No. of Printed Pages : 3

BICEE-002

B.Tech. IN CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00395

December, 2014

BICEE-002 : PRESTRESSED CONCRETE

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. Assume any missing data if necessary. Use of scientific calculator is permitted. Use of IS 1343-1980 is permitted.*

1. (a) Write short notes on the following : 8

(i) High strength concrete

(ii) High strength steel

(b) Why are high strength materials used in prestressed concrete ? 6

2. (a) Explain the basic difference between load balancing concept and stress concept. 8

(b) Why should cable profile follow the B.M. profile for economical design ? 6

3. A pretensioned prestressed concrete beam having a rectangular cross-section, 150 mm width and 350 mm depth, has an effective cover of 50 mm. If f_{ck} = 40 N/mm^2, f_p = 1600 N/mm^2 and the area of tension steel A_p = 461 mm^2, then calculate the ultimate flexural strength of the beam. *14*

4. Compare the types of losses that can occur in pretensioned and post-tensioned members. List out the various factors influencing the loss of stress due to creep of concrete. *14*

5. A concrete beam of span 8 m with a cross-section area 32,000 mm^2 and radius of gyration 72 mm, is prestressed with a parabolic cable having effective stress of 1000 N/mm^2 . The cable is composed of 6 numbers of 7 mm dia wires with an eccentricity of 50 mm at the centre and zero at the supports. Neglecting all losses, find the central deflection of the beam for

   (a) Self weight + Prestress,

   (b) Self weight + Presstress + Live load of 2 kN/m.

   Assume E = 38 kN/mm^2 and weight density of concrete D_e = 24 kN/m^3. *14*

6. A pretensioned beam of rectangular cross-section 200 mm width by 600 mm depth is prestressed by 5 wires of 7 mm dia at 100 mm from the soffit. The maximum shear force at a particular section is 120 kN. If the modular ratio is 6, calculate the bond stress developed when

   (a) the section is uncracked.

   (b) the section is cracked. *14*

7. Explain the procedure behind selecting the preliminary dimensions for the thickness of web in prestressed beams with short and long span. *14*