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Total No. of Pages : 02

Total No. of Questions : 09

B.Voc. (Building Construction and Technology) (Sem.–4) SOIL MECHANICS Subject Code : BVBCT-404-20 M.Code : 91640 Date of Examination : 13-07-22

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) A soil sample has a bulk unit weight of 1.80g/cc and water content of 5%. If the void ratio remains constant, find dry unit weight of soil for water content of 10%.
- b) Differentiate between Liquid limit and Plastic limit.
- c) List methods of finding coefficient of permeability of soils.
- d) What are phase diagrams of soils? Make phase diagram for partially saturated soil.
- e) In an Unconfined compressive strength test value of UCS was found to be 30KN/m². Determine undrained Cohesion.
- f) Compute Capillary rise of water in soil having $D_{10} = 0.1$ mm and void ratio = 0.6.
- g) List down laboratory methods of finding shear strength of soils.
- h) Differentiate between Shrinkage limit and Plastic limit.
- i) List down factors affecting coefficient of permeability of soils.
- j) What do you understand by OMC and zero air void line?

SECTION-B

- 2. In a shrinkage limit test a dish with volume of 10.5 ml was filled with saturated clay. The mass of saturated clay was 18.75gms. The clay was dried gradually first in atmosphere and then in an oven. The mass of dry clay was 12.15 gm and its volume 5.95 ml. Determine the shrinkage limit.
- 3. Explain in detail Engineering classification of soils as per IS system.
- 4. Discuss direct shear strength test with its merits and demerits.
- 5. In a liquid limit test specimens of certain sample of clay at water contents of 31.93, 27.62, 25.51 and 23.30% required 5, 16, 23, 42 blows respectively to close the standard groove. The plastic limit and natural water content of clay is 13% and 18% respectively. Determine Liquid limit, Plasticity index, liquidity index and Flow index.
- 6. Explain friction circle method of stability analysis.

SECTION-C

7. A series of shear tests (CU) were performed on a soil each test was carried out until the soil sample sheared and the stresses for each test are as follows:

Test	Chamber pressure (kN/m ²)	Principal stress Difference (kN/m ²)	Pore pressure at Failure (kN/m ²)
1	100	150	50
2	200	190	75
3	300	240	135

Estimate the effective strength parameters by plotting Mohr-Coulomb plot.

- 8. Derive with assumptions, Terzaghi's theory of one dimensional consolidation.
- 9. Write short notes on the following :
 - a) Darcy's Law
 - b) Laplace's equation

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.