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Total No. of Questions: [09]

Total No. of Printed Pages: [01]

B. Tech. (Civil Engineering) (Semester: 5th)
GEOTECHNICAL ENGINEERING
Subject Code: BCIES 1522
Paper ID: [19110717]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

- Q1. Attempt the following:
- a) Explain the term 'principal stresses'.
 - b) Name the curves generated by Laplace equation.
 - c) Give any two assumptions of wedge theory.
 - d) How do we determine specific gravity of soil using pycnometer?
 - e) Draw typical stress-strain curves for sandy soils.
 - f) Define over-consolidation ratio.
 - g) Classify sand, silt and clay based on their sizes as per Indian Standards.
 - h) Write names of any four tests used for determination on in-situ unit weight.
 - i) Distinguish between seepage velocity and superficial velocity.
 - j) Why Triaxial shear test is considered better than direct shear test?

Section – B

(5 marks each)

- Q2. Give general engineering properties of different types of soils classified according to Indian Standard classification system.
- Q3. What are the various methods for obtaining flow nets?
- Q4. What are the factors affecting compaction? Explain in detail.
- Q5. What is Mohr's strength theory of soils? Sketch typical strength envelopes for a clean sand.
- Q6. In a consolidation test on soil, the void ratio of the sample decreased from 1.25 to 1.10 when the pressure is increased from 250 kN/m² to 410 kN/m². Calculate the co-efficient of consolidation if the co-efficient of permeability is 8×10^{-6} cm/sec.

Section – C

(10 marks each)

- Q7. Obtain the differential equation defining the one-dimensional consolidation as given by Terzaghi, listing the various assumptions.
- Q8. Explain various tests to measure shear strength.
- Q9. Define the following:
- a) Porosity
 - b) Degree of Saturation
 - c) Specific gravity of particles
 - d) Consolidation
 - e) Skempton's pore pressure parameter