EX/CON/T/326/2018

B. Construction Engineering 3rd year 2nd semester Examination – 2018

Subject: Precast & Prestressed Concrete

Total Time: Three hours

Full Marks: 100

CO1 [25]	[1]Answer any five from (a) –(e) in this block a. Prestress concrete & advantages of Pre stress concrete b. Transmission length & cracking load c. Pre tensioning & post tensioning d. Degree of prestressing e. Transfer. f. Proof stress and creep coefficient.
CO2 [20]	[2] *Answer any one* from **(a), (b)** *in this block:* a. A rectangular concrete beam of cross section 40cm deep & 25 cm wide is prestressed by means of 18 wires of 5mm dia located 7 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 950 N/mm^2. Calculate the stresses at the extreme fibres of the mid span section when the beam is supporting its own weight over a span of 8m. take UDL= 10KN/m. density of concrete= $24KN/m^3$ (b) A prestressed concrete beam of section 250X 400 mm deep is Prestressed by force of 600 KN at a constant eccentricity of 60 mm. the beam is supported a concentrated load of 70KN at the centre of a span of 3 meter. Determine the location of the pressure line at the centre. Neglect the self-weight of the beam.
CO3 [20]	3. (a)A rectangular concrete beam of cross section of 400× 250 is prestressed by means of 18 wires of 5mm dia located 7 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 950 N/mm^2. Calculate the percentage loss of stress in steel due to elastic deformation of concrete.[10] (b) Write a short notes on loss of prestress. Write the names of different kind f loss of prestress. [5+5=10]
CO4 [20]	*[4]Answer* **(a) and (b)** or (c) *in this block:* (a) A Prestress concrete beam of rectangular section 300 mm wide and 500 mm deep spans over 10m. the beam is prestressed by a straight cable carrying an effective force of 250 KN at an eccentricity of 50 mm. if its supports an imposed load of 6KN/m and the modulus of elasticity of concrete is $38KN/mm^2$, compute the deflection at the following stages and check whether they comply with the IS Code specification.(i)Upward deflection under (Prestress + self-weight) (CO4),(ii)Final downward deflection under (Prestress+ Self-weight + imposed load) including the effects of creep and shrinkage. Assume the creep coefficient to be 1.80 [10]. b. What do you mean by anchorage Zone stresses? What do you mean by Magnel's Method.[5=5=10] (C) A continuous prestressed concrete beam ABC(AB=BC=10m) has a uniform rectangular cross section with a width of 100 mm and depth 300 mm. the cable carrying an effective prestressing force of 400 KN is parallel to the axis of the beam and located at 100 mm from the sofit. Determine the secondary and resultant moment at the central support B. If the beam supports an imposed load of 1.5

	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]	5. Answer all question in this block a) A pretension concrete beam having a rectangular section of 200× 400 mm has an effective cover of 50 mm. If f_{ck} =40 N/mm^2, f_p=1600 N/mm^2 and area of prestressing steel Ap=461 mm^2, calculate the ultimate flexural strength of the section using IS1343 Code. [10] b) Write short notes on two way prestressing & circular prestressing [5]

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)**