

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

Term-End Examination

00682

December, 2016

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 allowed.

1. (a) Derive a relation between bulk density, void ratio, specific gravity and degree of saturation. 7

- (b) A falling head permeability test was carried out on a 15 cm long sample of silty clay. The diameter of the sample and stand pipe are 98 mm and 7.5 mm respectively. The water level in the stand pipe was observed to fall from 60 cm to 45 cm in 12 minutes.

Determine : 7
 - (i) Coefficient of permeability of soil in m/day
 - (ii) Height of water level in the stand pipe after another 20 minutes.

2. (a) Explain Quicksand condition with a neat sketch. 7
- (b) Discuss about the Atterberg's limits and define each one of them. 7
3. (a) Explain local shear failure, general shear failure and punching shear, with a suitable sketch. 7
- (b) Name the various methods of slope stability analysis. Describe any one of them in detail. 7
4. (a) How will you determine the field permeability for open aquifer ? 7
- (b) What are the various methods of determining the compaction in the field ? Explain any one method. 7
5. (a) How is soil gradation determined ? 7
- (b) Discuss the various methods of determining the shear strength of soil. Explain Direct Shear test method in detail. 7
6. (a) What are the various factors which affect the shear strength of soil ? Write the use of shear strength of soil. 7
- (b) Classify the soil according to I.S.I. (Unified Soil Classification System). 7

7. (a) Write the advantages and disadvantages of plate load test. 7
- (b) A moist soil sample weighs 10 N and has a volume of 600 c.c. Its dry weight is 9 N and specific gravity is 2.70. Determine the void ratio, porosity, moisture content and degree of saturation. Take unit weight of water as 10 kN/m^3 . 7
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