B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2015

00376

BICEE-002 : PRESTRESSED CONCRETE

Time : 3 hours   *Maximum Marks : 70*

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

1. A pre-tensioned T-section has a flange width 120 mm, flange thickness 150 mm, rib width 300 mm and depth 150 mm. The high tensile steel having area 4700 mm^2 is located at an effective depth of 1600 mm. If f_{ck} = 40 N/mm^2 and f_p (tensile strength of steel) = 1600 N/mm^2, calculate the flexural strength of the T-section.   *14*

2. (a) Explain the procedure to compute the loss of stress in steel due to curvature and wobble effect.   *7*

(b) What is anchorage slip ? Explain the procedure to compute the loss due to anchorage slip. 7

3. Write short notes on the following : $4 \times 3\frac{1}{2}=14$

(a) Reasons for using high strength concrete and steel in pre-stressed concrete

(b) Production of pre-stressed sleepers

(c) Transmission length

(d) Advantages of pre-stressed concrete over reinforced cement concrete

4. A pre-tensioned rectangular beam 160 mm width by 320 mm depth is prestressed by 4 wires of 7 mm dia at an eccentricity of 100 mm. If f_{ck} = 40 N/mm^2, calculate the transmission length at the ends of the pre-tensioned section. 14

5. For a pre-stressed concrete beam supporting a UDL of intensity 'w', derive the equation giving the resultant stresses at the top and bottom fibres at any given section. 14

6. Sketch a typical symmetrical I-section as pre-stressed concrete girder and show the position of cables, longitudinal and transverse reinforcement at the centre of span and support sections. Also show the profile of the cable along the span. *14*

7. Discuss the importance of control of deflection in a pre-stressed concrete beam. How will you calculate deflections in the same ? *14*

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