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Name of Examination : **Summer 2021** - (Preview)

Course Code & Course Name : **CE354UC - Prestressed Concrete**

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Maximum Marks : **60**   Duration : **3 Hrs**

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Instructions:

1. *All questions are compulsory.*
2. *Illustrate your answer with suitable figures/sketches wherever necessary.*
3. *Assume suitable additional data; if required.*
4. *Use of logarithmic table, drawing instruments and non programmable calculators is allowed.*
5. *Figures to the right indicate full marks.*
6. *Use of IS 1343 is permitted*

1) a) What is the stress distribution in end block? Explain and draw. [6]

b) Explain the principle of post-tensioning. What are post tensioning anchorages? [6]

OR

c) Explain with sketches Freyssinet system of post-tensioning. [6]

2)) A straight pre-tensioned beam 12 m long of 380 mm x 380 mm is concentrically pre-stressed with 780 mm^2 wires anchored to bulkheads with a F1 = 1035 MPa. *Es* = 2x10^5 MPa, *Ec* = 0.33x10^5 MPa. Estimate Elastic Shortening at transfer. [12]

3) A pre-stress concrete rectangular beam of size 500 mm x 750 mm has a simple span of 7.3 m and is loaded with a UDL of 45 kN/m including its self-weight. An effective pre-stress of 1620 kN is produced. Compute the fiber stresses in concrete at mid-span section. [12]

4) A simply supported prestressed concrete beam 250 mm wide and 450 mm deep is provided with a prestressing force of 850 kN . All the cables pass through the same circular duct and anchored to a common anchor plate 200 mm square with an over hang of 25 mm on all sides.
Find the thickness of the anchor plate , permissible bending stress for the anchor plate is 140 N/mm^2 .
Find also the bursting force and the reinforcement necessary for the end block.
 Assume the length of end block is 450 mm and zero tension occurs at 90 mm from the anchoring end. Assume parabolic bursting stress distribution. [12]

5) A prestressed concrete beam of uniform rectangular cross section and span 15 m supports a total distributed load of 272 kN excluding the weight of beam. Determine the suitable dimensions of the beam and calculate area of tendons and their positions. The permissible stresses are 1.40 N/mm^2 for concrete and 1050 N/mm^2 for the tendens . [12]

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