ROLL NO:

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

TEST 2

Odd Semester: 2018-19
Course Code: CIV 307
Course Name: Elements of Prestressed concrete structures
Branch & Sem: CIV(Discipline Elective) & VII Sem Group - I

Date: 28 November 2018
Time: 1 Hour
Max Marks: 40
Weightage: 20%

Instructions:

(i) *Read the question properly and answer accordingly.*
(ii) *Question paper consists of 3 parts.*
(iii) *Scientific and Non-programmable calculators are permitted.*
(iv) *Code of Practice for Prestressed Concrete, IS 1343 is permitted.*

Part A

Answer the Question. Question carries **twelve** marks. (1x12=12)

1. A prestressed concrete beam of section 125mm wide and 325mm deep is used over a an effective span of 6.2m to support a uniformly distributed load of 4.5kN/m (exclusive of self-weight). The beam is prestressed by a straight cable carrying a force of 200kN and located at an eccentricity of 60mm. Determine the location of thrust line in the beam and plot its position at quarter and central span.

Part B

Answer the Question. Question carries **sixteen** marks. (1x16=16)

2. A rectangular PSC beam 425 x 325mm has a span of 8m. The beam supports two point loads 40kN each at middle third points. If the eccentricity at the middle third point is 135mm, suggest a suitable cable profile and calculate the effective prestressing force required to balance the bending effect of the loads. If the resultant tensile stress at the midspan is to be made zero due to prestress, self-weight and imposed load, calculate the initial prestressing force in the cable for the above profile.

Part C

Answer the Question. Question carries **twelve** marks. (1x12=12)

3. A concrete beam having a rectangular section 160mm x 325mm is prestressed by a parabolic cable at an eccentricity of 80mm at mid-span towards soffit and at an eccentricity of 30mm towards top at support sections. The effective prestressing force is 400kN. The beam supports a concentrated load of 30kN at centre of span in addition to the self-weight with a span of 9m. Find the short-term deflection at centre of span under prestress, self-weight and live load. Find also the long-term deflection if the loss ratio is 0.80 and the creep coefficient is 1.6. Ec = 40 x 10^3 N/mm^2.

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END TERM FINAL EXAMINATION

Odd Semester: 2018-19 | **Date**: 28 December 2018

Course Code: CIV 307 | **Time**: 2 Hours

Course Name: Elements of Prestressed Concrete Structures | **Max Marks**: 80

Programme & Sem: CIV & VII Sem (Discipline Elective) | **Weightage**: 40%

Instructions:

(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.
(iv) Code of Practice for Prestressed Concrete, IS 1343 is permitted.

Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. Explain the need for High strength steel and concrete.
2. What are the advantages of prestressed concrete over reinforced concrete?
3. Explain with neat sketch freyssinet anchorage system.
4. Explain the types of flexural failures in PSC sections.

Part B

Answer **both** the Questions. **Each** question carries **twenty** marks. (2Qx20M=40)

5. A pre-tensioned T-section having flange width of 1300mm and thickness of flange is 160mm. Width and depth of the rib are 350mm and 1600mm respectively. The area of tensile steel is 5000mm^2 located at an effective depth of 1700mm. If the characteristic cube strength of concrete and steel are 40 N/mm^2 and 1650 N/mm^2. Calculate the flexural strength at limit state of collapse in flexure for the Tee-section as per IS code provisions.
6. The support section of a PSC beam 175 x 325mm is to resist a shear of 150kN. The prestress at centroidal axis is 5 N/mm^2, fck = 50 N/mm^2. The cover to tension reinforcement is 50mm. Check the section for shear and design suitable shear reinforcement. f_t = 1.5 N/mm^2.

Part C

Answer the Question. Question carries **twenty** marks. (1Qx20M=20)

7. Design a simply supported slab for a bridge deck using the following data: span = 9m, thickness of slab = 450mm, permissible compressive stress in concrete at transfer, fct = 15Mpa, safe stress in steel = 1000 Mpa, Live load on slab = 11kN/m^2, loss of prestress = 20%, No tensile stress at any stage is allowed. Determine the prestressing force & eccentricity.