| BICE-026 |

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2017

00914

BICE-026 : GEOTECHNICAL ENGINEERING – I

Time : 3 hours   *Maximum Marks : 70*

*Note : Attempt any **seven** questions. All questions carry equal marks. Assume missing data, if any. Use of scientific calculator is permitted.*

1. A sample of wet silty clay soil has a mass of 126 kg. The following data were obtained from laboratory tests on the sample :
    Wet density ρ_1 = 2·2 g/cm^3, G = 2·5, water content, w = 14%.
    Determine (a) dry density ρ_d (b) porosity, (c) void ratio, and (d) degree of saturation.   *10*

2. What are the index properties of soils ? Why are they required ? Discuss.   *10*

3. What are the different systems of classification of soils ? Discuss the merits and demerits of each of the systems. *10*

4. Explain and discuss the unified soil classification system. *10*

5. A sand deposit contains three distinct horizontal layers of equal thickness (3 layers). The upper and lower layers' coefficient of permeability is 10^{-3} cm/sec and that of the middle is 10^{-2} cm/sec. What are the values of horizontal and vertical coefficients of permeability of the three layers and what is their ratio ? *10*

6. (a) Explain the practical application of a flow net.

   (b) Explain the boundary conditions for drawing flow nets for a homogeneous earth dam. *2×5=10*

7. A clay stratum 8·0 m thick is located at a depth of 6 m from the ground surface. The natural moisture content of clay is 56% and G = 2·75. The soil stratum between the ground surface and the clay consists of fine sand. The water table in located at a depth of 2 m below the ground surface. The submerged unit weight of fine sand is 10·5 kN/m^3, and its moist unit weight above the water table is 18·68 kN/m^3. Calculate the effective stress at the centre of the clay layer. *10*

8. What are the different methods of soil stabilization ? Explain in detail any two methods of it. *10*

9. What are the types of slope failures ? Give the brief procedure for stability analysis by the Swedish circle method. *10*

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