CBCS SCHEME

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18CV63

Sixth Semester B.E. Degree Examination, July/August 2022
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. Discuss the various processes involved in 'Hydrologic Cycle' using Horton's Engineering representation. **(10 Marks)**

b. List the importance of hydrology with emphasis on global water availability. **(10 Marks)**

OR

2 a. Define Rain gauge. Describe with a neat sketch, the principle of working of Symon's non – recording gauge and its demerits. **(06 Marks)**

b. What is Precipitation? Distinguish between Convection and Orographic precipitation. **(07 Marks)**

c. Determine the optimum number of raingauges in a catchment area using the following data :
i) Number of existing rain gauges = 08.
ii) Mean annual rainfall at the gauges : 1000, 950 , 900 , 850 , 800 , 700 , 600 and 400mm.
iii) Permissible error = 6%. **(07 Marks)**

Module-2

3 a. What is meant by 'Evaporation Losses'? Discuss the factors affecting evaporation. **(08 Marks)**

b. Define 'Evapotranspiration'. Explain in brief the 'Lysimeter method' of estimating the same in the field. **(06 Marks)**

c. What is the Evaporation, if 4.80 litres of water is removed from an evaporation pan of diameter 1.22m and the simultaneous rainfall measurement is 9.0mm? **(06 Marks)**

OR

4 a. Discuss the factors that affect infiltration. Explain with a neat sketch, measurement of infiltration using double ring infiltrometer. **(10 Marks)**

b. A 6 hour storm produced rainfall intensities of 7, 18, 25, 12, 10 and 3mm/hour is successive one hour intervals over a basin of 800km^2. The resulting run - off is observed to be 264×10^5 m^3. Determine ϕ - index for the basin. **(10 Marks)**

Module-3

5 a. Define the following :
i) Basin recharge ii) Direct run off iii) Drainage density iv) Form factor
v) Overland flow. **(10 Marks)**

b. What is Runoff? List and explain factors affecting it. **(10 Marks)**

OR

6 a. How the hydrograph is affected by the following :
i) Shape of the basin ii) Non – uniform aerial distribution of rainfall. **(06 Marks)**

b. Define 'Unit hydrograph'. With the help of neat sketch, explain the various components of a flood hydrograph. **(06 Marks)**

c. Given the ordinates of a 4 – hour unit hydrograph. Derive the ordinates of 12 – hour unit hydrograph for the same catchment. What is the peak value of discharge and the corresponding time interval observed in 4-h and 12-h unit hydrograph. **(08 Marks)**

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

Module-4

7 a. Define Irrigation. Discuss in brief the benefits and ill – effects of irrigation. **(08 Marks)**

b. Distinguish between : Direct Irrigation and Storage Irrigation. **(06 Marks)**

c. What is Bhandara Irrigation? List its advantages and disadvantages. **(06 Marks)**

OR

8 a. Define Duty and Delta. Derive the relation between them. **(06 Marks)**

b. Define the following :
i) Permanent wilting point ii) Field capacity. **(06 Marks)**

c. After how many days water supply is required to ensure good yield, if :
Field capacity of soil = 30% ; Permanent wilting point = 12% ;
Density of soil = 1.4g/cc ; Effective depth of root zone = 80cm ;
Daily consumptive use = 15mm. Readily available moisture is 85% of available moisture.
(08 Marks)

Module-5

9 a. Write an explanatory note on Canal classification on the basis of its alignment. **(06 Marks)**

b. Enumerate the basic differences between Lacey's and Kennedy's theory. **(06 Marks)**

c. A channel section is to be designed for the following data :
Discharge Q = 5 cumecs ; Silt factor = 1.0 ; Side slope = 0.5H = 1V.
Also determine bed slope of the channel. Use Lacey's theory. **(08 Marks)**

OR

10 a. With a neat sketch, explain different zones of a storage reservoir. **(10 Marks)**

b. With a neat sketch, explain step – by – step procedure of determining reservoir capacity for a specific yield using the mass – inflow curve. **(10 Marks)**

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