

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 :

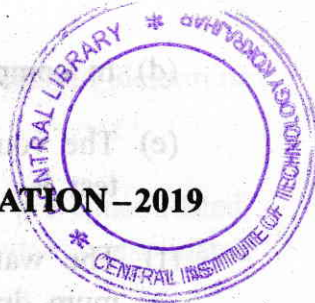
1. Questions of both PART-A and PART-B are compulsory.

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 volume 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. 5
- (b) Define well grade and poorly graded soil. 10
- (c) Define seepage velocity and discharge velocity. 5



- (d) What are the laboratory tests to determine shear strength of soil ? 5
- (e) Write the difference between pre-consolidated, over consolidated and under consolidated soil. 10
- PART - B
Marks - 45
4. (a) A sample of saturated soil has a water content of 35%. The specific gravity of soil is 2.65. Determine the void ratio, porosity, saturated unit weight and dry unit weight. 10
- (b) Explain the falling head permeability test. 5
- (a) An earth embankment is compacted at a water content 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 consolidation and compaction. 5

(b) In a falling head permeability test on a specimen 6cm high and 50cm² in cross-sectional area, the water level in the standpipe of 0.8 cm² in cross-sectional area dropped from a height of 60cm to 20cm in 3 minutes 20 seconds. Find the permeability.

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(c) Write down the factors affecting compaction.

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