

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2020**

**GEOTECHNICAL ENGINEERING**

[Maximum Marks: 100]

[Time: 3 Hours]

**PART-A**

[Maximum Marks: 10]

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

- I. 1. What is density index?  
2. What is uniformity coefficient and effective size?  
3. List any two objectives of compaction.  
4. What is significant depth?  
5. What is a fender pile? (5 x 2 = 10)

**PART-B**

[Maximum Marks: 30]

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

- II 1. What is grading of soils? Write any two differences between gap graded and well graded soils?  
2. Derive the relationship between  $\rho'$ ,  $\rho_{sat}$  and  $\rho_w$ .  
3. What is a compaction curve? Give its salient features?  
4. Explain effective pressure, pore pressure and total pressure.  
5. Differentiate between disturbed and undisturbed samples.  
6. Give the necessity of pile foundation  
7. What are the different shapes of wells? With neat sketches discuss the characteristics of each type. (5 x 6 = 30)

**PART-C**

[Maximum Marks: 60]

(Answer **one** full question from each Unit. Each full question carries 15 marks)

**UNIT – I**

- III (a) Explain the various corrections applied to hydrometer readings. (5)  
(b) A soil specimen has a water content of 10% and a wet unit weight of 20kN/m<sup>3</sup>. If the specific gravity of solids is 2.70, determine the dry unit weight, void ratio and the degree of saturation. Take  $\gamma_w = 10\text{kN/m}^3$ . (5)  
(c) Write down a brief procedure for water content determination by oven drying method. (5)

**OR**

- IV (a) Demarcate and explain the various consistency limits using volume moisture content graph of three states of soil. (5)
- (b) Describe core cutter method. (5)
- (c) What are the uses of particle size distribution curves? (5)

**UNIT – II**

- V (a) Explain discharge velocity and seepage velocity. (5)
- (b) Explain the factors affecting permeability. (5)
- (c) Discuss the method of finding out the coefficient of permeability using constant head permeameter. (5)

**OR**

- VI (a) Explain standard proctor test. (5)
- (b) Explain the factors affecting compaction. (5)
- (c) What is the suitability criteria of various field methods of compaction in cohesive, cohesionless and both cohesive and cohesionless soils. (5)

**UNIT- III**

- VII (a) Briefly describe the various stages in subsurface exploration programme. (7)
- (b) Describe electrical profiling method with a neat sketch. (8)

**OR**

- VIII (a) Define the terms (i) Ultimate bearing capacity (ii) Net safe bearing capacity (iii) General shear failure (iv) Punching shear failure. (8)
- (b) Describe the procedure of plate load test to find out the bearing capacity of soils. (7)

**UNIT - IV**

- IX (a) What are the objectives of providing foundation for a structure. (5)
- (b) Explain the different types of shallow foundation with sketches indicating their suitability for site conditions. (10)

**OR**

- X (a) Explain the classification of piles based on method of installation. (5)
- (b) Explain the component parts of a well foundation with a neat sketch. (10)

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