

5. (a) Discuss the phenomenon of Compaction. How is it different from Consolidation ? Explain Standard Proctor Test, illustrating the relationship between Water Content and Dry Density. **12**

- (b) A cohesive soil yields a maximum dry density of 1.9 g/cc at an OMC of 14% during a standard Proctor Test. If the value of G is 2.65, what is the degree of saturation ? What is the maximum dry density it can further be compacted to ? **8**

6. (a) Discuss Boussinesq theory of “Stress Distribution”, elaborating the assumptions made. By means of Boussinesq Stress Distribution theory, describe, how would you prepare the diagrams of vertical pressure distribution on horizontal plane. **12**

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B. Tech EXAMINATION, Dec. 2017

(Fifth Semester)

(Old Scheme) (Re-appear Only)

(CE)

CE-311

GEO-MECHANICS

Time : 3 Hours]

[Maximum Marks : 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *Five* full questions, out of total eight questions, in the question paper. All questions carry equal marks. Missing data, if any, may suitably be assumed and stated, clearly. Supplement your answer with

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suitable, proportionately draw neat sketches, wherever required.

1. (a) The In-situ density of an embankment, compacted at a water content of 8% was determined with the help of a core cutter. The empty mass of the core cutter was 1300 gm. And the cutter full of soil had a mass of 3320 gm. The volume of the cutter was 1000 cm^3 . **6+4**
 - (i) Determine the bulk density, Dry Density and Degree of Saturation of the embankment.
 - (ii) If the embankment becomes fully saturated during rains, what would be its water content and saturated unit weight ? Assume no volume change in soil on saturation. Take the specific gravity of the soil as 2.70.
- (b) What is meant by Consistency of soils ? Discuss various Atterberg's limits. Describe Plasticity Index and Liquidity Index. **10**

2. (a) Describe with neat sketches various types of Soil Structures and how do these define the characteristics of various types of soils. **15**
 - (b) Discuss briefly classification of rocks for engineering purposes. **5**
3. (a) Define Permeability of soils. Explain Darcy's law, with neat sketches and derive the relation for discharge. **8**
 - (b) Derive the expressions for average equivalent permeability of the stratified soils deposit, when the flow is : **12**
 - (i) Parallel to the bedding planes
 - (ii) Perpendicular to the bedding planes.
4. (a) Describe, with a neat sketch various types of heads at any point in a soil mass, when water flows through a saturated soil mass. Also explain Velocity Function and Potential Function. **15**
 - (b) Explain Quick Sand Condition. **5**

- (b) Find the intensity of vertical pressure and horizontal shear stress at a point 5m directly below a 25 kN point load acting at a horizontal ground surface. What will be vertical pressure and shear stress at a point 3 m horizontally away from the axis of loading but at the depth of 4 m ?

8

7. (a) Discuss consolidation of a laterally confined soil. Draw the curves showing Virgin Compression Curve, Expansion and Recompression. Also discuss about each part of this curve. **12**

- (b) Define coefficient of compressibility and coefficient of volume change and illustrate its relation with the change in thickness of the remoulded specimen. **8**

8. Describe direct shear test and how would you determine the values of cohesion and angle of internal friction from the test results. **20**

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