Registration no: | | | | | | | | | | |

Total Number of Pages: 2

B.TECH
PECI5415

8th Semester Regular / Back Examination 2015-16
PRESTRESSED CONCRETE
BRANCH: Civil
Time: 3 Hours
Max Marks: 70
Q.CODE: W372

Answer Question No.1 which is compulsory and any five from the rest. The figures in the right hand margin indicate marks. Use of IS Code, IS1343 is allowed.

Q1 Answer the following questions: **(2 x 10)**

a) Distinguish between pre tensioning and post tensioning .

b) State the various types of high tensile steel used for pre stressing.

c) Write Mohr's theorem used for finding the deflection at any point of a pre stressed concrete member.

d) Is it possible to improve the shear resistance of a pre stressed concrete beam member? Explain.

e) Write the formula to find the loss due to anchorage slip in a pre stressed concrete member.

f) Draw separate figures and explain between axial prestressing and eccentric pre stressing.

g) Distinguish between *web shear crack* and *flexure shear crack*.

h) What do you mean by *effective reinforcement ratio*? What is its importance?

i) Explain the concept of *load balancing*.

j) Differentiate between *primary moment* and *secondary moment* in a continuous pre stressed beam.

Q2 **a)** For a pre stressed concrete beam subjected to a pre stressing force, P through a parabolic tendon profile with zero *e* value at ends and with an eccentricity of *e* at centre, calculate the equivalent loading. Draw figures and explain. **(5)**

b) Calculate the deflection of a simply supported pre stressed concrete beam applied with a prestressing force , P through a triangular tendon with zero eccentricity value at supports and with eccentricity of *e* below the neutral axis at centre. **(5)**

Q3 A simply supported rectangular concrete beam , 120 mm wide and 250 mm deep is having a span length of 8 m carrying a live load of 15 kN/m in addition to its dead load. It carries an effective prestressing force of 250 kN through a horizontal tendon located at an eccentricity of 50 mm below the neutral axis. Calculate the resultant stresses at extreme fibres and draw the stress distribution diagram at a section, 6 m from left end. **(10)**

Q4 The end section of a prestressed concrete beam of size 140 mm by 300 mm supports an ultimate shear force of 180 kN. The compressive prestress at the centroidal axis is 4 N/sq mm. Assuming the cover to tension reinforcement as 40 mm, f_y value of stirrups as 415 N/sq mm, design suitable shear reinforcements in the section as per IS Code provision. Use M40 grade of concrete. **(10)**

Q5 A pre stressed concrete beam of rectangular section, 150 mm wide and 300 mm deep is to be designed to support a uniformly distributed load of 10 kN/m in addition to a concentrated load of 30 kN at centre of span of a beam of length 12 m. If there is no tensile stress in the concrete at any stage, calculate the minimum prestressing force and the corresponding eccentricity. **(10)**

Q6 A pre tensioned beam 150 mm x 300 mm is prestressed by 8 wires each of 5 mm diameter initially stressed upto 1400 N/sq mm. with their centroids located 80 mm above the soffit. Find the total percentage loss of stress due to elastic deformation, creep and shrinkage of concrete. Es = 210 kN/sq mm, Ec = 35 kN/sq mm. Creep coeff= 1.5. Residual shrinkage strain = 0.0003. **(10)**

Q7 A pre stressed concrete beam of span 10 m with rectangular section, 150 mm wide and 300 mm deep is prestressed by a parabolic cable profile carrying an effective force of 250 kN with zero eccentricity at ends and e = 50 mm below the neutral axis at centre of span. If there is a udl of 12 kN/m including the dead load of the beam, find the final deflection under pre stress, self weight, live load and creep. The creep coeff. = 1.5 **(10)**

Q8 Write short notes on **any two:** **(5 x 2)**

a) Moment of resistance of a rectangular pre stressed concrete beam

b) Cracking load and cracking moment

c) Creep and shrinkage of PSC members

d) Stress distribution in an end block with single anchor plate