

**DIPLOMA IN CIVIL ENGINEERING  
DCLE(G)**

**Term-End Examination**

**June, 2018**

00103

**BCE-046 : SOIL MECHANICS AND FOUNDATION  
ENGINEERING**

*Time : 2 hours*

*Maximum Marks : 70*

---

**Note :** Question no. 1 is compulsory. Attempt any four out of the remaining seven questions. Use of calculator is permitted.

---

---

1. Fill in the blanks. 7×2=14

- (a) \_\_\_\_\_ is defined as the ratio of the volume of \_\_\_\_\_ to the volume of solid.
- (b) Porosity is ratio of the volume of \_\_\_\_\_ to the \_\_\_\_\_ volume.
- (c) The difference between \_\_\_\_\_ and \_\_\_\_\_ is plasticity index.
- (d) In soil mechanics 'e' represents \_\_\_\_\_ while 'n' represents \_\_\_\_\_.

- (e) \_\_\_\_\_ is the moisture content at which the \_\_\_\_\_ strength of soil becomes zero.
- (f) Optimum moisture content is the \_\_\_\_\_ at which maximum \_\_\_\_\_ weight is obtained.
- (g) The \_\_\_\_\_ and \_\_\_\_\_ piles are cast-in-situ piles.
- 2.** A wet soil sample of mass 1.9 kg had a volume of 945 cm<sup>3</sup>. After oven drying, its mass was reduced to 1.7 kg. The specific gravity of solids was found to be 2.7. Determine the following :  $7 \times 2 = 14$
- (a) Moisture content
- (b) Bulk density
- (c) Dry density
- (d) Void ratio
- (e) Porosity
- (f) Saturated density
- (g) Density at 30% saturation
- 3.** (a) If the liquidity index of soil is zero, find its consistency index.
- (b) What is meant by effective stress of a soil ?
- (c) Explain secondary consolidation.
- (d) Write down any four advantages of direct shear test.  $4 \times 3 \frac{1}{2} = 14$

4. Explain the direct shear test in detail with diagram and sketch along with merits and demerits of the test. 4+5+5=14

5. A saturated cohesive soil is tested in a triaxial cell. During the test, no drainage is allowed from the sample. At a failure, the major and minor principal stresses are 260 and 100 kPa, respectively. What is the cohesion of the sample ? Explain with sketch and figures of Mohr circle. 14

6. Write short notes on any *four* of the following :  $4 \times 3 \frac{1}{2} = 14$

(a) Bearing Capacity of Soils

(b) Expansive Soils

(c) Secondary Consolidation

(d) Mohr's Circle

(e) Soil Classification

7. (a) How is SPT performed ? Elaborate the process in sequential steps.

(b) Can one find bearing capacity by SPT ? If so, how ? Explain with example and methodology. 7+7=14

8. (a) Explain the term quicksand with neat sketch and how does this take place.

(b) Derive Terzaghi's Bearing Capacity equation. How does this equation help in defining the soil properties ?

7+7=14

---