Peak Flood (m<sup>3</sup>/sec) 40,809

Printed Pages: 02

B.TECH (SEM V) THEORY EXAMINATION 2022-23 ENGINEERING HYDROLOGY

Time: 3 Hours

Note: Attempt all Sections. If you require any missing data, then choose suitably.

## SECTION A

## 1. Attempt *all* questions in brief.

- (a) Write water budget equation.
- (b) Define actual evapotranspiration.
- (c) Write 2 basic assumptions of unit hydrograph.
- (d) What is mass curve?
- (e) Write down the Ryves formula of flood estimation.
- (f) Define attenuation.
- (g) Draw diagram to show mutual interference of wells.
- (h) What is perched water table.
- (i) What are different types of contamination in groundwater?

Return Period T (Years)

50

(j) Define tube well.

## SECTION B

## 2. Attempt any *three* of the following:

- (a) What are different forms of precipitation? Also draw a schematic section of tropical cyclone.
- (b) Explain double mass curve of rainfall. Also write the steps to correct the consistency of data.
- (c) Explain risk, reliability and safety factors. Flood frequency computations for a river by using Gumble's method, yielded the following results. Calculate the flood magnitude in the river with the return period of 1000 years.

		100	$\Delta O^{\prime}$		46,300			
Derive an e	equation to	calculate	discharge	from	anunconfined	aquifer	for	steady
state conditi	ons.							

- (e) Write the applicability of water wells. Mention its advantages and disadvantages. **SECTION C**
- 3. Attempt any *one* part of the following:

(d)

- (a) Explain in detail different types of recording rain gauges.
  The average annual rainfall of 5 rain gauges in a basin 890, 540,450,410 and 550
- (b) mm respectively. Calculate the additional gauges required, if it is desired to limit the error to only 15%?

 $10 \ge 3 = 30$ 

 $10 \ge 1 = 10$ 

242.32

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 $2 \ge 10 = 20$ 

Total Marks: 100

Paper Id: 2 3 1 6 5 2

#### 4. Attempt any one part of the following:

- Explain time characteristics of hydrograph. (a)
- Define Hydrograph and its components in detail with neat sketch. Explain Unit (b)
  - Hydrograph by defining 1-hour, 6-hour and 24- hour unit hydrograph.

#### 5. Attempt any *one* part of the following:

A bridge has an expected life of 25 year and is designed for a flood magnitude of (a) return period 100 years. Calculate the following: -(a) What is the risk of this hydrologic design?

(b) If a 10% risk is acceptable, what return period will have to be adopted?

Analysis of annual flood series of a river yielded a sample mean of 1000 m<sup>3</sup>/s and (b) standard deviation of 500 m<sup>3</sup>/s. Derive the design flood of a structure on this river to provide 90% assurance that the structure will not fail in next 50 years. Use Gumbles method and assume the sample size to be very large.

### 6. Attempt any *one* part of the following:

- (a) Drawdown in observation well is 5m and 10 m and corresponding radius from well is center is 20m and 15 m respectively. Radius of circle of influence for a well is 500 meters. A tube well is 0.65 m in diameter. The unconfined aquifer is of 25 m depth. After drawdown depth of water is 12 m in the well. Permeability of soil is 27.50 m/day. Calculate the discharge from the well.
- (b) Explain different types of saturated formations.

## 7. Attempt any one part of the following:

- Differentiate between Open wells and tube wells. Provide its method of (a) construction by analyzing the soil and ground level characteristics.
- (b) Write the well construction methods in detail. Also Describe the operation and , 1 , 1 , 2023, 2023, 21:31 maintenance of water wells.

10 x 1

 $10 \ge 1 = 10$ 

# $10 \ge 1 = 10$