BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH **SEMESTER : IV**
BRANCH: CEE **SESSION : SP/2023**

SUBJECT: CE303 GEOTECHNICAL ENGINEERING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Describe the corrections to be applied to hydrometer readings and explain the reasons for applying the corrections?	[5]	1	2
Q.1(b)	An oven dry soil sample of volume 220 cm^3 has a mass of 400g. Determine its voids ratio and shrinkage limit if the specific gravity of soil particles is assumed as 2.76. If the sample is allowed to swell and get fully saturated on contact with water, what will be the water content which will fully saturate the sample and cause an increase in volume equal to 10% of the original dry volume?	[5]	1	3
Q.2(a)	Derive the equation for coefficient of permeability for a stratified layer when the flow is a) parallel to planes b) perpendicular to planes	[5]	2	2
Q.2(b)	A building column has a footing area of 3m x 4m and transmits a pressure of 200 KN/m^2 and its base is embedded 2 m below GL. Assuming a pressure distribution of 2 vertical to 1 horizontal, determine the consolidation settlement at the middle of clay layer. W.T at a depth of 1.5 m below the base of footing. Sand -γ = 17.5KN/m^3 & γ_{sat} = 20.5 KN/m^3, thickness-4m. Clay - γ_{sat} = 18KN/m^3, e_0 =0.90, C_c =0.28 thickness- 3m	[5]	2	3
Q.3(a)	Explain the limitations of direct shear test over triaxial test.	[5]	3	1
Q.3(b)	A cylindrical soil specimen having cohesion 80kN/m^2 and angle of internal friction 21^0 is subjected to a cell pressure of 100kN/m^2 in a triaxial testing machine. Compute the maximum deviator stress at which the sample will fail and the angle made by the failure plane with the axis of the specimen.	[5]	3	3
Q.4(a)	Explain how the drawback of SPT N value taken care in Cone Penetration test.	[5]	4	2
Q.4(b)	A strip footing, 2m wide, located at a depth of 1.5 m in a clay soil with Y_{sat}= 20kN/m^3.Water table is quite close to the ground surface. Determine the safe bearing capacity, using a factor of safety 2.85 c=15kN/m^2 and Ø=28^0 N_c= 25.80, N_q= 14.72, N_Y= 16.72	[5]	4	3
Q.5(a)	Summarize the method of proportioning of footing size with respect to column loads	[5]	5	2
Q.5(b)	Design a friction pile group to carry a load of 300t including the weight of the pile cap. Average unconfined compressive strength of the clay is 0.7 kg/cm^2.Length of pile 14m and diameter of pile 60 cm. A factor of safety 3 is required against shear failure. α =0.4	[5]	5	3

::::::27/04/2023::::::M