Roll No. | | | | | | | | | | | | |  Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE) (2011 Onwards E-I & II) (Sem.–7,8)

# BRIDGE ENGINEERING

Subject Code : BTCE-820

Paper ID : [A2974]

Time : 3 Hrs. Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**
4. **Assume any data suitably.**

## SECTION-A

**1. Write briefly :**

a. What are bearings?

b. Define Afflux and Abutments.

c. Explain buoyancy effect.

d. In what circumstances skew slab culverts are adopted?

e. What is balanced cantilever bridge?

f. Describe the usual types of bridge piers.

g. What are the loads considered while designing the road bridges?

h. List the various types of joints on a bridge structure.

i. What is the purpose of wing wall?

j. What is the significance of Impact factor?

## SECTION-B

2. A bridge has a linear waterway of 150m constructed across a stream, whose natural linear waterway is 220m. If average flood discharge is 1200$m^3$/sec, and average flood depth is 3m, find afflux under the bridge.

3. Explain briefly the different types of bridge bearings.

4. Discuss the factors that would affect the site selection for a bridge.

5. Consider a 12m span simply supported RC Slab bridge for traffic in 2-lanes and lm pedestrian way on either side. The bridge is located in Kerala. The slab deck rests on wall piers of size lm × 10m in plan and 8m height from top of its mat foundation. Use IRC 6 to estimate the design horizontal and vertical seismic coefficient values for the design of bridge.

6. Differentiate between IRC class AA and class A loading.

## SECTION-C

7. Discuss in detail the inspection and maintenance of bridges.

8. What is meant by economical span? Derive the conditions for an economical span mentioning the assumptions made in the derivation.

9. Design R.C. concrete slab culvert for a National highway to suit the following data :

   Carriage Way : 7.5m wide

   Clear Span : 7m

   Wearing Coat : 100mm

   Width of bearing : 0.4m

   Use M25 Grade Concrete and Fe415 Steel. Design the RC Deck Slab for IRC Class AA Loading and sketch the Reinforcement details in Longitudinal and Cross Section.