Code No: RT22353 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, November-2017
SOIL MECHANICS
(Agricultural Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Define the terms specific gravity of particles, porosity and submerged density. (4M)
   b) Differentiate Boussinesq's and Wester gaurd's Theories. (4M)
   c) Describe the direct shear test. (4M)
   d) Explain in detail about the procedure to get the controlled the density in the field during the compaction process. (4M)
   e) What are the assumptions made in the Terzaghi's one dimensional consolidation Theory? (4M)
   f) What is meant by stability of slopes? Explain briefly. (2M)

PART-B

2. a) Explain laboratory method to determine shrinkage limit of a given soil sample.
   b) The Atterberg limits of a clayey soil are liquid limit=63%, plastic limit =40% and shrinkage limit =27%. If a sample of this soil has a volume *of* 10cm^3 at the liquid limit and a volume of 6.4 cm^3 at the shrinkage limit, determine specific gravity of solids, shrinkage ratio and volumetric shrinkage.

3. a) State the assumptions made in computing stresses below the ground surface due to point load acting on it. Discuss their validity in practice.
   b) Find the intensity of vertical pressure and horizontal shear stress at a point 4m directly and shear stress at a point 2m horizontally away from the axis of loading but at the same depth of 4m.
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4. a) Differentiate between unconsolidated undrained test and drained test. Under what conditions are these test results used for design purposes?

   b) A sample of dry cohesionless soil was tested in a triaxial machine. If the angle of shearing resistance was 32^0 and the confining pressure 100kN/m^2, determine the deviator stress at which the sample failed.

5. a) Describe standard proctor test.

   b) A laboratory compaction test on soil having specific gravity equal to 2.68 gave a maximum dry density of 1.82 g/cc and a water content of 17%. Determine the degree of saturation, air content and percentage air voids at the maximum dry density. What would be theoretical maximum dry density corresponding to zero air voids at the optimum water content?

6. a) Explain in detail square root of time fitting method for evaluation of consolidation from laboratory test data.

   b) Normally consolidated clay settled by 2 cm when the effective stress was increased from 100kPa to 200kPa. Calculate the settlement when the effective stress is increased to 400kPa and 800kPa.

7. a) Derive an expression for the factor of safety of infinite slope in a pure cohesive soil.

   b) An embankment is inclined at an angle of 36^0 and its height is 12m. The angle of shearing resistance is 18^0 and the cohesion intercept is 200kN/m^2. The unit weight of soil is 18kN/m^3. If Taylor's stability number is 0.06, find the factor of safety with respect to cohesion