

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

## TEST -1 EXAMINATION- 2016

M.Tech 4<sup>th</sup> Semester

COURSE CODE: 11MIWCE133

MAX. MARKS: 15

COURSE NAME: Bridge Engineering

COURSE CREDITS: 03

MAX. TIME: 1 HR

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Suitably assume any missing data.*

1. What considerations are to be taken into account for selection of bridge site? State briefly what preliminary investigations you would make and what data you would collect and what calculations you would work out before making a decision in regard to the length, height and type of a bridge to be adopted for a major bridge project. [3 Marks]
2. Discuss the significance of scour depth calculation. A bridge needs to be constructed across an alluvial stream having a discharge of 500 cumecs. Calculate the depth of maximum scour when the bridge consists of: [4 Marks]
  - a. Three span of 15m each
  - b. Two span of 30m each
  - c. Four span of 30 m each

Take  $f = 1.1$

3. Design a waterway for a bridge over a trapezoidal channel having side slope of 1:1 with a discharge of  $25 \text{ m}^3/\text{s}$ , a bed fall of 1:1000 and a bed width of depth ratio of 6:1. The bed material is sand with a safe velocity of 2.5m/s. The afflux should not be more than 8cm. Take Manning coefficient  $n = 0.025$  and width of stream at HFL = 10.88m. [4 Marks]

4. List the Factors on which overall cost of the bridge depends. Derive the expression for effective economical span, along with all the assumptions followed in the derivation. The approximate costs of one superstructure and one pier for a multi-span bridge are given below. Estimate the economic span. [4 Marks]

Span(m)	10	16	19
Superstructure cost (Rs)	34,000	80,000	150,000
Substructure cost (Rs)	50,000	54,000	48,000