

Code No: RT31011

R13**SET - 1**

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

Time: 3 hours

Max. Marks: 70

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

PART –A

- 1 a) What are the factors affecting compaction of soil? [3M]
- b) Differentiate between liquidity index and consistency index. [4M]
- c) State the factors effecting permeability of soil. [3M]
- d) Distinguish between Boussinesq's and Westergaard's theory of stress distribution in soils. [4M]
- e) Explain the terms Normally consolidated and Over consolidated soils. [4M]
- f) Distinguish between angle of repose and angle of internal friction. [4M]

PART –B

- 2 a) Describe standard proctor test and modified proctor test. [8M]
- b) Discuss the characteristics and construction of Kaolinite, Montmorillonite and Illite mineral groups. [8M]
- 3 a) Sketch typical grading curves for i) well graded soil, ii) gap graded soil, iii) uniformly graded soil, iv) clayey sand. [5M]
- b) For a soil liquid limit is 25% and plastic limit is 15%, if its flow index is 12.5%, Determine toughness index and consistency index. [6M]
- c) Describe the method of determination of shrinkage limit of soil. [5M]
- 4 a) What is quick sand condition and derive the relationship for critical hydraulic gradient of sandy soil. [6M]
- b) A falling head permeability test was carried out on a silty clay using a standard permeameter having sample of 12.7cm long. Diameter of the sample and the stand pipe were 10cm and 1.0cm respectively. The water level in the stand pipe was observed to fall from 80cm to 50cm in 15 minutes. Determine the co-efficient of permeability of the soil and height of water level in the stand pipe after another 15 minutes. [10M]
- 5 a) The four legs of a transmission tower form in plan a square of side 4m and together carry a total load of 200kN. Compute the increase in vertical stress at a depth of 3m vertically below a Leg. Use Boussinesq's theory. [8M]
- b) Find the intensity of vertical pressure at a point 4m directly below 20 kN point load acting at a horizontal ground surface. What will be the vertical pressure at a point 2 m horizontally away from the axis of loading but at the same depth of 4m and directly under the load at a depth of 3 m? [8M]

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- 6 a) Discuss the spring analogy for primary consolidation. [6M]
b) Describe log time fitting method. [6M]
c) Define coefficient of compressibility and compression index. [4M]
- 7 a) What are the various drainage conditions and what is the significance of each drainage conditions? [8M]
b) Describe direct shear test. What are its merits and demerits? [8M]

2 of 2