CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐

15CV73

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Hydrology and Irrigation Engineering

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. With a neat sketch, explain the Engineering representation of the Hydrologic cycle. **(08 Marks)**

   b. Briefly explain with a neat sketch, the i) Moving average curve   ii) Mass curve
      iii) Rainfall hyetograph   iv) Forms of precipitation. **(08 Marks)**

OR

2 a. With a Table, explain Global and Indian water availability. **(05 Marks)**

   b. Write a note on optimum number of rain gauge stations. **(05 Marks)**

   c. The average annual rainfall of 8 rain gauge stations in a basin are 1000, 950, 900, 850, 800, 700, 600, 400 mm. If the permissible error is 6%. Determine the optimum number of rain gauges required in the basin. **(06 Marks)**

Module-2

3 a. Explain what is evapo – transpiration and also factors affecting evapo – transpiration. **(08 Marks)**

   b. Describe how the estimation of evaporation is carried by
      i) Meyer's equation   ii)   Rohwer's equation. **(08 Marks)**

OR

4 a. Describe the method of determining infiltration capacity using a double ring infiltrometer. **(06 Marks)**

   b. A reservoir with average surface spread of 4.8 km^2 in the first weak of November has the water surface temperature of 30^{0}C and relative humidity of 40%. Wind velocity measured at 3.0m above the ground is 18km/h. The mean barometer reading is 760mm of Hg. Calculate the average evaporation loss from the reservoir in mm/day and the total depth and volume of evaporation loss in the first weak of November. Use both Meyer's equation as well as Rohwer's equation. Take saturation vapour pressure at 30^{0}C as 31.81mm of Hg. **(10 Marks)**

Module-3

5 a. Define Runoff. Explain the factors affecting Runoff. **(05 Marks)**

   b. Explain with a neat sketch, components of storm hydrograph. **(05 Marks)**

   c. Find the ordinates of a flood hydrograph resulting from a storm with rainfalls of 2.50 , 6.85 and 3.75cm each during success –ve 3 hours. The ordinates of a 3 hour UHG are given below. Assume an initial loss of 5mm – infiltration index , ϕ = 2.5 mm/hr , Base flow = 12 cumec.

Time (hours)	3	6	9	12	15	18	21	24	3	6	9	12	15	18	21	24
UHG ordinates (cumec)	0	115	370	510	395	315	252	231	112	127	96	64	43	25	12	0

(06 Marks)

OR

6 a. Explain Rainfall – Runoff correlation analysis. (04 Marks)

b. Define Unit Hydrograph. Explain with a neat sketch, the derivation of unit Hydrograph. State its assumption , application and limitations. (08 Marks)

c. Given the ordinates of a 4 – h unit hydrograph as below derive the ordinates of a 12 – h unit hydrograph for the same catchment. (04 Marks)

Time (hr)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinates of 4h UH (m^3/sec)	0	20	80	130	150	130	90	52	27	15	05	0

Module-4

7 a. with neat sketches. Explain Band hara Irrigation. List its advantages and disadvantages. (06 Marks)

b. Define Irrigation. What are the necessity of irrigation? (05 Marks)

c. Explain the various irrigation efficiencies. (05 Marks)

OR

8 a. Explain with neat sketch, the variation of Duty with the places of its measurement. (06 Marks)

b. What are the different methods adopted to improve duty of water? (05 Marks)

c. With a neat sketch, explain different systems of irrigation. (05 Marks)

Module-5

9 a. Write a note on Canal classification. (04 Marks)

b. Briefly explain the Lacey's Regime theory. (06 Marks)

c. Write with a neat sketch, the calculation of Reservoir capacity for a specified yield form the mass inflow curve. (06 Marks)

OR

10 a. Define the following : i) Gross command area   ii)   Cultural command area
iii) Crop factor   iv) Time factor. (04 Marks)

b. Explain with a neat sketch, zones of storage in a Reservoir. (04 Marks)

c. A channel section has to be designed for the following data :

Discharge Q = 30 cumes   ;   Silt factor f = 1.00   ;   Side slope = $\frac{1}{2}$: 1.

Find also the longitudinal slope. (08 Marks)

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