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Roll No.

Total Pages : 3

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August/September 2022
B.Tech. (Civil) 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) What is the objective of soil investigation? (1.5)
- (b) Define standard penetration number. (1.5)
- (c) Distinguish between representative and non-representative samples. (1.5)
- (d) What are the finite and infinite slopes? (1.5)
- (e) Define Active and Passive earth pressures. (1.5)
- (f) Define the net and gross bearing capacity. (1.5)
- (g) Write a brief note on the concept of pressure bulb. (1.5)

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- (h) Distinguish between shallow and deep foundations. (1.5)
- (i) What is the difference between floating and end-bearing piles. (1.5)
- (j) Define Negative skin friction. How does it affect the load carrying capacity of piles. (1.5)

PART-B

2. (a) Explain SPT test and plate load test in detail. (10)
- (b) Write the advantages of SCPT over SPT. (5)
3. (a) Discuss in detail the Rankine's theory for active and passive earth pressure. (5)
- (b) A retaining wall 9 m high retains a cohesionless soil, with an angle of internal friction 33° . The surface is level with the top of the wall. The unit weight of the top 3 m of the fill is 21 kN/m^3 and that of the rest is 27 kN/m^3 . Find the magnitude and point of application of the resultant active thrust. (10)

4. (a) Discuss the types of slope failure. (5)
- (b) List the assumptions of Boussinesq's theory. A pole carries a vertical load of 200 kN. Determine the vertical total stress increase at a depth 5 m (i) directly below the pole and (ii) at a radial distance of 2 m. (10)

5. (a) Explain Terzaghi's theory of bearing capacity of soil in general shear failure with assumptions. (10)
- (b) What are the factors to be considered while designing the foundation? (5)

6. (a) Draw and discuss the contact pressure and settlement distribution diagrams for rigid footing resting on granular soil and clayey soil. (5)
- (b) Discuss the different methods of installation of piles. How would you estimate the load carrying capacity of a pile in cohesionless soil? (10)

7. A group of 9 piles with 3 piles in a row was driven into soft clay extending from ground level to a great depth. The diameter and length of piles were 30 cm and 10 cm respectively. The unconfined compression strength of clay is 70 kN/m^2 . If the piles were spaced at 90 cm center to center, compute the allowable load on the pile group on the basis of shear failure criteria for a factor of safety of 2.5, neglect bearing at the tip of piles, take $m = 0.6$ for shear mobilization around each pile. (15)