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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

(AUTONOMOUS)

**B.Tech III Year I Semester Supplementary Examinations August-2021****GEO TECHNICAL ENGINEERING-1**

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 Using three phase diagram of soil, derive an expression for saturated unit weight of soil in terms of Void ratio, unit weight of water, specific gravity and degree of saturation **12M**

**OR**

- 2 a Briefly explain the Procedure of core cutter method **6M**  
b Explain Determination of specific gravity in the laboratory **6M**

**UNIT-II**

- 3 Determine the average coefficient of permeability in the horizontal and vertical directions for a deposit consisting of three layers of thickness 5 m, 1 m and 2.5 m and having coefficient of permeability of  $3 \times 10^{-2}$  mm/sec,  $3 \times 10^{-5}$  mm/sec, and  $4 \times 10^{-2}$  mm/sec, respectively. Assume that the layers are isotropic. **12M**

**OR**

- 4 What is flow net? Describe its properties and applications. How to construct a flow net? **12M**

**UNIT-III**

- 5 The following data are obtained in a compaction test. Specific gravity = 2.65 **12M**

Moisture content (%)	2	4	5.8	6.7	7.8	10
Wet density (kN/m <sup>3</sup> )	20.4	20.9	21.4	22.2	22.4	22.0

Determine the OMC and maximum dry density. Draw 'Zero-air-void line'

**OR**

- 6 a Explain the concept of 'Pressure Bulb' in soils. **6M**  
b Write a short note on Method of Compaction **6M**

**UNIT-IV**

- 7 A sand fill compacted to a bulk density of  $18.32 \text{ kN/m}^3$  is to be placed on a compressible saturated Mass deposit 4 m thick. The height of the sand fill is to be 3.5 m. If the volume compressibility  $m_v$  Of the deposit is  $6.5 \times 10^{-4} \text{ m}^2/\text{kN}$ , estimate the final settlement of the fill. **12M**

**OR**

- 8 A layer of soft clay is 5 m thick and lies under a newly constructed building. The weight of sand Overlying the clayey layer produces a pressure of  $250 \text{ kN/m}^2$  and the new construction increases the Pressure by  $120 \text{ kN/m}^2$ . If the compression index is 0.5, compute the settlement. Water content is 40% and specific gravity of grains is 2.68. **12M**

**UNIT-V**

9 Briefly explain how you conduct the triaxial compression test and compute the shear parameters for the soil from the test data. 12M

**OR**

10 Calculate the potential shear strength on a horizontal plane at a depth of 3 m below the surface in a Formation of cohesionless soil when the water table is at a depth of 3.5 m. The degree of saturation May be taken as 0.5 on the average. Void ratio = 0.50; grain specific gravity = 2.70; angle of internal Friction =  $30^\circ$ . What will be the modified value of shear strength if the water table reaches the Ground surface? 12M

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