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Question Paper Code : 62006

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fifth Semester

Civil Engineering

080100029 — FOUNDATION ENGINEERING

(Regulations 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by significant depth of exploration?

2. What are representative and non-representative samples?

3. How the depth of foundation is decided?

4. How would you estimate the immediate settlements of foundations on clay?

5. Differentiate flexible footing from rigid footing.

6. How will you ensure uniform contact pressure beneath a raft foundation?

7. What are different factors influencing the selection of piles?

8. Write Converse Labarra formula used to get the group efficiency.

9. State the assumptions made in Rankine's earth pressure theory.

10. Differentiate between active and passive earth pressure.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain in detail the rotary drilling technique. State also its advantages over other methods of boring. (8)

(ii) Explain different parts of Piston Sampler along with its operating principle. (8)

Or

(b) (i) At a site the soil is fine sand and has a unit weight of 17kN/m³ and the water table is at a depth of 3 m. The observed N values at the site were as follows:

Depth, m	3	6	9	12	15
N_{obs}	9	8	17	19	25

Calculate the corrected N value. From the data given suggest a suitable value of angle of internal friction. (8)

(ii) Describe the interpretation of SCPT data for the design of foundation. (8)

12. (a) A strip footing 0.90 m wide is placed at a depth of 1.80 m below ground level in a soil having $c = 40kN/m^2, \phi = 20°, \gamma_b = 20kN/m^3$ and $\gamma_{sub} = 10kN/m^3$. Determine the ultimate bearing capacity if (i) water table at greater depth (ii) water table at 0.60 m below the base of the footing (iii) water table at 0.30 m below the ground level and (iv) water table at the ground level.

Or

(b) A square footing 1.75 m size is placed at 2.00 m below the ground level in normally consolidated soft clay. The soft clay stratum is 6.30 m thick and is underlain by dense sandy stratum. Determine the safe bearing capacity of the footing and also compute the settlement that would result due to the above safe bearing pressure if allowed to act on the footing. Water table is at the ground level. Take C_u = 50kN/m², liquid limit = 33%, natural moisture content = 30%, G = 2.66 and $\phi = 0°$.

13. (a) Proportion a strap footing for the following data:

Allowable soil pressure:

for DL+ reduced LL : 150 kN/m², for DL+LL : 225 kN/m².

	Column A	Column B
Dead Load (DL)	540 kN	690 kN
Live Load (LL)	400 kN	810 kN

Distance c/c of columns: 5.4m; Projection beyond column A not to exceed 0.5m. (16)

Or

(b) (i) Explain the conventional method of design of raft foundation. (10)

(ii) Discuss about the foundations on expansive soils. (6)

14. (a) (i) What is the basis on which the dynamic formulae are derived? Mention two well known dynamic formulae and explain the symbols involved. (8)

(ii) A pile group has to be proportioned in a uniform pattern in soft clay with equal spacing in all directions. Determine the optimum value of spacing of piles in the group. Take n = 25, and α = 0.7. Neglect the end bearing effect and assume that each pile is circular in section. (8)

Or

(b) (i) A square pile group of 9 piles passes through a recently filled up material of 4 m depth. The diameter of the pile is 0.3 m and pile spacing is 0.9 m centre to centre. If the unconfined compressive strength of the cohesive material is 60 kN/m^2 and unit weight is 15 kN/m^3, compute the negative skin friction of the pile group. (8)

(ii) Discuss the method of obtaining ultimate load and also allowable load on a single pile from pile load test. (8)

15. (a) Explain the Culmann's graphical method for evaluating the active earth pressure. Also justify its application on account of line loads running parallel to the retaining walls.

Or

(b) Briefly explain the Coulomb's Wedge theory and the determination of active earth pressure.