Geotechnical Engineering - II
(1080)

P. Pages : 2

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer **any two** question from each unit.
5. Attempt complete question at one place only.
6. Use of non-programmable calculator is allowed.

UNIT – I

1. a) Explain : Electrical Resistivity Method.   **4**

    b) Explain :   **6**
       i) Area Ratio   ii) Inside clearance   iii) Outside clearance

2. Explain Terzaghi's bearing capacity analysis.   **10**

3. a) Explain the effect of eccentricity on bearing capacity.   **5**

    b) Define RQD. Explain its significance in determining lock bearing pressure. **5**

UNIT - II

4. What is the effect of lowering of water table on   **10**
    i) Consolidation settlement.
    ii) Elastic settlement.

5. A compressible clayey layer 2m thick underlies a thick sand bed which carries a footing 2m x 3m with an allowable soil pressure of 250 kN/m^2 at a depth of 1.0m or of 300 kN/m^2 at a depth of 1.5m. Examine consolidation settlement due to compressible layer at a depth of 10m below the G.S. G = 2.7   **10**

    clayey layer, $\gamma_b = 10 kN/m^3$, $W_L = 50\%$ $W_n = 35\%$.

6. A rigid footing 2.5m x 2.5m carrying a load of 750 kN rests at a depth of 1m, on a layer of silty clay 8m thick. If the soil has $E_s = 12,500 \, kN/m^2$, $\mu = 0.35$. Determine the total settlement if $W_n = 35$, $C_C = 0.3$, $\gamma_b = 10 kN/m^3$ $\mu_1 = 0.63$, $\mu_0 = 0.89$. **10**

UNIT - III

7. Explain in detailed plate load test. **10**

8. A footing is to rest on a sandy layer N=32 at a depth of 1.5m. Determine the size of footing if it carries a load of 800 kN. Assume submergence. **10**

9. Explain in detailed design of Trapezoidal combined footing with example. **10**

UNIT – IV

10. Explain classification of piles depends on their function. **10**

11. A group of 10 piles 300 mm x 8m arranged in three rows (3+4+3) are spaced at 1m c/c. Determine the group capacity using different efficiency formula if the single pile capacity is 300 kN. **10**

12. Explain why group action is different from individual action of friction pile. Also explain negative skin friction. **10**

UNIT - V

13. Explain :
i) Open cassion. **3**
ii) Box cassion **3**
iii) Compressed air cassion. **4**

14. Explain merits and demerits of piers and cassion foundation. **10**

15. a) Determine the unsupported depth of excavation in clayey soil, assuming a circular zone of failure for a proceed cofferdam given, $C = 25 kN/m^2$, $\gamma = 20 kN/m^3$, $\phi = 0$, $B = 4m$, $F_C = 1.5$. **5**

   b) Determine the natural frequency of a machine foundation 1.5m x 1.5m with a mass of 1000 kg including machine if the soil has $q_a = 300 \, kN/m^2$. **5**

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