BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2024)

CLASS: BTECH **SEMESTER : VI**
BRANCH: CIVIL **SESSION : SP/2024**

SUBJECT: CE302 WATER RESOURCES 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**

			CO	BL
Q.1(a)	Write sources (name of concerned department) of data in India for the following: i. Weather records ii. Precipitation data iii. Land use & land cover, and Water quality data.	[2]	1	2
Q.1(b)	Define 'Hydrology' and 'Hydrologic Cycle'. Illustrate various elements of hydrologic cycle with the help of a neat sketch.	[3]	1	2
Q.2(a)	Discuss the practical application of hydrology in dam and coastal work constructions.	[2]	1	5
Q.2(b)	A reservoir has an average area of 50 km^2 over a year. The normal annual rainfall at the place is 120 cm and the class A pan evaporation (Pan coefficient = 0.70) is 240 cm. Assuming the land flooded by the reservoir has a runoff coefficient of 0.4, estimate the net annual increase or decrease in the streamflow due to the reservoir.	[3]	1	3
Q.3(a)	Discuss the factors influencing the evaporation process.	[2]		
Q.3(b)	A quadratic catchment area has its four corners in (x,y) coordinates; (0,0),(1000,0),(0,1000) and (1000,1000). Two raingauges A and B installed in the area are at coordinates (500, 500) and (1100,500) respectively. During a rainfall, 100mm were recorded at A while no rainfall at B. Calculate the areal rainfall using (i) arithmetic average method (ii)Thiessen method.	[3]	2	5
Q.4(a)	What factors should be considered in selecting a site for a stream gauging station?	[2]	2	3
Q.4(b)	A 400-ha watershed has predominantly black cotton soil and its CN_{II} value is estimated as 73. Estimate the runoff volume due to two consecutive days of rainfall as follows: Day 1: 65 mm, Day 2: 80 mm	[3]	2	4
Q.5(b)	The runoff data at a stream gauging station for a flood are given below. The drainage area is 40 km2. The duration of rainfall is 3 hours. Derive the 3-hour unit hydrograph for the basin and plot the same.	[5]	2	5

Date	Time (hr)	Disch. (m^3/s)	Date	Time(hr)	Disch. (m^3/s)
1-3-1970	2	50	2-3-1970	2	110
	5	47		5	90
	8	75		8	80
	11	120		11	70
	14	225		14	60
	17	290		17	55
	20	270		20	51
	23	145		23	50

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