MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

III B.Tech II Sem Supply End Examination, January 2023
Foundation Engineering
(Civil Engineering)

Time: 3 Hours.   Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
   Each question carries 10 marks and may have a, b as sub questions.

PART- A
(10*2 Marks = 20 Marks)

1.	a)	When do you prefer undisturbed soil samples?	2M	CO1	BL1
	b)	Write a note on core recovery ratio.	2M	CO1	BL1
	c)	Differentiate infinite and finite slopes.	2M	CO2	BL1
	d)	Write formula for stability number.	2M	CO2	BL1
	e)	What is at rest earth pressure?	2M	CO3	BL1
	f)	Why shear key is provided beneath the retaining wall?	2M	CO3	BL1
	g)	Define allowable bearing pressure.	2M	CO4	BL1
	h)	Write limitations of plate load test.	2M	CO4	BL2
	i)	Define pile group efficiency.	2M	CO5	BL1
	j)	When do you prefer driven piles?	2M	CO5	BL2

PART- B
(10*5 Marks = 50 Marks)

2	a)	What are the sampling methods? Discuss how you obtain undisturbed soil sample.	5M	CO1	BL1
	b)	Draw the typical bore log and explain its importance in soil site investigation.	5M	CO1	BL2

OR

3	What is SPT N? Discuss how you carry out the Overburden correction and Dilatancy correction for measured SPT N.	10M	CO1	BL3

4	a)	Explain why slopes fail? Write with neat sketches different slope failures.	5M	CO2	BL2
	b)	An embankment is inclined at an angle of 35° and its height is 15 m. The angle of shearing resistance is 15° and the cohesion intercept is 200 kPa. The unit weight of soil is 18.0 kN/m³. If Taylor's stability number is 0.06, evaluate the factor of safety with respect to cohesion.	5M	CO2	BL3

OR

5	Demonstrate step by step procedure how you evaluate factor of safety against slope failure by the method of slices and compare its drawbacks with Bishop's simplified method.	10M	CO2 BL3

6 a)	With clear sketches write the classification of retaining walls.	5M	CO3 BL2
b)	Determine the active and passive earth pressure given the following data: Height of retaining wall = 10 m; $\phi = 25°$; $\gamma = 17$ kN/m³. Ground water table is at the top of the retaining wall.	5M	CO3 BL3

OR

7	A smooth backed vertical wall is 6.3 m high and retains a soil with a bulk unit weight of 18 kN/m³ and $\phi = 18°$. The top of the soil is level with the top of the wall and is horizontal. If the soil surface carries a uniformly distributed load of 4.5 kPa, Evaluate the total active thrust on the wall per linear meter of the wall and its point of application.	10M	CO3 BL3

8 a)	Compare both local shear failure and general shear failure with clear illustrations.	5M	CO4 BL3
b)	A circular footing is resting on a stiff saturated clay with unconfined compression stress, UCS = 250 kPa. 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 as 2.5. The bulk unit weight of soil is 20 kN/m³.	5M	CO4 BL3

OR

9	A column carries a load of 1000 kN. The soil is dry sand weighing 19kN/m³ and having an angle of internal friction of 40°. A minimum factor of safety of 2.5 is required and Terzaghi factors are required to be used. ($N_\gamma = 42$ and $N_q = 21$). (*i*) Evaluate the size of a square footing, if placed at the ground surface; and, (*ii*) Evaluate the size of a square footing required if it is placed at 1 m below ground surface with water table at ground surface. Assume $\gamma_{sat} = 21$ kN/m³.	10M	CO4 BL3

10 a)	With clear illustrations write the classification piles.	5M	CO5 BL2
b)	A pile is driven in uniform clay of large depth. The clay has unconfined compression strength of 90 kN/m². The pile is 30 cm diameter and 6 m long. Determine the safe frictional resistance of the pile, assuming a factor of safety of 3. Assume the adhesion factor $\alpha = 0.7$.	5M	CO5 BL3

OR

11	A 16-pile group has to be arranged in the form of a square in soft clay with uniform spacing. Neglecting end-bearing, evaluate the optimum value of the spacing of the piles in terms of the pile diameter, assuming a shear mobilization factor of 0.6.	10M	CO5 BL3

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