



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.														
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End - Term Examinations – May / June 2026

Date: 21- 05-2026

Time: 09:30am – 12:30pm

School: SOE	Program: B. Tech-CIV	
Course Code: CIV2512	Course Name: Geotechnical Engineering	
Semester: IV	Max Marks: 100	Weightage: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	26	-	28	22	24

Instructions:

- Read all questions carefully and answer accordingly.
- Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	Explain voids ratio and porosity of soil.	2 Marks	L2	CO1
2.	List the clay forming minerals of soil.	2 Marks	L1	CO1
3.	If the liquid limit of soil is 40% and plastic limit of soil is 20%, what is the plasticity Index of soil.	2 Marks	L2	CO1
4.	Explain the term permeability of soil.	2 Marks	L2	CO3
5.	List the various methods of finding the coefficient of permeability of soil.	2 Marks	L1	CO3
6.	Explain effective stress of soil.	2 Marks	L2	CO3
7.	If effective stress is 200 kPa and neutral stress is 50 kPa then what is the value of total stress.	2 Marks	L1	CO3
8.	Explain the term compressibility of soil.	2 Marks	L2	CO4
9.	List the laboratory tests which are conducted to determine the optimum moisture content and maximum dry density of soil.	2 Marks	L1	CO5
10.	Explain the term Initial consolidation of soil.	2 Marks	L2	CO5

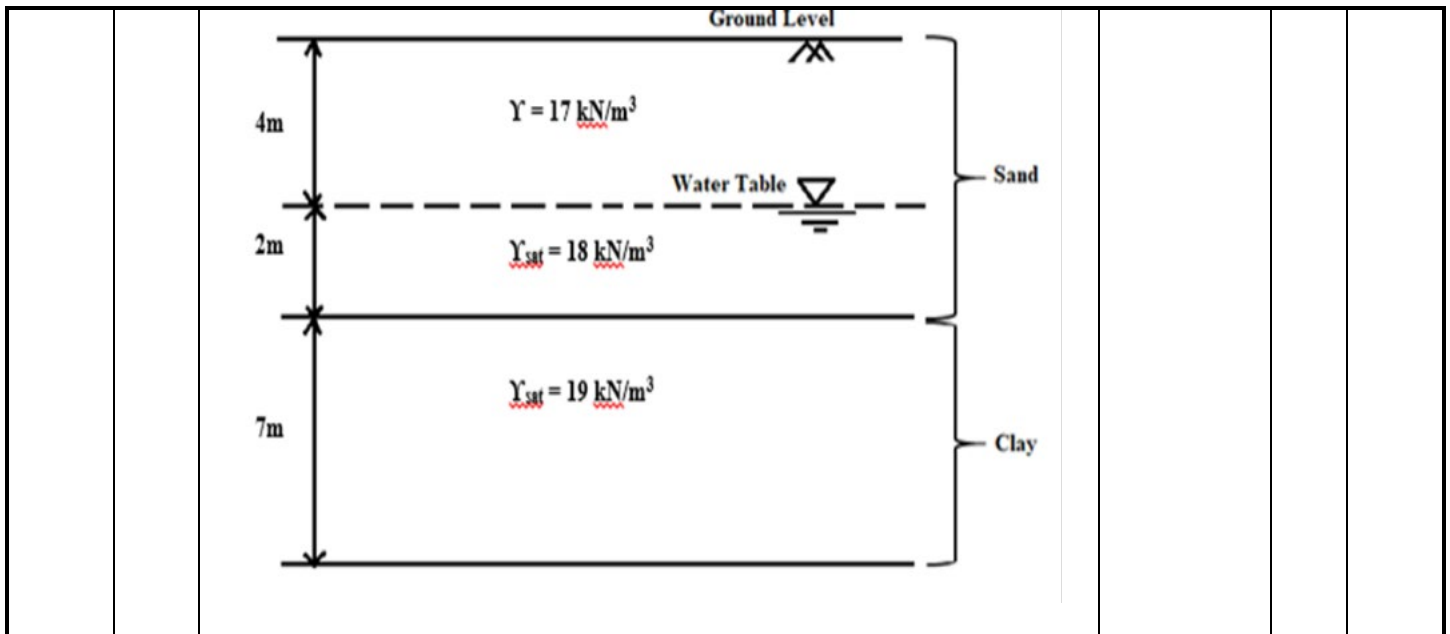
Part B

Answer the Questions.

