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**Question Paper Code: 31152**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Fifth Semester

Civil Engineering

01UCE502 - FOUNDATION ENGINEERING

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What is significant depth of exploration?
2. What is bore log report? and Draw a sample bore log report.
3. What are the disadvantages of plate load test?
4. What do you mean by differential settlement and how to minimize it?
5. State the situations under which the raft foundation is adopted.
6. Define floating foundation.
7. List out the types of piles based on materials and based on erection.
8. How is the efficiency of pile group calculated?
9. Differentiate between active earth pressure and passive earth pressure.
10. What is unsupported vertical height in cohesive soil?

PART - B (5 x 16 = 80 Marks)

11. (a) Explain wash boring method with neat sketch. Also explain how depth of boring and spacing of borehole is decided. (16)

Or

- (b) Explain about standard penetration test in detail and also the corrections applied. (16)

12. (a) Determine the depth at which a circular footing of 2 m diameter be founded to provide a factor of safety of 3. The footing has to carry a safe load of 1600 kN. The foundation soil has  $C = 10 \text{ kN/m}^2$ ;  $\phi = 30^\circ$  and unit weight  $\gamma = 18 \text{ kN/m}^3$ . Use Terzaghi's analysis. Take  $N_c = 28$ ;  $N_q = 12$ ;  $N_\gamma = 10$ . (16)

Or

- (b) (i) A footing 3 x 1.5 m in plan transmits a pressure of  $160 \text{ kN/m}^2$  on a cohesive soil having  $E = 8 \times 10^4 \text{ kN/m}^2$  and  $\mu = 0.48$ . Determine the immediate settlement at the centre, assuming the footing is (1) Flexible (2) Rigid. (8)
- (ii) Explain in detail about the factors affecting bearing capacity. (8)
13. (a) Explain the different types of mat foundation with neat sketches. (16)

Or

- (b) A trapezoidal footing is to be produced to support two square columns of 30 cm and 50 cm sided respectively. Columns are of 6 m apart and the safe bearing capacity of the soil is  $400 \text{ kN/m}^2$ . The bigger column carries 5000 kN and the smaller carries 3000kN. Design suitable size of the footing so that it does not extend beyond the faces of the columns. (16)
14. (a) A 200 mm diameter, 8 m long piles are used as foundation for column in a uniform deposit of medium clay ( $q_u = 100 \text{ kN/m}^2$ ). The spacing between the piles is 500 mm. There are 9 piles in the ground arranged in a square pattern. Calculate the ultimate pile load capacity of the group. Assume adhesion factor = 0.9. (16)

Or

- (b) (i) Describe in detail about the pile load tests with neat sketch, also discuss about cyclic load test and draw load penetration curve. (10)
- (ii) Briefly explain about negative skin friction. (6)
15. (a) Derive the expression for active earth pressure for cohesive backfill. Also draw the pressure distribution diagram and explain the salient features. (16)

Or

- (b) A retaining wall, 4 m high supports a backfill ( $c = 20 \text{ kN/m}^2$ ;  $\phi = 30^\circ$ ;  $\gamma = 20 \text{ kN/m}^3$ ) with horizontal top, flush with the top of the wall. The backfill carries a surcharge of  $20 \text{ kN/m}^2$ . If the wall is pushed towards the backfill, compute the total passive pressure on the wall, and its point of application. (16)