

Code No: R32011

R10**Set No. 1**

III B.Tech II Semester Supplementary Examinations, November - 2017
GEOTECHNICAL ENGINEERING –I
(Civil Engineering)

Time: 3 hours**Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Derive the relationship between dry density and bulk density in terms of water content. [4M]
b) What is meant by relative density of soil? Mention its importance. [4M]
c) Briefly describe the processes of soil formation. [7M]
- 2 a) Explain IS, Unified and HRB soil classification systems. [9M]
b) Define and explain shrinkage limit of soil. Briefly describe the procedure to determine the Shrinkage Limit of a soil. [6M]
- 3 a) Describe clearly with a neat sketch how you will determine the coefficient of permeability of a clay sample in the laboratory and derive the expression used to compute the permeability coefficient. [10M]
b) (i) Why is the capillary rise greater for fine grained soils than for coarse grained soils? [5M]
(ii) What is the effect of temperature of the capillary rise of water in soil?
- 4 a) In a deposit of silty soil, the water table which was at originally at a depth of 1m below ground level was lowered to 3m below ground level. The bulk and saturated unit weight of silty soil was 18kN/m^3 and 20kN/m^3 respectively. What is the change in effective pressure at a depth of 1.0m and 3.0m? [8M]
b) What is quick sand? How to calculate the hydraulic gradient required to create quick sand condition in a sample of sand? [7M]
- 5 a) Derive an expression for a vertical stress below the centre of circular area supporting a uniformly distributed load at the surface. Use Boussinesq's theory [7M]
b) Explain the construction procedure of New mark's chart and its usage. [8M]
- 6 a) Discuss the effect of compaction on soil properties. [7M]
b) What is the mechanism behind compaction of soils? [4M]
c) What are the field compaction equipments? Explain any one. [4M]
- 7 a) Explain Spring Analogy Mechanism for primary consolidation. [5M]
b) Distinguish between normally consolidated and over consolidated soils. [4M]
c) Explain in detail any one method for determining the coefficient of consolidation of a soil. [6M]

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- 8 a) What are the advantages and disadvantages of a triaxial compression test? [9M]
Briefly explain how you conduct the test and compute the shear parameters for the soil from the test data.
- b) What are the advantages of vane shear test? A shear vane of 5 cm diameter and 10 cm length was used to measure the shear strength of saturated soft clay. If a torque of 35 N-m was required to shear the soil, calculate the undrained shear strength. The vane was then rotated rapidly to cause remoulding of the soil. The torque required in the remoulded state was 5 N-m. Determine the sensitivity of the soil [6M]

2 of 2

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