

## CBCS SCHEME

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## Seventh Semester B.E. Degree Examination, Jan./Feb.2021 **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

List and explain the importance of hydrology.

(10 Marks)

What is hydrological cycle? Explain with neat sketch, Horton's engineering representation of hydrological cycle.

What is Rain gauge? Explain with neat sketch non recording types of raingauge.

The average annual rainfall of 6 rain gauge stations in a basin are 89, 68, 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)

Module-2

What is evaporation? Explain the factors affecting evaporation.

(10 Marks)

b. A reservoir had a average surface area of 20 km<sup>2</sup> during June. In that month the mean rate of inflow = 10 m<sup>3</sup>/sec. Mean outflow = 15 m<sup>3</sup>/sec, monthly rainfall = 10 cm and change in storage = 16 million m<sup>3</sup>. Assuming the seepage losses to be 1.8 cm. Estimate the evaporation in that month. (10 Marks)

Explain the process of methods to control evaporation from lakes.

(10 Marks)

What are the factors affecting the infiltration? Explain with neat sketch double ring infiltrometer. (10 Marks)

Module-3

What is runoff? List and explain the factors affecting on it.

(10 Marks)

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 in (Hr) 0	0	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)

OR

a. Define Hydrograph. With neat sketch explain component parts of hydrograph.

b. Find out the ordinates of a storm hydrograph resulting from a 3 hr storm with rain fall of 3, 4.5 and 1.5 cm during subsequent 3 hr intervals. The ordinates of unit hydrograph are given in the table.

Hr 0	03	06	09	12	15	18	21	24	03	06	09	12
OVH (cumecs) 0	90	200	350	450	350	260	190	130	80	45	20	0

Assume an initial loss of 5 mm infiltration index of 5 mm/hr and base flow of 20 cumecs.

(10 Marks)

Module-4

- 7 a. What is the necessity of irrigation in India and write benefits and ill effects of irrigation? (10 Marks)
  - b. Explain in detail system of irrigation.

(10 Marks)

OR

- 8 a. What is irrigation frequency? Explain the factors affecting on frequency of irrigation.
  (10 Marks)
  - b. The gross commanded area for a distributor is 20000 hectares. 75% of which can be irrigated. The intensity of irrigation for Rabi season is 40% that for Kharif season 10%. If Kov period is 4 weeks for Rabi and 2.5 weeks for Kharif. Determine the out let discharge. Outlet factors for Rabhi and Kharif may be assumed as 1800 hectares/cumecs and 775 hectares/cumec. Also calculate delta for each crop. (10 Marks)

Module-5

- 9 a. Write the difference between Lacey's theory and Kennedy's theory. (10 Marks)
  - b. The slope of a channel in alluvial soil is  $s = \frac{1}{5000}$ . Lacey's silt factor f = 0.9. Channel side slope are  $\frac{1}{2}$ H:1V. Find the channel section and maximum discharge which can be allowed to flow in it. (10 Marks)

OR

- 10 a. With a neat sketch, explain zones of storage in a reservoir. (10 Marks)
  - b. Explain Hydrologic investigation of reservoir planning? List the points to be consider for selection of site for a reservoir.

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