A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 55102

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Fifth Semester

Civil Engineering

15UCE502 - FOUNDATION ENGINEERING

(Regulation 2015)

(IS 6403-1981 is permitted)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. For an undisturbed sample the area ratio of the sample should be CO1- R

   (a) 0 (b)10% or less (c)10% to 20% (d) More than 20%

2. The Standard penetration test is useful to measure CO1- R

   (a) Shear strength of clay (b) Shear strength of sand

   (c) Consistency (d) None of the above

3. A Shallow foundation is usually defined as a foundation which has CO2- R

   (a) Depth less than 0.6m (b) Depth less than its width

   (c) Depth less than 1m (d) None of the above

4. The permissible settlement is the maximum in the case of CO2- R

   (a) Isolated footing on clay (b) Raft on clay

   (c) Isolated footing on sand (d) Raft on sand

5. The load carrying capacity of the pile depends on CO3- R

   (a) Skin friction (b) Point resistance (c) Both a and b (d) Neither a or b

6. The group efficiency of driven piles in sand at a close spacing may be CO3- R

   (a) Equal to 100% (b) Greater than100%

   (c) Well below 100% (d) None of the above

7. The active earth pressure coefficient (Ka) generally refers to CO4- R

(a) Effective stress (b) Total stress (c) Neutral stress (d) All of the above

8. The minimum allowable factor of safety against sliding in case of cantilever retaining wall is CO4- R

(a) 2.0 (b) 3.0 (c)1.5 (d) 2.5

9. A Well foundation is a type of CO5- R

(a) Open caisson (b) Pier (c) Floating caisson (d) Drilled pier

10. The most commonly used Well foundation CO5- R

(a) Double-D (b) Circular (c) Double octagonal (d) Rectangular

PART – B (5 x 2= 10 Marks)

11. Differentiate between Disturbed and Undisturbed. CO1- R

12. Compare General shear failure and Local shear failure. CO2- R

13. Define Negative skin friction. CO3- R

14. List any two assumptions made in Coloumb's earth pressure theory CO4- R

15. Define Damping. CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Explain Standard Penetration Test with corrections. CO1 U (16)

Or

(b) Explain any two Geophysical methods of soil explorations. CO1 U (16)

17. (a) A Circular footing is resting on a stiff saturated clay with qu = 250 kN/m^2. The depth of foundation is 2 m. Determine the diameter of the footing if the column load is 600 kN. Assume a factor of safety of 2.5. The bulk unit weight of soil is 20 kN/m^3. CO2 App (16)

Or

(b) (i) A reinforced concrete foundation, of dimensions 18 m × 36 m, exerts a uniform pressure of 180 kN/m^2 on a soil mass, with E - value 45 MN/m^2. Determine the value of immediate settlement under the foundation. CO2 Ana (8)

(ii) Discuss the methods of minimizing settlement and differential settlement in cohesive soils. CO2 U (8)

18. (a) Explain the various classification of Pile Foundations. CO3 U (16)

Or

(b) A 16-pile group has to be arranged in the form of a square in soft clay with uniform spacing. Neglecting end-bearing, determine the optimum value of the spacing of the piles in terms of the pile diameter, assuming a shear mobilisation factor of 0.6. CO3 Ana (16)

19. (a) A gravity retaining wall retains 12 m of a backfill, $\gamma = 17.7$ kN/m^3 $\varphi = 25°$ with a uniform horizontal surface. Assume the wall interface to be vertical, determine the magnitude and point of application of the total active pressure. If the water table is a height of 6 m, how far do the magnitude and the point of application of active pressure changed? CO4- Ana (16)

Or

(b) Explain Culmann's method of earth pressure theory. CO4- Ana (16)

20. (a) List out the different types of machine foundations and describe the factors considered for design of Tower foundation. CO5- U (16)

Or

(b) Describe the various components of a well foundation, indicating their function. CO5- U (16)

55102