Roll No. | | | | | | | | | | |

B.E / B.Tech (FT) END SEMESTER EXAMINATIONS – APRIL / MAY 2019

CIVIL ENGINEERING BRANCH

Fifth Semester

CE8502 – Foundation Engineering

(Regulations 2012)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is bore log?
2. Distinguish between a disturbed sample and undisturbed sample.
3. Draw typical load settlement curves for general shear failure and local shear failure of shallow foundations.
4. What are different components of settlement?
5. What is a 'raft foundation'? When is it preferred?
6. Draw the contact pressure distribution below the rigid footing resting on clay.
7. What is negative skin friction?
8. State the situations where under reamed piles are most suitable.
9. What is the effect of rise in the level of water table behind the retaining wall on active and passive pressures?
10. Define depth of tension crack.

Part – B (5 x 16 = 80 marks)

11. i) Describe Standard Penetration test. What are the corrections applied to observed SPT 'N' value? (8)

    ii) Explain the operating principle of Piston Sampler. State its advantages over other samplers. (8)

12. a(i) A strip footing has to carry a gross load of 550kN per metre run. The footing is placed at a depth of 1.2m below ground level in a dry, cohesionless deposit. The unit weight and angle of internal friction of the soil are 15.9kN/m^3 and 28° respectively. Determine the required width of the footing with respect to a factor of safety of 3 against shear failure. Given, for ϕ=28°, N_c'=17.3, N_q'= 7.2 and N_γ'= 4.7. (10)

    a(ii) How can you determine the ultimate bearing capacity of a square footing from the results of the plate load test? (6)

    (OR)

    b(i) A footing 2m×2m is located at a depth of 1.5 m in a sand deposit. Borings have indicated that the average corrected N value at the site is 25. Water table is at a depth of 2m below the ground surface. Determine the net allowable bearing pressure for a factor of safety of 3 against shear failure and a permissible settlement of 25mm. Use Teng's equations. (10)

b(ii) Discuss the effects of the width of foundation on the ultimate bearing capacity of footings on (a) cohesive (b) cohesionless deposits. (6)

13. a(i) What are different types of shallow foundations? Explain with the help of sketches. (6)

a(ii) Design a rectangular combined footing for two columns 6m apart. The exterior column of size 0.3m×0.3m carries a load of 600kN and interior column of size 0.4m×0.4m carries a load of 900kN. The allowable soil pressure is 150kN/m^2. (10)

(OR)

b(i) Derive the expression to proportion trapezoidal combined footing. (8)

b(ii) Explain the conventional method of design of raft foundation. (8)

14. a(i) Explain different types of piles based on their function, installation and material used. (10)

a(ii) A precast concrete pile was driven in sand, using a 20kN hammer having a free fall of 910mm. If the penetration of the pile in the last blow of the hammer was noted as 10mm, determine the load carrying capacity of the pile in kN using Engineering News Formula. (6)

(OR)

b(i) Explain the interpretation of pile load test data for arriving at the capacity of pile. (6)

b(ii) A group of 12 short piles, each having a diameter of 500mm and an embedded length of 8m, supports the platform of jetty. The piles are arranged in 3 identical rows and are spaced at 1.75m from each other. The subsoil has the following properties: γ_{sat}=21kN/m^3, ϕ=0°, c=37.5kN/m^2, α=0.72. Determine the safe axial load carrying capacity of the pile group. (10)

15. a(i) A smooth backed vertical wall is 6.3 m high and retains a soil with a bulk unit weight of 18 kN/m^3 and ϕ = 18°. The top of the soil is level with the top of the wall and is horizontal. If the soil surface carries a uniformly distributed load of 10 kN/m^2, determine the total active thrust on the wall per meter length of the wall. (12)

a(ii) What are the different modes of failure of retaining wall? (4)

(OR)

b(i) Discuss in detail Culmann's graphical method for the determination of active earth pressure. (8)

b(ii) Explain Rankine's theory of active earth pressure for cohesive soil. (8)

****