

Paper Id: **100731**Roll No:

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B. TECH
(SEM -VII) THEORY EXAMINATION 2019-20
WATER RESOURCES ENGINEERING

Time: 3 Hours

Total Marks: 100

Note: Attempt sections in any order as you wish. Do not attempt any section more than once.

SECTION A

1. Attempt the questions briefly. 2 x 10 = 20

- a. Define Unit hydrograph.
- b. Explain various types of precipitation.
- c. Write down the relation between Duty and Delta.
- d. Define PET and AET.
- e. Define intensity of irrigation.
- f. Explain Lacey's silt factor.
- g. What do you mean by consumptive use of water?
- h. Write a short note on synthetic unit hydrograph.
- i. Define silting and scouring in canals.
- j. Explain well losses and well shrouding.

SECTION B

2. Attempt any three of the following: 10x3=30

- a. A catchment has six raingauge stations. In a year, the annual rainfall recorded by the gauges are as follows:

Station	A	B	C	D	E	F
Rainfall(cm)	82.6	102.9	180.3	110.3	98.8	136.7

Calculate the optimum number of raingauges stations in the catchment for 10% error.

- b. Write a short note on 'synthetic Unit Hydrograph'. How will you derive the synthetic unit hydrograph from a number of unit hydrograph? Illustrate the method with suitable example in a tabular form.
- c. Differentiate between Kennedy's and Lacey's theory for design of alluvium channels. Explain defects in Kennedy's theory.
- d. Define Well Efficiency. What are the various factors governing the selection of suitable site of a tube-well?
- e. What is the problem of water logging? What are the poor effects of water logging? Describe some suitable remedial measures against water logging in brief.

SECTION C

3. Attempt any one part of the following: 10x1=10

- a. Write down the water budget equation for a catchment. Define which type of precipitation generally occurs in India.
- b. Define following terms:
 - i. Depth area duration curve
 - ii. Probable Maximum Precipitation
 - iii. Evapotranspiration
 - iv. Φ -index

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4. Attempt any *one* part of the following: 10x1=10
- a. Define surface runoff. Explain the factors affecting the runoff.
 - b. What do you understand by consumptive use of water? What are the factors affecting consumptive use of water? List the various direct methods of a measurement of consumptive use of water.
5. Attempt any *one* part of the following: 10x1=10
- a. Design an irrigation channel to carry a discharge of 30 cumec by Kennedy's theory. Take B/D ratio as 8.0, $N = 0.0225$ and $m = 1.0$.
 - b. Using Lacey's theory, design a trapezoidal irrigation channel (side slope, 1H: 2V) carrying discharge of $40 \text{ m}^3/\text{sec}$. Take silt factor as 1.0.
6. Attempt any *one* part of the following: 10x1=10
- a. What is cross drainage works? What are the various types of cross drainage works?
 - b. What is the concept of river training? What do you mean by river training for discharge and river training for depth and river training for sediment? List the various types of river training works and explain anyone of them with suitable sketches.
7. Attempt any *one* part of the following: 10x1=10
- a. Describe Confined and Unconfined aquifer with suitable diagram. Derive the expression for the discharge through confined aquifer.
 - b. Define following terms:
 - i. Aquifer
 - ii. Aquiclude
 - iii. Aquitard
 - iv. Aquifuge
 - v. Porosity

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