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Fourth Semester B.E. Degree Examination, July/August 2022
Basic Geotechnical Engineering

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. With a neat sketch of phase system, explain the soil mass in three phases. **(10 Marks)**

    b. List the different systems for classification of soil for general engineering purposes. Explain the unified soil classification in detail. **(10 Marks)**

OR

2   a. Briefly explain the procedure to determine the grain size distribution by pipette. **(10 Marks)**

    b. Enlighten in detail the method for determination of field density and dry unit weight by sand replacement method. **(10 Marks)**

Module-2

3   a. Briefly explain the diffuse double layer theory with colloid repulsion and attraction. **(10 Marks)**

    b. List and explain with neat sketch the different clay structures. **(10 Marks)**

OR

4   a. Define compaction. Explain the standard proctor test to define the relationship between soil water content and degree of dry density. **(10 Marks)**

    b. List and explain the factors affecting the compacted density of soil. **(10 Marks)**

Module-3

5   a. Enumerate the various factors affecting the permeability of soil. **(10 Marks)**

    b. List the various methods to determine the coefficient of permeability of soil. Briefly explain any one in detail. **(10 Marks)**

OR

6   a. Define flownets with its properties and applications in brief. **(10 Marks)**

    b. Explain with neat sketch the Casagrande method to draw phreatic line in a dom with filter. **(10 Marks)**

Module-4

7   a. Briefly explain the laboratory test to determine coefficient of consolidation by
     i) Square root of time fitting method   ii) Logarithm of time fitting method **(10 Marks)**

    b. With assumptions, explain the Terzaghi's theory of one dimensional consolidation. **(10 Marks)**

OR

8   a. Explain the mechanism of consolidation process by means of the piston and spring analogy. **(10 Marks)**

    b. Briefly explain the following in details:
     i) Coefficient of compressibility
     ii) Coefficient of volume change
     iii) Normal consolidated soil and preconsolidated soils
     iv) Determination of pre-consolidated pressure. **(10 Marks)**

Module-5

9   a. Explain the Mohr-Coulomb failure theory on soil. **(10 Marks)**

b. Explain how the effective stress principle is used to represent the failure envelop of soil sample. **(10 Marks)**

OR

10 a. List the laboratory methods to determine the shearing resistance of soil and explain any one in detail. **(10 Marks)**

b. What are the factors affecting the shear strength of soil? Explain them in detail. **(10 Marks)**

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