1611

April 2025

Time – Three hours
(Maximum Marks: 100)

[*N.B.* Answer all the questions, choosing any two subdivision from each question. Each subdivision carries 10 marks.]

1. (a) Write about the following:
void ratio, porosity, specific gravity, water content and degree of saturation.

(b) If soil sample has a porosity of 40% and the specific gravity of solids is 2.70, calculate (i) void ratio (ii) unit weight when the soil is 50% saturated and completely saturated.

(c) A compacted sample of soil with bulk unit weight of 19 kN/m^3 has a water content of 12%. Calculate its void ratio, dry density and degree of saturation. Take G =2.70

(d) A soil has a bulk unit weight of 19.85 kN/m^3 and water content of 13%. Calculate the water content of the soil when it partially dries to a unit weight of 18.50 kN/m^3 and the void ratio remain unchanged.

2. (a) Discuss the factors affecting the co-efficient of permeability.

(b) Explain the determination of co-efficient of permeability using constant head method with neat sketch.

(c) Describe the phenomenon of quick sand condition. What are the necessary conditions for the occurrence of quick sand condition?

(d) Explain the factors that affect the shear strength of soil.

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3. (a) Explain the primary factor that influences the process of soil consolidation.

(b) Describe about various field methods of compaction.

(c) Explain the CBR test procedure.

(d) Explain the different types of rollers.

4. (a) Explain about the various types of foundation with neat sketch.

(b) Write about negative skin friction and its importance in bearing capacity.

(c) Explain the factors that affect the bearing capacity of soil.

(d) Write short note on the following: (2+2+3+3)
Assumptions of Terzaghi's theory, uses of pile group, safe bearing capacity of soil and well foundation.

5. (a) Explain the various types of samplers.

(b) Discuss about any two methods of soil stabilization.

(c) Write short notes on geo-materials used in soil stabilization.

(d) Write about lime and fly ash used in soil stabilization.
