[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

Dec.-22-0236

CE-604 (Hydrology and Water Resources Engineering)

B.Tech. 6th (CBCS)

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, select one question from each sections A, B, C and D. Section E is compulsory.

SECTION - A

1. (a) What do you mean by water balance system in hydrology?

   (b) A lake has an area of 15 km^2. Observation of hydro logical variables during a certain year has shown that:

   Precipitation = 700 mm/year

   Average inflow = 1.4 cumecs

   Average outflow = 1.6 cumecs

   Assume that there is no net water exchange between the lake and the ground water. Determine the evaporation during this year. (10)

2. What are some possible effects of climate change on the hydrological cycle? (10)

SECTION - B

3. What are the factors which affect the infiltration capacity of soil? Describe some of the empirical models of infiltration capacity. (10)

4. A catchment (area = 300 km^2) receives an uniform rainfall of 30mm in one day. During the next few days, the discharg is observed in the river that drains the catchment. The readings are give in the following table. (10)

T (days)	0	1	2	3	4	5
Q(cumecs)	2	5	10	8	4	2

The base-flow is assumed constant = 2 cumecs during the discharge period.

(a) How much was the direct runoff during the period?

(b) How much was the total losses for the rainfall?

(c) What was the maximum discharge in the water course during the period? (10)

SECTION - C

5. Describe a method for routing flood through a deep reservoir using the fundamental relation between inflow, outflow, and storage. Take $Q= C.L.H^{3/2}$ for the spillway. (10)

6. The daily flows in a river for three consecutive years are given in the table by class interval along with the number of days of flow belonged to this class. What are the 50% and 75% dependable flows (annual and daily) for the river? (10)

		Year 1981	Year 1982	Year 1983
S.No.	Daily mean discharge cumecs (range)	No. of days the flow belonged to the given range (class interval)	No. of days the flow equalled the class range of col (2)	No. of days the flow equalled the range given in col (2)
(1)	(2)	(3)	(4)	(5)
1	100-90.1	0	6	10
2	90-80.1	16	19	16
3	80-70.1	27	25	38
4	70-60.1	21	60	67
5	60-50.1	43	51	58
6	50-40.1	59	38	38
7	40-30.1	64	29	70
8	30-20.1	22	48	29
9	20-10.1	59	63	26
10	10-Negl.	54	26	13

SECTION - D

8. Define and explain the well loss. How is well loss related to specific capacity of well? (10)

9. How urbanizations influence the storage of ground water? Explain the methods to be adopted for conservation of water in current scenarios. (10)

SECTION - E

10. Answer the following questions in brief:

    (a) How to calculate average domestic water consumption in a developed country?

    (b) Explain the ring infiltrometer for measuring the infiltration capacity.

    (c) Describe 'time of concentration' in runoff estimation.

    (d) Differentiate between S Hydrograph and Instantaneous Hydrograph.

    (e) Explain Muskingum method for flow routing in brief.

    (f) State the Darcy's law.

    (g) Differentiate between permeability and seepage.

    (h) What kind of filters to be used in rainwater harvesting system?

    (i) Distinguish between flood control reservoir and multipurpose reservoir.

    (j) Describe sedimentation and control in reservoir.

(10×2=20)