26759

Name : .....

Reg. No: .....

SIXTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2012

CE 09 604 – GEOTECHNICAL ENGINEERING – II

Time : Three Hours Maximum : 70 Marks

PART – A

(Answer all questions)

I (a) What is meant by 'pressure bulb'?

(b) What are the functions of foundations.

(c) What are the causes of settlement.

(d) Explain 'negative skin friction'.

(e) What is a floating foundation.

$(5 \times 2 = 10)$

PART – B

(Answer any four questions)

II (a) Explain Westergaard's Theory for the determination of the vertical stress at a point. How does it different from Boussinesq's solution.

(b) Differentiate between safe bearing capacity and allowable soil pressure. How will you determine these values for a shallow footing on cohesionless soil if SPT value is given.

(c) What are the causes of differential settlement? Mention the remedial measures also?

(d) What is a raft foundation? When it is preferred?

(e) Explain stress distribution in sheeting and bracing of shallow excavations.

(f) Explain the different methods to determine the bearing capacity of piles

$(4 \times 5 = 20)$

PART – C

(Answer all questions)

III (a) A concentrated load of 100 kN is applied at ground surface. Compute the vertical pressure (i) at a depth of 4 m below the load (ii) at a distance of 2m at the same depth. Use Boussinesq's theory

(OR)

(b) What are the factors to be considered for deciding on the number and spacing of bore holes? How will you fix the depth of boring?

IV(a) A foundation, 2.0 m square is installed 1.2m below the surface of a uniform sandy gravel having a density of 19.2 kN/m³, above the water table and submerged density of 10kN/m³. The strength parameters with respect to effective stress are $e^{l} = 0$ and $\phi^{l} = 30^{0}$. Find the gross ultimate bearing capacity for the following conditions.

(i) Water table is well below the base of the footing.

(ii) Water table rises to the ground level.

(For $\phi = 30^{0}$, Terzaghi given $N_{q}^{l} = 22$ and $N_{r} = 20$)

(OR)

(b) A strip footing of 1.0 m width is founded at a depth of 2.0m below ground surface. Determine the net ultimate bearing capacity using (i) Terzaghi's theory (ii) skempton's method and (iii) IS code method.

The soil is clay ($\phi = 0$ and C = 16 kN/m²).

V (a) Two load tests were performed at a site – one with a 50 cm square plate and the other with a 75 cm square plate. For a settlement of 15mm, the loads were recorded as 50 kN and 90 kN, respectively in the two tests. Determine the allowable bearing pressure of the sand and the load which a square footing, 1.5 m size, can carry with the settlement not exceeding 25 mm.

(OR)

(b) Design a combined footing for two columns (both 300 mm × 300 mm) carrying loads of 1200 kN and 900 kN, if the centre to centre spacing between columns is 4m. Take allowable soil pressure as 200 kPa. The distance to the edges of footing from the outer face of both the columns should be kept as 0.3 m.

VI(a) Explain the procedure of design of raft foundation by conventional method.

(OR)

(b) A square pile group of nine, 12m long piles of 300 mm diameter is placed in a uniform clay deposit with average undrained shear strength of 68 kPa. Considering the system as a combined end bearing and friction pile group, find out the centre to centre spacing for a group efficiency of unity (1.0). Adhesion factor may be assumed as 0.9.

$(4 \times 10 = 40)$

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