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15CV73

Seventh Semester B.E. Degree Examination, July/August 2022
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 neat sketch, explain Hydrological cycle. (06 Marks)
b. Briefly explain method used in estimation of missing rainfall data. (05 Marks)
c. Determine optimum number of raingauges in a catchment area from the following data :
i) Number of rain gauges = 8.
ii) Mean annual rainfall at the gauges = 1000 , 950 , 900 , 850 , 800 , 700 , 600 and 400mm.
iii) Permissible error = 6%. (05 Marks)

OR

- 2 a. Briefly explain hydrological equation and enumerate important rivers of India with their water potential. (08 Marks)
b. Briefly explain Forms and types of precipitation. (08 Marks)

Module-2

- 3 a. Explain the process of Evaporation and explain factors affecting Evapo – transpiration. (08 Marks)
b. Briefly explain i) Horton's infiltration equation ii) Blaney – Criddle equation. (08 Marks)

OR

- 4 a. Enumerate factors affecting Evaporation. With a neat sketch, explain Double ring infiltrometer. (08 Marks)
b. Briefly explain Infiltration Indices. (03 Marks)
c. For a storm of 2 – hours duration, the rainfall data rates are as follows :

Time period (min)	20	20	20	20	20	20
Rainfall Rate (min)	2.5	2.5	10	7.5	5.1	1.25

If ϕ - index is 3cm/hr estimate the surface runoff and also determine W – index. (05 Marks)

Module-3

- 5 a. What are Isochrones? Explain the factors affecting Runoff. (08 Marks)
b. The ordinates of a 3 – hr unit hydrograph of a basin at 6hr interval are 0 , 3 , 5 , 9 , 11 , 7 , 5 , 4 , 2 , 1 , 0 cumecs.
Derive a storm hydrograph due to a 3 – hr storm with a total rainfall of 15cm. Assume initial loss of 0.5cm and a ϕ - index of 1cm/hr. Take base flow – 4 cumes. (08 Marks)

OR

- 6 a. Define Unit Hydrograph. Explain limitation of Unit hydrograph. (06 Marks)
 b. Find out the ordinates of a storm hydrograph resulting from 9 – hr storm with rainfall of 2.0 , 5.75 and 2.75cm during subsequent 3 – hr interval. The ordinates of 3-hr storm unit hydrograph at 3-hr interval are as follows :
 0 , 100 , 355 , 510 , 380 , 300 , 260 , 225 , 165 , 120 , 85 , 55 , 30 , 22 , 10 , 0 (cumecs).
 Assume an initial loss of 0.5cm an unfiltration index of 0.25 cm/hr and a base flow of 10 cumecs. (10 Marks)

Module-4

- 7 a. Bring out importance of Irrigation. With neat sketch, explain Bandhara Irrigation system. (08 Marks)
 b. Define i) Frequency of Irrigation ii) Delta. (04 Marks)
 c. Find out the delta of a crop if the duty is 1800ha/cumec and base period is 130 days. What would be the duty if the delta is increased by 20% and the base period reduced by 10 days. (04 Marks)

OR

- 8 a. Briefly explain Lift Irrigation. Enumerate benefits and ill – effect of Irrigation. (08 Marks)
 b. What is Irrigation Efficiency? Explain Irrigation efficiency depending upon purpose served in practice. (08 Marks)

Module-5

- 9 a. Write step by step procedure of canal design by Kennedy's method. (08 Marks)
 b. What are Reservoirs? Explain various investigations required for Reservoir planning. (08 Marks)

OR

- 10 a. List and explain the different types of canals based on different criteria. (08 Marks)
 b. Design the channel section for the following data by Lacey's method.
 Discharge = 20 cumecs , Silt factor $f = 1$. (08 Marks)
