Total number of printed pages: 2 **6th Semester/B.Tech/UCE-604**

2025
(MAY)
FOUNDATION ENGINEERING
Full Marks: 100
Time: Three hours
The figures in the margin indicate full marks for the questions.
*Answer **all five** questions.*

		Question body	Marks
1.		Write short notes a) Negative skin friction b) Split spoon sampler c) Borehole log d) Grouting e) Lime stabilization	**5x4=20**
2	a)	Define soils samplers. Explain the design features of soil samplers with neat diagram	**2+8=10**
	b)	A rectangular footing with dimensions 2mX3m has to carry a uniformly distributed load of 150 kN/m^2. Plot the distribution of vertical stress intensity due to this load on a horizontal plane at a depth of 2m below the base of the footing.	**10**
3	a)	Describe the plate load test with neat diagram	**10**
	b)	A strip footing of width 2m is founded at a depth of 2m below the ground surface in a c-φ soil having cohesion= 30 kN/m^2 and angle of shearing resistance φ=35°. The water table is at a depth of 8m below GL. The bulk unit weight of soil above water table is 17.25 kN/m^3. Determine (a) the ultimate bearing capacity of soil (b) the net ultimate bearing capacity. Consider FOS=3, use general shear failure theory of Terzaghi, for φ=35°, N_c=57.8,N_q=41.4 and N_γ =42.4	**10**
4	a)	Define the bearing capacity failures with neat diagram	**10**
	b)	Design a friction pile group to carry a load of 2500 kN including the weight of pile cap at a site where the soil is uniform clay to a depth of 18m, underlain by rock. Average UCS of clay is 70 kN/m^2. The clay may be assumed tobe of normal sensitivity and normally loaded with liquid limit 60%. A FOS of 3 is required against shear failure, m=1.0	**10**
5	a)	Draw the vertical stress distribution diagram for a concentrated load with explanation (i) on a horizontal plane (ii) on a vertical plane	**5x2=10**
	b)	A plate load test was performed in a uniform deposit of sand on a 60 cm X 60 cm plate the following data were obtained. i)Plot load settlement curve ii) Determine the load that a footing 1.5 m X 1.5m can safely carry if its allowable settlement is 1.5 cm. Bikash chattopadhy/Pg 241	**10**

Load (kg/cm^2)	0.5	1	2	3	4	5	6
Settlement (mm)	0.75	1.25	2.0	3.5	5.375	7.75	10.75