

FIFTH SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY—OCTOBER, 2013

GEOTECHNICAL ENGINEERING

(Common to CE, EV, WR & QS)

[Time : 3 hours

(Maximum marks : 100)

Marks

PART—A

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

1. Define the term field density of soil.
2. What are the different forms of soil water ?
3. Define pore pressure.
4. Define ultimate and safe bearing capacities of soil.
5. Define the term skin friction for pile foundation.

(5×2=10)

PART—B

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

1. Mercury is used for finding shrinkage limit determination, why mercury is preferred over any other liquids ?
2. Define liquid limit, plastic limit and shrinkage limit of soil.
3. Explain compaction curve and OMC.
4. Explain how Darcy's law is applied for finding coefficient of permeability.
5. Give procedure for soil profiling using wash boring method.
6. Give detailed classification of types of foundations.
7. Explain any three types of pile foundations with their suitability for site conditions.

(5×6=30)

PART—C

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

UNIT - I

- III (a) The in-situ density of a road embankment, compacted with rollers at a water content of 10%, was determined by core cutter. The empty mass of core cutter was 1300 gm. and the cutter full of soil had a mass of 3200 gm. With the volume of cutter being 1 lit., determine the bulk density and dry density of compacted soil formation.

5

- (b) Write down a brief procedure for water content determination by oven drying method. 5
- (c) Explain three phase diagram and its application in soil mechanics. 5

OR

- IV (a) Define the geologic cycle in the origin of soil. 5
- (b) What is the significance of standard sand in sand replacement method ? 5
- (c) Give classifications of transported soil based on the mode of transportation. 5

UNIT – II

- V (a) List down the factors affecting compaction. 5
- (b) Explain the process of compaction with the help of three phase diagrams. 5
- (c) List down the factors affecting permeability of soil formations. 5

OR

- VI (a) Give a brief procedure of finding coefficient of permeability of soil using constant head method. 5
- (b) Determine the value of OMC from compaction curve for a sample of soil whose compaction test observations are given below. The volume of sample is 0.95 lit.

Water content	0.1	0.12	0.14	0.16	0.18	0.2
Mass of wet soil (kg)	1.65	1.74	1.90	1.92	1.83	1.78

10

UNIT – III

- VII (a) What are the different stages of soil exploration ? 5
- (b) Explain the procedure for electrical resistivity method of soil investigation. 10

OR

- VIII (a) Prepare a detailed list of methods for soil exploration techniques. 5
- (b) Explain the procedure for plate load test to find bearing capacity of soil. 10

UNIT – IV

- IX (a) What are the objectives of providing foundation for structures ? 5
- (b) Design a square footing for a column subjected to a total dead load of 80KN and live load of 45 KN. The ultimate bearing capacity of soil at founding level is 350KN/m². 10

OR

- X (a) Sketch any two shallow foundations indicating their suitability for site conditions. 5
- (b) Give the detailed procedure of erection of well foundation with the help of sketches. 10