

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION- May 2022

B.Tech IV Semester

COURSE CODE: 18B11CE414

MAX. MARKS: 35

COURSE NAME: Water Resource Engineering

COURSE CREDITS: 03

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 and not provided.

Q.1.

- (a) Explain the "time invariance" and "linear response" assumptions of unit hydrograph theory. [2]
(b) The ordinates of a flood hydrograph resulting from two successive storms each of 4 hour duration producing excess rainfall depths of 2 cm and 3 cm respectively are given below. Determine the unit hydrograph and resulting direct runoff from the first storm.

Time(hrs)	0	4	8	12	16	20	24	28	32	36	40	44	48
Discharge(m ³ /sec)	05	45	125	185	240	275	275	210	160	110	50	05	05

[5]

- Q.2 During the passage of a flood, the data estimated at two sections 500 m apart are given. The eddy loss coefficients for contraction and expansion are 0.1 and 0.35 respectively. Manning's $n=0.022$. Find the flood discharge.

Section	Water Surface elevation(m)	Area of flow(m ²)	Hydraulic mean depth(m)
Upstream, P	85.233	91.746	2.835
Downstream, R	85.176	84.354	2.917

[6]

- Q.3 Annual maximum flood data in a river at a station have been processed to estimate the maximum flood for different return periods using Gumbel's method which yielded the maximum floods for 100 and 50 years return period as 450 m³/sec and 400 m³/sec respectively. Estimate the flood discharge for return period of 500 years. [5]

Q.4

- (a) A well is drilled into an impermeable base at the centre of a circular island 880 m in radius located in a large lake. The well completely penetrates a confined sandstone aquifer 16 m thick having a permeability of 16 m/day. What will be the steady discharge if the drawdown in the main well is not to exceed 3 m. Take well diameter as 0.3 m. [3]
(b) Derive the Thiem's expression for discharge through gravity well. Clearly state the assumptions made in the derivation. [4]

Q.5 Write short notes on any two of the following:

- a) Currentmeter and its working
- b) Tubewell
- c) Snowfall Measurement

[5x2]

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