R18 Regulation *Subject code:2E6AA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, May 2025

PRESTRESSED CONCRETE

(CE)

Maximum Marks: 70 Date: 25.06.2025 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.

IS 1343 CODE BOOK IS ALLOWED

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	List the Methods of Prestressing concrete?	2M	1	L1
2	Write any two advantages of using prestressed concrete?	2M	1	L1
3	Define anchorage slip.	2M	2	L1
4	Define and Write the formula to calculate loss due to Slip of anchorage.	2M	2	L1
5	A 150 mm wide and 300 mm depth beam, is prestressed with curved tendon having 120 kN prestressing force. Calculate the direct stress.	2M	3	L1
6	Define the term Kern zone and Pressure line.	2M	3	L1
7	What is Hoyer effect?	2M	4	L1
8	How the prestressing forces transfer in pretensioned members?	2M	4	L1
9	Write any two advantages in using precast prestressed units with the in situ concrete.	2M	5	L1
10	What is the basic difference between Propped and Un-propped concrete 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 with sketches 'Hoyer's long line system of pretensioning'.	5M 5M	1	L2
	OR			
12	Explain the various devices used for tensioning steel.	10M	1	L2
13	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 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%.	10M	2	L2
	OR			

14	A prestressed concrete beam, 200mm wide and 300mm deep, is prestressed with wires of area 320 mm^2, located at a constant eccentricity of 50 mm and carrying an initial stress of 1200 N/mm^2. The span of the beam is 10 m. Calculate the percentage loss of stress in wires if (a) the beam is pretensioned, and (b) the beam is post-tensioned. Take E_s as 210 kN/mm^2 and E_c as 32 kN/mm^2. Assume if any data is required.	10M	2	L2
15	An unsymmetrical I-section beam is used to support an imposed load of 2 kN/m over a span of 8 m. the sectional details are top flange: 200 mm wide and 40 mm thick, bottom flange: 100 mm wide and 40 mm thick, thickness of web is 60 mm, overall depth of the beam is 300 mm. At the centre of the span, the effective prestressing force of 120 kN is located at 30 mm from the soffit of the beam. Estimate the stresses at the centre of span section of the beam for the following load conditions: (a) Prestress + self weight (b) Prestress + self weight + live load.	10M	3	L2
	OR			
16	Explain the Design procedure for shear reinforcement as per IS 1343:2012.	10M	3	L2
17	Write in detail about anchorage zone reinforcement and sketch the arrangement of reinforcement in end blocks.	10M	4	L2
	OR			
18	The end block of a post tensioned concrete beam 300 mm × 300 mm is subjected to a concentric anchorage force of 800 kN by a freyssinet anchorage system of area 1100 mm^2. Design, Discuss and detail the anchorage reinforcement for the end block.	10M	4	L2
19	A composite T-beam is made up of a pretensioned 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 $100x10^{-6}$ units, determine the shrinkage stresses developed in the precast and cast in-situ units.	10M	5	L2
	OR			
20	Explain with examples the effect of tendon profile on deflections of prestressed concrete members.	10M	5	L2

3