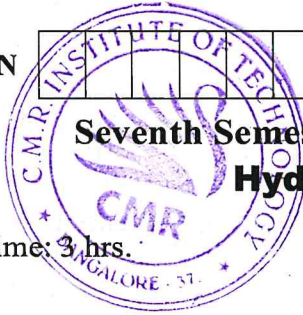


CBCS SCHEME

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Seventh Semester B.E. Degree Examination, July/August 2021 Hydrology and Irrigation Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. Explain the storage and transportation components and their relative positions using Horton's Hydrological cycle. (10 Marks)
 b. The average annual rainfall of 8 rain gauge stations in a basin are 1000, 950, 900, 850, 800, 700, 600 and 400mm. Find out the optimum number of raingauges required in the basin if the permissible error is 6%. Also state additional raingauge required if any. (10 Marks)

- 3 a. Explain what is Evapo-transpiration and also factors affecting evapo-transpiration. (10 Marks)
 b. A 6 hour storm produce rainfall intensities of 7, 18, 25, 12, 10 and 3mm/hour in successive one hour intervals over a basin of 800 sq. km. If the resulting run-off is observed to be 2500 Hectare – meters. Find the ϕ index for the basin. (10 Marks)

- 4 a. Describe the method of determining infiltration capacity using a double ring infiltrometers. (10 Marks)
 b. A reservoir with surface area of 250 hectares had the following average values of climate parameters during a week : Water temperature = 20°C ; Relative Humidity = 40%. Wind velocity at 1.0m above ground surface = 16km/h. Estimate the average daily evaporation from the lake using Meyer's formula and also compute the volume of water evaporated from the lake in that week. (10 Marks)

- 5 a. Explain with neat sketches : i) Influent stream ii) Effluent stream iii) Catchment iv) Ephemeral stream v) Windex. (10 Marks)
 b. Annual rainfall and runoff value (in cm) of a catchment are given. Develop a linear co-relation equation to estimate annual runoff volume for a given annual rainfall value. (10 Marks)

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Rainfall	118	58	112	97	84	91	138	89	104	80	97
Run off	54	45	51	41	21	32	66	25	42	11	32

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Rainfall	75	107	75	93	129	153	92	84	121	95
Run off	17	32	15	28	48	76	27	18	52	26

- 6 a. Explain with a neat sketch, three methods of separating the base flow from the hydrograph. Give applications and limitations of unit hydrograph. (10 Marks)
 b. Rainfall of magnitude 3.8cm and 2.8cm occurs on two consecutive 4h durations on a catchment of area 27km² produced the following hydrograph of flow at the outlet of the catchment. Find the rainfall excess and Phi (ϕ) index. (10 Marks)

Time (hr)	-6	0	6	12	18	24	30	36	42	48	54	60	66
Flow (cumes)	6	5	13	26	21	16	12	9	7	5	5	4.5	4.5

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(10 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.

- 7 a. Explain benefits and ill effects of Irrigation. (10 Marks)
b. Explain Bandhara Irrigation. Explain the various Irrigation efficiencies. (10 Marks)
- 8 a. Explain with neat sketch the variation of duty with the places of its measurement. Also explain different methods to improve duty of water. (08 Marks)
b. Differentiate between Duty, Delta and Base period. (06 Marks)
c. The left canal of tank irrigation carries a discharge of 10 cumecs and has a culturable commanded area of 8000ha. The intensity of irrigation of Rabi crops is 70 percent and base period is 110 days. The right canal scheme carries a discharge of 24 cumecs and has a culturable commanded area of 1500ha. The intensity of Rabi crops is 80 percent and base period is 110 days. Give your comment on efficiency of both canals. (06 Marks)
- 9 a. Define the following : i) GCA ii) CCA iii) Intensity of irrigation
iv) Crop rotation v) Time factor vi) Crop factor vi) Economical height of a dam. (06 Marks)
b. With a neat sketch, explain the computation of reservoir capacity for a specified yield from mass inflow curve. (08 Marks)
c. Explain Lacy's regime theory. (06 Marks)
- 10 a. Explain with a neat sketch, Zones of Storage Reservoir. (06 Marks)
b. Write a note on Canal classification. (06 Marks)
c. Design an irrigation channel to carry 50 cumecs of discharge. The channel is to be laid at a slope of 1 in 4000. The critical velocity ratio for the soil is 1.1. Use $n = 0.023$ in Katter's equation. (08 Marks)

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31/07/2021

2.00pm to 5.00pm

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Seventh Semester B.E. Degree Examination, July/August 2021

Hydrology and Irrigation Engineering

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- 2 a. Explain Double mass analysis of finding consistency in rainfall during change of exposure. (10 Marks)
- b. Explain with neat sketches :
- | | |
|---------------------------------|---|
| i) Forms of precipitation | ii) Symon's rain gauge |
| iii) Float type recording gauge | iv) Thiessen polygon method. (10 Marks) |

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