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Total number of printed pages: 2

6th Semester/B.Tech/UCE-604

2023
(JUNE)

FOUNDATION ENGINEERING

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any** questions.*

		Question body	Marks
1.	a)	Describe pile load test with neat sketch	10
	b)	A concentrated load of 40 kN acts on the surface of a soil. Determine the vertical stress increment at points directly beneath the load upto a depth of 10m and draw a plot. Also plot the variation of vertical stress increment due to load on horizontal plane at depth of 2m upto a horizontal distance of 3m at 1each 1 m interval.	10
2	a)	Describe the objectives of ground improvement techniques. Explain one method to improve highly compressible clayey soils.	5+5=8
	b)	A square foundation is 1.5m X 1.5m in plan. Corresponding to the friction angle of soil supporting the foundation, Nc, Nq and Nγ are respectively 17.7, 7.4 and 5 and c = 15.2 kN/m^2. Determine the allowable load on the foundation with a factor of safety of 4. The depth of the foundation is 1 m and general shear failure occurs in soil.	10
3	a)	Describe the design features of a soil samples with diagram.	10
	b)	Using the Hiley's formula, determine the safe load that can be carried by a pile. The gross weight of the pile is 1.4 t, weight of hammer is 2 t, height of free fall is 91 cm, hammer efficiency is 70%, average penetration under last 5 blows is 10 mm, and coefficient of restitution is 0.55. Length and diameter of the pile are 20 m and 180 mm. The factor of safety is 2.5.	10
4	a)	Explain with neat sketches, the different modes of bearing capacity failure of soil under a foundation load	10
	b)	A plate load test was performed in a uniform deposit of sand on a 60 cm X 60 m plate the following data were obtained	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

i) Plot lo ad 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.	
5	a)	Foundation of a column consist of pile group of four piles, arranged in a square patter, at a spacing of 1 m. The diameter of the piles is 40 cm and the length is 12 m. The subsoil is of clay with unconfined compressive strength 1 kg/cm^2. Calculate allowable column load.	10
	b)	Deduce Boussinesq's equation for stress distribution due to a concentrated load at ground surface	10
6		Write short note i)Negative skin friction in pile ii)Cone penetration test iii)Dynamic compaction iv)Well Foundation	5X4=20