Code No: R1931013 **R19** **SET - 1**

III B. Tech I Semester Supplementary Examinations, June/July-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
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UNIT-I

1. a) List out various practical applications of hydrology. [8M]
   b) Describe the step by step procedure involved in the analysis for developing Intensity - Duration- Frequency relationships. Sketch a typical set of these curves. [7M]

(OR)

2. a) A catchment has 4 Rain gauge stations. In a year, the annual Rainfall recorded by the gauges is 70 cm, 90 cm, 98 cm, and 100 cm. For a 6% error in the estimation of mean rainfall, determine the additional number of rain gauges required. [8M]
   b) How is the double mass curve technique used to check the consistency? [7M]

UNIT-II

3. a) How evapotranspiration is estimated using penman's equation? [8M]
   b) Table below gives the time distribution of rainfall lasting for 7 hours. If the direct runoff is 7.3 cm, determine the ϕ-index of the storm and time of rainfall excess. [7M]

Time (Hours)	1	2	3	4	5	6	7
Rainfall in each hour (cm)	0.7	1.4	2.4	3.7	2.9	1.7	0.5

(OR)

4. a) Describe the standard ISI standard Evaporation pan with a neat sketch. [8M]
   b) A 12 hour storm rainfall with the following depths in cm occurred over a basin: 2.0, 2.5, 7.6, 3.8, 10.6, 5.0, 7.0, 10.0, 6.4, 3.8, 1.4 and 1.4. The surface run-off resulting from the above storm is equivalent to 25.5cm of depth over the basin. Determine the infiltration indices for the basin. [7M]

UNIT-III

5. a) Following table gives the ordinates of 2hr- unit hydrograph. Find the ordinates of flood hydrograph if depth of rain fall excess is 10cm, consider constant base flow of 10 m^3/sec. [8M]

Time (Hr)	2	4	6	8	10	12	14
Ordinates of 2 Hr-UH (m^3/s)	0	10	20	30	20	10	0

b) Discuss about various conceptual methods for rainfall – runoff modeling. [7M]

(OR)

6. a) Table below gives ordinates of 3-hr Unit Hydrograph. Derive ordinates of 9-hr Unit Hydrograph for the same catchment. [8M]

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

b) Draw a single peaked hydrograph and explain various components of hydrograph. [7M]

UNIT-IV

7. a) Explain various flood control methods and management. [8M]
b) A stream has a uniform flow of 10 m^3/s. A flood in which discharge increases linearly from 10 m^3/s to 70 m^3/s in 6 h and then decreases linearly to 10 m^3/s in 24 h from the peak arrives at a reach. Route the flood through the reach in which k = 10 h and x = 0. [7M]

(OR)

8. a) Discuss about puls method of flood routing. [8M]
b) Explain in detail about Gumbel's method frequency analysis. [7M]

UNIT-V

9. a) Determine the yield from a 30 cm diameter well under a drawdown of 10 m in the well, if the radius of influence and coefficient of permeability are 150 m and 5 m/day respectively. The aquifer is unconfined with a thickness of 60m. [8M]
b) How do you estimate yield from an open well by recuperation test method? [7M]

(OR)

10. a) Discuss about storage coefficient, permeability, transmissivity and specific yield. [8M]
b) Derive the equation of discharge from a tube well fully penetrated into a confined aquifer. [7M]

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