

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2018

00543

BICEE-010 : ANALYSIS AND DESIGN OF BRIDGES

Time : 3 hours

Maximum Marks : 70

*Note : Attempt any **five** questions. All questions carry equal marks. Assume any missing data suitably. Use of scientific calculator and relevant IS code is permitted.*

1. (a) Discuss the factors that determine the choice of a bridge structure. 4
- (b) Explain the components of a bridge structure with a neat labelled sketch. 10

2. Discuss the following in reference to the design of bridges :
 - (i) Wind load 3
 - (ii) Force due to water current 4
 - (iii) Buoyancy effect 3
 - (iv) Seismic effect on bridge structures 4

3. Discuss in detail about the design aspects and considerations of hollow girder bridges, balanced cantilever bridges and continuous girder bridges with a schematic diagram of each type of bridge. 14

4. A plate girder bridge deck is to be designed for B.G. track to suit the following data :

Effective span = 15 m

Dead load of sleepers, rails and fittings
= 10 kN/m

E.U.L.L. for B.M. calculation = 1631 kN

E.U.L.L. for S.F. calculation = 1801 kN

Design the plate girder. 14

5. Discuss in detail the design procedure of elastomeric bearings. 14

6. (a) What are the precautions to be observed by a pre-stressed concrete bridge engineer? 7

(b) Write short notes on the following : 7

(i) External Post Tensioning

(ii) Bondings of Tendons

7. Design a cantilever slab of T-beam and slab bridge deck for the following data :

14

- (i) Width of roadway = 5.5 m
- (ii) Width of kerb = 600 mm
- (iii) Depth of kerb = 300 mm
- (iv) Number of girders = 3
- (v) Width of girders = 300 mm
- (vi) Spacing of girders = 1.5 m
- (vii) Thickness of wearing coat = 65 mm

Type of loading : IRC Class A wheel loads.

Use M 25 and Fe 500 grade steel HYSD bars.
