

(b) What are the different types of consolidation ? Explain Terzaghi's theory of one-dimensional primary consolidation with its assumptions. 7.5

7. (a) Explain consolidation settlement. Describe also the consolidation of partially saturated clay in brief. 7.5

(b) Explain normally consolidated and over-consolidated clay. Also describe over-consolidation ratio. 7.5

Section D

8. (a) What are the different tests to determine shear strength of soil ? Explain under what conditions these tests are used. 7.5

(b) What is Mohr Stress Circle ? Explain Mohr-Coulomb failure-criterion with diagram. 7.5

9. (a) Describe different factor of safety used in stability of slopes. 7.5

(b) How is a slope analysed using Swedish circle method ? Derive an expression for the factor of safety. 7.5

MAR-21-210046

B. Tech. EXAMINATION, March 2021

Semester IV (CBCS)

GEOTECHNICAL ENGINEERING-I

CE-402

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from each Sections A, B, C and D. All questions carry equal marks. Assume missing data, if any suitably.

Section A

1. Explain the following :

- (i) Origin of soil
- (ii) Classification of soil
- (iii) Plasticity chart

- (iv) Properties and utilities of flownet
- (v) Permeability of stratified soil
- (vi) Total and effective stress
- (vii) Factors affecting consolidation
- (viii) Expansion index
- (ix) Taylor's stability number
- (x) Types of slope failures. **10×1.5=15**

Section A

2. (a) What are the important index properties ? Explain the different consistency limits in detail. **7.5**
- (b) What is the significance of particle size distribution curve ? How can we determine uniformity coefficient from this curve ? **7.5**
3. (a) What are the different soil structures ? Describe each in detail. **7.5**
- (b) What is soil-water system ? Explain the common clay minerals present in soil with their application. **7.5**

Section B

4. (a) Define discharge velocity and seepage velocity. Describe Darcy's law with its assumption and validity. **7.5**
- (b) In a falling head permeability test, head causing flow was initially 50 cm and it drops 2 cm in 5 minutes. How much is time required for the head to fall to 25 cm ? **7.5**
5. (a) What do you mean by "Quick Sand Condition" ? Describe briefly. **7.5**
- (b) The water table in uniform sand deposit is 2 m below ground surface. Determine the effective stress at a depth of 6 m below ground surface if the void ratio is 0.65 and specific gravity of solids is 2.62. Assume soil above water table is dry. **7.5**

Section C

6. (a) What do you mean by consolidation process ? Differentiate between compaction and consolidation. **7.5**