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10CV55

Fifth Semester B.E. Degree Examination, June/July 2015
Hydrology & Irrigation Engineering

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define hydrology and explain briefly the practical applications of Hydrology. **(08 Marks)**

b. Explain how the Double mass curve method is used to test the consistency of rainfall record. **(06 Marks)**

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

2 a. Define Evaporation (E) and Evapo – transpiration (ET) and list out the factors affecting the evaporation. **(06 Marks)**

b. Mention the different methods of measurement of rate of infiltration and describe anyone of them. **(08 Marks)**

c. For a storm of 2 hr duration the rainfall rates are given below :

Time period (minutes)	20	20	20	20	20	20
Rainfall rate (cm/hr)	2.5	2.5	10.0	7.5	5.1	1.25

If ϕ – index is 3cm/hr, estimate the surface runoff. Also determine W – index. **(06 Marks)**

3 a. What is Unit hydrograph? State the assumptions and limitations of Unit Hydrograph Theory. (Any 3 each). **(08 Marks)**

b. Explain how base flow is separated from a simple storage hydrograph, with a neat sketch (any two methods). **(06 Marks)**

c. The ordinate of 4 hr unit hydrograph are given below. Determine the ordinates of 12 hr unit hydrograph. **(06 Marks)**

Time (hr)	0	4	8	12	16	20	24	28	32	36	40	44	48
Ordinates of unit hydrograph (4hr)cumecs	0	15	110	220	150	115	90	70	60	50	30	20	0

4 a. Define the terms Flood and Flood routing. **(04 Marks)**

b. What is the importance of Design flood? List out the factors affecting flood. **(08 Marks)**

c. An Urban catchment has an area of 1km^2. The slope of the catchment is 0.005 and the maximum length of travel of water is 500m. The maximum depth of rainfall with a 20 years return period is as given below :

Duration (tc) (minutes)	10	15	20
Depth of rainfall (cm)	4.0	5.0	6.0

Estimate the required peak flow rates by using runoff co-efficient as 0.40. **(08 Marks)**

PART – B

5 a. Define the term Irrigation and Explain the necessity of Irrigation in India. **(06 Marks)**

b. Explain the Flow Irrigation System with the aid of necessary sketches. **(08 Marks)**

c. Write a note on Environmental impacts of Irrigation. **(06 Marks)**

6 a. Explain the essential soil conditions for good plant growth. **(06 Marks)**

b. Give a brief classification of Indian soils. **(06 Marks)**

c. After how many days you will supply water to soil in order to ensure sufficient irrigation of the given crop, if field capacity of the soil is 35%, permanent wilting point is 18%, density of soil is 1.50gm/cc, effective depth of root zone is 70cm and daily consumptive use of water for the given crop is 17mm. Assume that readily available moisture is 75% of the available moisture. **(08 Marks)**

7 a. Define Duty and Delta and give the relationship between them. **(04 Marks)**

b. Explain the terms : i) Base period ii) Crop period iii) Crop season iv) Irrigation requirement. **(08 Marks)**

c. Two canal system A and B have the cultural command area of 30000 ha and 15000 ha and discharge $20m^3/S$ and $10m^3/S$ respectively. The intensity of Rabi crop and Base period for canal A are 85% and 120days. For canal B intensity of Rabi crop and the Base period are 50% and 120days. Which system is more efficient? **(08 Marks)**

8 a. Describe briefly the various considerations made in the alignment of an Irrigation canal. **(06 Marks)**

b. Explain briefly the classification of canals based on alignment. **(06 Marks)**

c. Design an Irrigation channel by Kennedy's theory to carry a discharge of 5 cumecs. Take $m = 1.0$, $N = 0.0225$ and $\frac{B}{D} = 3.24$. **(08 Marks)**

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