R18 Regulation *Subject code:2E6AA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, November 2025

PRESTRESSED CONCRETE

(CE)

Maximum Marks: 70 Date: 15.11.2025 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.
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	BTL
1	Write any two advantages of Prestressing Concrete.	2M	1	L1
2	Define Pre-tensioning and Post-tensioning.	2M	1	L1
3	List the losses of prestress to be considered in the Pre-tensioned Concrete member.	2M	2	L1
4	Types of losses in post-tensioning	2M	2	L1
5	State Hoyer Effect?	2M	3	L1
6	State the concept of load balancing.	2M	3	L1
7	Define the term Bursting Tension.	2M	4	L1
8	Draw the sketch of End Block and show the transmission of forces in the same sketch.	2M	4	L1
9	Define the terms 'propped construction' of composite members.	2M	5	L1
10	How the magnitude of load and span of member influences the deflections of PSC member?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) What are uses of prestressed concrete members? b) Explain the various types of devices used for tensioning steel.	5M 5M	1	L2
	OR			
12	a) Write the advantages and limitations of prestressed concrete. b) Explain the significance of high strength concrete and high tensile steel in PSC members.	5M 5M	1	L2
13	a) What is anchorage slip? How do you compute the loss of stress due to anchorage slip? b) Explain the provisions made in IS:1343 for relaxation loss.	5M 5M	2	L2
	OR			
14	a) Explain the different types of losses of prestress in pre-tensioned members. b) A simply supported post-tensioned concrete beam of span 10 m has section 200 mm × 450 mm is subjected to an initial prestressing force of 300 kN applied at a constant eccentricity of 75 mm by tendons of 250	5M 5M	2	L2

	mm^2. Find the total loss of prestress in the tendons using the following data: $E_S = 2\times10^5$ N/mm^2, E_C = 35 kN/mm^2, anchorage slip = 3 mm, creep coefficient of concrete = 1.5, shrinkage of concrete = 0.0002 and relaxation of steel = 2%.			
15	A concrete beam is simply supported at A and B area span of 8m and the overhang BC is 2m. The beam is of rectangular section 300mm wide by 900mm deep and supports a UDL of 3.52 kN/m over the entire length in addition to its self-weight. Determine the profile of the prestressing cable with an effective force of 500kN which can balance the dead and life loads on the beam. Sketch the profile of the cable along the length of the beam.	10M	3	L2
	OR			
16	The support of an PSC beam 120mm wide by 250mm deep is required to support an ultimate shear force of 60 kN. A compressive prestress of 5 N/mm^2 is acting at centroidal axis. Characteristic cube strength of concrete is 40 N/mm^2. The cover to the tension reinforcement is 50 mm. If characteristic strength of steel is 250 N/mm^2. Design suitable reinforcement using IS:1343 provisions.	10M	3	L2
17	The end block of a prestressed concrete beam, rectangular in section, is 100mm wide and 200 mm deep. The prestressing force of 100 kN is transmitted to concrete by a distribution plate, 100 mm wide and 50 mm deep, concentrically located at the ends. Calculate the position and magnitude of the maximum tensile stress on the horizontal section through the centre and edge of the anchor plate. Compute the bursting tension on these horizontal planes.	10M	4	L2
	OR			
18	Explain the concept of prestress distribution and bond stress along the transmission length with a neat sketch.	10M	4	L2
19	A composite T-beam is made up of a pre-tensioned rib 100mm wide by 200mm deep, and a cast in situ slab 400mm wide and 40 mm thick having a modulus of elasticity of 32 kN/mm^2. If the differential shrinkage is $100\text{x}10^{-6}$ units, determine the shrinkage stresses developed in the precast and cast in-situ units.	10M	5	L2
	OR			
20	a) Explain the factors effecting deflection of pre stressed concrete members. b) A prestressed concrete beam of a rectangular section 120 mm wide by 300 mm deep, spans over 6 m. The beam is prestressed by a straight cable carrying an effective force of 200 kN at an eccentricity of 50 mm. The modulus of elasticity of concrete is 38kN/m^2. Compute the deflection under prestress + self weight at the center span of the beam.	5M 5M	5	L2