Total No. of printed pages = 8

END SEMESTER EXAMINATION, NOVEMBER- 2018

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.

Instructions :

1. *All* questions of PART–A are compulsory.
2. Answer *all* questions from PART–B.

PART – A
Marks – 25

1. Choose the correct answer from the options given below the statement : 1×10=10

   (i) In particle size classification system, the soils are classified according to

   (a) Grain size

   (b) Properties

   (c) Shape

   (d) Solubility

[Turn over

(ii) Indian standard classification of soil is based on

(a) PRA system

(b) International soil classification

(c) M.I.T system

(d) Indian system

(iii) The compaction process can be accomplished by _____ process.

(a) Rolling

(b) Tampering

(c) Vibration

(d) All of the mentioned

(iv) Which of the following equipment is not used in standard compactor test ?

(a) Cylindrical metal mould

(b) Rammer

(c) Circular face plate

(d) Collar

(v) The water content corresponding to the maximum density in compaction curve is called

(a) Water content of compacted soil

(b) Optimum water content

(c) Air void water content

(d) None of the mentioned

(vi) Permeability can be determined by direct measurement with the help of

(a) Permeameter

(b) Consolidation test

(c) Horizontal capillary test

(d) Pumping-out test

(vii) The unit of coefficient of permeability(K) is

(a) kg/cm

(b) m/s

(c) m^2

(d) All of the mentioned

(viii) What is the diameter of the sieve that is used for finding the liquid limit ?

(a) 275 microns

(b) 700 microns

(c) 425 microns

(d) 200 microns

(ix) The plastic index is calculated from the relation

(a) IP = WP-WL

(b) IP = WL-WP

(c) IP = IL-IS

(d) IP = IW-IS

(x) The shearing resistance of a soil is constituted by

(a) Structural resistance and frictional resistance

(b) Shearing strength

(c) None of the mentioned

(d) All of the mentioned

2. (a) For a saturated soil mass how many phase will be present in a phase diagram ? 1

(b) What is the difference between clayey silt and silty clay soil ? 2

(c) Name the forces which are predominant in cohesionless and fine grained soil ? 2

(d) Between the sand and clay which is more permeable ? 1

(e) Differentiate dry unit weight and wet unit weight of soil. 2

(f) What is the relation between consolidation and settlement ? 2

(g) Why internal friction angle of a soil specimen tested in unconfined compression test is zero ? 2

(h) What is the basic difference between a well graded and a poorly graded soil ? 2

(i) Between sand and clay which is more permeable ? 1

PART – B

Marks – 45

3. **The following properties were determined for two soils A and B :**

Soil →	A	B
Water content	37%	25%
Liquid limit	61%	35%
Plastic limit	25%	20%
Specific gravity	2.72	2.68
Degree of saturation	100%	100%

Which of these soil

(i) contains more clay particles

(ii) has a greater saturation unit weight

(iii) has a greater dry unit weight

(iv) has a greater void ratio ?

Your answer should be supported by computation.

3+4+4+4=15

4. A soil having G = 2.75 is subjected to Proctor compaction test in a mould of V : 945 cm^3. The observations recorded are as follows :

Mass of wet sample (g)	Water content (w%)
1389	7.5
1767	12.1
1824	17.5
1784	21.0
1701	25.1

Determine the maximum dry density and moisture content of the soil. 15

5. (a) What are the differences between compaction and consolidation ? 5

(b) The total unit weight of the soil in 6 kN/m^3. The specific gravity of the soil solids is 2.67, the water content of the soil is 17%. Assume that unit weight of water is 9.81 kN/m^3. Calculate the following : 10

(i) Dry unit weight

(ii) Porosity

(iii) Void ratio

(iv) Degree of saturation.

Or

How will you obtain MDD and OMC from compaction curve? Explain. What are the influencing factors for compaction? 10