Code No: **R1941012**   **R19**   Set No. 1

IV B.Tech I Semester Advance Supplementary Examinations, March - 2023
GEOTECHNICAL ENGINEERING - II
(Civil Engineering)

Time: 3 hours   Max. Marks: 75

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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UNIT I

1 a) What is the need of site exploration? Explain about general exploration. [7]
   b) Explain with neat a figure, area ratio, inside and outside clearances of a cutting edge used for soil exploration borings. Compute the area ratio of a sampler with inside diameter 70mm and thickness 2mm and comment. [8]

(OR)

2 a) Explain in detail plate load test with a neat diagram. [7]
   b) Discuss the procedure to decide the depth and spacing of boreholes in a soil investigation programme? [8]

UNIT II

3 a) What is stability number? What is its utility in the analysis of stability of slopes? [7]
   b) An embankment is inclined at an angle of 35^0 and its height is 15 m. The angle of shearing resistance is 15^0 and the cohesion is 200KN/m^2. The unit weight of soil is 18 KN/m^3. If Taylor's stability number is 0.06, find of safety with respect to cohesion. [8]

(OR)

4 a) Describe stability analysis by Swedish arc method. [7]
   b) Determine the depth of tension crack behind a vertical wall 8m high supporting a saturated cohesive backfill with Φ_u=0 and horizontal surface. The backfill weighs 18KN/m^3 and has an apparent cohesion of 18 KN/m^2 [8]

UNIT III

5 a) Explain the basic difference in the determination of bearing capacity computation of shallow and deep foundations. [7]
   b) Compute the safe bearing capacity of a continuous footing 1.50m wide, at a depth of 1.50m, in a soil with γ =18 KN/m^3, c =18 KN/m^2, and φ = 25°. Terzaghi's factors of φ =25° are Nc = 25, Nq = 12.5, and Nγ = 10. What is the safe load per metre run, if the factor of safety is 3? [8]

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(OR)

6 a) State the assumptions of Terzaghi's bearing capacity theory? Write the equation developed by him for a strip footing and describe the terms in the equation. [7]

    b) With the help of neat sketches, explain different types of shallow foundation. [8]

UNIT IV

7 a) Write brief note on different types settlements. [7]

    b) Estimate the immediate settlement of a concrete footing 1.50m x 1.50m in size founded at a depth of 1m in silty soil whose modulus of elasticity is 90kg/cm^2. The footing is expected to transmit a unit pressure of 200 KN/m^2. Assume $\mu = 0.35$, $I_f = 0.82$ for a rigid footing. [8]

(OR)

8 a) Explain in detail the methods for determining safe bearing pressure based on N – value. [7]

    b) What will be the gross safe bearing capacity of sand having $\Phi = 36^0$, effective unit weight of soil is 18kN/m^3 under the following conditions i) 1m width of strip footing ii) 1m x 1m square footing iii) 1m dia circular footing. Consider 1m as the depth of the footing from the ground surface. Factory of safety =3.0, N_q=47, N_γ=43. [8]

UNIT V

9 a) How do you assess the settlement of pile groups? Explain with the help of neat sketches. [7]

    b) A group of 16 piles of 50 cm diameter is arranged with a centre to centre spacing of 1.0m. The piles are 9m long and are embedded in soft clay with cohesion 30 KN/m^2. Bearing resistance may be neglected for the piles. Adhesion factor is 0.6. Determine the ultimate load capacity of the pile group. [8]

(OR)

10 a) Explain the various components of well foundation with a neat sketch. [7]

    b) Discuss about well sinking and well steining. [8]