

Total No. of printed pages = 4



**RETEST EXAMINATION-2022**

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 :**

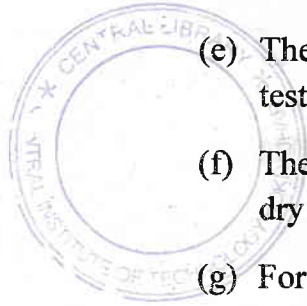
- All questions of PART-A and PART-B are compulsory.

**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 = —.
  - (d) In compaction expulsion of — occur.

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(e) The volume of the cylinder used in proctor test is \_\_\_\_\_  $\text{cm}^3$ .

(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.

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- (d) What are the laboratory tests to determine shear strength of soil ?
- (e) Write the differences between pre-consolidated, over-consolidated and under-consolidated soil.

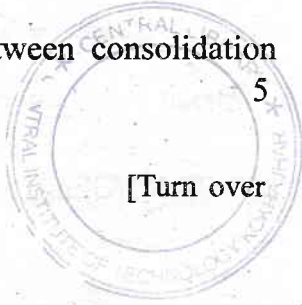
**PART – B**

Marks – 45

4. (a) A sample of saturated soil has a water content of 35%. The specific gravity of solid 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 content of 18% to a bulk density of  $19.2 \text{ kN/m}^3$ . 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

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(b) In a falling head permeability test on a specimen 6 cm high and 50 cm<sup>2</sup> in cross-sectional area, the water level in the standpipe of 0.8 cm<sup>2</sup> in cross-sectional area dropped from a height of 60 cm to 20 cm in 3 min 20 sec. Find the permeability. 5

(c) Write down the factors affecting compaction. 5

