JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATION- MAY 2023
B.Tech IV Semester (Civil)

COURSE CODE (CREDITS): 18B11CE414 (3) MAX. MARKS: 35
COURSE NAME: WATER RESOURCE ENGINEERING
Course Instructor: NIRAJ SINGH PARIHAR MAX. TIME: 2HR

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume suitable data if required and not provided.*

1. Briefly answer the following:

   a) Discuss the significance of DAD curve in hydrology.
   b) If the base period of a 6-hr hydrograph of a basin is 84 hours, then comment on the base period of a 12 –hr hydrograph derived from this 6-hr unit hydrograph.
   c) An 8-hr. unit hydrograph of a certain basin has a peak ordinate of X m^3/sec. What could be the effect on the peak ordinate value of a 4-hr. unit hydrograph for the same basin.
   d) Define specific yield of an aquifer.
   e) Estimate the time required to irrigate 0.04 hectares of land having infiltration capacity of 5 cm/hr and average depth of flow 10 cm with a discharge of 0.02 cumecs by border strip method.

   [5] (CO1,2,3)

2. 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.

   [5] (CO1,2)

3. (a) Derive the Thiem's expression for discharge through a confined aquifer stating all the assumptions.

   (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.

   [4+4] (CO1,2)

4. 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 required to be applied in the field.

   [4] (CO3)

5. 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.

Crop	Base period(days)	Duty at the field (hec/cumec)	Area under crop (hec)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

[5] (CO3,4)

6. Give the relative merits and demerits of sprinkler irrigation system. Derive the expression for spacing of a tile drainage system with proper figures and explanation. **[3+5]** (CO3)