

**B.Tech. Civil (Construction Management) /
B.Tech. Civil (Water Resources Engineering)**

Term-End Examination

December, 2018

00303

ET-501(A) : SOIL MECHANICS

Time : 3 hours

Maximum Marks : 70

Note : Attempt any **five** questions. Assume any suitable data, if missing. All questions carry equal marks. Use of scientific calculator is permitted.

1. (a) Explain how shrinkage limit of a fine grained soil is determined. What is volumetric shrinkage ? 7
- (b) The mass specific gravity of a soil equals 1.64. The specific gravity of solids is 2.70. Determine the void ratio under the assumption that the soil is perfectly dry. What would be the void ratio, if the sample is assumed to have a water content of 8% ? 7
2. (a) Explain the characteristics of Montmorillonite, Kaolinite and Illite minerals. 7
- (b) Discuss about the Atterberg's limits and define each one of them. 7

3. (a) Discuss how permeability is determined by variable head permeameter. 7
- (b) Define total stress, neutral stress and effective stress. What is the importance of effective stress? 7
4. Establish the following consolidation relation : 14

$$\frac{\partial u}{\partial t} = C_r \frac{\partial^2 u}{\partial z^2},$$

the symbols carrying their usual meaning.

5. (a) Discuss the factors affecting shear strength of cohesive and cohesionless soils. 7
- (b) Discuss the Swedish circle method for finding the factor of safety of the slope. 7
6. (a) Write a short note on plate load test in the field. 7
- (b) Describe flow net and its use. How will you calculate the parameters of seepage? 7
7. (a) Discuss how Standard Proctor test is performed in the laboratory. Explain compaction curve. 7
- (b) Describe the soil structures with neat sketches. 7
8. Write short notes on any **two** of the following : $2 \times 7 = 14$
- (a) Newmark's Chart
- (b) Hydraulic Conductivity of Soil
- (c) Triaxial Shear Test