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BICEE-010

B.Tech. IN CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00335

December, 2014

BICEE-010 : ANALYSIS AND DESIGN OF BRIDGES

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks.*

1. (a) What is the function of bearings in bridges ? *4*

(b) List the procedure for the design of an elastomeric pad bearing for girder bridges. *10*

2. Discuss three methods for load distribution concrete bridges. *14*

3. Design an R.C. slab culvert for a culvert on a State Highway with the following data : *14*

Width of bridge = 12·0 m

No footpath provided.

Conditions of exposure – moderate

Material : M 25 concrete, Fe 415 steel deformed bars

Clear span = 5·0 m

Height of vent = 3·0 m

Depth of foundation = 1·35 m

Wearing of course = 56 mm thick asphaltic concrete.

4. (a) Sketch a typical cross-section of a composite prestressed concrete girder of a composite bridge deck. *10*

(b) What are the characteristics of an ideal site for a major bridge across a river ? *4*

5. (a) What is the significance of the impact factor and how is it estimated for *10*

(i) design of superstructure ?

(ii) design of substructure ?

(b) How would the centrifugal force due to movement of vehicles on a bridge be calculated ? *4*

6. Design a post-tensioned concrete slab bridge deck for a national highway crossing to suit the following data : *14*

Clear span = 10 m, Width of bearing = 400 mm

Clear width of roadway =7·5 m,

Footpath = 1 m on either side,

Kerbs = 600 mm wide

Thickness of wearing coat = 80 mm,

L.L. = IRC Class AA tracked vehicle, Type of structure = Class I type, M 20 grade concrete, 7 mm ϕ wire with ultimate strength = 1500 N/mm^2, Loss ratio = 0·8.

7. Write notes on any ***two*** of the following : *2×7=14*

(a) Components of Box Culverts

(b) Steel arch bridges

(c) Types of fixed bearings