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UITians

EH-215

B.E. VIII Semester (CGPA) Civil Engg.
Exam. 2014

PER-STRESSED CONCRETE

Paper - CE - 804 (Elective - II)

Time Allowed : Three Hours

Maximum Marks : 60

Note: Attempt any five questions. Assume suitable data wherever it is necessary. Question carrying marks as indicated.

Q.1. a) Comparing prestressed concrete beams with reinforced concrete beams? 4

b) A prestressed concrete I beam supports a live load of 4000 N/m over a simply supported span of 8 meters. The beam has an overall depth of 400mm the thickness of each flange and web are 60mm and 80mm respectively the width of each flange = 200mm. The beam is to be prestressed by an effective prestressing force of 235 KN applied at suitable eccentricity such that the resultant stress at the bottom of beam at centre of span is zero.

- i) Find the eccentricity required for the prestressing force.
- ii) If the tendon is concentric, what would be the magnitude of the prestressing force for the resultant stress to be zero at the bottom fibre of central section? 8

Q.2. a) Define long term deflection? 4

- b) A simply supported post tensioned concrete beam of span 15m has a rectangular cross section 300mm×800mm the prestressed at ends is 1300KN with zero eccentricity at the supports and an eccentricity of 250mm at the centre, the cable profile being parabolic. Assuming $K = 0.15$ per 100m and $\mu = 0.35$ determine the loss of stress due to friction at the centre of the beam? 8

Q.3. a) Write principles of circumferential prestressing? 4

- b) A prestressed concrete beam section is 250mm wide and 300mm deep the initial prestressing force is 450KN at an eccentricity of 60mm. The beam has a span of 5.75m and has to carry a superimposed load of 7.5 KN/m. Analyse the beam section for the stresses produced at mid span before and after application of the live load allow a loss of prestress of 15% take weight of concrete equal to 24 KN/m. 8

- Q.4. a) What is cracking moment? 4
- b) A prestressed concrete tank of diameter 20m has to resists an internal pressure head of 5m of water. Find the reinforcement per metre height and the thickness of concrete required. Strength of mortor coating over the wire may be ignored. take $f_{ck} = 35 \text{ N/mm}^2$, $f_c = 0.5 f_{ck}$ at transfer. Stress in concrete at servicing condition shall remain compressive. $f_s = 1000 \text{ N/mm}^2$, loss of prestress = 18%, m = 8. 8
- Q.5. a) State various stages of loading considered in design of prestressed beam. 6
- b) What are the measures taken to minimise loss of prestress due to friction. 6
- Q.6. a) Write behaviour of composite beam? 4
- b) Following figure shows a prestressed concrete beam provided with bent tendon the beam carries a point load of 160 KN at the centre. Determine the stress distribution for the end section and mid section of the beam the dead load of beam in 6 KN/m. 8

(4)

