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Total No. of Printed Pages: 1

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B.Tech. (Civil Engg.) (Semester – 7th)

PRE-STRESSED CONCRETE

Subject Code: BCIE1756

Paper ID: [110724]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a) What do you mean by concentric and eccentric tendons?
- b) What is the need of high strength steel and concrete in pre-stress members?
- c) Differentiate between creep and shrinkage of concrete.
- d) Explain partial prestressing.
- e) What do you understand by circular pre-stressing?
- f) What is Elastic shortening?
- g) What are different materials used for Pre-Stressing purpose.
- h) What do you mean by anchorage zone reinforcement?
- i) Explain the importance of IS:1343.
- j) Explain the term Internal Prestressing.

Section – B

(5 marks each)

- Q2. Discuss the advantages and disadvantages of prestressed concrete over reinforced concrete.
- Q3. List the methods of post-tensioning. Explain Freyssinet anchorage system.
- Q4. How do you compute the loss of stress due to shrinkage of concrete as per IS: 1343 code recommendation?
- Q5. Explain stress-strain relationship of high strength steel used for pre-stressing.
- Q6. Explain the load balancing concept in detail.

Section – C

(10 marks each)

- Q7. A Concrete beam is pre-stressed by a cable carrying an initial pre-stressing force of 300 KN. The cross-sectional areas of the wires in the cables are 300 mm². Calculate the percentage loss of stress in the cable only due to shrinkage of concrete using IS: 1343 recommendation assuming the beam to be
 - a) Pretension
 - b) Post tensioned.Assume $E_s=210 \text{ KN/mm}^2$ and age of concrete at transfer= 8 days.
- Q8. Explain the Various types of losses of prestress in detail.
- Q9. A pretensioned concrete beam of size 250 mm × 600 mm has an effective cover to tendon 200 mm. Area of prestressing steel is 565 mm², $f_{ck} = 40 \text{ N/mm}^2$, $f_p = 1600 \text{ N/mm}^2$. Calculate the ultimate flexural strength of the section.