

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION-DECEMBER 2017

B.Tech V Semester

COURSE CODE: 10B11CE513

COURSE NAME: Water Resource Engineering

MAX. MARKS: 35

COURSE CREDITS: 04

MAX. TIME: 2 HR

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume suitable data if required. Prefer answering in sequence.

1. Given below are the observed flows from a 6 hr. duration storm with a drainage area of 316 sq.km. Calculate the excess rainfall depth and ordinates of 6-hr. unit hydrograph. [5]

Day	Time	Ordinates of storm hydrograph(cumecs)	Day	Time	Ordinates of storm hydrograph(cumecs)
1	12AM	17	2	6PM	67.9
	6AM	113.2	3	12AM	53.8
	12PM	254.5		6AM	42.5
	6PM	198		12PM	31.1
2	12AM	150		6PM	22.6
	6AM	113.2	4	12AM	17
	12PM	87.7		6AM	17

2. The annual maximum flood data in a river at a station have been processed to estimate the maximum floods for different return periods using Gumbel's method. If the estimated maximum floods for return periods 100 and 50 years are $450\text{m}^3/\text{sec}$ and $400\text{m}^3/\text{sec}$ respectively, estimate the flood discharge for a return period of 500 years. [5]
3. 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. [5]

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

4. Wheat is to be grown in field having a field capacity equal to 27% and the permanent wilting point as 13%. The depth of soil is 80 cm with dry unit weight 1.5 gm/cc. Calculate: [4]
- The depth of available moisture storage capacity.
 - The water depth to be supplied for irrigation considering OMC at 18%.
 - Water depth to be supplied to field if field application efficiency is 80%.
 - The water depth needed at the canal outlet if 15% water gets lost in water course and field channel.
5. Derive the following with suitable figures and explanation: [7]
- Thiem's expression for discharge through an unconfined aquifer.
 - Expression for spacing of a tile drainage system.
6. Write short notes on any three of the following: [9]
- Recuperation test
 - Tubewells
 - Types of irrigation systems
 - Alignment of canals