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

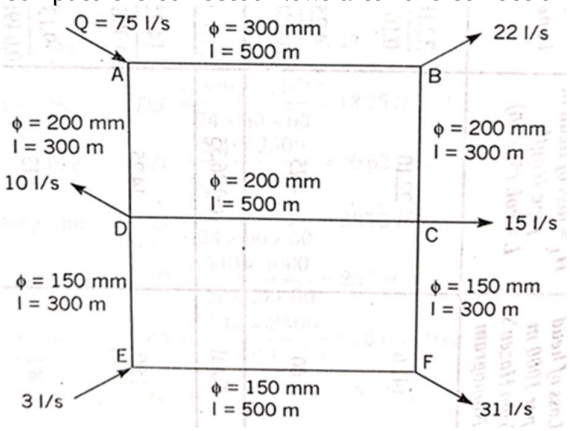
CLASS: BTECH **SEMESTER : V/ADD**
BRANCH: CIVIL AND ENVIRONMENTAL ENGINEERING **SESSION : MO/2025**

SUBJECT: CE304 ENVIRONMENTAL 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)	Compare the simple graphical method and comparative graphical method for population forecasting. What is the advantage of second method?	[5]	1	2
Q.1(b)	Compute the population of the year 2025 and 2030 for a city whose population in the year 1980 was 1,50,000 and in the year 2010 was 2,25,000.	[5]	1	3
Q.2(a)	Explain the principle of breakpoint chlorination	[5]	2	2
Q.2(b)	Design a coagulation –cum- sedimentation tank with continuous flow for a population of 2,00,000 persons with a daily per capita allowance of 150 litres. Make suitable assumptions	[5]	2	3
Q.3(a)	What is water hammer and how it is produced in pipelines conveying water under pressure	[5]	3	2
Q.3(b)	Calculate the head losses and corrected flows in the various pipes of a distribution network given below. The diameters and the lengths of the pipes are given against each pipe. Compute the corrected flows after one correction	[5]	3	3



Q.4(a)	A main combined sewer was designed to serve an area of 100 sq.km with an average population of 200 persons/ hectare. The average rate of sewage flow is 400 litres/capita/day. The maximum flow is 50% more than the average together with the rainfall equivalent of 10 mm in 24 hrs, all of which are run off. What should be the capacity of sewer in cu.m./sec? Find the minimum velocity and gradient required to transport coarse sand through a sewer of 50 cm dia. with sand particles of 1. 5mm dia. and specific gravity 2.65. Assume k=0.04 and $f' = 0.012$. the roughness coefficient for the sewer material may be assumed as 0.012	[5]	4	3
Q.4(b)	What is the significance of drop manholes and street inlets in a sewerage system	[5]	4	1
Q.5(a)	What is the purpose of contact bed in the treatment of sewage and explain the process involved in its operation.	[5]	5	1
Q.5(b)	Why is the sludge digested before drying and what are the products obtained after digestion	[5]	5	1

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