Total Marks 80M

11.	a.	Geometrical arrangement of soil particles with respect to one another is known as soil structure. Explain the structure of soil with a neat sketch.	15 Marks	L2	CO1										
	b.	In an in-situ density test on a soil, the mass of wet soil in the mould was 1.855 kg and the volume of the mould was 0.945 liters. The water content of the soil was 16%. Determine the dry density, void ratio, Degree of saturation and percentage air voids. Take $G=2.68$.	5 Marks	L3	CO1										
Or															
12.	a.	Explain various consistency limits of soil with a neat sketch.	6 Marks	L2	CO1										
	b.	The following data gives the results of liquid limit of soil. Draw the graph and calculate Liquid limit and Flow Index of the soil. <table><tr><td>No of blows (N)</td><td>34</td><td>24</td><td>18</td><td>12</td></tr><tr><td>Water content (%)</td><td>44.6</td><td>49.4</td><td>51.4</td><td>55.6</td></tr></table>	No of blows (N)	34	24	18	12	Water content (%)	44.6	49.4	51.4	55.6	14 Marks	L3	CO1
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13.	a.	Explain Darcy's law with its assumptions and validity.	10 Marks	L2	CO3
	b.	Permeability test has been conducted for a soil sample from a construction site at Delhi and following are the experimental data-sample height is 10 cm, cross sectional area is 50 square centimeter, if a quantity of water of 450 ml is passed down in 10 min under a constant head of 40 cm determine permeability of soil. On oven drying, the soil has a mass of 498 g, $G=2.65$, and also calculate seepage velocity during the test.	10 Marks	L3	CO3
Or					
14.	a.	Demonstrate the relationship between discharge velocity and seepage velocity and also list the difference between them.	10 Marks	L3	CO3
	b.	The diagram shown below is the profile of the ground at a construction site in Rajanukunte from the soil investigation report. Calculate and plot the total stress, pore water pressure, and effective stress diagram for the soil profile shown in Figure.	10 Marks	L3	CO3



15.	a.	Sketch the Moh'r coulomb failure envelope for pure cohesive soil, cohesion less soil and for the soil having both cohesion and angle of friction.	6 Marks	L3	C04												
	b.	A series of direct shear tests were conducted on soil at a construction site at Yelahanka, and each test was carried out until the sample failed. The following results were obtained and are tabulated below. Calculate cohesion and angle of shearing resistance for the soil sample by plotting the graph. <table><tr><td>sample No</td><td>Normal Stress (kN/m²)</td><td>Shear stress (kN/m²)</td></tr><tr><td>1</td><td>15</td><td>18</td></tr><tr><td>2</td><td>30</td><td>25</td></tr><tr><td>3</td><td>45</td><td>32</td></tr></table>	sample No	Normal Stress (kN/m ²)	Shear stress (kN/m ²)	1	15	18	2	30	25	3	45	32	14 Marks	L3	C04
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1	15	18															
2	30	25															
3	45	32															
Or																	
16.	a.	The following results were obtained from a series of consolidated undrained triaxial shear test on a soil sample procured from Kolar, in which the pore water pressure was not determined. Determine the cohesion intercept and the angle of shearing resistance. <table><tr><td>sample No</td><td>Confining Pressure (kN/m²)</td><td>Deviator stress (kN/m²)</td></tr><tr><td>1</td><td>100</td><td>600</td></tr><tr><td>2</td><td>200</td><td>750</td></tr><tr><td>3</td><td>300</td><td>870</td></tr></table>	sample No	Confining Pressure (kN/m ²)	Deviator stress (kN/m ²)	1	100	600	2	200	750	3	300	870	20 Marks	L3	C04
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17.	a.	Explain the various factors affecting compaction.	16 Marks	L2	C05
	b.	Explain the terms compaction and consolidation of soil.	4 Marks	L2	C05
Or					
18.	a.	Explain Mass Spring analogy of soil consolidation with a neat diagram.	15 Marks	L2	C05
	b.	Sketch the compaction curve and show the salient points in it.	5 Marks	L3	C05