

Seat No.	
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T.E. (Civil) (Part - III) (Semester - V) Examination, April - 2016

GEOTECHNICAL ENGINEERING - I (Pre-Revised) (Old)

Sub. Code : 45537

Day and Date : Saturday, 30 - 04 - 2016

Total Marks : 100

Time : 10.30 a.m. to 01.30 p.m.

- Instructions :
- 1) Question No. 1 from Section - I and Question No. 5 from Section - II are compulsory. Attempt any two questions from the remaining in each Section.
  - 2) Figures to the right indicate full marks.
  - 3) Make assumptions wherever necessary.
  - 4) Use of non-programmable calculator is allowed.

**SECTION - I**

**Q1)** All questions are compulsory: **[3×6=18]**

- a) Explain procedure for preparation of soil sample for wet mechanical analysis of soil.
- b) A natural deposit of soil has bulk unit weight of 16.8 KN/ cu.m. at water content of 15 %. How many liters of water will have to be added to 1 Cu. Mt. of this soil to raise its water content to 25 %. The Sp. Gravity of soil solids is 2.67.
- c) Explain density index of non cohesive soil.

**Q2)** a) Explain Darcy's law and its validity. **[8]**

- b) Laboratory test on soil sample gave following results
  - i) Liquid limit – 50 %,
  - ii) Plastic limit – 25 %,
  - iii) Natural water content – 20 %,
  - iv) Particles less than 0.002 mm – 20 %.

Calculate Plasticity index, Liquidity index, Relative consistency and activity number.

**[8]**

**P.T.O.**

- Q3)** a) List the methods for determination of compaction parameters. Explain any one method. [8]
- b) Calculate effective stress, pore pressure and total stress at 8 Mt. below ground level where water table is at 3 Mt. below ground level. For following properties of soil :- [8]
- Dry density of soil 1.6gm/cc., moisture content of soil above water table 15 % and Sp. Gravity of soil 2.7.

- Q4)** a) Explain the following [10]
- i) Proctor theory of compaction.
- ii) Normally and over consolidated soil
- b) In a consolidation test void ratio decreased from 0.70 to 0.65 when the load was changed from 50KN/sq.m to 100 KN/sq.m. Calculate compression index and coefficient of volume compressibility. [6]

**SECTION - II**

**Q5)** All questions are compulsory :- [4×5=20]

- a) State the assumptions made in Westergaards analysis in stress distribution.
- b) Write the applications of shear strength parameters in the field.
- c) For which type of soil, unconfined compression test is suitable? How Mohr circle is drawn for this test.
- d) What are the assumptions of Rankine's theory?

- Q6)** a) Discuss equivalent point load method. [7]
- b) Discuss Newmark's influence chart and its use. [8]

- Q7)** a) Explain Mohr-Coulomb failure theory. [7]  
b) Discuss Vane shear test. Derive the relation between the torque applied, the dimensions of vane and the shear strength. [8]
- Q8)** a) State the assumptions of Coulomb's Earth pressure theory. [7]  
b) Estimate the value  $K_a$ ,  $K_p$ , and  $K_o$  for a cohesionless soil whose angle of shear resistance is  $30^\circ$ . [8]

