**Roll No……..** **Total No. of Printed Pages: 1**

**Total No. of Questions: [09]**

**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 $mm^2$. 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 Es=210 $KN/mm^2$ 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 $mm^2$, $f_{ck}$ = 40 $N/mm^2$, $f_p$ = 1600 $N/mm^2$. Calculate the ultimate flexural strength of the section.