Code: 13A01602 **R13**

B.Tech III Year II Semester (R13) Regular Examinations May/June 2016

GEOTECHNICAL ENGINEERING – I

(Civil Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Derive the relation between void ratio and porosity.
(b) Write briefly about various consistency limits.
(c) Discuss about capillary rise.
(d) Write about characteristics of flow nets.
(e) Write assumptions of Boussinesq's theory for stress distribution in soils.
(f) Discuss about relative compaction.
(g) Explain determination of preconsolidation pressure.
(h) Write about stress history of clay using e Vs σ curves.
(i) Discuss about Liquefaction.
(j) Explain about determination of shear strength using vane shear test.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Determine the consistency of a soil having plastic limit of 22% and a plasticity index of 32. The natural water content of the soil is 36%. Also, determine the liquidity index and consistency index of the soil.

OR

3 Explain step by step procedure to classify soils as per I.S. Classification of soils.

UNIT – II

4 Explain the permeability of layered soils for vertical flow and horizontal flow.

OR

5 Explain about factors affecting permeability of soils.

UNIT – III

6 A load 500 kN acts as a point load at the surface of a soil mass. Estimate the vertical stress at a point 4 m below and 3m away from the point of load using Boussinesq's and Westergaard's theory.

OR

7 Explain the laboratory procedure to determine maximum dry density and optimum moisture content by using standard compaction test.

UNIT – IV

8 Explain Casagrande's logarithm of Time fitting method to estimate coefficient of consolidation with a neat sketch.

OR

9 A clay layer of 6m thick is situated with sand on top and impervious rock at the bottom. In a consolidation test conducted in the laboratory on an undisturbed specimen of 20 mm thick clay sample, 90% settlement was reached in 3 hours. Estimate the time in years for the building on this deposit to reach 90% of its final settlement.

UNIT – V

10 Explain the merits and demerits of direct shear test when compared with the other laboratory tests to determine the shear strength of soil.

OR

11 Explain about shear strength of sands with a neat sketch.

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