

Code: CE4T2

**II B.Tech - II Semester – Regular/Supplementary Examinations –
April 2017**

**GEOTECHNICAL ENGINEERING - I
(CIVIL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22

1.

- a) Define degree of saturation.
- b) What are the index properties of soils?
- c) Define plasticity index.
- d) Define permeability.
- e) What are the factors affecting permeability?
- f) What is pore water pressure?
- g) What is Quick sand condition?
- h) Define compaction.
- i) What is zero air voids line?
- j) Define compression index.
- k) What is Coulombs law?

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) What is soil structure? Explain different types of soil structure. 8 M

b) A saturated sample of soil has a water content of 35%, adopting $G = 2.7$ calculate dry unit weight, saturated unit weight, submerged unit weight. 8 M

3. a) Explain the IS Soil classification system. 8 M

b) In a constant head permeability test, the following observations were taken: 8 M

i) Distance between piezometer tapings = 200 mm

ii) Difference of water levels in piezometer = 80mm

iii) Dia of test sample = 150mm

iv) Quantity of water collected = 350 ml

v) Duration of the test = 300 sec.

Determine the coefficient of permeability of soil.

4. a) Write the assumptions taken in Boussinesq's theory. 8 M

b) A concentrated load of 200kN is applied at the ground surface. Determine the vertical stress at point P which is 6m directly below the load. Also calculate the vertical

stress at point R which is at a depth of 6m but at a horizontal distance of 5m from the axis of the load. 8 M

5. a) What are the factors affecting compaction? Explain. 8 M

b) Define Consolidation. Explain different types of consolidations. 8 M

6. a) Write a brief note on Direct Shear Test, its merits and demerits. 8 M

b) A shear vane of 7.5 cm diameter and 11 cm length was used to measure the shear strength of soft clay. If a torque of 600kN-m was required to shear the soil, calculate shear strength.

The vane was then rotated rapidly to cause remoulding of the soil. The torque required in the remoulded state was 200N-m. Determine the sensitivity of the soil. 8 M