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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

- 1 a. List and explain the importance of hydrology. (10 Marks)  
 b. What is hydrological cycle? Explain with neat sketch, Horton's engineering representation of hydrological cycle. (10 Marks)

**OR**

- 2 a. What is Rain gauge? Explain with neat sketch non recording types of raingauge. (10 Marks)  
 b. 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

- 3 a. 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)

**OR**

- 4 a. Explain the process of methods to control evaporation from lakes. (10 Marks)  
 b. What are the factors affecting the infiltration? Explain with neat sketch double ring infiltrometer. (10 Marks)

### Module-3

- 5 a. What is runoff? List and explain the 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 in (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)

**OR**

- 6 a. Define Hydrograph. With neat sketch explain component parts of hydrograph. (10 Marks)  
 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)

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.

**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. (10 Marks)

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