

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM

III B. Tech I Semester Regular Examinations November -2025

WATER RESOURCE ENGINEERING

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions. Part B Answers any one question from each unit.

1		PART-A	(20Marks)
	a)	What is Probable Maximum Precipitation (PMP).	[2]
	b)	Explain hydrologic cycle with a neat sketch	[2]
	c)	Discuss Horton's infiltration equation.	[2]
	d)	Define the term: Infiltration capacity and infiltration rate	[2]
	e)	Enlist the assumptions made in the analysis of unit Hydrograph.	[2]
	f)	Differentiate between total runoff and surface runoff.	[2]
	g)	Explain: i) Specific retention of a soil ii) Specific yield of an aquifer	[2]
	h)	Explain i) Storage coefficient of an aquifer ii) Specific capacity of a well.	[2]
	i)	Name Methods of applying water to the fields.	[2]
	j)	Write duty delta relationship.	[2]
		PART-B	(50Marks)
		Question from Unit - I	
2	a)	Describe with a neat sketch the construction and use of a float-type of a recording gauge	[5]
	b)	The annual rainfalls in cm at a station for a period of 21 years from 1960 to 1980 are 97, 125, 103, 81, 101, 119, 103, 79, 102, 118, 98, 83, 105, 123, 100, 86, 99, 114, 91, 83 and 106. Determine the 75% dependable rainfall from frequency analysis.	[5]
		(OR)	
3	a)	How will you determine the areal rainfall over a basin by (i) Arithmetic mean method, (ii) Thiessen polygon method, (iii) Isohyetal method.	[5]
	b)	What is an intensity duration curve, and how will you proceed to derive such a curve for a given frequency at a rain gauge station from the available data of worst storms of different duration kept for a sufficient number of years.	[5]
		Question from Unit - II	
4	a)	What is evaporation? Mention the factors controlling the evaporation process. What do you understand by water budget determination of reservoir evaporation?	[5]
	b)	Explain: (a) evaporation, (b) infiltration, (c) interception, (d) transpiration, e) percolation, and (f) consumptive use	[5]
		(OR)	
5	a)	Discuss in detail any one method for the measurement of Evapotranspiration.	[5]

	b)	A seven hour storm produced the following rainfall intensities in mm/h at half an hour intervals over a basin of area 1830 km ² are 4, 9, 20, 18, 13, 11, 12, 2, 8, 16, 17, 13, 6 and 1. If the corresponding observed runoff is 36.6 million m ³ , estimate the ϕ -index	[5]
		Question from Unit - III	
6	a)	Write methods of base flow separation from storm hydrograph.	[5]
	b)	What is unit hydrograph? Discuss its uses and explain how a 6-hour unit hydrograph can be determined from a given 3-hour unit hydrograph	[5]
		(OR)	
7	a)	Define S-hydrograph and IUH.	[5]
	b)	Given below are the ordinates of a unit hydrograph for a storm of 4-hour duration. Find ordinates of flood hydrograph when the maximum flood observed was 400 m ³ /s and base flow was 250 m ³ /s. Time (hours) 0 4 8 12 16 20 24 Flow (m ³ /s) 0 1500 1200 600 220 80 0	[5]
		Question from Unit - IV	
8	a)	Derive a discharge equation for unconfined aquifer.	[5]
	b)	A 30 cm well completely penetrates an unconfined aquifer of depth 40 m. After a long period of pumping at a steady state of 1580 lpm, the drawdown in two observation wells 25 m and 75 m from the pumping well were found to be 3.5 m and 2.0 m respectively. Determine the transmissibility of the aquifer. What is the drawdown at the pumping well?	[5]
		(OR)	
9	a)	Derive a discharge equation for confined aquifer.	[5]
	b)	A well penetrating an aquifer which is underlain and overlain by impermeable layers was tested with uniform discharge of 1000 litres/min. The steady state drawdowns measured in two observations wells which were at 1m and 10m radial distances from the centre of the pumped well were 13.40m and 4.2m respectively. Determine the hydraulic properties of the aquifer if its saturated thickness is 10m	[5]
		Question from Unit - V	
10	a)	What are the advantages of irrigation	[5]
	b)	Explain about Water logging: causes, effects and remedial measures.	[5]
		(OR)	
11	a)	With the help of a neat sketch, explain about sprinkler irrigation.	[5]
	b)	What are the factors affecting the Water requirement of crops?	[5]
