Roll No. of candidate

2018

B.Tech. 7th Semester End-Term Examination

FLOOD MANAGEMENT AND RIVER
ENGINEERING

(Elective I)

Full Marks – 100                               Time – Three hours

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The figures in the margin indicate full marks
for the questions.

Answer Question.No.1 and any *six* from the rest.

1.    Answer the following: (Fill in the blanks) :

$(10 \times 1 = 10)$

   (i)   The time taken for a drop of water from the farthest part of the catchment to reach the outlet is called —————.

   (ii)  A catchment consists of 30% area with runoff coefficient of 0.40 while the remaining 70% area with runoff coefficient 0.60. The equivalent runoff coefficient of the catchment is —————.

   (iii) The most commonly used probability distribution to fit the flood data is —————.

(iv) As a result of high flows in river, flooding extends over large areas called ————.

(v) The longitudinal dams constructed along the rivers parallel to river flow to prevent overflow is called ————.

(vi) ———— is designed to confine the low water flow in a single channel with a view to maintain suitable depth for navigation.

(vii) The structures that are made for guiding the stream near a structure so as to confine it in a reasonable width is known as ————.

(viii) For a return period of 1000 years, the Gumbel's reduced variate, $Y_T$ is ————.

(ix) The probability that a T year flood occurs in any year is ————.

(x) The Dicken's formula for flood peak is given by, $Q$ = ————.

2. (a) Explain briefly the following terms : (6)

(i) Design Flood

(ii) Standard Project Flood

(iii) Probable Maximum Flood.

(b) A small watershed consists of 1.5 km² of cultivated area (C = 0.20), 2.5 km² under forest (C = 0.35) and 1.0 km² under grass cover. There is a fall of 22 m in a water course of length of 1.8 km. The intensity-frequency-duration relation for the area may be taken as (9)

$$I = (80T^{0.2})/(t + 13)^{0.46}$$

where $I$ is in cm/h, $T$ is in years and t is in minutes. Estimate the peak rate of discharge for a 25 years frequency.

3. (a) Describe the method of estimating a T-year flood using Log-Pearson type-III distribution. (8)

(b) Discuss the condition for incipient motion of sediment in a channel. (7)

4. (a) What do you understand by (i) Flood plain zonig (ii) Flood Proofing and (iii) Flood insurance? (2 + 2 + 2 = 6)

(b) For a river the estimated flood peaks for two return periods by the use of Gumbel's method are as follows. (9)

| Return Period (Years) | Peak flood (m³/sec) |
| --- | --- |
| 100 | 435 |
| 50 | 395 |

What flood discharge in this river will have a return period of 1000 years?

5. (a) The mean annual flood of a river is 600 m³/s and the standard deviation of the annual flood series is 150 m³/s. What is the probability of flood of magnitude 1000 m³/s occurring in the river? What is the Probability of a flood of magnitude 1000 m³/s occurring in the river in next 5 years? Use Gumbel's method and the sample size is very large. (6 + 2 + 3 = 11)

(b) Distinguish between suspended load and wash load. (2 + 2 = 4)

6. (a) What is a cut off? How it is developed? (2 + 2 = 4)

(b) What is river training? What are its objectives? (1 + 3 = 4)

(c) Discuss briefly the various river training works in Assam. (7)

7.  (a)  Differentiate between aggrading and degrading rivers. (4)

    (b)  What are the three stages of a river course? Discuss the characteristics of each stages. (1 + 7 = 8)

    (c)  What is pitched island? (3)

8.  (a)  What do you mean by regime channels? (3)

    (b)  Explain the differences between rivers of peninsular rivers and the Himalayan rivers. (6)

    (c)  What do you mean by high water, low water and mean water river training? (6)

9.  (a)  A wide rectangular channel in alluvium of 3.00 mm medium size (relative density 2.65) has a longitudinal slope of 0.0003. Estimate the depth of flow in this channel which will cause incipient motion. (7)

    (b)  Discuss the characteristic bed features of mobile bed channels. (8)

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