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

1 a. With a neat sketch, explain the engineering representation of hydrological cycle. **(10 Marks)**

b. Explain how consistency of rainfall data is checked using double mass curve technique. **(05 Marks)**

c. Briefly explain: i) Forms of precipitation ii) Rainfall hyetograph. **(05 Marks)**

OR

2 a. Define precipitation, list its types and explain with neat sketch how its amount is measured using Symon's raingauge. **(10 Marks)**

b. 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

3 a. What is evaporation? Explain the factors affecting evaporation. **(10 Marks)**

b. What are the factors affecting the infiltration? Explain with neat sketch double ring infiltrometer. **(10 Marks)**

OR

4 a. Explain the process of methods of control evaporation from lakes. **(10 Marks)**

b. Explain what is evapo-transpiration and also factors affecting evapo-transpiration. **(10 Marks)**

Module-3

5 a. Define Run-off. Explain factors affecting runoff. **(10 Marks)**

b. Explain with a neat sketch, components of storm hydrograph. **(10 Marks)**

OR

6 a. Explain Rainfall-Runoff correlation analysis. **(06 Marks)**

b. Define unit hydrograph. Explain with a neat sketch, the derivation of unit hydrograph. State its assumption application and limitation. **(10 Marks)**

c. 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^3/sec)	0	20	80	130	150	130	90	52	27	15	05	0

(04 Marks)

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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