PRN:		Course Code :	UCE402

Second Year B. Tech End Semester Examination Winter 2024

Soil Mechanics

000132

Day and Date: Mon 25 NOV 2024 Max Marks: **100**

Time : 02:00PM To 05:00PM Duration: **03** hrs

Instructions: 1. All questions are compulsory.
2. Assume suitable data, is necessary and mention it clearly.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Explain three phase soil system. Also discuss when it becomes two phase system.	08	L2	CO1
	b)	A soil sample has a porosity of 40 per cent. The specific gravity of solids is 2.70. Calculate (a) voids ratio, (b) dry unit weight, (c) unit weight if the soil 50% saturated and (d) unit weight if the soil is completely saturated.	08	L3	CO1
		OR			
	b)	Discuss consistency limits of soils with the help of volume versus water content relationship.	08	L2	CO1
Q.2		**Attempt the following**			
	a)	Discuss factors affecting permeability of soil.	08	L2	CO2
	b)	A soil deposit consists of three layers of thickness 6m, 4m, 12 m with permeabilities 8×10^{-4} cm/s, 52×10^{-4} cm/s and 6×10^{-4} cm/s respectively. Calculate average effective permeability in horizontal and vertical direction.	08	L3	CO2
		OR			
	b)	What is flow net? Explain its characteristics and bring out the uses of flow net.	08	L3	CO2
Q.3		**Attempt any two from the following**			
	a)	Explain in brief factors affecting compaction with neat sketches.	08	L2	CO3
	b)	Explain spring analogy of consolidation.	08	L2	CO3
	c)	In a consolidation test, the void ratio of the specimen which was 1.068 under the effective pressure of 214 kN/m^2, voids ratio changed to 0.994 when the pressure was increased to 429 kN/m^2.	08	L2	CO3

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		Determine coefficient of compressibility (a_v), compression index (C_c) and coefficient of volume compressibility (m_v).			
Q.4		**Attempt any two from the following**			
	a)	Find the intensity of vertical pressure and horizontal shear stress at a point 4 m directly below a 20 kN point load acting at a horizontal ground surface. What will be vertical pressure and shear stress at a point 2 m horizontally away from the axis of loading but at same depth of 4 m ?	08	L2	CO3
	b)	Explain the concept and use of Newmark's chart.	08	L2	CO3
	c)	A rectangular area 2 m x 4 m carries uniform load of 80 kN/m^2 at ground surface. Find vertical stress at 5 m below the centre and corner of the loaded area. Use equivalent load method.	08	L3	CO3
Q.5		**Attempt any Two of the following**			
	a)	Draw the failure / strength envelopes for i) c – soil, ii) ϕ – soil & iii) c – ϕ soil.	09	L2	CO4
	b)	Explain UU, CU and CD test w.r.t triaxial test.	09	L2	CO4
	c)	Explain the concept of active earth pressure and passive earth pressure.	09	L3	CO4
Q.6		**Attempt any Two of the following**			
	a)	Discuss types of rocks.	09	L2	CO4
	b)	Explain geological investigation for dams.	09	L2	CO4
	c)	Discuss structural geology. Also mention practical applications of structural geology in Civil Engineering.	09	L2	CO4

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