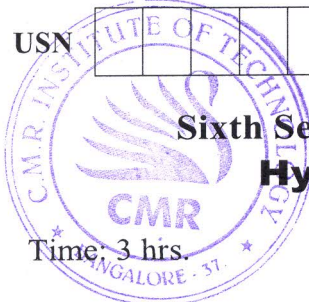


CBCS SCHEME

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Sixth Semester B.E. Degree Examination, Feb./Mar.2022

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. Explain the importance of hydrology. (10 Marks)
b. The average rainfall of 5 rain gauge stations in a basin are 89, 54, 45, 41 and 55 cm. If the error in the estimation of basin rainfall should not exceed 10%. How many additional rain gauges should be installed in the basin? (10 Marks)

OR

- 2 a. Explain with a neat sketch Horton's Engineering representation of hydrological cycle. (10 Marks)
b. The isohyets drawn for a storm occurred over a drainage basin yielded the following information. Find out the depth of the rainfall.

Isohytes interval (mm)	9 – 10	10 – 11	11 – 12	12 – 13	13 – 14	14 – 15
Area (km ²)	22	80	105	98	78	16

(10 Marks)

Module-2

- 3 a. Explain what is Evapo-transpiration and factors affecting Evapo-transpiration. (10 Marks)
b. The total observed runoff volume during a storm of 6 hr. duration with a uniform intensity of 20 mm/hr is 220 Mm³. If the area of the basin is 3000 km². Find the average infiltration rate and the runoff coefficient of the basin. (10 Marks)

OR

- 4 a. Explain with a neat sketch, double ring infiltrometer. Add a note on factors affecting infiltration. (10 Marks)
b. A reservoir had a average surface area of 15 km² during June. In that month the mean rate of inflow 10 m³/sec. Mean outflow = 12 m³/sec, Monthly rainfall = 10 cm and change in the storage = 12 Mm³. Assuming the seepage losses to be 1.5 cm. Estimate the evaporation in that month. (10 Marks)

Module-3

- 5 a. Define Hydrograph and explain with a neat sketch components of Hydrograph. (10 Marks)
b. Given below are the observed flow from a storm of 6 hr duration on a stream with a drainage area of 316 km². Assume a constant base flow of 17 cumecs. Derive and plot a 6 hr duration unit hydrograph.

Time (hr)	0	6	12	18	24	30	36	42	48	54	60	66	72
Flow (cumec)	17	113.2	254.5	198	150	113.2	87.7	67.9	53.8	42.5	31.1	22.64	17

(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.

OR

- 6 a. Explain the runoff and factors affecting on it. (10 Marks)
 b. The following ordinates are of 3 hr. unit hydrograph. Find out the volume of surface runoff from 1.5 cm effective rainfall of 3 hr. duration.

Time(hr)	0	6	12	18	24	30	36	42	48	54	60
Unit hydrograph ordinates	0	5.1	21.6	27	23.5	17	10.7	6.2	3.2	1	0

(10 Marks)

Module-4

- 7 a. Explain with a neat sketch, Bandhars Irrigation. List out its advantages and disadvantages. (10 Marks)
 b. An area irrigated by a distributor is 220 ha out of which 150 ha is Jowar and 70 ha is sugarcane. If delta for Jowar is 45 cm and sugar cane is 180 cm. Average annual transit losses are 40%. Calculate the duty of each crop at the head of distributory. Base period for Jowar is 120 days and for sugar cane 365 days. (10 Marks)

OR

- 8 a. Discuss in benefits and ill effects of irrigation. (10 Marks)
 b. A Kharif crop having a duty of 2500 ha/cumecs and the delta for the crop is 0.425 m. Find the base period of the crop. (10 Marks)

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- 9 a. Define a canal and explain the types of canals in detail. (10 Marks)
 b. A canal flowing at a rate of 120 litre/sec, delivers 100 litres/sec to the field. An area of 1.62 ha was irrigated in 8 hr. The effective depth of root zone is 1.70 m. The runoff loss in the field is 425 m³. Available moisture holding capacity of soil is 20 cm per metre depth of soil. Irrigation is started at a moisture extraction level of 50% of the available moisture. Determine the water conveyance efficiency (n_e) and water application efficiency. (10 Marks)

OR

- 10 a. Discuss on canal alignment considerations in detail. (10 Marks)
 b. Explain the zones of storage in a reservoir with a neat sketch. (10 Marks)

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