

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00894

June, 2017

**BICE-017 : STRUCTURAL DESIGN AND
DRAWING – II**

Time : 3 hours

Maximum Marks : 70

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

1. (a) What is Hoyer's long line system of pre-tensioning ? Explain it in brief with a neat sketch. 7
- (b) Explain various forces considered for the design of tall chimneys, in brief. 7
2. A pre-tensioned beam, 200 mm wide and 300 mm deep, is prestressed by 10 wires of 7 mm diameter, initially stressed to 1200 N/mm^2 with their centroid located

100 mm from the soffit. Find the maximum stress in concrete immediately after transfer, allowing only for elastic shortening of the concrete. If the concrete undergoes a further shortening due to creep and shrinkage while there is a relaxation of 5% of steel stress, estimate the final percentage loss of stress in the wires using IS standard code regulations and the following data :

$$E_s = 210 \text{ kN/mm}^2, E_c = 5700 \sqrt{f_{cu}}$$

$$Q \text{ (creep coefficient)} = 1.6$$

$$\text{Total residual shrinkage strain} = 3 \times 10^{-4}. \quad 14$$

3. (a) Discuss why under-reinforced flexural members are preferred to the over-reinforced ones. 7

(b) Discuss why the working stress method is still retained in IS 456. 7

4. Write down the steps for designing of trussed girder railway bridges. Briefly discuss some precautions to be taken in its construction. 14

5. Give a classification of steel chimneys. Derive an expression connecting bending moment, stresses and thickness of plates for designing a steel chimney. 14

6. (a) Draw a neat sketch showing the stress – strain relationship of mild steel and briefly describe it. 7
- (b) Discuss how the effect of torsion is considered in an RC beam. 7
7. Draw a neat sketch of a cross-section of an Intze water tank. Explain why ring beams are required in such a tank. 14
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