| BICEE-010 |

B.Tech. CIVIL ENGINEERING (BTCLEVI)
Term-End Examination
⊓⊓5⊑⊑ **June, 2019**

BICEE-010 : ANALYSIS AND DESIGN OF BRIDGES

Time : 3 hours   *Maximum Marks : 70*

*Note : Attempt any **five** questions. Relevant IRC and IS codes are permitted. All questions are of equal weightage. Use of scientific calculator is permitted.*

1. (a) What are the types of bearings ? Explain elastomeric bearing with neat sketches.   7

   (b) Explain the design principles of plate girders.   7

2. (a) Write a note on IRC loading on bridges.   7

   (b) What is the design criteria for the design of urban flyover ?   7

3. Design an RC box culvert having clear ventway of 3 m by 3 m. The superimposed dead load on the culvert is 12 kN/m². The live load on the culvert is 45 kN/m². The geotechnical properties of the soil are as follows :

   Bulk density = 18·5 kN/m²

   Angle of repose = 32°

   Use M20 grade of concrete mix and Fe415 grade of tor steel.   *14*

4. Explain the following forces acting on the bridges : $4 \times 3\frac{1}{2} = 14$

    (i)   Centrifugal forces

    (ii)   Horizontal forces due to water current

    (iii) Buoyant forces

    (iv) Earth pressure

5. What are the precautions to be taken by a bridge engineer for the construction of concrete prestressed bridges ? *14*

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

    (a)   Masonry and Composite Bridges

    (b)   Temporary and Movable Bridges

    (c)   Urban Flyovers and Elevated Roads

7. What are the performance criteria which must be satisfied for an effective joint sealing system for a long span bridge ? *14*