

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM**  
**III B. Tech II Semester Regular/Supplementary Examinations, November-2025**  
**WATER RESOURCE ENGINEERING**  
**(CIVIL ENGINEERING)**

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**  
All Questions Carry Equal Marks

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<b>UNIT-I</b>			
1.	a)	What is duty and delta? And also derive the relation between them.	[7M]
	b)	Explain with neat sketches various methods of applying water to the field.	[7M]
		(OR)	
2.	a)	Discuss in detail about various irrigation efficiencies with expressions.	[7M]
	b)	After how many days will you supply water to field in order to get efficient irrigation, if the field capacity of soil is 50%, permanent wilting point is 10%, dry density of soil is 1.5 g/cc, effective depth of root zone is 80 cm, and daily consumptive use of water for the crop is 10 mm?	[7M]
<b>UNIT-II</b>			
3.	a)	Write about weir and barrages with a neat sketch. And also explain its importance.	[7M]
	b)	Explain Kennedy's silt theory in detail.	[7M]
		(OR)	
4.	a)	Explain Khosla's theory for seepage flow below a weir.	[7M]
	b)	Design a concrete lined channel of trapezoidal section to carry a discharge of 250 cumecs at a slope of 1 in 6000. The side slopes of the channel are to be made as 1.5:1 and a limiting depth of 3m is to be maintained. Take N for the lining material as 0.015.	[7M]
<b>UNIT-III</b>			
5.	a)	Enlist different recording type of rain gauges and explain any one of type rain gauge with suitable sketch in brief.	[7M]
	b)	The average annual rainfalls of 5 rain gauges in a basin are 89,54,45,41 and 55 cm. If the error in the estimation of basin mean rainfall should not exceed 10%, how many additional gauges should be installed in the basin.	[7M]
		(OR)	
6.	a)	Explain about Intensity-Duration-Frequency (IDF) curves.	[7M]
	b)	How to estimate the missing precipitation record of any rain gauge station? Discuss various methods for it in brief.	[7M]
<b>UNIT-IV</b>			
7.	a)	Define the term "Evaporation". Describe the factors affecting for evaporation losses.	[7M]
	b)	Explain about flow mass curve and flow duration curve.	[7M]
		(OR)	
8.	a)	Explain the following terms in brief: • Infiltration capacity • Infiltration rate • Infiltration indices (w-index and $\phi$ -index)	[7M]
	b)	Explain the various factors which affect the run-off from basin.	[7M]
<b>UNIT-V</b>			

9.	a)	Explain different components of hydrograph with a neat sketch.	[7M]
	b)	The successive three-hourly ordinates of a 6-hr UG for a particular basin are 0, 15, 36, 30, 17.5, 8.5, 3, 0 m <sup>3</sup> , respectively. The flood peak observed due to a 6-hr storm was 150 m <sup>3</sup> . Assuming a constant base flow of 6 m <sup>3</sup> and an average storm loss of 6 mm/hr, determine the depth of storm rainfall and the stream flow at successive 3 hr interval	[7M]
		(OR)	
10.	a)	Write a note on separation of base flow from hydrograph. What are the three methods of hydrograph separation?	[7M]
	b)	Direct runoff hydrograph of a storm obtained from a catchment is triangular in shape and has a base period of 80 hours. The peak flow rate is 30 m <sup>3</sup> /sec and catchment area is 86.4 km <sup>2</sup> . Find the rainfall excess that has resulted the above hydrograph.	[7M]

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