

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026***Fourth Semester**Civil Engineering***UCETL24401 – Soil Mechanics 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.	Define plasticity index.	L1	1	2
2.	What is mean by compaction?	L1	1	2
3.	Enlist the various factors affecting permeability.	L2	2	2
4.	Define specific yield and specific retention.	L1	2	2
5.	What are the assumptions made in Terzaghi's one dimensional consolidation theory?	L1	3	2
6.	Differentiate consolidation and compaction.	L2	3	2
7.	Explain Mohr - Coulomb failure theory.	L1	4	2
8.	Define liquefaction.	L1	4	2
9.	Differentiate finite slope and infinite slope.	L2	5	2
10.	What are the various slope protection measures?	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 A soil sample has a porosity of 50%. The specific gravity of solids is 2.70. Calculate (a) Voids ratio (b) Dry density (c) Unit weight if the soil is 50% saturated and (d) Unit weight if the soil is completely saturated. Or b Explain about the various factors affecting compaction.	L3	1	16
12.	a Compute the total, effective and pore pressure at a depth of 20 m below the bottom of a lake 6 m deep. The bottom of lake consists of soft clay with a thickness of more than 20 m. The average water content of the clay is 35% and the specific gravity of the soil may be assumed to be 2.65. Or b Calculate the coefficient of permeability of a soil sample 6 cm is height and 50 cm ² in cross-sectional area, if a quantity of water equal to 440 ml passed down in 10 minutes under an effective constant head of 40 cm. On oven drying, the test specimen weighs 496 g. Taking the specific gravity of soil solids as 2.65, calculate the seepage velocity of water during the test.	L3	2	16

13.	a	A concentrated point load of 200 kN acts at the ground surface. Find the intensity of vertical pressure at a depth of 10 m below the ground surface and situated on the axis of the loading. What will be the vertical pressure at a point at a depth of 5 m and at a distance of 2 m from the axis of loading? Use Boussinesq analysis.	L3	3	16	
		Or				
	b	i	What are the various components of settlement? How are they estimated?	L2	3	8
		ii	Describe the factors influencing settlements.	L2	3	8
14.	a	Explain the triaxial shear test in detail. What are the advantages of triaxial shear test over direct shear test?	L2	4	16	
		Or				
	b	Explain in detail the determination of shear strength using unconfined compression test.	L2	4	16	
15.	a	Explain Friction circle method of stability analysis in detail with neat sketch.	L2	5	16	
		Or				
	b	Calculate the factor of safety with respect to cohesion, for a clay slope laid at 1 in 2 to a height of 10 m, if the angle of internal friction $\phi = 10^\circ$, $c = 25 \text{ kN/m}^2$ and $\gamma = 19 \text{ kN/m}^3$. What will be the critical height of the slope in this soil?	L3	5	16	

