

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- Dec 2018

B.Tech V Semester

COURSE CODE: 10B11CE513

MAX. MARKS: 35

COURSE NAME: Water Resource Engineering

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. Briefly answer the following:

[1x5=5]

- A 5-hr. unit hydrograph of a certain basin has a peak ordinate of X m³/sec. Comment on the peak ordinate value of a 2-hr. unit hydrograph for the same basin.
 - How can you estimate proportion of sodium ions in water.
 - Derive the relation between specific yield and specific retention for an aquifer.
 - Calculate the Lacey's regime scour depth for a channel with silt factor as unity and discharge intensity $8 \text{ m}^2/\text{sec}$.
 - 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.
- Derive the Thiem's expression for discharge through a confined aquifer stating all the assumptions. A 30 cm diameter well penetrates 25 m below the static water table. After 24 hrs. of pumping @ 5400 l/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. [3+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. [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. [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

5. An earthen canal has to irrigate 24000 ha of Rabi crop. If duty at head is 400 ha/cumec, design the dimensions and bed slope of the canal using Manning's formula. Given: B/D ratio=6. $N=0.025$, side slope=1.5H:1V and permissible velocity=0.8 m/sec. [4]
6. Derive the expression for spacing of the tile drains with proper description stating all the assumptions involved. [5]
7. Describe in brief the various methods of 'Canal Alignment' under different topographic conditions. [4]

JUIT TEST-3 EXAMINATION DECEMBER 2018