

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2021**

**GEOTECHNICAL ENGINEERING**

[Maximum Marks: 75]

[Time: 2.15 Hours]

**PART-A**

(Answer *any three* questions in one or two sentences. Each question carries **2** marks)

- I. 1. Illustrate IS classification of soils.  
2. Distinguish between effective stress and neutral stress in soil.  
3. State Darcy's law.  
4. List out the parameters found from the standard penetration number (N), obtained by conducting standard penetration test (SPT) in soil.  
5. Under what circumstances does a foundation engineer suggest a combined footing over an isolated footing. (3 x 2 = 6)

**PART-B**

(Answer *any four* of the following questions. Each question carries **6** marks)

- II. 1. Derive the functional relationship between void ratio, water content, specific gravity and degree of saturation.  
2. Describe the procedure for finding dry density of soil by core cutter method.  
3. Describe various rollers used for compacting soils.  
4. Explain different types of soil water.  
5. Explain the need of site reconnaissance in soil exploration.  
6. Explain any two types of failure analysis in foundation engineering.  
7. Write the steps for the proportioning of a rectangular footing. (4 x 6 = 24)

**PART-C**

(Answer *any of the three units* from the following. Each full question carries **15** marks)

**UNIT – I**

- III. (a) Plot and describe particle size distribution curve and then explain the classification of soil based on nature of the distribution curve. (9)

- (b) A soil specimen has a water content of 12% and a wet unit weight of  $22\text{kN/m}^3$ . If the specific gravity of solids is 2.7. Determine the dry unit weight, void ratio and the degree of saturation. Take  $\gamma_w=10\text{kN/ m}^3$ . (6)

**OR**

- IV. (a) Differentiate between residual and transported soil. (2)  
(b) Illustrate and explain Atterberg's limits of soil. (6)  
(c) Describe the procedure for the calculation of liquid limit of soil. (7)

### **UNIT – II**

- V. (a) With a neat sketch describe the procedure for the determination of coefficient of permeability of soil by constant head permeability test. (9)  
(b) The falling head permeability test was conducted on a soil sample of 4 cm diameter and 18cm length. During the test duration, initial head of 1.0m fell to 0.40m. The cross-sectional area of the stand pipe was  $1\text{cm}^2$ . If the co-efficient of permeability found out was  $1.09 \times 10^{-3}\text{cm/sec}$ , what was the duration of the test? (6)

**OR**

- VI. (a) Explain the factors effecting compaction of soil. (9)  
(b) Tabulate the differences in the apparatus and procedure for standard and modified proctor tests. (6)

### **UNIT- III**

- VII. (a) Describe the objectives of soil exploration. (6)  
(b) Explain the geophysical methods for soil exploration. (9)

**OR**

- VIII. (a) With neat sketch describe plate load test. (8)  
(b) Explain Terzaghi's theory of bearing capacity. (7)

### **UNIT - IV**

- IX. (a) Elucidate the necessity of providing pile foundation to a structure. (5)  
(b) Explain the classification of pile foundations briefly. (10)

**OR**

- X. (a) With neat sketch explain the different components of a well foundation. (8)  
(b) Briefly describe the measures to rectify tilts and shifts during sinking of wells. (7)

\*\*\*\*\*