

III B. Tech I Semester Regular Examinations, February-2022

WATER RESOURCES ENGINEERING – I

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

UNIT-I

1. a) Explain with neat sketches the various methods of measuring rainfall. [8M]
 b) A storm commenced at 7.00 hours. The ordinates of rainfall mass curve of this storm in mm as recorded by a recording rain gauge at 15 minute intervals are 0, 10, 17, 27, 40, 49, 65, 85, 95, 100, 110, 115, and 120. Construct the hyetograph of this storm for a uniform interval of 30 minutes. [7M]

(OR)

2. a) What are the state government agencies that are under taking the hydrologic data collection? [8M]
 b) A precipitation station X was inoperative for some time during which storm occurred. The station totals at three stations A, B and C surroundings X were respectively 6.60, 4.80 and 3.40 cm. The normal annual precipitation amounts @ station X, A, B, C are respectively 65.6, 72.6, 51.8, 38.2 cm. Estimate the storm precipitation for station X. [7M]

UNIT-II

3. a) Explain the working of a double ring infiltrometer with adjustable depth of flooding with a neat sketch. [8M]
 b) Discuss about various factors effecting evaporation. [7M]

(OR)

4. a) What are the initial losses? How these vary with magnitude of storm rainfall? [8M]
 b) Define ϕ -index and W-index and bring out the difference between them. How ϕ - index determined from the rainfall hyetograph? [7M]

UNIT-III

5. a) Describe the step-by-step procedure of the derivation of a Unit Hydrograph from an isolated storm. [8M]
 b) Table below gives ordinates of 6-hr Unit Hydrograph. Derive ordinates of 3-hr Unit Hydrograph for the same catchment. [7M]

Time(Hrs)	0	3	6	9	12	15	18	21	24
Ordinates of 6-Hr UH (m ³ /sec)	0	10	20	30	40	30	20	10	0

(OR)

6. a) Explain various empirical formulae, curves and tables for estimating the Runoff. [8M]
 b) What is flow duration curve and flow mass curve and explain how they are to be constructed? [7M]

UNIT-IV

7. a) Discuss in detail the various causes and effects of Floods. [8M]
 b) Observed values of inflow and outflow hydrograph at the end of a reach in a river are given below. Determine the best values of k and x for use in Muskingum method of flood routing. [7M]

Time (hr)	0	6	12	18	24	30	36	42	48	54	60
Inflow (m ³ /sec)	20	80	210	240	215	170	130	90	60	40	28
Outflow (m ³ /sec)	20	20	50	150	200	210	185	155	95	85	55

(OR)

8. a) Describe the various steps involved in the Inflow-Storage-Discharge method of reservoir routing. [8M]
 b) What is frequency analysis? What is the importance of frequency analysis in water resources engineering? [7M]

UNIT-V

9. a) Discuss about various types of Aquifers with neat sketches. [8M]
 b) During a recuperation test conducted on an open well in a region, the water level in the well was depressed by 3 m and it was observed to rise by 1.75 m in 75 minutes. What is the specific yield of open well in that region and what could be the yield from a well of 5 m diameter under a depression head of 2.5 m? [7M]

(OR)

10. a) In an artesian aquifer of 8 m thickness, a 10 cm diameter well is pumped at a constant rate of 100 lit/min. The steady state draw down observed in two wells located at 10 m and 50 m distance from the centre of the well are 3 m and 0.05 m respectively. Compute the transmissivity and permeability of the aquifer. [8M]
 b) Explain various Aquifer parameters. [7M]
