

Roll No.

Total Pages : 3

002625

May 2024

**B.Tech. (Civil) Re-Appear VI SEMESTER
Foundation Engineering (PEC-CV-404-1)**

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART-A

1. (a) Define area ratio. (1.5)
(b) What do you mean by soil exploration? (1.5)
(c) Compare Local Shear and Punching Shear Failure. (1.5)
(d) What are the various causes of settlement? (1.5)
(e) What are the various types of shallow foundation? (1.5)
(f) Define negative skin friction. (1.5)
(g) What is under reamed pile? (1.5)

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- (h) Write equations for coefficient of active and passive earth pressure. (1.5)
- (i) Classify the deep foundations. (1.5)
- (j) Write assumptions of Rankine's theory. (1.5)

PART-B

2. (a) Describe the salient features of good subsoil investigation. (10)
- (b) Explain different modes of failure of foundation soil. (5)
3. (a) A retaining wall with smooth vertical back is 8 m high and retains a two-layer sand backfill. The top layer is 3 m high having $\phi = 30^\circ$ and $Y = 20 \text{ kN/m}^3$. The bottom layer is 5 m having $\phi = 35^\circ$ and $Y = 22 \text{ kN/m}^3$. Determine the total active earth pressure and point of its application. (5)
- (b) The field 'N' value in a deposit of fully submerged fine sand was 50 at a depth of 8 m. The average saturated unit weight of soil is 19 kN/m^3 . Calculate the corrected 'N' value. (10)
4. Evaluate the factors influencing the behavior of combined footings and raft foundations, and discuss their advantages and disadvantages in different soil conditions. (15)

5. (a) Determine the safe height of a slope which is to be constructed at an angle of 30° with the horizontal. The required factor of safety with respect to both cohesion and angle of internal friction is 1.5, and the soil has the following properties : $C = 10 \text{ kN/m}^2$, $\phi = 22.50$ and density = 20 kN/m^3 . Taylor's stability numbers for mobilized friction angles of 22.5° and 15° are, respectively, 0.016. (5)
- (b) How a slope is analyzed using the Swedish circle method? Derive an expression for the factor of safety. (10)
6. (a) Describe the types of piles used in deep foundation construction, and explain the dynamic and static formulae employed to calculate their load-bearing capacity in sands and clays. (10)
- (b) What is pressure bulb? Explain with neat sketch. (5)
7. Discuss the procedure and significance of pile load tests and the phenomenon of negative skin friction in deep foundation engineering, illustrating their relevance in ensuring structural stability and performance. (15)