Q. P. Code: 18506

N. B.:   (1) Question No. 1 is compulsory.

(2) Attempt any three from remaining five questions.

(3) Figures to the right indicate the full marks.

(4) Assume suitable data if not given and justify the same.

Q.1   (A) Write characteristics of flow net.   05

(B) What do you mean by borehole logs? Write at least five number of information which it reflects.   05

(C) Write the use of particle size distribution curve.   05

(D) Explain the factors affecting the permeability of soil.   05

Q.2   (A) Explain how to determine the preconsolidation pressure by Casagrande Method.   05

(B) A moist soil has weight of 1260 gms and volume of 605 cc at a moisture content of 11%. If the specific gravity of soil grains is 2.66, determine the void ratio, degree of saturation, and percentage air voids.   10

(C) Establish the relationship between σ_1, σ_3, c, and ϕ.   05

Q.3   (A) In a liquid limit test; specimen of a certain sample of clay at water contents of 31.93, 27.62, 25.51 and 23.30 % required 5, 16, 23, and 42 blows respectively to close the standard groove. The plastic limit of clay is 13%. Natural water content is 18%. Determine the liquid limit, plasticity index, liquidity index, consistency index, flow index, and toughness index.   10

(B) Explain the primary consolidation by spring analogy system.   05

(C) For two soils the data is given as below. Classify the soil as per IS: 1498.   05

Soil	LL	PI	%-75 µ	% Gravel	% Sand
A	60	30	90	0	10
B	—	NP	100	0	0

Q.4   (A) In a falling head permeability test on a soil sample of length l_1 the head of water in the stand pipe takes 5 seconds to fall from 900 mm to 135 mm above the tail water level. When another soil of length 60 mm is placed on top of first soil, the time taken for the head to fall between the same limits is 150 seconds. The permeameter has a cross sectional area of 4500 mm², and a stand pipe area of 130 mm². Calculate the permeability of second soil.   10

(B) Write a note on methods of boring.   05

(C) Explain the quick sand condition and derive an expression for same.   05

[TURN OVER

Q.5   (A) Define reinforcing earth material. Classify the Geosynthetics and Geotextile.   05

(B) Write a brief note on factors affecting the compaction.   05

(C) Given the following data from a consolidated undrained test with pore water pressure measurement, determine the total and effective stress parameters.   10

σ_3	100 kN/m²	200 kN/m²
$(\sigma_1 - \sigma_3)_f$ D.P.	156 kN/m²	198 kN/m²
u_f	58 kN/m²	138 kN/m²

Q.6   (A) In a normally consolidated clay of LL = 65.65% and 5 m thickness, the overburden pressure is increased from 250 kN/m² by 120 kN/m². Estimate the settlement that takes place; assume the saturated water content and specific gravity of solid are 45% and 2.7 respectively.   05

(B) Explain the effect of surcharge and capillary rise on effective pressure.   05

(C) Write scope of Geotechnical Engineering in design of deep foundation. Write five points.   05

(D) Explain the applicability of Plasticity chart [as per ISCS] in classifying the fine grained soil and how it differs from USCS.   05

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