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320553(20)

B. E. (Fifth Semester) Examination, April-May 2018

(New Scheme)

(Civil Engg. Branch)

GEOTECH ENGINEERING-I

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of each unit is compulsory whereas attempt any two parts from (b), (c), (d).

Unit-I

1. (a) Define bulk unit weight and dry unit weight of solids. 2

(b) Derive a relationship between γ_d, G, w, n_a. 7

(c) Define the following : (any three) 7

(i) Void ratio

(ii) Porosity

(iii) Degree of saturation

(iv) Percentage air voids

(v) Air content

(d) Discuss briefly the Atterberg limits. 7

Unit-II

2. (a) Explain the purpose of soil classification. 2

(b) Explain how soil is classified according to HRB classification system. 7

(c) Discuss in detail (with suitable practical examples) about Quick sand conditions. 7

(d) A garnular 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 12 m with a saturation of 50%. Plot the variation of total stress, pore water pressure and effective stress with the depth of deposit. Take $e = 0{\cdot}6$, $q = 2{\cdot}65$. 7

Unit-III

3. (a) Discuss in brief about the clay minerology. 2

   (b) Mentioning Poiseuille's law adopted for the flow through the soil pores. Explain different factors affecting permeability of soil. 7

   (c) A cohesive soil yields a maximum dry density of 1·8 g/ce at an OMC at 16% 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 compacted to. 7

   (d) Draw a neat sketch of flow net. Enumerate uses of flow net. Explain any two. 7

Unit-IV

4. (a) Define geostatic stresess. 2

   (b) What are the assumptions made to solve stress distribution in Boussinesq equation? Write its expressions and various notations used. Enumerate the application of this equation. 7

   (c) State the assumptions made in Terzaghi's theory of one dimensional consolidation. 7

   (d) A clay layer 3·6 m thick is sand wiched between layers of sand. Calculate the time the clay layer will take to reach 50% consolidation. Take coefficient of consolidation equal to 4×10^{-4} cm^2/s. 7

Unit-V

5. (a) What are the methods for measurement of shear strength? 2

   (b) Explain direct shear test for determination of shear strength. 7

   (c) Describe test procedure of triaxial test. 7

   (d) Briefly discuss soil exploration methods. 7