B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023
Fifth Semester
Civil Engineering
20CEPC501 - FOUNDATION ENGINEERING
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	Compare about disturbed & un-disturbed samples.	*2,K2,CO1*
2.	Define the factors on deciding the depth of soil exploration.	*2,K1,CO1*
3.	What are the assumptions made in Terzaghi's bearing capacity analysis.	*2,K1,CO2*
4.	Define safe bearing capacity and allowable bearing capacity.	*2,K1,CO2*
5.	Define the term Settlement.	*2,K1,CO3*
6.	Distinguish between uniform settlement and differential settlement.	*2,K2,CO3*
7.	Where can be the raft or mat foundation adopted?	*2,K1,CO4*
8.	What are the advantages of combined footing?	*2,K1,CO4*
9.	State Feld's rule for determining group capacity of pile groups.	*2,K1,CO5*
10.	Explain the different types of piles according to its installation.	*2,K2,CO5*

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) Explain in detail about Selection of foundation based on soil condition with neat sketches.   *13,K2,CO1*

OR

b) Summarize the various factors affecting quality of samples. Explain any two types of soil samplers with neat sketches.   *13,K2,CO1*

12. a) Explain in detail about IS code method for computing the bearing capacity of soil with various types of failure and shape factor.   *13,K2,CO2*

OR

b) A strip footing 2m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kN/m^3. The shear strength parameters are C=0 and Φ = 350. Solve the factor of safety with respect to shear failure for the following cases of location of water table : (a)Water table is 4m below G.L, (b)Water table is 1.2 m below G.L   *13,K3,CO2*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12323**

13. a) Explain the plate load test to determine the bearing capacity of soil. *13,K2,CO3*

OR

b) A footing 2m x 2m is placed at a depth of 1.5m in a uniform sand *13,K3,CO3* deposit. Borings indicated that the average corrected N-value above and below the base of the footing is same and equal to 25. The ground water table is at 1.5m from the surface. Solve the allowable bearing pressure so that the factor of safety against shear failure is not less than 3 and settlement is not more than 40mm

14. a) (i) Briefly explain about the various types of footing with neat sketch. *6,K2,CO4*

(ii) Construct a rectangular combined footing for two columns 6m(c/c) *7,K3,CO4* apart. The exterior column size is 0.5 * 0.5m and it carries a1500KN load. The interior column of size 0.3 * 0.3m and it carries a load of 1000KN. The projection of footing beyond left column is 0.7m from centre and 1.8m beyond right side column centre take allowable soil pressure as $200KN/m^2$.

OR

b) Construct a strap footing to carry loads of 750 kN and 400 kN through *13,K3,CO4* columns of sizes 400mm x 400mm and 250mm x 250mm respectively. The columns are spaced at 5m c/c and the second is on the boundary line. The width of the footing could be assumed as 2.2m. The allowable bearing capacity of the soil is 250Kpa.

15. a) Explain the following: (i) Under reamed piles *6,K2,CO5*
(ii) Negative skin friction *7,K2,CO5*

OR

b) A group of 9 piles of diameter 400 mm is spaced at 1.2m c/c in a *13,K3,CO5* square pattern. The pile group of length 7.2 m is driven into a clay extending upto 10 m below the ground level. The clay layer is underlain by an incompressible layer. The specific gravity of solids, unit weight and compression index of the clay are 2.65, 18.5 kN/m^3 and 0.18 respectively. Make an estimate of settlement of the pile group if the total load of the pile group if the load on the pile group including pile cap is 1200 kN. Assume the water table to be quite close to the ground level.

PART - C (1 × 15 = 15 Marks)

16. a) Demonstrate on the method of estimating the active earth pressure on a *15,K2,CO6* retaining wall by using the Culmann's method.

OR

b) A retaining wall 6m height retains the backfill of bulk unit weight *15,K3,CO6* 19kN/m^3, C = 20 kN/m^3, angle of internal friction 30° and with the top horizontal. The backfill carries a surcharge of 30kN/m^2. Compute the total active and passive earth pressure on the wall and their point of application. Draw the earth pressure distribution diagram.