Total No. of Questions : 8] *[Total No. of Printed Pages : 4*

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CE-8003(1) (CBGS)

B.E. VIII Semester

Examination, November 2019

Choice Based Grading System (CBGS)

Pre-Stress Concrete Design

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume suitable data if missing.

1. a) Write a note on 7
   i) Freyssinet System
   ii) Magnel blaton system
   iii) Hoyer system
   iv) Gifford udall system
   b) Briefly explain losses in pre and post-tensioning systems. 7

2. a) Explain why high strength concrete and high strength steel are needed for PSC construction. 7
   b) Explain in detail, What is mean by Flexural strength. 7

3. A rectangular concrete beam 100 mm wide and 250 mm deep spanning over 8m is pre-stressing by a Straight cable carrying a effective pre-stressing force of 250 kN located at an eccentricity of 40mm.The beam supports a live load of 1.2 kN/m. 14

   a) Calculate the resultant stress distribution for the centre of the span cross section of the beam assuming the density of concrete as 24 kN/m^2.
   b) Find the magnitude of pre-stressing force with an eccentricity of 40mm which can balance the stresses due to dead load and live load at the soffit of the centre span section.

4. A Pre stressed concrete beam with a rectangular section 150 mm wide by 350 mm deep supports a uniformly distributed load of 6kN/m, which includes the self weight of the beam. The effective span of the beam is 8m. The beam is concentrically pre-stressing by a cable carrying a force of 200kN. Locate the position of the pressure line in the beam. A rectangular concrete beam 300 mm wide,800 mm deep support two concentrated loads of 20 kN each at third point of a span of 9m. 14
   a) Suggest a suitable cable profile. If eccentricity of the cable profile is 100 mm for middle third portion of the beam, calculate the pre-stressing force required to balance the bending effect of the concentrated loads neglecting the self weight.
   b) For the same cable profile find effective force in cable if the resultant stress due to self wt., imposed load, and pre-stressed force is zero at the bottom fiber of mid span section. (Assume density of concrete = 24 kN/m).

5. A beam of symmetrical I-section spanning 8 m has a flange width of 150mm and flange thickness of 80 mm respectively. The overall depth of the beam is 450 mm. Thickness of the web is 80 mm. The beam is pre-stressing by a parabolic cable with an eccentricity of 150 mm at the centre of the span and zero at the supports. The LL on the beam is 2.5 kN/m. 14
   a) Determine the effective force in the cable for balancing the DL and LL on the beams.

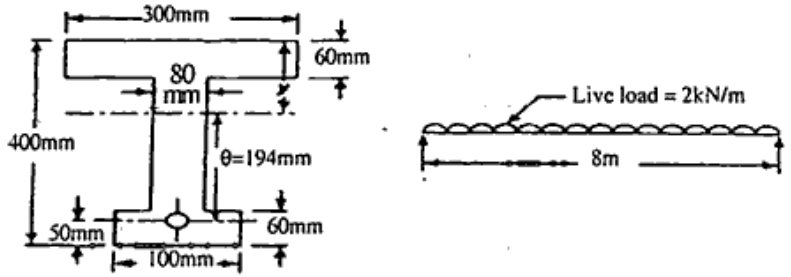
b) Sketch the distribution of resultant stress at the centre of span section for the above case.

c) Calculate the shift of the pressure line from the tendon-centre-line.

6. An unsymmetrical I-section beam is used to support an imposed load of 2kN/m over a span of 8m. The sectional details are top flange, 300mm wide and 60mm thick; bottom flange, 100mm wide and 60mm thick; thickness of web=80mm; overall depth of the beam = 400mm. At the centre of the span, the effective pre-stressing force of 100kN is located at 50mm from the soffit of the beam. Estimate stresses at the centre of span section of the beam for following load conditions: 14

a) Prestress + Self weight

b) Prestress + Self weight + Live load



7. a) List the various influencing the deflections of Pre-stressed concrete members.

b) A Pre-tensioned T-section has flange which is 300mm wide 200mm thick. The rib is 150mm wide by 350mm deep. The effective depth of the cross section is 500mm. given Ap = 200mm^2 fck = 50 Mpa and fp = 1600Mpa, estimate the ultimate moment of the T - section using the Indian standard code. 14

8. The end block of a post tension pre stressed member is 550mm wide and 550mm deep. The 4 cables each made up of 7 wires of 12mm dia. Strands carrying a force of 1000 kN are anchored by plate anchorages 150×150 mm locate at with their centers at 125mm from the edge of end block the cable duck is of 50mm dia the day 28 the cube strength of concrete f_{cu} = 45N/mm^2 the cube strength of concrete at transfer is 25N/mm^2 permissible bearing stress behind anchorages should be conformed with IS code with characteristic yield stress in mild steel anchorages 260N/mm^2. Design suitable anchorages in end block. 14

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