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Question Paper Code : 91006

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fifth Semester

Civil Engineering

080100029 – FOUNDATION ENGINEERING

(Regulations 2008)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is meant by significant depth of exploration ? State the minimum depth of exploration for pile foundations.
2. What are representative and non-representative samples ?
3. What are the failure features that indicate general shear failure ?
4. Why the cyclic plate load test is preferred over the static plate load test ?
5. When do you provide strap footing ?
6. How do you identify the expansive soil ?
7. What are different types of piles based on their construction ?
8. What is the procedure used to get the group efficiency by Feld's rule ?
9. Why is the passive earth pressure, not normally considered in the design ?
10. Sketch the active earth pressure distribution diagram for a fully saturated cohesive backfill.

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Discuss in detail different methods of exploration. (8)
- (ii) Discuss in detail about the selection of spacing and depth of bores for various projects. (8)

OR

- (b) (i) Why SPT values recorded in sand at different depths are corrected for overburden and submergence ? How these corrections are applied ? (8)
- (ii) Discuss in detail the selection foundation based on soil condition. (8)
12. (a) A strip footing 0.90m wide is placed at a depth of 1.80m below ground level in a soil having $c = 40 \text{ kN/m}^2$, $\phi = 20^\circ$, $\gamma_b = 20\text{kN/m}^3$ and $\gamma_{\text{sub}} = 10\text{kN/m}^3$. Determine the ultimate bearing capacity if (i) water table at greater depth (ii) water table at 0.60m below the base of the footing (iii) water table at 0.30 m below the ground level and (iv) water table at the ground level.

OR

- (b) A square footing 1.75 m size is placed at 2.00m below the ground level in normally consolidated soft clay. The soft clay stratum is 6.30 m thick and is underlain by dense sandy stratum. Determine the safe bearing capacity of the footing and also compute the settlement that would result due to the above safe bearing pressure if allowed to act on the footing. Water table is at the ground level. Take $C_u = 50\text{kN/m}^2$, liquid limit = 33%, natural moisture content = 30%, $G = 2.66$ and $\phi = 0^\circ$.

13. (a) (i) Explain the significance of contact pressure distribution. Explain the factors that affect the distribution of contact pressure. (5)
- (ii) Explain with necessary sketches, the concept of proportioning of footings. (5)
- (iii) Explain the need for floating foundations with case examples. (6)

OR

- (b) (i) Explain the ill-effects of black cotton soil on a non-engineered building. (8)
- (ii) Explain the precautions to be taken during construction of foundation in a black cotton soil. (8)

14. (a) (i) Give a brief account on 'Negative Skin Friction'. (8)
- (ii) How piles are ground ? List the piles that are grouped based on their function (load transfer) with neat sketches. (8)

OR

- (b) (i) Explain the pile load test with a neat sketch.
- (ii) Write a short note on, the following with their limitation.
- (1) Engineering News formula
 - (2) Hileys formula
 - (3) Felds-Rule
 - (4) Static formula for cohesive soil.

15. (a) A retaining wall of smooth vertical back face of 4m height supports a level backfill of sand of unit weight 15kN/m^3 and angle of shearing resistance of 32° . Determine the total lateral active pressure per metre length of the wall, if the angle of critical failure surface is 29° to the vertical using Culmann's graphical construction. Compare the results with Rankine's method. (16)

OR

- (b) (i) A rigid retaining wall of 6 m height has two layers of backfill. The top layer to a depth of 1.5 m is sandy clay having $\phi = 20^\circ$, $c = 15\text{ kN/m}^2$ and $\gamma = 16.4\text{ kN/m}^3$. The bottom layer is sand having $\phi = 30^\circ$, $c = 0$ and $\gamma = 17.3\text{ kN/m}^3$. Draw the variation of lateral active earth pressure with height using Rankine's theory. Find also the total lateral active earth pressure and its point of application. (12)
- (ii) What are different modes of failure of retaining wall? (4)