



**GIET UNIVERSITY, GUNUPUR – 765022**  
 B. Tech (Third Semester - Regular) Examinations, December – 2022  
**21BAEES23004 – SOIL MECHANICS**  
 (AGE)

Time: 3 hrs

Maximum: 70 Marks

**Answer ALL questions**  
**(The figures in the right hand margin indicate marks)**

**PART – A****(2 x 5 = 10 Marks)**Q.1. Answer *ALL* questions

- |   | CO # | Blooms Level |
|---|------|--------------|
| a. Write short note on Adsorbed Water?              | CO1  | L2           |
| b. Define and explain: Liquid limit; Plastic limit? | CO2  | L3           |
| c. Define Permeability?                             | CO3  | L3           |
| d. Define OMC?                                      | CO3  | L2           |
| e. What is the Soil Compaction?                     | CO4  | L3           |

**PART – B****(15 x 4 = 60 Marks)**Answer ALL questions

- |  | Marks | CO # | Blooms Level |
|--|-------|------|--------------|
| 2. a. The moist unit weight of a soil is $16.50 \text{ KN/m}^3$ . Given that the water content = 15% and specific gravity of soil solids = 2.70, find the dry unit weight, porosity, degree of saturation the mass of water that must be added to reach full saturation?   | 8     | CO1  | L2           |
| b. Explain different types of soil structures with neat figures?   | 7     | CO1  | L3           |
| (OR)   |       |      |              |
| c. Explain the procedure of Determination of water content of soil solids by oven drying method?   | 8     | CO1  | L2           |
| d. Derive the expression $\gamma_b = \frac{(G + Se)\gamma_w}{1 + e}$   | 7     | CO1  | L3           |
| 3.a. Briefly describe the procedure to determine the Liquid Limit of a soil.   | 8     | CO2  | L2           |
| b. Determine the ratio of average coefficient of permeability in the horizontal to vertical direction for a deposit consists of three layers 6m, 1.5m and 3m and having coefficient of permeability $2.5 \times 10^{-2} \text{ mm/s}$ , $3.5 \times 10^{-5} \text{ mm/s}$ , $4.5 \times 10^{-2} \text{ mm/s}$ . Assume the layer to be isotropic | 7     | CO2  | L3           |
| (OR)   |       |      |              |
| c. State & Explain the Darcy's law?  | 8     | CO2  | L2           |
| d. Describe clearly with a neat sketch how you will determine the coefficient of permeability of a Soil sample in the laboratory by falling head permeability test?  | 7     | CO2  | L4           |
| 4.a. Explain Total, Neutral Stresses?  | 8     | CO3  | L2           |
| b. Explain the procedure of Determine the field density of a natural soil by using core cutter method.   | 7     | CO3  | L3           |
| (OR)   |       |      |              |
| c. Define & Explain i) Effective stress ii) capillary rise in soil   | 8     | CO3  | L4           |
| d. What are the factors that affecting compaction? Explain it?   | 7     | CO3  | L2           |
| 5.a. What are the various Soil compaction methods?   | 8     | CO4  | L3           |
| b. What are the laboratory soil compaction tests? Explain it?  | 7     | CO4  | L2           |
| (OR)   |       |      |              |
| c. Explain the Quick sand condition?   | 8     | CO4  | L4           |
| d. Explain the basic mechanism of shear strength of soils.   | 7     | CO4  | L2           |

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