Total No. of printed pages = 4

**END SEMESTER EXAMINATION–2019**

Semester – 5th

Subject Code : CT-503

**GEOTECHNICAL ENGINEERING**

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

**Instruction :**

1. Questions of both PART–A and PART–B are compulsory.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

(a) In nature soil exist as a _____ phase system.

(b) The ratio between volumes of voids to the ____ in a soil mass is called void ratio.

(c) Liquid limit, plastic limit = ____.

[Turn over

(d) In compaction expulsion of _____ occur.

(e) The voulme of the cylinder used in proctor test is _____ $cm^3$.

(f) The water content corresponding to maximum dry density is called _____.

(g) For Darcy's law to be validating the flow in soil should be _____ .

(h) In consolidation the load applied is _____.

(i) The shearing resistance of a soil is constituted by _____ and _____.

(j) The unit of coefficient of permeability is _____.

2. Classify the soil : 1×5=5

(a) CL (b) ML (c) OH

(d) GW (e) SP

3. Answer the following questions : 2×5=10

(a) Deduce the relation between void ratio (e) and porosity (n) by phase diagram.

(b) Define well grade and poorly graded soil.

(c) Define seepage velocity and discharge velocity



(d) What are the laboratory tests to determine shear strength of soil ?

(e) Write the difference between pre-consolidated, over consolidated and under consolidated soil.

PART – B

Marks – 45

4. (a) A sample of saturated soil has a water content of 35%. The specific gravity of soild is 2.65. Determine the void ratio, porosity, saturated unit weight and dry unit weight. 10

(b) Explain the falling head permeability test. 5

5. (a) An earth embankment is compacted at a water cotent of 18% to a bulk density of 19.2 $kN/m^3$. If the specific gravity of the sand is 2.7, find the void ratio and the degree of saturation of the compacted embankment. 5

(b) Explain the consolidation process by Terzaghi's spring piston analogy model. 10

6. (a) Write the differences between cosolidation and compaction. 5

(b) In a falling head permeability test on a specimen 6cm high and 50 $cm^2$ in cross-sectional area, the water level in the standpipe of 0.8 $cm^2$ in cross-sectional area dropped from a height of 60 cm to 20 cm in 3 minutes 20 seconds. Find the permeability. 5

(c) Write down the factors affecting compaction. 5