Code No: **R32011** **R10** **Set No. 1**

**III B.Tech II Semester Supplementary Examinations, November - 2018**

**GEOTECHNICAL ENGINEERING - I**

(Civil Engineering)

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

**Answer any FIVE Questions**

**All Questions carry equal marks**

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1 a) Describe different types of structure of soils.

b) Explain the basic structural units with which clay minerals are made.

2 a) Explain i) void ratio ii) porosity iii) water content iv) bulk density

b) A saturated soil mass has a porosity of 40% and a specific gravity of 2.6. Determine i) water content ii) dry unit weight and iii) saturated unit weight.

3 a) Explain laboratory determination of coefficient of permeability by variable head method.

b) A horizontal stratified soil deposit consists of three layers each uniform in itself. The permeabilities of these layers are 8 x $10^{-4}$cm/s, 50 x $10^{-4}$cm/s and 15 x $10^{-4}$cm/s and their thicknesses are 6, 3, and 12 m respectively. Find the effective average permeability of the deposit in the horizontal and vertical directions.

4 a) Define total, neutral and effective stresses in soil.

b) What is flow net? What are the salient characteristics and uses of flow net?

5 a) Derive an expression for the vertical stress at a point due to a point load, using Boussinesq's theory.

b) Explain geostatic stresses. How are these determined?

6 a) What are the factors affecting compaction?

b) What are the different methods of compaction adopted in the field? How would you select the type of roller to be used?

7 a) Define the following i) Under consolidated soil ii) Normally consolidated soil iii) Over consolidated soil.

b) What is consolidation? Describe Terzaghi's spring dash pot model to explain mechanism of consolidation.

8 a) Explain stress-strain behavior for dense and loose sand with a neat sketch.

b) The effective shear strength parameters of a soil are 25 kPa and $30^0$. Find the shearing resistance on a plane within a submerged soil mass, where the total normal stress is 328 kPa and the pore water pressure is 114 kPa.

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