BICE-017

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

December, 2017

00452

BICE-017 : STRUCTURAL DESIGN AND DRAWING – II

Time : 3 hours   *Maximum Marks : 70*

*Note : Answer any **four** questions. All questions carry equal marks. Assume any missing data suitably, if required. Use of IS 456 : 2000, IS 800 : 2007 and steel tables is permitted. Use of scientific calculator is permitted.*

1. (a) Explain the essential requirements of steel and concrete for prestressed concrete. What are the advantages of prestressed concrete over reinforced concrete ?   9

    (b) Discuss different types of tensioning devices in brief. $8\frac{1}{2}$

2. Write design steps for trussed girder railway bridges giving neat labelled sketches wherever required. $17\frac{1}{2}$

3. Design a top dome, top ring beam and cylindrical tank wall of an intz-type water tank of 100 kilo-litres capacity. The tank is supported on an elevated tower comprising of 8 columns. The base of the tank is 16 m above the ground level. Depth of the foundation is 1 m below the ground level. Adopt M 20 grade concrete and Fe 415 grade steel. $17\frac{1}{2}$

4. Classify steel chimneys. Derive expressions for bending moment, stresses and thickness of plate for designing a steel chimney. $17\frac{1}{2}$

5. Discuss various IRC loadings considered for design of bridges. $17\frac{1}{2}$

6. A 6 m long rectangular simply supported prestressed concrete beam of cross-section 200 mm × 300 mm is prestressed by 15 wires of 5 mm diameter located at 65 mm from soffit and 3 wires of 5 mm diameter at 25 mm from the top. Assume effective stress in steel wires as 840 N/mm^2.

    (a) Calculate the stresses in concrete at extreme fibres at midspan section due to prestress and its own weight.

    (b) If a uniformly distributed working load of 6 kN/m is imposed on the entire span of a beam, obtain the maximum compressive stress in concrete. $17\frac{1}{2}$