ANNA UNIVERSITY OF TECHNOLOGY, COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : NOV / DEC 2011

REGULATIONS : 2008

FIFTH SEMESTER : CIVIL ENGINEERING

080100029 - FOUNDATION ENGINEERING

Time : 3 Hours   Max.Marks : 100

PART - A

(10 x 2 = 20 Marks)

ANSWER ALL QUESTIONS

1   State the objectives of soil investigation.

2   What is significant depth?

3   Enumerate the factors affecting bearing capacity of soils.

4   Define the term: Safe bearing capacity.

5   Draw the contact pressure distribution diagram of a rigid footing on clay soil.

6   Under what circumstances combined footing will be recommended?

7   What are the advantages of pile foundation?

8   Define the term: Negative skin friction.

9   For a purely clay soil, calculate the coefficient of active earth pressure

10   State the conditions to be satisfied for retaining wall being stable.

PART - B

(5 x 16 = 80 Marks)

ANSWER ALL QUESTIONS

11 a Describe with the help of neat sketches the different types of drilling bore holes for a soil exploration programme. State their merits and demerits.

(OR)

11 b Explain the Standard Penetration Test procedure and describe how different soil properties can be interpreted based on SPT values.

12 a Determine the safe bearing capacity of a square footing 2m X 2m laid at depth of 1.50m in a soil having unit weight of 18.5 kN/m^3, cohesion of 12 kN/m^2 and angle of internal friction of 20 degrees. A factor of safety of 2.5 required against shear failure. Use IS 6403 method. Also compute the reduction in the safe bearing capacity when

  i. The load acting over the footing is inclined at an angle of 15^0 to the vertical.

  ii. The water table rises up to the footing level.

(OR)

12 b Write short notes on   (4 x 4)

  i.   Effect of water table on safe bearing capacity of soils.

  ii.   Plate load test

  iii.   Methods of minimizing settlements.

  iv.   Assumptions made in Terzaghi's analysis of soil bearing capacity.

13 a Design the plan dimensions of a trapezoidal combined footing carrying two column loads of 2200 kN and 3300 kN acting at a c/c distance of 6.50 m. The heavier column is on the property line. Take SBC of soil as 200 kPa.

(OR)

13 b Write a detailed note on   (4 x 4)

    i.   Floating foundation

    ii.   Foundations for expansive soils.

    iii.   Identification of expansive soils

    iv.   Advantages of raft foundations.

14 a With the help of neat sketch, describe the procedure of pile load test and explain how safe load carrying capacity of pile has been determined based on this test. A 30 cm diameter pile of 12 m length was subjected to a pile load test and the following results were obtained. Determine its allowable load carrying capacity.

Load in kN	0	500	1000	1500	2000	2500
Settlement in mm	0	8.5	16.5	25.5	38.0	60.0

(OR)

14 b A group of 9 piles, 300 mm diameter and 8 m long were erected at a centre to centre distance of 1.0m. The sub soil consists of clay with UCC strength of 180 kN/m^2.

  i. Determine group efficiency by Converse- Lebarre formula.

  ii. Estimate the safe load carrying capacity of the pie group.

15 a A retaining wall 5 m high retains a back fill of soil having following properties, Unit weight = 17.5 kN/m^3, Cohesion = 7.5 kN/m^2 and Angle of shearing resistance =28^0. Determine

    i.   Rankine's active earth pressure before the formation of tension crack.

    ii.   Depth of tension crack that can form in this soil.

    iii.   Rankine's active earth pressure after formation of tension crack.

    iv.   Depth at which no lateral support is required.

(OR)

15 b Write a short notes on   (4 x 4)

    i.   Assumptions made in Rankine's theory.

    ii.   Coloumb's wedge theory.

    iii.   Earth pressure at rest.

    iv.   Stability of retaining walls.

*****THE END*****