CE 13

Course Code: **23CE5T03**

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

III - B. Tech I-Semester Regular Examinations (BR23), November- 2025

GEOTECHNICAL ENGINEERING -1 (CIVIL)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	Define plasticity index and flow index.	(2M)	C313.1	BL1
b)	Define texture and structure of soils.	(2M)	C313.1	BL1
c)	State Darcy's law. What are the assumptions made in Darcy's law?	(2M)	C313.2	BL1
d)	Define Total, Neutral and Effective Stresses.	(2M)	C313.2	BL1
e)	What is the basic equation for seepage?	(2M)	C313.3	BL2
f)	Differentiate the Boussinesq's and Westergaard's theories.	(2M)	C313.3	BL3
g)	Define CU and CC.	(2M)	C313.4	BL1
h)	Differentiate between over-consolidated and normally consolidated clays.	(2M)	C313.4	BL2
i)	Sketch the stress-strain relationship for dense and loose and.	(2M)	C313.5	BL4
j)	Define critical void ratio	(2M)	C313.5	BL1

PART–B (5X10 = 50M)

2a.	What is a 3-phase diagram? Sketch the phase diagram for a soil and indicate the volumes and weights of the phases on it.	5(M)	C313.1	BL2
b.	Define 'Void ratio', 'Degree of saturation', 'Water content', 'Porosity'& 'Air Content '.	5(M)	C313.1	BL2
	(OR)			
3a.	Explain the Indian Standard (IS) Classification of Soils with neat sketches, wherever necessary.	5(M)	C313.1	BL1
b.	Briefly describe the procedure to determine the Liquid Limit of a soil.	5(M)	C313.1	BL1

4a.	Explain the different modes of occurrence of soil water.	5(M)	C313.2	BL1
b.	The sand stratum is 8m thick. The water table is at 1m below ground level G=2.7, e=0.7. The capillary rise above water table is 1m show the variation of Total stress, Neutral stress and Effective stress for the sand stratum.	5(M)	C313.2	BL2
	(OR)			
5a.	Explain procedure for determining coefficient of permeability of soil, by Falling head permeameter.	5(M)	C313.2	BL1
b.	A soil stratum consists of 3 layers of thickness 1m, 1.5m and 2.0 m having the			

	coefficient of permeability of 2 X 10^{-3}cm/s, 1.5 X 10^{-3}cm/s and 3 X 10^{-3}cm/s respectively. Estimate the average co-efficient of permeability in the direction i) parallel to the bedding plane ii) normal to the bedding plane.	5(M)	C313.2	BL1
6a.	What are the characteristics and uses of flow nets?	5(M)	C313.3	BL2
b.	Derive an equation for quicksand condition?	5(M)	C313.3	BL2
	(OR)			
7a.	Explain New mark's influence chart preparation?	5(M)	C313.3	BL1
b.	A concentrated load of 2000KN is applied at the ground Surface. Determine the Vertical stress at a point 'p' which is 6m directly below the load. Also calculate the vertical Stress at a point 'R' which is at a depth of 6m but at a horizontal distance of 5m from the axis of the load.	5(M)	C313.3	BL2
8a.	Explain the procedure of the Standard Proctor's test.	5(M)	C313.4	BL1
b.	Explain about various factors affecting compaction?	5(M)	C313.4	BL1
	(OR)			
9a.	Describe spring analogy of one-dimensional consolidation with a neat sketch.	5(M)	C313.4	BL2
b.	The time to reach 40% Consolidation of two-way drained laboratory 10mm thick. Saturated claying soil sample in 35 sec. Determine the time required for 60% Consolidation of the same soil 10mm thick on the top of a rockey Surface subjected to the same loading conditions as the laboratory Sample?	5(M)	C313.4	BL1
10a	Explain Mohr – Coulomb Failure theories?	10(M)	C313.5	BL1
	(OR)			
11a	The following results were obtained from a triaxial test on two soil specimens.	10(M)	C313.5	BL4

Sample No.	Confining Pressure(kPa)	Deviator Stress at failure(kPa)	Pore water pressure(kPa)
1	200	244	55
2	300	314	107

Determine the shear strength parameters of the soil terms of
(i) total stresses ii) effective stresses.

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