Reg. No. : | | | | | | | | | | | | |

Question Paper Code: R4102

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Fourth Semester

Civil Engineering

R21UCE402- SOIL MECHANICS

(Regulations R2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5Marks)

1. The uniformity coefficient is useful to …… CO1- U

   (a) 0.536 (b) 0.840 (c) 0.075 (d) 0.33

2. The permeability is inversely proportional to_____ CO1- U

   (a) Viscosity (b) Specific gravity (c) Temperature (d) None

3. Weight of Hammer used in Standard Proctor Test ……. CO1- U

   (a) 2.6 Kg (b) 4.6 Kg (c) 8 Kg (d) 12.5 Kg

4. The expansion of soil due to shear at constant value of pressure is called CO1- U

   (a) apparent cohesion (b) true cohesion

   (c) dilatancy (d) consistency

5. Depending upon the properties of a material, the failure envelope may CO1- U

   (a) All (b) Pass through the origin of stress

   (c) Intersect the shear stress axis (d) Be either straight or curvedstress

PART – B (5 x 3= 15 Marks)

6. Distinguish between Residual Soil and Transported Soil. CO1-U
7. What are the properties of flow net. CO1-U
8. Distinguish compaction and consolidation. CO1-U
9. Discuss about Shear strength of soil? CO1-U
10. Distinguish between finite and infinite slopes. CO1-U

PART – C (5 x 16= 80 Marks)

11.	(a)	A soil sample has a porosity of 50% the specific gravity of solids is 2.70.Calculate a) Void ratio b) dry density c) Unit weight if the soil is 40% saturated and d) unit weight if the soil is completely saturated.	CO2-App	(16)
		Or		
	(b)	A Core cutter 12.6 cm in height and 10.2 cm in diameter weighs 1071 gm when empty. It is used to determine the in-situ unit weight of an embankment. The weight of core cutter full of soil is 2970 gm. i) If the water content is 6%, what are the in-situ dry weight and porosity? ii) if the embankment gets fully saturated due to heavy rains what will be the increase in water content and bulk unit weight, if no volume change occurs? The specific gravity of soil soilds is 2.69.	CO2-App	(16)
12.	(a)	Explain permeability & Discuss the factors affecting permeability of soil in detail.	CO1- U	(16)
		Or		
	(b)	Discuss about quick sand condition and State the reason for Quick sand condition and its effect.	CO1- U	(16)
13.	(a)	Explain in detail the procedure of Modified Proctor Compaction test.	CO1- U	(16)
		Or		
	(b)	Discuss the effect of compaction on various engineering properties of soils.	CO1- U	(16)
14.	(a)	Demonstrate the Direct shear test. State advantages of Direct shear test.	CO1- U	(16)
		Or		
	(b)	Explain the triaxial shear tests based on drainage and their applicability. Mention its merits and demerits.	CO1- U	(16)
15.	(a)	Examine about the friction circle method of stability Analysis with neat sketch.	CO1- U	(16)
		Or		
	(b)	Briefly explain about slope protection measures in practice with neat sketch.	CO1- U	(16)