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 I Sem Supply End Examination, December 2022
Geotechnical Engineering
(CIVIL)

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)	The coefficient of uniformity and curvature of a soil are 4 and 1 respectively. Compute the ratio of D_{30}/D_{10}.	2M	CO1	BL2
	b)	Define Liquid limit and Plastic limit?	2M	CO1	BL1
	c)	Define Seepage Pressure	2M	CO2	BL1
	d)	State Darcy's Law	2M	CO2	BL1
	e)	List out the assumptions of Boussinesq's theory	2M	CO3	BL1
	f)	Describe about pressure bulb	2M	CO3	BL1
	g)	Define Consolidation	2M	CO4	BL1
	h)	List the assumptions of Terzaghi's theory for consolidation	2M	CO4	BL1
	i)	Define Dilatancy	2M	CO5	BL1
	j)	Explain Critical Void Ratio	2M	CO5	BL2

PART- B

(10*5 Marks = 50 Marks)

2	a)	Derive relationship between γ, S_r, w, e and G	5M	CO1	BL3
	b)	The mass specific gravity of a fully saturated clay specimen having a water content of 40% is 1.88. Determine Specific Gravity and Porosity	5M	CO1	BL3

OR

3	a)	Explain in detail IS classification of soils	10M	CO1	BL3

4	a)	Explain how to determine Coefficient of permeability with neat sketch as per constant head method?	5M	CO2	BL2
	b)	In a falling head permeability test, head causing flow was initially 500 mm and it drops to 20 mm in 5 minutes. Calculate the time required for the head to fall to 250 mm.	5M	CO2	BL3

OR

5	a)	Define flow net. Explain its Characteristics and Applications?	5M	CO2	BL2
	b)	A stratifies layer of soils consists of 4 layers of equal thickness the coefficient of permeability of second, third and fourth layers are respectively ½, 1/3 and twice of the permeability of the top layer. Compute the average permeabilities of the deposit, parallel and perpendicular to the direction of stratification in terms of permeability of top layer.	5M	CO2	BL3
6	a)	Differentiate between Boussinesq's and westergards theory	5M	CO3	BL2
	b)	Explain the term Compaction and Differentiate between Standard and Modified proctor test?	5M	CO3	BL2

OR

7	a)	Explain the Westergaard's theory for the determination of vertical stresses at a point. How is it different from the Boussinesq's solution?	5M	CO3	BL4
	b)	Explain in detail the factors effecting compaction	5M	CO3	BL2
8	a)	Explain in detail about CD, CU, and UU condition for triaxial test on clays?	5M	CO4	BL2
	b)	A clay layer 4m thick is subjected to a pressure of 55kN/m² if the layer has double drainage and undergo 50 per cent consolidation in 1 year. Determine the coefficient of consolidation take Tv = 0.196. If the coefficient of permeability is 0.02m/year determine the settlements in 1year	5M	CO4	BL4

OR

9	a)	A normally consolidated clay layer settled by 20 mm when the effective stress was increased from 25 KN/m² to 50 KN/m². What will be the settlement when the effective stress is increased from 50 KN/m² to 100 KN/m²	5M	CO4	BL2
	b)	Differentiate between primary and secondary consolidation	5M	CO4	BL2
10	a)	Differentiate the advantages and disadvantages of direct shear test over triaxial test?	5M	CO5	BL2
	b)	Explain in detail laboratory method of Triaxial test	5M	CO5	BL3

OR

11	a)	In a drained triaxial compression test, a saturated specimen of cohesionless sand fails under a deviator stress of 535kN/m², when the cell pressure is 150kN/m². Find the effective angle of shearing resistance of sand and the approximate inclination of the failure plane to the horizontal. Determine using graphical method also.	5M	CO5	BL4
	b)	Explain in detail laboratory method of Vane shear test	5M	CO5	BL2

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CO - Course Outcome　　　　　　　**BL - Blooms Taxonomy Levels**