



10CV55

**Fifth Semester B.E. Degree Examination, June/July 2019**  
**Hydrology and Irrigation Engineering**

Time: 3 hrs.

Max. Marks:100

- Note:1. Answer any FIVE full questions, selecting atleast TWO questions from each part.  
2. Assume missing data if any suitably.

**PART - A**

- 1 a. Explain Hydrologic cycle, with neat sketch. (07 Marks)  
b. Describe the double mass curve technique for checking the consistency of rainfall data. (06 Marks)  
c. A catchment has 8 raingauges of which one is a self recording type and 7 are of standard type. For a 5% error in estimation of the mean rainfall, what should be the required number of additional raingauges? Following table gives the annual precipitation at the 8 stations.

Station	A	B	C	D	E	F	G	H
Rainfall (cm)	74	87	94	88	104	118	60	95

(07 Marks)

- 2 a. Explain with neat sketch IS class A pan. (06 Marks)  
b. Define Evapotranspiration. List the factors that influence evapotranspiration. (06 Marks)  
c. The infiltration capacity of a catchment is represented by Horton's equation as  $f = 0.5 + 1.2e^{-0.5t}$ , where  $f$  is in cm/h and  $t$  is in hours. Assuming the infiltration to take place at capacity rates in a storm of 4 hours duration, estimate the average rate of infiltration for the duration of the storm. (08 Marks)

- 3 a. Sketch flood hydrograph and explain its different components. (06 Marks)  
b. Define Unit hydrograph. Explain the derivation of unit hydrograph from an isolated storm. (08 Marks)  
c. Ordinates of 4h-UH are given in table below. Compute the ordinates of 8h UH. Sketch the two UH's. (06 Marks)

Time (h)	0	4	8	12	16	20	24	28
Ordinates of 4h-UH(m <sup>3</sup> /s)	0	10	30	25	18	10	5	0

- 4 a. Define Flood. What are the factors influencing flood? (06 Marks)  
b. Explain the Muskingum's method of flood routing. (08 Marks)  
c. Estimate the peak discharge for an airport of area 3km<sup>2</sup>, with intensity duration equation for the area.

$$I = \frac{35}{(t+10)^{0.38}}$$

where  $I$  is rainfall intensity in cm/h and  $t$  is in minutes. The time of concentration is 50 minutes and runoff coefficient is 0.98. (06 Marks)

**PART - B**

- 5 a. Define Irrigation. What is the necessity of irrigation? (05 Marks)  
b. List the advantages and ill effects of irrigation. (08 Marks)  
c. Explain the systems of irrigation. (07 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

- 6 a. Give the classification of Indian soils. (07 Marks)  
 b. Explain the distribution of soil moisture. (07 Marks)  
 c. After how many days will you supply water to soil in order to ensure sufficient irrigation of the given crop, if the field capacity of the soil is 30%, permanent wilting point = 14%, density of soil =  $0.0125\text{N/cm}^3$ , effective depth of root zone = 70cm, daily consumptive use of water for the crop = 10.5mm. (06 Marks)
- 7 a. Give in brief crop seasons in India and Karnataka. (06 Marks)  
 b. Define Duty, Delta and Base Period. Give the relationship between them. (05 Marks)  
 c. The base period, intensity of irrigation and duty of various crops under a canal system are given in the table below. Find the total volume of the water to be stored if the canal losses are 20% and evaporation losses are 12%. (09 Marks)

Crop	Base period (days)	Duty at field (hectare/ cumec)	Area under crop (hectares)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

- 8 a. Give the classification of canals. (10 Marks)  
 b. Design an irrigation canal according to Lacey's silt theory for the following data :  
 Full supply discharge = 15 cumec.  
 Silt factor = 1.0  
 Side slope of channel = 0.5H : 1V (10 Marks)

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