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Question Paper Code: 35102

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

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. List out the primary objectives of soil exploration.

2. Mention the types of boring methods.

3. What is tolerable settlement?

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 spread footing.

7. Explain negative skin friction.

8. List out the types of piles based on materials and based on erection.

9. Differentiate between active earth pressure and passive earth pressure.

10. List out the assumptions made in Rankines theory.

PART - B (5 x 16 = 80 Marks)

11. (a) Explain the procedure involved in split-spoon sampler and thin walled sampler with neat sketches. (16)

Or

(b) Explain with sketch how standard penetration test is conducted. Also explain the corrections to be carried out to the observed N value. (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 $C = 10\ kN/m^2$; $\varphi = 30°$ and unit weight $\gamma = 18\ kN/m^3$. 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 kN/m^2 on a cohesive soil having $E = 8$ x $10^4\ kN/m^2$ 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 factors governing the selection of the types of foundations. (16)

Or

(b) A raft foundation 10 *m* wide and 12 *m* long is to be constructed in a clayey soil having shear strength of 12 kN/m^2. Unit weight of soil is 16 kN/m^2. If the ground surface carries a surcharge of 20 kN/m^2 calculate the max depth of foundation to ensure a factor of safety of 1.2 against base failure, $Nc = 5.7$. (16)

14. (a) A 200 *mm* diameter, 8 *m* long piles are used as foundation for column in a uniform deposit of medium clay ($q_u = 100\ kN/m^2$). 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) Describe in detail about the pile load tests with neat sketch, also discuss about cyclic load test and draw load penetration curve. (16)

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 wall 5.4 *m* high retains sand. In the loose state the sand has a void ratio of 0.63 and $\phi = 27\ degrees$, while in the dense state, the corresponding values of void ratio and ϕ are 0.36 and 45 *degrees* respectively. Compare the ratio of active and passive earth pressure in the two cases, assuming *G* is 2.64. (16)

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