

(06 Marks)

- 6 a. State the characteristics and uses of flownets.
 - b. Explain the terms superficial velocity and seepage velocity. Derive the relationship between them. (08 Marks)
 - c. Compute the quantity of water seeping under a weir per day for which the flownet has been satisfactorily constructed. The coefficient of permeability is 2×10^{-2} mm/s. $n_f = 5$ and $n_d = 18$. The difference in water level between upstream and downstream is 3.0 m. The length of the weir is 60 m. (06 Marks)

Module-4

- a. What are the advantages and disadvantages of direct shear test over triaxial test? (06 Marks)
 b. Explain sensitivity and thixotropy of clay. (06 Marks)
- c. The stresses on a failure plane in a drained test on a cohesionless soil are as under: Normal stress (σ) = 100 kN/m²

Shear stress (τ) = 40 kN/m²

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Determine the angle of shearing resistance and the angle which the failure plane makes with the major principal plane. Also find the major and minor principal stresses. (08 Marks)

OR

- a. Explain Mohr-Coulomb failure theory of soils.
 - b. Explain Vane shear test with a neat sketch.
 - c. A consolidated undrained test was conducted on a clay sample and the following results were obtained:-

Cell pressure (kN/m ²)	200	400	600
Deviator stress at failure, kN/m ²	118	240	352
Pore water pressure at failure, kN/m ²	110	220	320

Determine the shear strength parameters with respect to,

- (i) Total stresses.
- (ii) Effective stresses.

Module-5

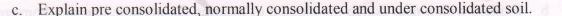
- 9 a. Explain spring analogy theory of consolidation of soil.
 - b. What is pre consolidation pressure? How is it determined by Casagraude's graphical method? (06 Marks,
 - c. In a consolidation test, the void ratio of soil sample decreases from 1.20 to 1.10 when the pressure increases from 160 to 320 kN/m². Determine the coefficient of consolidation, if the coefficient of permeability is 8×10^{-7} mm/sec. (06 Marks)

OR

10 a. Explain square root of time fitting method.

b. A 20 m thick isotropic clay layer overlies an impervious rock. The coefficient of consolidation of soil is 5×10^{-2} mm²/sec. Find the time required for 50% and 90% consolidation. Time factors are 0.2 and 0.85 for 50% and 90% consolidations respectively.

(08 Marks) (06 Marks)



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(06 Marks)

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