ANNA UNIVERSITY - 2007

B.E/B.TECH DEGREE EXAMINATION

FOUDATION ENGINEERING

(CIVIL ENGINEERING)

TIME-3HOUR
MARK-100

ANSWER ALL THE QUESTIONS

PART A — (10 ´ 2 = 20 MARKS)

1. Give the important parameter to fix the significant depth of exploration.

2. Mention the factors that affect the sample disturbance.

3. What are the different types of shear failures? Draw the sketches.

4. Mention the components of settlement of foundation.

5. Differentiate between cantilever footing and raft foundation.

6. List out the methods for design of mat foundation.

7. Under what circumstances the negative skin friction will develop.

8. List out the necessities of pile foundation.

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

10. What is the critical height of unsupported vertical cut in case of cohesive soils?

PART B — (5 ´ 16 = 80 MARKS)

11. Design a strap footing for the two columns. The allowable soil pressure is 100 kN/m2. Load on left column = 600 kN. Load on right column = 1000 kN, size of left column = 0.3m x 0.3m, size of right column = 0.4m x 0.4m, centre to centre distance between columns = 6m. Eccentricity of footing of left column = 1m. Take the allowable soil pressure as 100 kN/m2. Draw BMD and SFD. Find the thickness of footings for the design B.M.

12. (a) Explain the factors governing the spacing, number and depth of bore holes for a multi-storey building project.

(b) Explain the SPT test with neat sketch and give the correlation between SPT – N values and relative density.

(c) What are the corrections required for SPT-N value?

(OR)

(a) What are the commonly used methods of soil exploration? Explain any one method in detail.

(b) What are the basic requirements of good foundation?

(c) What are the necessary data required for plotting the bore log for any soil investigation project.

13. Calculate the ultimate bearing capacity per unit area of (i) Strip footing 2.5m wide (ii) Square footing 4.75 x 4.75 m (iii) Circular footing 5.25m diameter. The footing is supported on a soil for which the following data is available. ? = 19.5 kN/m3 ; C=17.0 kN/m2, ?=200, depth=1.75 m. Use Terzhaghi's equation. Take Nc = 17.7, Nq = 7.5, and Nr = 5.0.

(OR)

A building 10m x 20m in plan is built on a raft foundation resting on the surface. The soil profile consists of

4m dense sand over 3m thick silty clay layer resting on rock. The water table is at 2m below ground level. Consolidation test conducted on UDS of clay layer gave the results as follows.

Initial and final void ratios and corresponding stresses are, e0 = 1.1; ?0' = 2000 kN/m2; ef = 1.0; ?f' = 1000 kN/m2;

14. (a) Classify the pile based on functions, mode of transfer of load and method of installation with neat sketches.

(b) Explain how do you determine pile load capacity from pile load test.

(OR)

A pile group consists of 9 piles of 30 cm diameter and 10 m length driven in clay. Unconfined compressive strength of soil is 200 kN/m2 and insitu density of soil is 20 kN/m3. Determine the safe load for the pile group. ? = 0.6 and F.S. = 3.

15. Determine the active pressure on the retaining wall shown in figure by Culmann's method.

(OR)

A retaining wall 4m height with smooth backfill and horizontal surface subjected to a surcharge of 36 kN/m2 uniformly. Saturated density of backfill is 18 kN/m3, ? = 300, C=0, find the active earth pressure and the point of application of the resultant pressure. (