

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019**

**GEOTECHNICAL ENGINEERING**

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

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

1. List two examples of transported soil.
2. Given expression for dry unit weight when bulk unit weight and water content are given.
3. Distinguish between adsorbed water and capillary water.
4. Which type of sample is obtained when a split spoon sampler is used to exploration ?
5. Distinguish between bearing pile and friction pile. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Establish a relation between voids ratio, specific gravity and unit weight of soil.
2. List the consistency limit and explain the procedures for finding plastic limit of soil.
3. Distinguish clearly the discharge velocity and seepage velocity with examples.
4. List the factors affecting compaction.
5. List the guide lines for selecting the number and position of pits and boring for soil exploration.
6. List the classification of pile according to the materials and method of installation.
7. Explain how to rectify the tilting of well while sinking. (5×6 = 30)

## PART — C

(Maximum marks : 60)

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

## UNIT — I

- III (a) A partially saturated soil samples obtained from a earth fill has a natural water content of 22 % and unit weight of  $19.62 \text{ kN/M}^3$ . Assuming specific gravity of solid as 2.7 and density of water as  $1 \text{ g/cc}$ . Compute :
- (i) Degree of saturation. (ii) Void ratio
- (iii) If subsequently soil get saturated, determine the unit weight. 8
- (b) Explain three phase diagram of soil with sketch. 7

OR

- IV (a) Explain the procedure for finding specific gravity by pycnometer method. 8
- (b) A fully saturated clay has a water content 30% and bulk unit weight at  $18.64 \text{ kN/m}^3$ . After drying the dry unit weight is  $17.66 \text{ kN/m}^3$ .
- Find : (i) The specific gravity of soil (ii) Shrinkage limit for the clay 7

## UNIT — II

- V (a) Solve an equation for discharge velocity by using Darcy's law for one dimensional flow through soils. 8
- (b) List the factors affecting permeability. 7

OR

- VI (a) Explain standard proctor compaction test with figure. 8
- (b) Explain zero air void lines with a sketch. 7

## UNIT — III

- VII (a) List the objectives of site investigations. 8
- (b) Explain standard penetration test with sketch. 7

OR

- VIII (a) Explain Terzaghi theory of bearing capacity. 8
- (b) Explain plate load test with figure. 7

## UNIT — IV

- IX (a) Explain the procedure of sinking of well. 8
- (b) List the type of foundation and state their suitability with respect to different soil condition. 7

OR

- X (a) Explain the necessity of pile foundation. 8
- (b) Identify the causes of failure of foundation and rectify methods. 7