



CBCS SCHEME

18CV63

Sixth Semester B.E. Degree Examination, June/July 2023 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 neat sketch, explain the engineering representation of the hydrological cycle. (10 Marks)
- b. Thiessen polygon constructed for a network of the rain gauges in river basin yielded theissson weights of 0.10, 0.16, 0.12, 0.11, 0.09, 0.08, 0.07, 0.11, 0.06, 0.10. If the rainfall recorded for these gauges during a cyclonic storm are 132, 114, 162, 138, 207, 156, 135, 158, 168 and 150 mm respectively. Determine the average depth rainfall by theissson mean and arithmetic mean methods, also determine the value of surface runoff at the basin outlet. If 35% of the rainfall is lost as infiltration. Take the area of the basin as 5000 km² and express the answer in million cubic meter. (10 Marks)

OR

- 2 a. Explain with neat sketch how its amount is measured using Symon's raingauge. (10 Marks)
- b. List and explain the types of precipitation. (10 Marks)

Module-2

- 3 a. (i) Explain with neat sketch the measurement using class A pan. (06 Marks)
(ii) Write the Rohwer's formula and explain its term. (04 Marks)
- b. Briefly explain the measurement of Evapo-transpiration. (10 Marks)

OR

- 4 a. What is evaporation? Explain its factor affecting. (10 Marks)
- b. Write a short notes on: (i) AET (ii) PET (10 Marks)

Module-3

- 5 a. Define hydrograph. With a neat sketch, explain components parts of hydrograph. (10 Marks)
- b. Derive the UHG for the catchment of 200 km² if the following discharge was observed in stream as a 6 hr rainfall storm. The base flow can be assumed to have increase linearly.

Time	0	3	6	9	12	15	18	21	24	27
6 hr discharge (m ³ /s)	5	110	265	230	165	30	95	70	55	50
Base flow (m ³ /s)	5	10	15	20	25	30	35	40	45	50

(10 Marks)

OR

- 6 a. Explain the rainfall runoff relationships using regression analysis. (10 Marks)
- b. Derive the S-curve for the 4 hr UHG given below:

Time (Hr)	0	4	8	12	16	20	24	28
Ordinates in 4 hr UHG (m ³ /s)	0	10	30	25	18	10	5	0

(10 Marks)

Module-4

- 7 a. A water course has a culturable command area of 1200 hectares. The intensity of irrigation for crop A is 40% and for B is 35% and both the crops are rabi crops. Crop A has a kore depth of 10 cm and kore period of 10 days and crop B has kore depth of 16 cm and kore period of 15 days. Calculate the discharge of water course. (10 Marks)
- b. What are Duty, Delta and Base period? Explain factors affecting duty of waters. (10 Marks)

OR

- 8 a. A channel is to be design for irrigating 5000 hectares in Kharif crop and 4000 hectares in rabi crop. The water requirement for Kharif and rabi are 60 cm and 25 cm respectively. The kore period of Kharif is 3 weeks and for rabi is 4 weeks. Determine the discharge of the channel for which it is to be designed. (10 Marks)
- b. What is flow irrigation and lift irrigation? Explain the Bandhara irrigation. (10 Marks)

Module-5

- 9 a. Define canal. Explain different types of canal based on alignment. (10 Marks)
- b. Find the section and maximum discharge of a channel with the following data:
Bed slope = 1 in 5000
Lacey's silt factor = 0.95
Side slope = 1:1 (10 Marks)

OR

- 10 a. Define reservoir. With a neat sketch, explain zones of storage in a reservoir. (10 Marks)
- b. Design an irrigation channel with the following data:
(i) Full supply discharge = 6 cumex
(ii) Rugosity coefficient, $N = 0.0225$
(iii) CVR (m) = 1
(iv) Bed slope = 1 in 5000
Assume other reasonable data for the design. (10 Marks)
