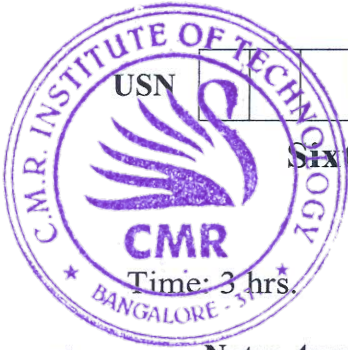


CBCS SCHEME



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Sixth Semester B.E. Degree Examination, Jan./Feb. 2023

Hydrology and Irrigation Engineering

Max. Marks: 100

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

Module-1

- Explain with neat sketch, Horton's Engineering representation of hydrological cycle. (06 Marks)
 - Define Precipitation. Explain different forms of precipitation. (06 Marks)
 - The average rainfall in cm at four existing rain gauge stations in a basin are 105, 79, 70 and 66. If the average depth of rainfall over the basin is to be estimated within 10% error, determine the additional number of rain gauges required. (08 Marks)

OR

- With a neat sketch, explain the working of Symon's type rain gauge. (06 Marks)
 - Write a note on optimum number of rain gauge stations in a catchment. (06 Marks)
 - The rainfall data for the period 1990 – 2008 is presented, construct a 3 year moving average curve. (08 Marks)

No.	1	2	3	4	5	6	7	8	9	10
Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Annual rainfall (mm)	525	620	430	280	315	400	710	595	375	560

No.	11	12	13	14	15	16	17	18	19
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Annual rainfall (mm)	575	420	540	450	380	305	450	1025	915

Module-2

- With a neat sketch, explain how evaporation can be measured using IS class A pan. (06 Marks)
 - List the factors affecting infiltration capacity. Explain. (06 Marks)
 - A 6 hour storm produced rainfall intensities of 7, 18, 25, 12, 10 and 6mm/hr in successive one hour intervals over a basin of 800 sq.km. The resulting runoff observed as 2640 hectares – meters. Determine the ϕ index for the basin. (08 Marks)

OR

- Describe a double ring infitrometer working for measuring infiltration rate. (06 Marks)
 - Bring the difference between ϕ index and w index. (06 Marks)
 - The rates of rainfall for the successive 30 min period of a 3 hour storm are 1.6, 3.6, 5.0, 2.8, 2.2, 1.0 cm/hour. The corresponding surface runoff estimated to be 8.6cm. Estimate ϕ index. Also determine W index. (08 Marks)

Module-3

- List the assumptions made in unit hydrograph theory. Write a note on its application. (06 Marks)
 - Explain different methods of base flow separation. (06 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.

- c. The ordinates of 4 hour hydrograph are given below. Determine the ordinates of 12 hour unit hydrograph.

Time (hours)	0	4	8	12	16	20	24	28	32	36	40	44	48
Discharge in cumecs UHG ordinates	0	15	110	220	150	115	90	70	60	50	30	20	0

(08 Marks)

OR

- 6 a. Define Runoff. Explain the factors affecting Runoff. (08 Marks)
 b. With neat sketch, explain the components of hydrograph. (06 Marks)
 c. Following are the ordinates of a 3 hour unit hydrograph. Derive and plot the 3 hour flood hydrograph due to an excess rainfall of 4.5cms. (06 Marks)

Time (hours)	0	3	6	9	12	15	18	21	24
3 hrs UHG ordinates (m ³ /s)	0	1.5	4.5	8.6	12	9.4	4.6	2.3	0.8

Module-4

- 7 a. Derive Irrigation. What are the types of flow irrigation? Explain any two flow irrigation systems. (08 Marks)
 b. Discuss the benefits of Irrigation. (08 Marks)
 c. The base period of paddy is 120 days. If the duty of this crop is 875 hectares per cumec, calculate the value of delta (Δ). (04 Marks)

OR

- 8 a. Define Duty, Delta and Base period. (06 Marks)
 b. What are the factors affecting duty of water? Explain. (08 Marks)
 c. Write short notes on : (06 Marks)
 i) Crop seasons in India
 ii) Frequency of Irrigation.

Module-5

- 9 a. Give the classification of canals base on their alignment. Explain the salient features of each of them. (06 Marks)
 b. Bring out the difference between Kennedy's and Lacey's theory. (06 Marks)
 c. A channel section has to be designed for the following data :
 Discharge, $Q = 30$ cumecs ; Silt factor, $f = 1.00$; Side slope = $\frac{1}{2} : 1$.
 Find also the longitudinal slope. (08 Marks)

OR

- 10 a. Explain different storage zones of reservoir with neat sketch. (10 Marks)
 b. Explain the investigations conducted for reservoir planning. List the points to be considered for selection of site for a reservoir. (10 Marks)

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