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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)
