



# CBCS SCHEME

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## Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Hydrology and Irrigation Engineering

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- With a neat sketch, explain the engineering representation of hydrological cycle. (10 Marks)
  - Explain how consistency of rainfall data is checked using double mass curve technique. (05 Marks)
  - Briefly explain: i) Forms of precipitation ii) Rainfall hyetograph. (05 Marks)

OR

- Define precipitation, list its types and explain with neat sketch how its amount is measured using Symon's raingauge. (10 Marks)
  - A catchment as six rain gauge stations in an year the annual rainfall is recorded as follows:

Station	A	B	C	D	E	F
Rainfall (mm)	82.6	102.9	180.3	110.3	98.8	136.7

For 10% error in the estimation of mean rainfall. Calculate the optimal number of stations in catchment. (10 Marks)

### Module-2

- What is evaporation? Explain the factors affecting evaporation. (10 Marks)
  - What are the factors affecting the infiltration? Explain with neat sketch double ring infiltrometer. (10 Marks)

OR

- Explain the process of methods of control evaporation from lakes. (10 Marks)
  - Explain what is evapo-transpiration and also factors affecting evapo-transpiration. (10 Marks)

### Module-3

- Define Run-off. Explain factors affecting runoff. (10 Marks)
  - Explain with a neat sketch, components of storm hydrograph. (10 Marks)

OR

- Explain Rainfall-Runoff correlation analysis. (06 Marks)
  - Define unit hydrograph. Explain with a neat sketch, the derivation of unit hydrograph. State its assumption application and limitation. (10 Marks)
  - Given the ordinates of a 4-hr unit hydrograph as below, derive the ordinates of a 12-h unit hydrograph for the same catchment.

Time (hr)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinates of 4h UH (m <sup>3</sup> /sec)	0	20	80	130	150	130	90	52	27	15	05	0

(04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

**Module-4**

- 7 a. Define irrigation. List and explain benefits and ill effects of irrigation. (08 Marks)  
 b. What are duty, delta and base period? Explain factors affecting duty of water. (08 Marks)  
 c. Give relationship between duty, delta and base periods. (04 Marks)

**OR**

- 8 a. What is Irrigation efficiency? Define different efficiencies of irrigation water. (08 Marks)  
 b. The gross command area was an irrigation project is 1.5 lakh-ha where 7500 ha are unculturable. The area of Kharif crop is 60,000 hectares and that of rabi is 40,000 hectares. The duty of Kharif is 3000 hectares/cumec and duty of rabi 4000 hectares/cumec. Find:  
 i) The design discharge of canal assuming 10% transmission loss.  
 ii) Intensity of irrigation for Kharif and Rabi. (12 Marks)

**Module-5**

- 9 a. What is canal? List its types and explain with neat sketch its classification based on alignment. (10 Marks)  
 b. Explain different storage zones of reservoir with neat sketch. (10 Marks)

**OR**

- 10 a. Explain hydrological investigation of reservoir planning. List the points to be considered for selection of site for a reservoir. (10 Marks)  
 b. The channel section is to be designed for the following data:  
 Discharge  $Q = 30$  cumecs  
 Lacy's silt factor  $f = 1$   
 Side slope =  $\frac{1}{2} H : 1V$   
 Find also the longitudinal slope. (10 Marks)

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