



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

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III B. Tech II Sem Regular End Examination, June 2022

Hydrology and Water Resource Engineering (Civil Engineering)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part - A, answer all questions which carries 20 marks.

3. In Part - B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

- | | | | | |
|-------|--|----|-----|-----|
| 1. a) | Write depth, duration and frequency relation. | 2M | C01 | BL1 |
| b) | What do you understand by precipitation? | 2M | C01 | BL1 |
| c) | Explain the evaporation process. | 2M | C02 | BL4 |
| d) | Draw a typical infiltration curve and indicate on it the various components. | 2M | C02 | BL1 |
| e) | Define S - curve hydrograph. How is it constructed? | 2M | C03 | BL1 |
| f) | Describe the procedure for the derivation of unit hydrograph from an isolated storm. | 2M | C03 | BL2 |
| g) | Write a note on field capacity. | 2M | C04 | BL1 |
| h) | What is saturation capacity? | 2M | C04 | BL1 |
| i) | Write a note on canal losses. | 2M | C05 | BL1 |
| j) | What do you understand by water logging? | 2M | C05 | BL1 |

PART- B

(10*5 Marks = 50 Marks)

- | | | | | |
|-----------|--|-----|-----|-----|
| 2 | a) Differentiate between:
i) Recording and non- recording rain gauge stations
ii) Isohyets and contours | 5M | C01 | BL2 |
| | b) Describe various methods of computing average rainfall over a basin. | 5M | C01 | BL2 |
| OR | | | | |
| 3 | Rain gauge station X was in operation for some days of the month during which the storm occurred. The respective storm totals at the three neighboring stations A, B and C were 107, 90 and 120 mm. The normal annual precipitation values at stations A, B, C and X are 980, 1100, 890 and 1200 mm, respectively. Determine the missing precipitation for station X | 10M | C01 | BL3 |
| 4 | a) Explain with sketches if necessary the following methods for calculating the net storm rainfall.
i) Infiltration capacity methods
ii) W- Index method | 5M | C02 | BL4 |

- b) Discuss the effect of climatic factors on the run off from a drainage basin.

5M C02 BL2

OR

- 5 Using Blaney - Criddle formula determine the evapotranspiration for crop of natural light vegetation, for following data during the month of December:

10M C02 BL3

Consumptive use coefficient $k = 0.80$

% age sunshine hours during December = 7.15 (for place having a latitude = 36° N)

Mean monthly temperature = 15°C

Assume any other suitable data

- 6 a) Define unit hydrograph. State the underlying assumptions of the unit hydrograph theory. Discuss also the limitation of unit hydrograph theory.

5M C03 BL2

- b) Explain how a 3 - D hour unit hydrograph can be derived from a D- h unit hydrograph.

5M C03 BL4

OR

- 7 Elaborate the concept of Synthetic Unit Hydrograph and its applicability

10M C03 BL4

- 8 a) Design an open well in fine sand to give a discharge of 0.003 cumec when worked under a depression head of 2.5 metres.

5M C04 BL6

- b) What do you understand by crop rotation? What are its advantages?

5M C04 BL1

OR

- 9 A gravity well has a diameter of 60 cm. The depth of water in the well is 40 metres before pumping is started. When pumping is being done at the rate of 2000 liters per minute, the drawdown in a well 10 metres away is 4 metres and in another well 20 metres away is 2 metres. Determine

10M C04 BL3

(i) radius of zero drawdown,

(ii) coefficient of permeability,

(iii) drawdown in the well,

(iv) specific capacity of the well

(e) maximum rate at which water can be pumped from the well.

- 10 a) Give a brief notes on classification of canals.

5M C05 BL1

- b) Design a trapezoidal shaped concrete lined channel to carry a discharge of 100 cumecs at a slope of 25 cm/ km. The side slopes of the channel are 1.5: 1. The value of N may be taken as 0.016. Assume the limiting velocity as 1.5 m /sec.

5M C05 BL6

OR

- 11 Explain design of canal using Kennedy theory with neat sketch.

10M C05 BL4

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