BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - VI CIVIL :SUMMER- 2022
SUBJECT : GEOTECHNICAL ENGINEERING

Day : Tuesday
Date : 21-06-2022

S-13612-2022

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N.B. :

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data, if **necessary.**
4) Use non-programmable **calculator** is allowed.

Q.1 Describe the clay minerals, its type. Explain any one clay mineral in detail. **(10)**

OR

Q.1 a) Draw a typical three phase diagram of soil and describe it. **(05)**

b) Define the following terms **(05)**
Void Ratio, Porosity, Degree of Saturation, Percentage Air Voids, Air Content.

Q.2 List out various methods to determine water content and explain any one of them. What is the significance of water content? **(10)**

OR

Q.2 The soil sample is tested in the laboratory. The sieve analysis on soil sample gave the following results: **(10)**

Sieve size	% Finer
4.75	85
2.36	68
1.18	56
0.600	42
0.300	24
0.150	16
0.075	10

Draw a grain size distribution curve and classify the soil.

Q.3 a) Define total stress, effective stress, pore water pressure. **(03)**

b) State Darcy's Law & discuss the assumptions and limitations. **(07)**

OR

Q.3 Derive the Laplace equation for two dimensional flow mentioning assumptions for the same. **(10)**

Q.4 Compare on Boussinesq's theory and Westergaard's theory of vertical stress distribution due to point load, including the equation involved. **(10)**

OR

Q.4 The following are the results of standard proctor Test performed on a sample **(10)**

Water Content %	6	10	14	20	25
Bulk Density of Soil in g/cc	1.67	1.94	2.2	2.16	2.14

Plot the water content-dry density curve and obtain the optimum moisture content and maximum dry density.

P.T.O.

Q.5 Describe unconfined compression shear test in detail, with neat sketch. **(10)**

OR

Q.5 a) In a laboratory vane shear test, a vane 100mm long and 60mm diameter was pressed in to the soft cohesive soil, in undisturbed state. A torque of 35kN-mm was required to achieve the failure. Same soil when remolded, it required torque of 12 kN-mm. Determine the value of sensitivity. **(07)**

b) Write various drainage conditions of shear test. **(03)**

Q.6 Explain the Rankine's active and passive Earth pressure for cohesive backfill.

OR

Q.6 A gravity retaining wall retains 11 meter of backfill with $\gamma = 18kN/m^3$, $\phi = 28^0$ with surcharge of 14kN/m. The wall is vertical. Determine the magnitude and point of application of total active earth pressure if water table is 3 m below the top surface.

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