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**School of Engineering****B.TECH Civil Engineering  
Mid Term Examination - May 2024****Duration : 90 Minutes  
Max Marks : 50****Sem IV - G1UA401B - Geotechnical Engineering**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Explain the effects of frost boil K2 (2)
- 2) Explain the theory of sedimentation K1 (3)
- 3) Explain the uses of consistency limits. K2 (4)
- 4) Explain the preventive measures of piping failures. K2 (6)
- 5) Discuss the factors influencing the permeability of soils K3 (8)
- 6) Illustrate the experimental procedure for determining the specific gravity of soil using pycnometer. K3 (9)
- 7) The in situ-percentage voids of a sand deposit is 34%. For determining the density index, dried sand from the stratum was first filled loosely in a 1000 cm<sup>3</sup> mould and was then vibrated to give a maximum density. The loose dry mass in the mould was 1610 g and the dense dry mass at maximum compaction was found to be 1980 g. Determine the density index if the specific gravity of the sand particles is 2.67. K4 (8)
- 8) A soil profile consists of a surface layer of clay 4m thick (unit weight = 19.5 kN/m<sup>3</sup>) and a sand layer 2m thick (unit weight = 18.5 kN/m<sup>3</sup>) overlying an impermeable rock. The water table is at the ground surface. If the water level in a standpipe driven into the sand layer rises 2m above the ground surface, draw the plot showing the variation of effective stress, total stress and pore water pressure. Also determine the increase in effective stress at the top of the rock when the artesian head in the sand is reduced by 1m. K4 (12)

**OR**

The water table in a deposit of sand 8m thick, is at a depth of 3m below the surface. Above the water table, the sand is saturated with capillary water. The bulk density of sand is 19.62kN/m<sup>3</sup>. Calculate the effective pressure at 1m, 3m and 8m below the surface. Hence plot the variation of total, neutral and effective stress over the depth of 8m K4 (12)