B 217

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Sixth Semester

Civil Engineering

CE 340 — FOUNDATION ENGINEERING

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How will you reduce the area ratio of a sampler?

2. When thin walled samples is used for sampling?

3. Give the Terzaghi's bearing capacity equation of strip footing for local shear failure.

4. List the various components of settlement.

5. Under what circumstances, a strap footing is adopted.

6. What are the two methods of design of raft foundation as per IS?

7. Explain group efficiency of pile.

8. Find the group efficiency using Feld's rule for six piles in a group.

9. Give the criteria of design of gravity retaining walls.

10. Define coefficient of earth pressure.

PART B — (5 × 16 = 80 marks)

11. (i) What are the various factors influencing the selection of pile? (6)

(ii) Explain briefly cyclic load test on pile. (10)

12. (a) (i) Briefly explain with neat sketch Auger boring method of soil exploration. (10)

(ii) Explain dynamic cone penetration test. (6)

Or

(b) Explain (i) Seismic refraction method and (ii) Electrical resistivity method of soil exploration. (8 + 8 = 16)

13. (a) Compute the safe bearing capacity of a square footing 1.5 m × 1.5 m located at a depth of 1 m below the ground level in a soil of average density 20 kN/m^3. ϕ = 20°, N_C = 17.7, N_q = 7.4 and N_γ = 5. Assume a suitable factor of safety and that the water table is very deep. Also compute the reduction in safe bearing capacity of the footing if the water table rises to the ground level. (16)

Or

(b) In a load test conducted at a depth of 1 metre below ground with a square plate of 30 cm side on a granular soil, load required to cause 25 mm settlement was 72 kN. Find out the size of a square column footing which will be having its base at a depth of 2.5 m below ground level and is required to take a load of 1750 kN. The settlement of the footing is restricted to be 10 mm only and factor of safety against bearing capacity failure is to be 3 only. Unit weight of soil 19 kN/m^3. N_C = 25, N_q = 12 and N_γ = 6. (16)

14. (a) (i) State the design requirement of a foundation. (6)

(ii) Briefly explain the structural design of spread footing. (10)

Or

(b) Briefly explain how proportioning and structural design of trapezoidal combined footing is done with diagram. (16)

15. (a) A retaining wall is 4 metres high. Its back is vertical and it has got sandy backfill up to its top. The top of the fill is horizontal and carries a uniform surcharge of 85 kN/m^2. Determine the active pressure on the wall per metre length of wall. Water table is 1 m below the top of the fill. Dry density of soil = 18.5 kN/m^3. Moisture content of soil above water table = 12%. Angle of internal friction of soil = 30°, specific gravity of soil particles = 2.65. Porosity of backfill = 30%. The wall friction may be neglected. (16)

Or

(b) Determine by Culmann's graphical method, the active pressure on the retaining wall per metre length and its line of action. Top width of wall = 4 m, Bottom width of wall = 10 m, Height of wall = 20 m. The wall retains sandy backfill which is inclined at 15° with the horizontal at the top of the wall. The angle of internal friction of sand is 32° and the angle of friction between the wall and the soil is 20°. Unit weight of sand is 21 kN/m^3. (16)