

R09

Code: 9A01807

B.Tech IV Year II Semester (R09) Advanced Supplementary Examinations, July 2013

PRESTRESSED CONCRETE

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 Write the advantages of prestressed concrete structures. Why there is need a for high strength steel and high stress concrete for PSC structures.
- 2 Discuss the difference between pre-tensioning and post-tensioning. Write the detailed procedure of calculating stresses by using Hoyer system.
- 3 List out the various losses of PSC beams. Explain friction losses with its significance in PSC beams.
- 4 A PSC beam with a single overhang has a span of 8, between the simple supports and an overhanging length of 2 m. Cross section of the beam is 300 mm × 900 mm, UDL excluding self weight is 5.52 kN/m. Determine the profile of the cable for an effective prestressing force of 500 kN which balances the dead and live load.
- 5 Explain the effect of tendons profile on the flexural behavior of PSC beams with some examples.
- 6 What is differential shrinkage? Explain the general design considerations of composite sections.
- 7 The cross section of prestressed concrete beam is rectangular with a width of 350 mm and overall depth of 700 mm. The prestressing force of 180 kN acts at an eccentricity of 190 mm. If the bending and twisting moments at the section are 80 kNm and 20 kNm respectively. Calculate the maximum principal tensile stress at the section.
- 8 A rectangular concrete beam of cross section 150 mm wide and 300 mm deep is simply supported over a span of 8 m and is prestressed by means of a symmetrical parabolic cable at a distance of 75 mm from the bottom of the beam at mid span and 125 mm from the top of the beam at support sections. If the force in the cable is 350 kN and the modulus of elasticity of concrete is 38 kN/mm^2 . Determine:
 - (a) The deflection at mid span when the beam is supporting its own weight.
 - (b) The concentrated load which must be applied at mid span to restore it to the level of supports.
