O.P.Code: 20CE0114	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular & Supplementary Examinations June-2024
GEOTECHNICAL ENGINEERING
(Civil Engineering)

Time: 3 Hours **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define Liquid limit, Plastic limit, Shrinkage limit and Plasticity index.	CO1	L1	6M
	b	A soil has a liquid limit of 45%, plastic limit of 20% and flow index of 50%.Determine its toughness index. If the natural water content is 25%, determine itsconsistency index.	CO1	L3	6M
		OR			
2		Determine the average coefficient of permeability in the horizontal and vertical direction for a deposit consisting of three layers of thickness 5 m, 1m, and 2.5 m and having the coefficient of permeability of 3 $x10^{-2}$ mm/sec, $3x10^{-5}$ mm/sec and 4 $x10^{-2}$ mm/sec respectively.	CO1	L3	12M
		UNIT-II			
3		What is the Compaction phenomenon of soils? Explain various factors effecting of compaction on properties of soils.	CO2	L2	12M
		OR			
4	a	The Maximum dry density of a sample by the light compaction test is 1.78g/ml at an optimum water content of 15%. Find the air voids and degree of saturation G=2.67. What would be the corresponding value of dry density on the zero airvoids at optimum moisture content.	CO2	L3	6M
	b	Differentiate between Standard proctor test and Modified proctor test.	CO2	L2	6M
		UNIT-III			
5	a	Write short notes on Mohr's Circle of stress.	CO4	L1	6M
	b	A concentrated load of 2000 kN acts vertically 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.	CO4	L3	6M
		OR			
6	a	What are the various methods of determination of shear strength in the laboratory?	CO4	L1	6M
	b	Explain types of soils based on total strength.	CO4	L2	6M
		UNIT-IV			
7	a	Explain factor of safety with respect to shear strength, cohesion and friction.	CO5	L2	6M
	b	Explain different types of slope failures with neat sketches	CO5	L2	6M
		OR			
8		A canal is to be excavated through a soil with c = 15 kN/m^2, $\varphi = 20^\circ$, e = 0.9 and G = 2.67. The side slope is 1 in 1. The depth of the canal is 6 m. determine the factor of safety with respect to cohesion when the canal runs full. What will be the factor of safety if the canal is rapidly emptied.	CO5	L2	12M

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UNIT-V

9		Explain in detail how cone penetration test is conducted with neat sketch.	CO6	L2	12M

OR

10	a	How boring operations are carried out using rotary auger boring and percussion drilling?	CO6	L1	6M
	b	Describe the construct of a split spoon sampler. Explain how undisturbed soil sample is extracted using it.	CO6	L2	6M

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