

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE) (2012 to 2017) (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 have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.
4. Use of IS 1343 is permitted in the examination.

**SECTION-A**

**1. Answer briefly :**

- a. What are the sources of prestress force?
- b. Write a short note on post tensioned bridge decks.
- c. How do you compute the shrinkage and resultant stresses in composite members?
- d. Write **any two** general failures of pre-stressed concrete tanks.
- e. Differentiate between pre-tensioning and post-tensioning.
- f. Mention the various losses in prestress.
- g. What is meant by end block in a post tensioned member?
- h. State the principle involved in circular prestressing.
- i. Name the loadings to be considered for computing short time deflection.
- j. What is meant by “Kern Distance”?

**SECTION-B**

2. A prestressed concrete beam of rectangular section 375mm wide and 750mm deep has a span of 12.50m. The eff. Prestressing force is 1520 kN at an eccentricity of 150mm. The dead load of the beam is 7kN/m and the beam has to carry a live load of 12.50 kN/m. Determine the extreme stresses in concrete :
  - a. At the end section
  - b. At the mid section without the action of the live load.

3. What is meant by partial prestressing? Discuss the advantages and disadvantages when partial prestressing is done.
4. A composite prestressed conc. Beam section consists of a prefabricated stem of 300 mm × 800 mm and a cast-in-situ slab of 800mmx 150mm. If the differential shrinkage is  $1.2 \times 10^{-4}$  mm/mm. Find the shrinkage stress at the extreme edges of the slab and stem. Take  $E_c = 2.75 \times 10^4 \text{N/mm}^2$ .
5. Explain different types of composite construction with sketches.
6. Explain the factors influencing deflections.

### SECTION-C

7. A psc beam of span 8m has a section of area  $42 \times 10^3 \text{mm}^2$  the M.O.I of the section being  $1.75 \times 10^8 \text{mm}^4$ . The beam is prestressed with a parabolic cable providing a prestressing force of 245KN. The Cable has an eccentricity of 50 mm at the centre and zero eccentricity at the ends. Ignoring all losses, Find the deflection at the centre when -
  - a. The beam carries in its own weight and prestress.
  - b. The beam carrier in addition to its own weight and prestress, a super imposed load of 1.80kN/m. Take weight of concrete equal to  $24 \text{kN/m}^3$  and modulus of elasticity of concrete equal to  $40 \text{kN/m}^2$ .
8. Discuss the difference in Load deflection behavior of under prestressed, partially prestressed and over prestressed cases. Why Partial Prestressing is preferred in design?
9.
  - a. Explain the types of composite construction with neat sketch.
  - b. Explain the precast prestressed concrete stresses at serviceability limit state.

**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.**