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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

B.Tech-VI Semester (CE)

COURSE CODE (CREDITS):23B11CE611 MAX MARKS: 35

COURSE NAME: WATER RESOURCE ENGINEERING

COURSE INSTRUCTOR: DR. NIRAJ SINGH PARIHAR MAX. TIME: 2 Hours

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

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

(c) Use of calculator is allowed

Q.No	Question	CO	Marks
Q1	The ordinates of a 6-hr unit hydrograph of a catchment are as follows: Time(hrs): 0, 6, 12, 18, 24, 30, 36, 42 Discharge(m^3/sec): 0, 10, 40, 55, 45, 30, 7, 0 Arrive at the direct runoff hydrograph resulting from the following excess rainfall hyetograph occurring over the catchment Time (hrs): 0-6, 6-12 Rain intensity(cm/hr): 1, 2	CO1,2	5
Q2	The flood frequency computations for a flashy river at a point 50 km upstream of a bund site produced the peak flood discharges of 20,600 m^3/sec and 22150 m^3/sec for return periods of 50 and 100 years respectively. Estimate the flood magnitude in the river for a return period of 500 years using Gumbel's method.	CO2	5
Q3	a) Derive the Thiem's expression for discharge through an unconfined aquifer. b) A 30 cm diameter well penetrates 25 m below the static water table. After 24 hrs. of pumping@5400l/min, the water levels in two test wells at 90 m and 30 m distance are lowered by 0.53 m and 1.11 m respectively. Find the transmissibility of the aquifer and the drawdown in the main well.	CO3	4+4
Q4	A loam soil has a field capacity of 25% and wilting coefficient of 10%. The dry unit weight of the soil is 1.5 gm/cc. If the root zone depth is 60 cm, determine the effective storage capacity of the soil. The irrigation water is applied when moisture content falls to 15%. If the water application efficiency is 75%, determine the water depth	CO4	4

<table>
<tr><td></td><td>required to be applied in the field.</td><td></td><td></td></tr>
<tr><td>Q5</td><td>The base period, intensity of irrigation and duty of various crops under the canal system are given in the table. Find the reservoir and canal capacity if the canal losses are 20% and the reservoir losses are 12%.Assume all the crops to be grown simultaneously.
<table>
<tr><th>Crop</th><th>Base period(days)</th><th>Duty at the field (hec/cumec)</th><th>Area under crop (hec)</th></tr>
<tr><td>Wheat</td><td>120</td><td>1800</td><td>4800</td></tr>
<tr><td>Sugarcane</td><td>360</td><td>800</td><td>5600</td></tr>
<tr><td>Cotton</td><td>200</td><td>1400</td><td>2400</td></tr>
<tr><td>Rice</td><td>120</td><td>900</td><td>3200</td></tr>
<tr><td>Vegetables</td><td>120</td><td>700</td><td>1400</td></tr>
</table></td><td>CO4,5</td><td>5</td></tr>
<tr><td>Q6</td><td>Discuss the following in brief:
(a) Moving boat method of discharge measurement
(b) Merits and demerits of sprinkler and drip irrigation methods.</td><td>CO2,3</td><td>4+4</td></tr>
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