R16

IV B.Tech II Semester Regular Examinations, September - 2020
PRESTRESSED CONCRETE
(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
(**Provide Code Book IS-1343**)
*****

PART–A *(14 Marks)*

1. a) List the general principles of prestressing. [2]
   b) Explain stress concept. [2]
   c) What do you mean by loss of prestress? [3]
   d) State any two factors influencing the deflection. [2]
   e) What are the different types of shear failure in PSC beams? [3]
   f) Sketch the distribution of stresses in anchorage zone. [2]

PART–B *(4x14 = 56 Marks)*

2. a) Distinguish between linear and circumferential prestressing. [10]
   b) Discuss about debonding. [4]

3. a) Compute the stresses at mid span of prestressed concrete beam of size 500mm x 750mm.The beam is subjected to a udl of 30kN/m and the applied prestressing force of 1000kN .The applied force is at an eccentricity of 225mm. [7]
   b) Write about Freyssinett system of post tensioning. [7]

4. A rectangular concrete beam 100 x 300 mm is prestressed by means of eight 5mm wires located 65 mm from the bottom and two 5mm wires located 35mm from top of the beam. If the wires are tensioned to a strong of $800N/m^2$, calculate the percentage loss of stress in steel immediately after transfer allowing for the loss of stress due to elastic deformation of concrete only. Given $E_S = 210$ kN/ mm^2 and $E_c = 31.5$ kN/mm^2. [14]

5. a) What are the various steps followed in computing the flexural strength of prestressed concrete sections? [8]
   b) Discuss about effective reinforcement ratio? [6]

6. Discuss briefly the basis of Indian standard IS 1343 code recommendations regarding the design of reinforcement in prestressed sections subjected to moment, shear and torsion. [14]

7. a) How will you find the area of reinforcement in end block? [7]
   b) Distinguish between spalling tension and brusting tension. [7]

|''|'||''|'''|''|''|''|

R16

IV B.Tech II Semester Regular Examinations, September - 2020
PRESTRESSED CONCRETE
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
(**Provide Code Book IS-1343**)
*****

PART–A *(14 Marks)*

1.	a)	Distinguish between bonded and un bonded beams.	[3]
	b)	Explain force concept.	[2]
	c)	What is Wobble effect? Write the formula.	[3]
	d)	What are the types of flexural Failure?	[2]
	e)	What are the codal provisions for bending, shear and torsion?	[2]
	f)	What is end block?	[2]

PART–B *(4x14 = 56 Marks)*

2. a) What are the factors affecting creep and shrinkage of concrete? [7]
    b) What are the advantages of prestressed concrete? [7]

3. a) Write about Magnel Blaton System of post tensioning. [7]
    b) A beam of size 500mm x 1000mm is used on a simply supported span of 10 metres. It is provided with a bent tendon having eccentricity of 100mm at the centre and an eccentricity of 50mm upwards at the ends. The dead load on the beam is 10kN/m. Compute the stresses at ends and at the mid span. [7]

4. a) How do you estimate the loss due to elastic shortening in PSC beams? [7]
    b) A pretensioned beam 250mm wide and 300 mm deep in prestressed by 12mm wires each of 7mm diameter initially stressed to 1200 N/ mm^2 with their centroids located at 100mm from the soffit. Estimate the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation using IS1343. [7]

5. a) A concrete beam having a rectangular section 100 x 300 mm is prestressed by a parabolic cable with an initial prestressing force of 240kN .The cable has an eccentricity of 50mm at the centre and eccentric at supports. If the span of the beam is 10m and subjected to a live load of 2 kN/m. Calculate the short term deflection at mid span. Assume E_c =38 kN/mm^2, creep coefficient = 2, loss of prestress = 20 % Estimate the long term deflection. [10]
    b) Distinguish between short term and long term deflections. [4]

6. Explain the various modes of failures encountered in prestressed concrete beams subjected to bending moment, shear and torsion. [14]

