Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - MAY 2023

Semester : Semester VI - B.Tech CIV - 2020

Course Code : CIV3047

Course Name : Sem VI - CIV3047 - Fundamentals of Pre-Stressed Concrete Design

Program : B.Tech. Civil Engineering

Date : 18-MAY-2023

Time : 2.00 PM - 3.30 PM

Max Marks : 60

Weightage : 30%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(2 X 5 = 10M)**

1. What are the various ways in which Pre-stressing Steel, Sheathing and Anchorages can be protected? (CO1) [Knowledge]
2. Explain the principle of pre-tensioning system. (CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(3 X 10 = 30M)**

3. Determine the eccentricity of a load balancing cable for a beam of size 350mm x 750mm at its center. The beam support a live load of 10kN/m over a span of 9m and is simply supported. The prestressing force applied is 1700kN. (CO1) [Comprehension]
4. A prestressed concrete beam of 250mm x 500mm is used over an effective span of 8m. It is subjected to a central load of 80kN. The effective prestressing force is 600kN acting at an eccentricity of 60mm. Draw the pressure line indicating its location. (CO1) [Comprehension]

5. A simply supported beam of prestressed concrete spanning over 10m is of rectangular section 500mm wide by 750mm deep. The beam is prestressed by a straight cable having an eccentricity of 200mm. The effective force in the cable is 1600kN. If the beam supports a total uniformly distributed load of 40kN/m, which includes the self weight of the beam, evaluate the extreme fibre stresses at the mid-span section.

(CO1) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION **(1 X 20 = 20M)**

6. The cross-section of a prestressed concrete beam used over a span of 10m is 150 mm wide and 350 mm deep. The initial stress in the tendons located at a constant eccentricity of 65mm is 1300 N/mm^2. The sectional area of the tendons is 150 mm^2. Calculate the resultant stress distribution for the center-of-span cross section of beam. Also find the percentage increase in stress in the wires when the beam supports a live load of 5kN/m. Density of concrete is 24 kN/m^3. Modulus of elasticity of concrete is 35 kN/mm^2 and steel is 200 kN/mm^2 respectively.

(CO1) [Application]