00977

DIPLOMA IN CIVIL ENGINEERING

Term-End Examination

June, 2013

BICEE-010 : ANALYSIS AND DESIGN OF BRIDGES

Time : 3 hours   *Maximum Marks : 70*

*Note :   Answer **any five** questions.*

1.   Why Bridge investigation is necessary, and write   **14**
     the characteristics of an ideal site for a bridge
     across a river ?

2.   Write the different specification for Railway   **14**
     bridges and also explain forces act due to
     earthquake on railway bridges.

3.   Explain different types of Box-culvert according   **14**
     to loading cases, and also explain the different
     components of Box-culvert.

4.   A simply supported plate girder having a span of   **14**
     14 m has to support floor beams that frame at
     2 m centre-to-centre as given in figure below.
     Each floor beam introduces a concentrated load
     of 100 KN on the girder. In addition the girder
     has to carry uniformly distributed load of

18 KN/m including its own weight. The top flange of the girder is to be restrained effectively and the girder provided with vertical stiffeners. Assuming that the depth of web plate is to be 100 cm. Find, the suitable thickness of the web.

7 @ 2 = 14 m
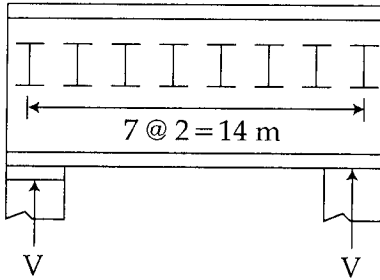
5. Write the design steps of T - beam bridge and also explain the forces acting on T - beam bridge. **14**

6. The cross - sectional area of an unsymmetrical prestressed I - girder designed to carry a central point load on a simply supported span of 15 m is 194000 mm². The second moment of area is equal to 197×10^4 mm⁴. The overall depth of the section is 900 mm. With the centriod located at 520 mm from the soffit. The maximum permissible stresses are 14N/mm² in compression and zero in tension. The loss ratio is 0.8. **14**

Calculate :

(a) the width of rectangular section, having the same depth designed for the same loading.

(b) the value of the point load

(c) the saving in steel and concrete compared to the rectangular section

7. Write notes on *any two* : 7x2=14

   (a) pre-tension and post - tension method of prestressing

   (b) Importance of expansion joint in bridge

   (c) Modern trend in bearing design