7. a) Write a note on end zone reinforcement in end block. [7]
    b) Sketch the distribution of stresses in the anchorage zone. [7]

Code No: **R1642013**

R16

Set No. 3

IV B.Tech II Semester Regular Examinations, September - 2020

PRESTRESSED CONCRETE
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
(**Provide Code Book IS-1343**)
*****

PART–A *(14 Marks)*

1.	a)	Write a short note on the type of pre stressing steel	[3]
	b)	Explain load balancing concept.	[3]
	c)	Define creep coefficient.	[2]
	d)	What is pressure line?	[2]
	e)	How do PSC beams behave in torsion?	[2]
	f)	What is transmission length?	[2]

PART–B *(4x14 = 56 Marks)*

2.	a)	What are the basic principles of pres stressed concrete?	[7]
	b)	Differentiate between full pre stressing and partial pre stressing.	[7]

3.	a)	Briefly explain the relation between the tendon profiles and equivalent loads in prestressed concrete beams with sketches.	[7]
	b)	What are the different methods of prestressing systems? Explain any one.	[7]

4. A post tensioned beam of span length 10m is prestressed by a parabolic cable, concentric at the support and having an eccentricity of 250mm at mid span. The cross sectional area of high tensile wire of the cable is 500mm^2.The wires are stressed by using a jack at the left end so that the initial force in the cable at the right end is 230 kN. Calculate the (i)jacking force at the left end and
 (ii)the total losses of stress in wires. Assuming
coefficient of curvature effect = 0.55,
coefficient of wave effect = 0.003/m
Relaxation of steel stress = 4%
Shrinkage of concrete = 0.0002
Creep coefficient = 2.2
Anchorage of slip at jacking end = 3mm
 E_S = 210 kN/ mm^2 and E_c = 35 kN/mm^2 [14]

|''|'||||''|'''|||'|

5. a) What are the different types of flexural failure modes observed in prestressed concrete beams? Explain with sketches. [7]

    b) A rectangular beam 250mm x 500mm in section is simply supported over a span of 10m.It is prestressed with a parabolic cable which has a maximum eccentricity of 200mm at mid span and 40mm at support sections .Effective prestressing force is 1450kN .Concrete grade is M40.Determine the deflection due to prestress and self weight. [7]

6. What are the different ways of improving the shear resistance of structural concrete members by prestressing techniques? [14]

7. Explain the Magnel's method for end block design. [14]

R16

Set No. 4

IV B.Tech II Semester Regular Examinations, September - 2020
PRESTRESSED CONCRETE
(Civil Engineering)

Time: 3 hours   **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
(**Provide Code Book IS-1343**)
*****

PART–A *(14 Marks)*

1. a) What is the purpose of using under tensioned steel?   [2]
    b) List the general principles of prestressing.   [2]
    c) List out the applications of pre-tensioned and post-tensioned members.   [3]
    d) Define deflection.   [2]
    e) What are the different types of failure due to shear?   [3]
    f) What is the anchorage zone?   [2]

PART–B *(4x14 = 56 Marks)*

2. a) Discuss why high strength concrete and high strength steel is required for pre
       stressed concrete?   [7]
    b) What are the advantages of pres stressed concrete?   [7]

3. a) What is Pressure or Thrust line? Explain its significance with sketches.   [7]
    b) Compute the stresses at mid span of prestressed concrete beam of size 400mm x
       650mm.The beam is subjected to a udl of 20kN/m and the applied prestressing
       force of 800kN .The applied force is at an eccentricity of 125mm.   [7]

4. a) List the types of losses in prestressed concrete beam. How to estimate the loss
       due to elastic shortening.   [10]
    b) List out the factors influencing the shrinkage loss.   [4]

5. a) What are the factors affecting long term deflections?   [7]
    b) Explain with sketches the IS 1343 code method of computing the moment of
       resistance of rectangular sections.   [7]

6. State the equation for calculating the ultimate torsional resistance of a PSC
    member.   [14]

7. Explain the Guyon's method for end block design.   [14]

|"|"|||"|"|||'|