School of Civil Engineering

Civil Engineering
ETE - Jun 2023

Time : 3 Hours **Marks : 100**

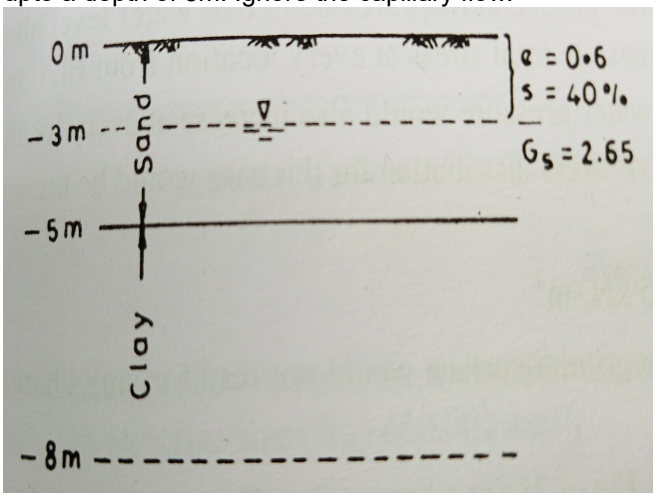
Sem IV - G1UA401B / BCE01T3403
Geotechnical Engineering
Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

1. A soil has a dry density of 1.816 gm/ml in the natural condition. When 410 gm of the soil was poured in a vessel in a very loose state, its volume was 290ml. The same soil when vibrated and compacted was found to have a volume of 215ml. Determine the relative density — K2 CO2 (5)

2. Describe the factors affecting the permeability of soils. — K2 CO3 (5)

3. Explain the variation of capillary rise with respect to different diameter tubes. — K1 CO1 (5)

4. For the subsoil condition shown in figure draw the total, neutral and effective stress diagrams upto a depth of 8m. Ignore the capillary flow. — K3 CO3 (10)



5. (i) Distinguish between slaking of clay and bulking of sand
(ii) Compare frost heave and frost boil of soil. — K3 CO2 (10)

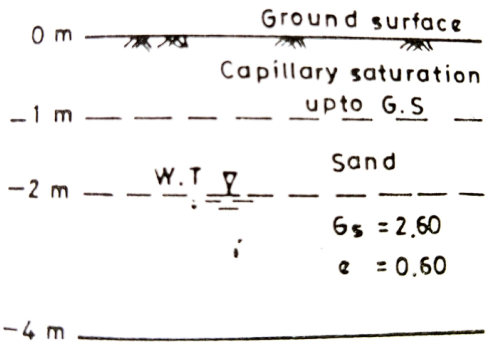
6. Infer the details of making a flow net and also draw the flow net at an impermeable stratum. Also discuss the properties and uses of flow net. — K2 CO1 (10)

7) Derive laplace equation for the construction of flow nets with required figures — K4 CO4 (10)

OR

Describe the textural classifications of soil. — K4 CO5 (10)

8. For a subsoil conditions shown in the following figure compute the effective stress values at 1m, 2m and 4m depths. Assume unit weight of water as 10kN/m3. The capillary flow upto a height of — K4 CO3 (15)



2m above water table.

PTO

9.	Infer the factor affecting compaction based on (1)water content (2)type of soil. Draw the effect of water content and its respective compaction curves.	K5 CO4	(15)
10)	Infer the technical procedure of unconfined compression test with required figure.	K5 CO4	(15)

OR

Derive the Boussinesq theoretical solutions for the stress distribution in an elastic medium of soil subjected to concentrated load. Also explain its limitations.	K5 CO5	(15)