

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026***Third Semester***Agricultural Engineering****UAIT24301 – Principles of Soil Science and Engineering***Regulations - 2024**Duration : 3 Hrs**Maximum : 100 Marks***PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	Why texture of soil important?	L1	1	2
2.	List out the different types of soil water.	L1	1	2
3.	Define base map.	L1	2	2
4.	List out the methods of soil reclamation.	L1	2	2
5.	What are the Atterberg's limits?	L1	3	2
6.	List any four-equipment used for field compaction of Soil.	L1	3	2
7.	State Darcy's law.	L1	4	2
8.	Draw the Mohr's Circle diagram for UCC test and mention the salient features.	L2	4	2
9.	Define bearing capacity of soil.	L1	5	2
10.	Give the expression for stability number.	L1	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Explain the procedure to find the specific gravity of soil using pycnometer method with neat sketch. Or b How does soil pH affect plant nutrient availability, and what practices are used to correct soil acidity or alkalinity?	L2	1	16
12.	a Discuss in detail the soils of Tamil Nadu and India, their classification and agricultural importance. Or b Explain the steps involved in the preparation of a soil survey report and discuss the importance of soil survey data in agriculture.	L2	2	16
13.	a In a sieve analysis conducted on a sandy soil, the following results were obtained. Draw the grain size distribution curve. Find the percentages of gravel, sand and fine-grained fraction. Also, find whether the soil is well graded or poorly graded.	L3	3	16

Sieve size in mm	4.75	2.36	1.18	0.6	0.3	0.15	0.075	Pan
Mass retained in g	40.2	219.8	100.5	49.5	40.6	19.4	10.3	19.7

Or

	b	Apply suitable method to find the optimum moisture content and maximum dry density in laboratory.	L3	3	16
14.	a	A direct shear test was performed on 60 mm x 60 mm sample of dry sand. The normal load was 360 N. The failure occurred at a shear load of 180 N. Plot the Mohr strength envelope and determine ϕ . Assume $c = 0$. Also, Evaluate the principal stresses at failure.	L4	4	16
		Or			
	b	A soil sample of height 60 mm, area of cross section $10,000\text{mm}^2$ subjected to falling head permeability test. Determine coefficient of permeability of sample in a time interval of 5 minutes. Head is dropped from 600mm to 200mm. If the cross-sectional area of the stand pipe of 200mm^2 and if the soil sample is subjected to constant head of 180mm, calculate the total quantity of water collected in 1 hr after flowing through the soil sample.	L4	4	16
15.	a	A square footing located at a depth of 1.5 m below the ground surface in Cohesionless soil carries a column load of 1280 kN. The soil is submerged having an effective unit weight of 11.5 kN/m^3 and an angle of shearing resistance of 30° . Show and find the size of the footing for $F_s = 3$ by Terzaghi's theory of general shear failure.	L4	5	16
		Or			
	b	A finite slope of clay is observed to be failing along a circular slip surface. Analyze the slope stability using friction circle method to and determine the factor of safety.	L4	5	16