C 6124 (Pages : 2)

Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION JUNE 2010

CE 04 604—GEOTECHNICAL ENGINEERING – II

(2004 Admissions)

Time : Three Hours Maximum : 100 Marks

1. (a) List the circumstances under a pile foundation becomes necessary.
   (b) Distinguish between General shear failure and Local shear failure.
   (c) List the factors to be considered in selection of foundation type.
   (d) Write down Skempton's bearing capacity equations for saturated clayey soils.
   (e) Explain field VST to determine shear strength of clayey soils.
   (f) Explain the difficulties encountered in sinking of wells.
   (g) Write a note on dynamic pile driving formulae.
   (h) Write notes on footings subjected to eccentric loading.

(8 × 5 = 40 marks)

2. (a) (i) Write notes on SPT N-value. How it is related with the strength characteristics of soils ?

(7 marks)

(ii) Name the different methods of advancing boreholes in ground. Explain their limitations and suitability for different soil conditions.

(8 marks)

Or

(b) (i) Explain the methods of geophysical exploration with the help of neat sketches. What are the limitations of these methods ?

(7 marks)

(ii) Explain the factors influencing the bearing capacity of a footing. (8 marks)

3. (a) (i) Derive an expression for stresses under uniformly loaded circular footing. (7 marks)

(ii) A rectangular footing of size 12 m × 8 m carries a uniformly distributed load of 250 kN/m^2. Determine the vertical pressure 6 m below which is located at a distance of 10 m from the centre of the footing.

(8 marks)

Or

(b) (i) Write a note on Newmark's chart. (5 marks)

(ii) Two footings of sizes 4 × 4 m and 3 × 3 m are placed at 8 m apart at the same level and carry loads of 1000 and 1300 kN respectively. Compute the vertical pressures at the following points : (i) midway between the footings at a depth of 4 m (ii) vertically below the centres of footings at same depths as given in (i) above.

(10 marks)

Turn over

4. (a) (i) How are rafts designed in clay ? (7 marks)

(ii) A strip footing 1m wide at the base is located at a depth of 1m below the ground surface. The properties of the foundation soil are γ = 18 kN/m^3, c = 30 kN/m^2 and φ = 20°. Determine the SBC of soil using a factor of safety of 3 by Terzaghi's analysis. The bearing capacity factors are N_c = 11.8, N_q = 3.9 and N_γ = 1.7.

(8 marks)

Or

(b) (i) Discuss the bearing capacity equations for a rigid mat. (7 marks)

(ii) A square footing of size 1.8 m^2 is to be built at a depth of 1.5 m on a uniform clay strata having the following properties : c = 30 kN/m^2, unit weight = 18.2 kN/m^3, φ = 0°. Find the safe load that the foundation can carry with a factor of safety of 3.

(8 marks)

5. (a) (i) How do you rectify tilts and shifts in a well ? (7 marks)

(ii) Explain the methods to calculate ultimate capacity of a pile. (8 marks)

Or

(b) (i) Explain the principle of a pneumatic caisson with a neat sketch. (7 marks)

(ii) A reinforced concrete pile weighing 20 kN inclusive of helmet and dolly is driven by a drop hammer weighing 30 kN and having an effective fall of 0.95 m. The average set per blow is 15 mm. The total temporary elastic compression is 19 mm. Assuming the coefficient of restitution as 0.25 and factor os safety of 2, determine the ultimate bearing capacity and allowable load on the pile.

(8 marks)

[4 × 15 = 60 marks]