Total number of printed pages:1

Programme: PG/2th /MCE201

2025

River Engineering

Full Marks: 100

Time: 3 hours

The figures in the margin indicate full marks for the questions.

1. Mention different discharge measuring devices that are used for river. Explain how they work. 20

2. a) Following are the current meter readings of Fig.1, compute the discharge. 10

Distance from one end of water surface (m)	*Depth of water, d (m)*	*Immersion of current meter below water surface*		
		depth (m)	*rev*	*sec*
0	0	—	—	—
2	1.0	0.6	10	40
4	2.2	0.44	36	48
		1.76	20	50
6	4.0	0.80	40	57
		3.20	30	53
8	8.0	1.6	46	59
		6.4	33	57
10	4.2	0.84	33	51
		3.36	29	49
12	2.5	0.50	34	52
		2.00	29	53
14	1.2	0.72	16	48
16	0	—	—	—

Rating equation of current meter: $v = 0.2\,N + 0.04$, where N = rev./sec, v = velocity (m/sec).

Fig, 1

t (h)	*I* (cfs)
0	10
0.25	16
0.50	31
0.75	50
1.00	58
1.25	60
1.50	54
1.75	42
2.00	32
2.25	25
2.50	20
2.75	17
3.00	15
3.25	13
3.50	12
3.75	11
4.00	10

Fig.2

b) How the rivers are classified. 10

3. a) What are bifurcation and confluences in the rivers. 10
   b) Explain how the sediments are transported in rivers. Also explain what are ripples and dunes. 10

4. The sides of a triangular channel are sloped at 5H: 1V. The channel has a bottom slope of 0.001 and a Manning roughness factor of 0.05. The length of the channel is 1800 m. Using Muskingum-Cunge method, route the river discharge. Consider initial discharge 10 m^3/s. 20

5. Redo the question number 4 using kinematic wave equation method. Consider Δx= 300m, Δt= 10 min and initial discharge 10 m^3/s. 20