

Kushal Kumar

Roll No.....

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- FEB 2019

M.Tech Structures/B-Tech 8th Semester

COURSE CODE: 11M1WCE133

MAX. MARKS: 15

COURSE NAME: Bridge Engineering

COURSE CREDITS: 3

MAX. TIME: 1 Hr

Note: All questions carry equal marks. Sharing of any material is not allowed. Assume necessary data but must be clearly mentioned. (One page one side hand written formula sheet is allowed)

Q1. Answer/describe the following.

- (a) What is the need of a Bridge? Various characteristics of selecting a site for bridge.
- (b) Types of bridges on the basis of span length with neat sketch.
- (c) Types of load are taken into account for impact effect on road bridges? Write the expression for impact factor for IRC Class A loading.

Q2. Calculate the peak discharge by the rational method for a 1- km² composite catchment with the following characteristics:

	Subarea A	Subarea B
Area (km ²)	0.4	0.6
Runoff coefficient	0.6	0.3
Time of concentration (min)	20	60

Assume return period of 10 years and suitable IDF function.

Q3. The approximate cost of one superstructure and one pier for a multi-span bridge are given below. Estimate the economical span.

Span (m)	12	18	24
Superstructure cost (Rs.)	44,000	62,000	165,000
Substructure (Rs.)	52,000	58,000	65,000

Q4. Design a waterway for bridge over a trapezoidal channel having side slope of 1:1 with a discharge of 25 m³/sec, a bed fall of 1:1000 and a bed width to depth ratio of 6:1. The bed material is sand with a safe velocity of 2.5 m/s. The afflux should not be more than 8 cm. Take Manning coefficient, n = 0.025.

Q5. Calculate the maximum scour depth for a bridge of two spans of total linear waterway of 62 m. The stream flows between quasi-alluvial soil with hard banks and alluvial bed (f = 1.1). The flood discharge is 400 cumecs and width of flow is 65 m.

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