Total No. of Printed Pages: 2

PRN No.	

PAPER CODE	U315-222(RE)

(AY:2025-26) December 2025 (ENDSEM) EXAM

TY BTech (SEMESTER - I)

COURSE NAME: Hydrology and Hydraulic Engineering Branch: Civil COURSE CODE: CV31232

(T.Y (Pattern 2023))

Time: [1Hr 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks. Use of scientific calculator is allowed**
2) **Use suitable data wherever required**
3) **All questions are compulsory. Solve any two sub question each from Questions 1, 2 ,3 and 4**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) The normal annual rainfall at stations A, B, C, and D in a basin are 80.97, 67.59, 76.28 and 92.01 cm respectively. In year 1975, the station D was inoperative and stations A, B, and C recorded annual precipitations of 91.11, 72.23 and 79.89 cm respectively. Estimate the rainfall at station D in that year.	[5]	1	Apply
	b) The infiltration capacity in a basin is represented by Horton's equation as $f_p = 3 + e^{-2t}$) where fp is in cm/h and t is in hours. Assuming the infiltration to take place at capacity rates in a storm of 60 minutes duration, estimate the depth of infiltration in (i) the first 30 minutes and (ii) the second 30 minutes of the storm.	[5]	1	Apply
	c) Explain different types of precipitation	[5]	1	Remember
Q2	a) What is a S-curve hydrograph? How is it constructed, and what is it used for?	[5]	2	Understand
	b) Derive the S-curve for the 4-h UH given below.	[5]	2	Apply
	c) Enumerate the various methods which can be used for estimating design flood discharge from a certain catchment, and discuss one of these methods in details	[5]	2	Remember

Time (h)	0	4	8	12	16	20	24	28
Ordinate of 4-h UH (m^3/s)	0	10	30	25	18	10	5	0

Q3	a) Explain the significance of channels of most efficient section.	[5]	3	Understand
	b) A rectangular channel which is laid on a bottom slope of 0.0064 is to carry 20 m3/s of water. Determine the width of the channel when the flow is in critical condition. Take Manning's n = 0.015.	[5]	3	Apply
	c) Define the following terms related with types of open channel flow: i) Steady flow; ii) Unsteady flow; iii) Uniform flow; iv) non-uniform flow	[5]	3	Remember
Q4	a) List the assumptions for the following form of GVF equation: $$\frac{dy}{dx} = \frac{S_0 - S_f}{1 - F_r^2}$$	[5]	4	Understand
	b) A rectangular channel 7.5 m wide has a uniform depth of flow of 2.0 m and has a bed slope of 1 in 3000. If due to weir constructed at the downstream end of the channel, water surface at a section is raised by 0.75 m, determine the water surface slope with respect to horizontal at this section. Assume Manning's n =0.02.	[5]	4	Apply
	c) Explain with neat sketches "Classification of Channel Bed Slopes".	[5]	4	Remember