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BICEE-002

01578

B.TECH. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2013

BICEE-002 : PRESTRESSED CONCRETE

Time : 3 hours *Maximum Marks : 70*

*Note : Answer **any five** questions and assume any missing data if necessary. Use of scientific calculator is **permitted**.*

1. What do you understand by load balancing concept and stress concept in prestressed concrete ? **14**

2. What are the different IS code recommendations in limit state of collapse in Flexure ? **14**

3. A rectangular concrete beam 250 mm wide and 600 mm deep is prestress by means of four 14 mm diameter high-tensile bars located 200 mm from soffit of the beam. If effective stress in wires is 700 N/mm^2, what is the maximum bending moment that can be applied to the section without causing tension at the soffit of the beam ? **14**

4. A concrete beam having a rectangular section, 150 mm wide and 300 mm deep, is prestressed by parabolic cable having an eccentricity of 100 mm at the centre of span, reducing to zero at the supports. The span of the beam is 8m. The beam supports a live load of 2 kN/m. Determine the effective force in the cable to balance the dead and live loads on the beam. Estimate the principal stress at the support section. **14**

5. A pre-tensioned beam of size 225×300 mm deep is prestressed by 12 wires of 5 mm ϕ initially stressed at 1100 MPa. The centroid of prestressing wire is located at 100 mm from bottom. Grade of concrete M40. Relaxation of steel $= 5\%$, $E_s = 2 \times 10^5$ MPa creep coff$^n = 1.6$. Calculate the different losses due to elastic shortening, creep of concrete, creep of steel and shrinkage of concrete. **14**

6. What are different methods of prestressing ? Explain in details. **14**

7. Write short notes on ***any two*** of the following : **2x7=14**

   (a) High strength concrete and steel

   (b) Advantage of prestressed concrete over Reinforced concrete.

   (c) Losses in prestressing