

B. Construction Engineering 3rd year 2nd semester Examination – 2019
Subject: Precast & Prestressed Concrete

Total Time: Three hours

Full Marks: 100

CO1 [25]	<p>[1] Answer any five from (a) –(e) in this block</p> <ol style="list-style-type: none"> Tendon & Axial prestressing. Anchorage How do you compute the loss of stress in steel due to curvature and wobble effect? Degree of prestressing Partial prestressing Transmission length
CO2 [20]	<p>[2] Answer any one from (a), (b) in this block:</p> <ol style="list-style-type: none"> A rectangular concrete beam of cross section 50cm deep & 25 cm wide is prestressed by means of 18 wires of 5mm dia located 6 cm from the bottom of the beam & 3 wires of diameter of 5mm , 5 cm from the top. Assuming the prestressed in the steel as 1050 N/mm². Calculate the stresses at the extreme fibres of the mid span section when the beam is supporting its own weight over a span of 10m. take UDL= 15KN/m. density of concrete= 24KN/m³ A prestressed concrete beam of section 250X 500 mm deep is Prestressed by force of 600 KN at a constant eccentricity of 60 mm. the beam is supported a concentrated load of 120KN at the centre of a span of 4 meter from one support. Determine the location of the pressure line at the centre, quarter span and support section of the beam. Neglect the self-weight of the beam. Show also the Sketches.
CO3 [20]	<p>3. (a) A rectangular concrete beam of cross section of 600× 250 is prestressed by means of 18 wires of 5mm dia located 6 cm from the bottom of the beam & 3 wires of diameter of 5mm , 4 cm from the top. Assuming the prestressed in the steel as 1200 N/mm². Calculate the percentage loss of stress in steel due to elastic deformation of concrete.[10]</p> <p>(b) Write short notes on loss due to creep of concrete of prestress. Write short notes on loss due to anchorage slip of prestress. [5+5=10]</p>
CO4 [20]	<p>[4] Answer (a) and (b) or (c) in this block:</p> <p>(a) A Prestress concrete beam of rectangular section 250 mm wide and 500 mm deep spans over 10m. the beam is prestressed by a straight cable carrying an effective force of 500 KN at an eccentricity of 50 mm. if its supports an imposed load of 20KN/m and the modulus of elasticity of concrete is 38KN/mm², compute the deflection at the following stages and check whether they comply with the IS Code specification.(i)Upward deflection under (Prestress + self-weight) (ii)Final downward deflection under (Prestress+ Self-weight + imposed load) including the effects of creep and shrinkage, and total loss is 15%. Assume the creep coefficient is 1.80 [10].</p> <p>b. What do you mean by anchorage Zone stresses? Explain the Magnel's Method.[5=5=10]</p> <p>(C) A continuous prestressed concrete beam ABC(AB=BC=15m) has a uniform rectangular cross section with a width of 200 mm and depth 500 mm. the cable carrying an effective prestressing force of 700 KN is parallel to the axis of the beam and located at 100 mm from the sofit.(i)Determine the secondary and resultant moment at the central support B.(ii) If the beam supports an imposed load of</p>

	15 KN/m calculate the resultant stress at top and bottom of the beam at B. Locate also the resultant line of thrust through the beam AB. [20]
CO5 [15]	<p>5. Answer all question in this block.</p> <p>a) A pretension concrete beam having a rectangular section of 250×5400 mm has an effective cover of 50 mm. If $f_{ck} = 40 \text{ N/mm}^2$, $f_p = 1600 \text{ N/mm}^2$ and area of prestressing steel $A_p = 461 \text{ mm}^2$, calculate the ultimate flexural strength of the section. Assume effective reinforcement ration within 0.8-0.9 and $X_u/d = 0.753-0.782$. [10]</p> <p>b) Write short notes on two way prestressing & circular prestressing [5]</p>

- CO1:** Explain and describe Precast elements, Joints and connections. Composite precast elements, methods of prestressing (K1)
- CO2:** Explain Partial prestressing, composite construction.(K2)
- CO3:** Classify and describe, Losses of prestress(K2)
- CO4:** Clarify and solve Anchorage zone stresses; prestressed containers of systems. Solve problems regarding determinate and indeterminate structures (K3)
- CO5:** Illustrate Two way prestressing, circular prestressing (K3)