \text{ kN/m}^2$   
Specimen 2 =  $\sigma_3 = 120 \text{ kN/m}^2$ ,  $\sigma_d = 258.7 \text{ kN/m}^2$   
Calculate shear strength parameters of the soil.
9. In a 16 pile group the pile dia is 0.4 m and the c/c spacing of piles in the square group is 1.5 m. If  $C_u = 50 \text{ kN/m}^2$  determine whether the failure would occur as a block failure or will the piles act individually. Neglect bearing at tip of piles. All piles are 12 m long. Take  $\alpha = 0.7$  for shear mobilization around each pile. Also determine the safe load on the group.