JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

BTech - IV Semester (CE)

COURSE CODE(CREDITS): 18B11CE414

COURSE NAME: Water Resource Engineering MAX. MARKS: 25

COURSE INSTRUCTORS: Saurabh Rawat MAX. TIME: 1 Hour 30 Minutes

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Note: *(a)All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

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Q1. During a 3-h storm event, it was observed that all abstractions other than infiltration are negligible. The rainfall was idealized as three 1-h storms of intensity 10 mm/hr, 20 mm/hr, and 10 mm/hr, respectively. The infiltration was idealized as a Horton's curve, $f = 6.8 + 8.7 \cdot e^{(-t)}$, where '$f$' is in 'mm/hr' and '$t$' is in 'hours'. What is the effective rainfall? *CO3* **[6]**

Q2. A 30-minute unit hydrograph for a catchment is given in **Table – 1**. The φ – index is 4mm/hr. The storm details are given in **Table – 2**. Obtain the runoff hydrograph for the storm.

Table - 1	
Time (min)	**Runoff (m^3/sec)**
0	0
30	1.2
60	2.8
90	1.7
120	1.4
150	1.2
180	1.1
210	0.91
240	0.74
270	0.61
300	0.5
330	0.28
360	0.17
390	0

Table - 2	
Time (min)	**Rainfall (cm)**
0 - 30	3.3
30 - 60	2.7
60 - 90	1.9

CO3 **[10]**

Q3. Differentiate between 'Evaporation' and 'Boiling'. Discuss the variation in 'Evaporation' with the following factors:

a). Vapour pressure

b). Wind speed

CO2; CO3 **[1+2+1 = 4]**

Q4. The infiltration capacity of soil follows the Horton's exponential model, $f = C_1 + C_2 \cdot e^{-kt}$. During an experiment, the initial infiltration capacity was observed to be 200 mm/hr. After a long time, the infiltration capacity was reduced to 25 mm/hr. If the infiltration capacity after 1 hour was 90 mm/hour, what is the value of decay constant k (in per hour)?

CO2; CO3 **[5]**