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B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Fifth Semester

Civil Engineering

CE 2305/CE 54/10111 CE 505 — FOUNDATION ENGINEERING

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the uses of Bore log Report.

2. Define detailed exploration.

3. Define punching shear failure.

4. What is mean by swelling potential?

5. Compute the critical depth for weak soil, if $\gamma = 18.4$ kN/m^3 and $q_u = 24$ kN/m^2 for the 4 m × 5 m size floating foundation.

6. In which situation are raft foundation used?

7. What are the factors governing the selection of piles?

8. Define negative skin pressure.

9. Write any three assumption of Rankine's theory.

10. Write the types of retaining wall.

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail the Geophysical methods of soil explorations with neat sketch. (16)

Or

(b) Write short notes on :

(i) Spacing of bore hole (4)

(ii) Sampling technique (6)

(iii) Planning of soil Exploration. (6)

12. (a) (i) Compute the ultimate load that an eccentrically loaded square footing of width 2 m width an eccentricity of 0.315 m can take at a depth of 0.45 m in soil with $\gamma = 17.75$ kN/m^3, C = 9 kN/m^2 and $\varphi = 35°$, $N_c = 52$, $N_q = 35$ and $N_\gamma = 42$. (8)

(ii) Write the step by step procedure for IS code method for computing bearing capacity in shallow foundation. (8)

Or

(b) (i) Explain in detail the types of bearing capacity failures and write the assumptions made in Terzaghi analysis. (8)

(ii) A rectangular footing of size 3 × 6 m is founded at a depth of 2 m in medium dense sand of angle of friction $\varphi = 36°$. The soil is submerged upto base level and is saturated above. The saturated unit weight of sand is 18 kN/m^3 determine q_d for the following cases.

(1) The loading is vertical and symmetrical

(2) The loading is symmetrical but inclined at an angle of 20° to the vertical parallel to the shoter side

(3) The loading is vertical and acts at an eccentricity of 0.5 m in both the length and width direction of the footing. (8)

13. (a) (i) Discuss the design procedure of rectangle combined footing and trapezoidal combined footing. (10)

(ii) A footing 3 m × 2 m in plan transmits a pressure of 160 kN/m^2 on a cohesive soil having E = 9 × 10^4 kN/m^2 and $\mu = 0.46$ determine the immediate settlement of the centre, assuming the footing to be

(1) flexible and

(2) rigid. (6)

Or

(b) Write short notes on :

(i) Mat Foundations (6)

(ii) Floating foundation (8)

(iii) Contact pressure (2)

14. (a) Explain the types of pile foundation with neat sketch. (16)

Or

(b) (i) A group of 9 piles arranged in a square pattern with diameter and length of each pile as 25 cm and 10 m respectively, is used as a foundation in soft clay deposit. Taking the un confined compressive strength of clay as 120 kN/m^2 and the pile spacing of the group. Ensure the bearing capacity factor $N_c = 9.1$ and adhesion factor = 0.81. A factor of safely of 2.51 may be taken. (8)

(ii) Write short notes on :

(1) Under reamed pile (5)

(2) Forces on pile cap (3)

15. (a) (i) Write the procedure involved in the Culmann's graphical method for active pressure. (8)

(ii) A Retaining wall, 4 m high support a back fill (c = 20 kN/m^2 ; φ = 30°, $\gamma = 20$ kN/m^3) with horizontal top, flush with the top of the wall. The backfill carries a surcharge of 20 kN/m^2. If the wall is pushed towards the backfill compute the total passive pressure on the wall, and it's point of application. (8)

Or

(b) A Retaining wall 6 m high retains sand with φ = 30° and unit weight 24 kN/m^3 upto a depth of 3 m from top. From 3 m to 6 m the material is a cohesive soil with c = 20 kN/m^2 and φ = 20°. Unit weight of cohesive soil is 18 kN/m^3. A uniform surcharge of 100 kN/m^2 acts on the top of soil determine the total lateral pressure acting on the wall and its points of applications. (16)
