



R20 Regulation

Subject code:3E8AA

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VIII Semester Supplementary Examinations, November 2025

## PRESTRESSED CONCRETE STRUCTURES (CE)

Maximum Marks: 70

Date: 25.11.2025

Duration: 3 hours

- Note: 1.This question paper contains two parts A and B.  
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.  
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.  
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

ALLOW IS1343 CODE BOOK

### Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	Bloom Tx
1	Mention the advantages of prestressed concrete.	2M	1	BL1
2	Give the principle of post-tensioning.	2M	1	BL1
3	What do you mean by loss of prestress?	2M	2	BL1
4	List the codal provisions for the loss of stress due to relaxation of stress in steel.	2M	2	BL2
5	Write the formula for shear stress at any point and maximum principal stress, when an element is subjected to two dimensional stresses.	2M	3	BL2
6	State the assumptions made in the analysis of prestressed flexural members.	2M	3	BL1
7	What is end block?	2M	4	BL1
8	Sketch the distribution of stresses in the anchorage zone.	2M	4	BL2
9	What is a composite section of a beam?	2M	5	BL1
10	List the factors influencing deflection of beams.	2M	5	BL1

### Part-B

Answer All the following questions.(5X10M=50Marks)		Marks	CO	Bloom Tx
11	a) Discuss the need of high strength steel in prestressed concrete construction. b) Compare prestressed concrete with reinforced concrete.	5M 5M	1	BL4
OR				
12	a) Why do you go for high grade concrete instead of ordinary concrete in prestressed concrete? b) Explain the Magnel Blaton system of prestressing with the help of a neat sketch.	4M 6M	1	BL3
13	Discuss in detail about various losses in pre-stress.	10M	2	BL3
OR				

14	A pretensioned beam 250 mm wide and 360 mm deep is prestressed by 10 wires of 8 mm diameter. Initial stress to 1000 N/mm <sup>2</sup> . The centroid of the steel wires is located at 105 mm from the soffit. Determine the maximum stress in concrete immediately after transfer allowing elastic shortening of concrete only at the level of centroid of the steel. If however, the concrete is subjected to additional shortening due to the creep and shrinkage and the steel is subjected to relaxation of stress of 5% of initial stress. Find the final percentage of loss of stress in steel wires. Take $E_s=210 \text{ kN/mm}^2$ , $E_c=36.85 \text{ kN/mm}^2$ , $\phi=1.60$ , take residual shrinkage strain $=3 \times 10^{-4}$ .	10M	2	BL4
15	A pretentioned prestressed concrete beam having rectangular section 150 mm wide and 300 mm deep has an effective cover 50 mm if compressive strength of concrete is 40 N/mm <sup>2</sup> , prestressing force is 1600 N/mm <sup>2</sup> and area of prestressing steel is 461 mm <sup>2</sup> . Calculate the ultimate flexural strength of the section.	10M	3	BL4
	OR			
16	Discuss the design procedure of shear reinforcement as per IS1343.	10M	3	BL5
17	Discuss the stress distribution in end block along the transmission length with neat sketch.	10M	4	BL4
	OR			
18	Design a prestressed concrete post tensioned beam to carry a load of 20 kN/m over a span of 15 m. Adopt Magnel's graphical method.	10M	4	BL5
19	A rectangular concrete beam of cross section 150 mm wide and 300 mm deep is simply supported over the span of 8 m and prestressed by means of a symmetric parabolic cable at a distance of 75 mm from the bottom of the beam at the mid span and 125 mm from top of beam at support section. If the force in the cable is 350 kN and modulus of elasticity of concrete is 38 KN/mm <sup>2</sup> . Calculate the deflection at mid-span when the beam is supporting its self-weight. Find the concentrated load which must be applied at mid-span to restore it to the level of supports.	10M	5	BL5
	OR			
20	Explain the propped and un-propped composite sections with a neat sketch.	10M	5	BL4