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320513(20)

APR-May

B. E. (Fifth Semester) Examination, 2020

(Old Scheme)

(Civil Engg. Branch)

GEOTECH ENGINEERING-I

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) from each question is compulsory. Attempt any two parts from parts (b), (c) and (d) of each question.*

Unit-I

1. (a) Define Soil Mechanics. 2

(b) Explain the inter-relationship between soil, soil mechanics, geo-technological engineering & geo-environmental engineering. 7

(c) Prove : 7

$$Y_d = \frac{GY_w}{1+e}$$

(d) The mass of 1 cm^3 of soil in its natural state is 1·81 gm. If its mass is reduced to 1·54 gm, after drying and it has a specific gravity of 2·7. Determine, void ratio, porosity, degree of saturation and water content, of the soil as it existed in the natural state. 7

Unit-II

2. (a) What are the systems of soil classification? 2

(b) Explain different types of soil moisture. 7

(c) Explain in detail seepage force and piping. 7

(d) A granular soil deposit is 7 m deep over an impermeable layer. The ground water table is 4 m below the ground surface. The deposit has a zone of capillary rise of 1·2 m with a saturation of 50%. Plot the variation of total stress, pore water pressure and effective stress with the depth of deposit. Take $e = 0{\cdot}6$ & $G_S = 2{\cdot}65$. 7

Unit-III

3. (a) What do you understand by Compaction? 2

(b) What are the factor affecting compaction? Explain briefly. 7

(c) What is OMC? Explain how you use the proctor tests apparatus in the field for checking compaction? 7

(d) What is Flow net? Give the properties of flow net. 7

Unit-IV

4. (a) Define Geostatic Stresses 2

(b) Derive the expression for vertical stress under uniformly loadel circular area according to Boussinesq theory. 7

(c) Discuss in detail Newmark's charts. 7

(d) Explain in detail the principle of consolidation. 7

Unit-V

5. (a) Define shear strength of a soil 2

(b) Discuss in details the factors affecting shear strength of soils. 7

(c) Draw the diagram of uniaxial compression tests and describe about its importance in soil exploration. 7

(d) Describe in detail the vane shear tests. 7