

Roll No.

Total Pages : 03

BT-7/M-20

37049

**RIVER MECHANICS AND FLOOD
CONTROL (E-1)
CE-415N/CE-415E**

Time : Three Hours]

[Maximum Marks : 75

Note Attempt Five questions in all, selecting at least one question from each Unit. All questions carry equal marks. Assume any missing data.

Unit I

1. (a) What is meant by meandering of rivers ? What are its causes ? How do increasing the river length due to meandering is counteracted in the nature ? **7½**
- (b) How to estimate design flood ? Mention any empirical formulae for peak flood discharge used in India. **7½**
2. (a) Values of annual precipitation of a rain gauge station is given below in cm per year : 36, 29, 56, 82, 27, 23, 70, 46, 32, 16, 29 and 65. Estimate the value of precipitation which has recurrence interval of 5 years using probability method. **7½**

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- (b) What is meant by the recurrence interval of a storm ? Explain California probability method to determine the recurrence interval. **7½**

Unit II

3. (a) Differentiate between circular and helicoidal flow in a river with suitable example. **7½**
(b) How to conduct hydrographic survey in a river ? Explain it briefly. **7½**
4. (a) How is toe protected through falling apron ? Discuss it with a diagram. **7½**
(b) What do you mean by Groynes ? Explain its flow pattern with a diagram when put in a river system. **7½**

Unit III

5. (a) What do you mean by multipurpose reservoir operation ? Explain reservoir operation procedure based on storage capacity to the annual runoff. **7½**
(b) Explain mass curve method that can be used for determining demand rate from a reservoir of a given capacity. **7½**

6. (a) Explain the following terms connected with reservoir :
Useful life, economic life, design life, trap efficiency.

7½

- (b) What do you mean by reservoir cost benefit ratio ? Explain, how optimization methods are going to help in the reservoir planning ?

7½

Unit IV

7. (a) What do you mean by forecast of rainfall ? How is it conducted in India ? Discuss it.

7½

- (b) What is a design flood ? Explain envelop curves used for estimation of a the flood.

7½

8. A project is estimated to cost Rs. 40 crores. The life of the project is 50 years. The annual interest on capital is 7% and the O & M cost is 2% of project cost. The salvage value from the project will be 5% of the initial investment after 50 years. Find annual cost and benefit cost ratio of the project. The annual net benefit for the project is 1000 lakhs.

7½

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