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ET-501(A)

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

Term-End Examination

00562

June, 2019

ET-501(A) : SOIL MECHANICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Use of calculator is allowed. Assume specific gravity of soil as 2·65.*

1. (a) Derive the relation amongst saturated density, specific gravity and void ratio. Define each of these terms. 7

(b) Explain how the liquid limit of clayey soil is determined in the laboratory. 7

2. (a) Discuss the factors affecting capillary rise in soil. Explain the significant consequences of capillarity on the behaviour of soil. 7

(b) Discuss the validity of Darcy's law. Calculate the coefficient of permeability of a soil sample, 6 cm in height and 50 cm^2 in cross-sectional area, if a quantity of water equal to 430 mL is passed down in 10 minutes, under an effective constant head of 40 cm. 7

3. (a) Discuss Mohr-Coulomb theory of failure w.r.t. shear strength of the soil. 7

(b) Discuss various methods of determining the shear strength of soil. Explain direct shear test method in detail. 7

4. (a) Classify the soil according to I.S.I. (Unified soil classification system). 7

(b) Explain the mechanical analogy for consolidation. 7

5. (a) With the help of neat sketches, explain various types of slope failure. 7

(b) Discuss the various methods of improving slope stability in the field. 7

6. (a) What is Compaction Energy ? Explain with neat sketches any two types of compaction equipment. 7

(b) Derive the Laplace equation for the two-dimensional condition of flow in soil. Establish the relation between equipotential function and flow function. 7

7. (a) What is the difference between equipotential lines and streamlines ? How is seepage quantity estimated through the flow net ? 7

(b) Explain with a suitable example, how pressure under a hydraulic structure is estimated. 7

8. Write short notes on any ***two*** of the following : *2×7=14*

(a) Swedish Circle Method

(b) Terzaghi's Theory of Consolidation

(c) Types of Soil Water