

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APR/MAY 2026****Third Semester****Agricultural Engineering****AI3301 PRINCIPLES OF SOIL SCIENCE AND ENGINEERING****Regulations - 2021****Duration : 3 Hrs****Maximum : 100 Marks****PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q. No	Questions	BTL	CO	Marks
1.	State the types of soil water	L2	1	2
2.	Interpret the role of soil texture on soil temperature.	L2	1	2
3.	List the types of soil survey.	L1	2	2
4.	Write down the benefits of interpretation of soil survey reports	L1	2	2
5.	Define liquid limit	L1	3	2
6.	List out various factors influencing compaction.	L1	3	2
7.	List the advantages of direct shear test.	L1	4	2
8.	State Darcy's law	L1	4	2
9.	Differentiate finite and infinite slope.	L2	5	2
10.	Highlight stability number	L1	5	2

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

Q. No	Questions	BTL	CO	Marks
11.	a i Discuss the importance of soil texture in Agriculture	L2	1	8
	ii Discuss about the Darcy's law and list the factors affecting movement of water in soil	L2	1	8
Or				
	b i Explain the characteristic features of a soil profile with the help of a diagram.	L2	1	8
	ii List the procedure to test the plant nutrient availability.	L2	1	8
12.	a Briefly explain the procedure of identifying land capability.	L2	2	16
	Or			
	b Explain the concepts and uses of land capability classes and subclasses	L2	2	16
13.	a Derive the equation for terzaghi's theory of one-dimensional consolidation with a neat sketch.	L4	3	16
	Or			
	b Analyze IS Soil classification system for soil.	L4	3	16
14.	a Two identical specimens of a soil were tested in a tri-axial apparatus the first specimen failed at a deviator stress of 770 kpa when the cell pressure was 200 kpa. While the second specimen failed at a deviator stress on 1370 kpa under a cell pressure of 400 kpa. Determine the shear strength parameters. Also find the deviator stress at failure when the cell pressure was 600 kpa. If the same soil is tested in a direct shear apparatus, estimate the shear stress at which the sample will fail under a normal stress of 600 kpa.	L3	4	16

Or

- b The results of three consolidated undrained tri-axial tests on identical specimens of a particular soil as follows: Find the total and effective shear strength parameters. L3 4 16

Test Number	1	2	3
Confining Stress (kpa)	200	300	400
Deviator stress at peak (kpa)	244	314	384
Pore water pressure at peak (kpa)	55	107	159

15. a An embankment of 10m high is inclined at 35° to the horizontal. A stability analysis by method of slices gives the following forces: Total normal forces = 900 kN; total tangential force = 420 kN; total neutral force = 200 kN. If the length of the failure arc is 23m, examine the FOS with respect to shear strength. The soil has $C = 20 \text{ kN/m}^2$ and $\phi = 15^\circ$. L3 5 16

Or

- b A slope of very large extent of soil with properties $C = 0$ and $\phi = 32^\circ$ is likely to be subjected to seepage parallel to the slope with water level at the surface. Determine the maximum angle of slope for a FOS of 1.5 treating it as an infinite slope. For the angle of slope, what will be the FOS if the water level were to come well below the surface? The saturated unit weight of soil is 20 kN/m^3 . L3 5 16