Roll No…….. **Total No. of Printed Pages: [01]**
Total No. of Questions: [09]

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 envelops 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/m^2 to 410 kN/m^2. 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