BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2023)

CLASS: BTECH   SEMESTER : IV
BRANCH: CIVIL   SESSION : SP/2023

SUBJECT: CE303 GEOTECHNICAL ENGINEERING
TIME: 02 Hours   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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Q.1(a)	Distinguish between specific gravity and unit weight of soil solids. Any 2 points.	[2]	1	4
Q.1(b)	The mass of one cubic centimeter of soil in its natural state is 1.81 gm. If its mass is found to be 1.54 gm after drying and it has a specific gravity of 2.7, determine void ratio, porosity, and degree of saturation of the soil as it existed in the natural state.	[3]	1	3
Q.2(a)	Explain why hydrometer readings are taken for longer intervals of time (30 sec- 24 hrs).	[2]	1	5
Q.2(b)	The atterberg limits of a clayey soil are LL-76%, PL-44% and SL-26%. If the sample of this soil has a volume of 30 cm^3 at liquid limit and volume of 16.6cm^3 at the shrinkage limit, calculate the specific gravity and shrinkage ratio.	[3]	1	3
Q.3(a)	Describe the significance of plasticity chart.	[2]	1	2
Q.3(b)	A deposit of sand has porosity of 35% and G=2.65.The soil is dry in top 1.5 m depth ,15% moisture content in next 1.8 m depth and submerged below it. Find effective pressure at a depth of 8 m below the ground level	[3]	2	3
Q.4(a)	Explain how various factors affect permeability (ANY TWO)	[2]	2	2
Q.4(b)	A falling head permeability test is to be performed on a soil sample whose coefficient of permeability is estimated to be about 3 x 10^{-5} cm/s. What diameter of the standpipe should be used if the head is to drop from 27.5 cm to 20 cm in 5 minutes and if the cross sectional area and length of sample are 15 cm^2 and 8.5 cm respectively? Will it take same time for the head to drop from 37.5 cm to 30 cm?	[3]	2	3
Q.5(a)	Explain critical gradient	[2]	2	1
Q.5(b)	Summarize the determination of hydrostatic pressure from flow net graphically and analytically	[3]	2	2

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