

Total No. of Questions : 09

B.Tech. (CE) (2011 Onwards E-I & II) (Sem.-7,8)

PRE-STRESSED CONCRETE

Subject Code : BTCE-809

M.Code : 71868

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

- a) Distinguish between web-shear and flexure shear cracks in concrete beams with sketches.
- b) Write a short note on applications of prestressed concrete.
- c) Explain the terms :
 - (i) Bursting tension
 - (ii) anchorage zone.
- d) What are the factors influencing the loss of stress due to creep of concrete?
- e) What is effective reinforcement ratio?
- f) What are the different types of flexural failure modes observed in prestressed concrete beams?
- g) Define Eccentric Prestressing.
- h) Distinguish between creep and shrinkage.
- i) How the shear resistance of structural concrete members can be improved by prestressing techniques?
- j) What are the types of losses of prestress?

SECTION-B

2. Enumerate load balancing concept.
3. A pretensioned prestressed concrete beam having a rectangular section 160mm wide and 380mm deep has an effective cover of 50mm. If $f_{ck} = 40 \text{ N/mm}^2$, $f_p = 1600 \text{ N/mm}^2$ and the area of prestressing steel $A_s = 481 \text{ mm}^2$, calculate the ultimate flexural strength of the section using IS : 1343 code provision.
4. Explain with sketches the IS code method of computing the moment of resistance of rectangular sections.
5. A beam of size $750 \text{ mm} \times 1500 \text{ mm}$ is used on simply supported span of 15m. It is provided with a bent tendon having an eccentricity of 100mm at centre and an eccentricity of 50mm upwards at the ends. The dead load of the beam is 10kN/m. Compute the stresses at ends and at mid span.
6. What are the codal provisions for design of torsion?

SECTION-C

7.
 - a) What is the effect of torsion on prestressed concrete section? How do you compute the shear stress developed in different types of cross sections due to torque?
 - b) What are the factors influencing the loss of stress due to creep of concrete?
8. A prestressed concrete beam $500 \text{ mm} \times 500 \text{ mm}$, is prestressed by 12 wires, each of 8mm diameter. The wires are initially stressed to 1600 N/mm^2 with their centriods located 80mm from the soffit. Calculate the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation using given the following data :
 $E_s = 210 \text{ kN/mm}^2$ and $E_c = 32 \text{ kN/mm}^2$,
Creep co-efficient = 1.6
Residual shear strain = 3×10^{-4}
Relaxation of steel stress = 90 N/mm^2
9.
 - a) What is a pressure line?
 - b) Write the need of high strength steel in prestressed concrete.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.