CBCS SCHEME

17CV73

Seventh Semester B.E. Degree Examination, Jan./Feb. 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. Define Hydrology. Explain the importance of Hydrology. **(06 Marks)**

b. With Engineering representation, explain Hydrologic cycle with processes involved in it. **(06 Marks)**

c. A catchment has five raingauge stations. In a year, the annual rainfall recorded by the gauges are 78.8cm, 90.2cm, 98.6cm, 102.4cm and 70.4cm. For a 6% error in the estimation of the rainfall, determine the additional number of gauges needed. **(08 Marks)**

OR

2 a. List the types of precipitation and explain the forms of precipitation. **(06 Marks)**

b. Briefly explain with a neat sketch : i) Rainfall Hyetograph ii) Moving average curve iii) Mass curve. **(06 Marks)**

c. Define Precipitation. Explain with neat sketch, how its amount is measured using Symon's raingauge. **(08 Marks)**

Module-2

3 a. Define Evaporation and also factors affecting evaporation. **(06 Marks)**

b. Describe the estimation of evaporation by using Meyer's and Rohwer's equation. **(06 Marks)**

c. Write short notes on :
i) Reservoir Evaporation and control ii) Consumptive use. **(08 Marks)**

OR

4 a. Explain what is Evapo – transpiration and also factors affecting Evapo - transpiration. **(06 Marks)**

b. Describe the method of determining infiltration capacity using a double ring infiltrometer. **(08 Marks)**

c. Explain the following :
i) Horton's Infiltration equation ii) ϕ - index iii) W - index. **(06 Marks)**

Module-3

5 a. Define Runoff. List and explain the factors affecting it. **(10 Marks)**

b. Define Hydrograph. With neat sketch, explain component parts of Hydrograph. **(10 Marks)**

OR

6 a. Find the ordinates of a storm hydrograph resulting from a 3 hour storm with rainfall of 2, 6.75 and 3.75cm during subsequent 3 hours intervals. The ordinates of unit 3 – hour hydrograph are given in the following table :

Hours	03	06	09	12	15	18	21	24	03	06	09	12	15	18	21	24
Ordinates of unit hydrograph (cumecs)	0	110	365	500	390	310	250	235	175	130	95	65	40	22	10	0

Assume an initial loss of 5mm, infiltration index of 2.5mm/hour and base flow of 10 cumecs. **(10 Marks)**

b. The hourly ordinates of a 2 – hour unit hydrograph are given below. Derive a 6 – hours unit hydrograph for the same catchment.

Time (h)	00	01	02	03	04	05	06	07	08	09	10
Discharge (cumecs)	0	1.0	2.7	5.0	8.0	9.8	9.0	7.5	6.3	5.0	4.0

Time (h)	11	12	13	14	15
Discharge (cumecs)	2.9	2.1	1.3	0.5	0.0

(10 Marks)

Module-4

7 a. Define Irrigation. Briefly explain the benefits and ill effects of Irrigation. (08 Marks)

b. Briefly explain with neat sketch, the working and design of Bandhara Irrigation. List its advantages and disadvantages. (12 Marks)

OR

8 a. Define Duty , Delta and Base period. Derive the relationship between them. (04 Marks)

b. Explain the factors affecting the duty of water crops and crop seasons in India. (08 Marks)

c. An Irrigation canal has gross commanded area of 80,000 hectares out of which 85% is culturable irrigable. The intensity of irrigation for Kharif season is 30% and for Rabi season 60%. Find the discharge required at the head of the canal if the duty at its head is 800 hectares/cumecs for Kharif season and 1700 hectares/cumecs for Rabi season. (08 Marks)

Module-5

9 a. Write difference between the Lacey's and Kennedy's theory. (04 Marks)

b. Define the terms : i) Gross commanded area ii) Culturable commanded area iii) Intensity of irrigation iv) Time factor. (08 Marks)

c. Using Lacey's theory, design an irrigation channel for the following data :
Discharge Q = 50 cumecs ; Silt factor f = 1 ; Side slopes ½ : 1. (08 Marks)

OR

10 a. Explain the types of canals and alignment of canals. (10 Marks)

b. Define Reservoir. With a neat sketch, explain Zones of storage in a Reservoir. (10 Marks)

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