Regulation R18 *Subject Code: 2E6AA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, February 2024

Prestressed Concrete

(Civil Engineering)

Maximum Marks: 70 Date:24.02.2024 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 questions from 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.

Part-A

	All the following questions carry equal marks (10X2M = 20 Marks)	**CO**	**Bloom Tx**
1.	Distinguish between Pre-tensioning and Post-tensioning.	CO1	L1
2.	What is debonding?	CO1	L1
3.	List the various types of loss of prestress in post tension members.	CO2	L1
4.	Write the formula to calculate slip of anchorage.	CO2	L2
5.	Define Kern Distance.	CO3	L1
6.	Draw the stress diagram for eccentric loading?	CO3	L2
7.	Define Transmission Length.	CO4	L1
8.	Give equation to find out Bond Length.	CO4	L2
9.	What is a composite beam?	CO5	L1
10.	What are short term deflection and long term deflection?	CO5	L1

Part-B

		Answer All the following questions. **(5X10M = 50 Marks)**		
11.	A.	Explain the Lee McCall system of prestressing. [5]	CO1	L2
	B.	Write a note on the historical development of prestressed concrete. [5]		L1
		OR		
12.	A.	Write down the type of tensioning used in the following post tensioning systems. (i) Freyssinet. [3] (ii) Magnel – Blaton. [2]	CO1	L2 L1

	B	Explain the advantages of prestressed concrete. [5]		
13.	A.	List the losses of prestress to be considered in the pre-tensioned and post-tensioned members. [5]		L2
	B.	A post-tensioned concrete beam of rectangular section, 100 mm wide and 300 mm deep, is stressed by a parabolic cable with zero eccentricity at the supports and an eccentricity of 50 mm at the centre of span. The area of the cable is 200 mm^2 and initial stress in the cable is 12 N/mm^2. If the ultimate creep strain is 30×10^{-6} mm/mm per N/mm^2 of stress and modulus of elasticity of steel is 210 compute the loss of stress in steel only due to creep of concrete. Assume any other missing data. [5]	CO2	L3
		OR		
14.		A concrete beam is prestressed by a cable carrying an initial prestressing force of 335 kN. The cross sectional area of wires is 320mm^2. Calculate the percentage loss of stress in the cable only due to shrinkage of concrete using IS-1343 recommendations assuming the beam to be [10] a) Pre-tensioned. b) Post-tensioned. Take E_S = 210 kN/mm^2. Age of concrete at the time of transfer = 10 days.	CO2	L3
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. [10]	CO3	L3
		OR		
16.		A pre stressed concrete beam of rectangular section 300mm by 600 mm is 12m long. Supports a live load of 12 kN/m in addition to its own self-weight. The beam is pre stressed by a cable having high tensile wires of 2000 mm^2 area stressed of 175mm from the soffit of the beam. Determine the shift in the pressure line at one quarter span and centre of span, when the beam supports the service load. [10]	CO3	L3
17.		A prestressing force of 250 KN is transmitted through a distribution plate 120 mm wide and 120 mm deep, the centre of which is located at 100 mm from the bottom of an end block having a section 120 mm wide and 300 mm deep. Evaluate the position and magnitude of the maximum tensile stress on a horizontal section passing through the centre of the distribution plate using the Rowe method. Find the area of steel necessary to resist the largest tensile force resulting from any of these methods. Yield stress in steel = 260N/mm^2. Assume any other missing data. [10]	CO4	L3
		OR		
18.		A prestressing force of 250 KN is transmitted through a distribution plate 120 mm wide and 120 mm deep, the centre of which is located at 100 mm from the bottom of an end block having a section 120 mm wide and 300 mm deep. Evaluate the position and magnitude of the maximum tensile stress on a horizontal section passing through the centre of the distribution plate using the Rowe method. Find the area of steel necessary to resist the largest tensile force	CO4	L4

		resulting from any of these methods. Yield stress in steel = 260 N/mm^2. Assume any other missing data. [10]		
19.		A composite T-beam is made up of a pre-tensioned rib 100 mm wide and 200 mm deep, and a cast in situ slab 400 mm wide and 40 mm thick having a modulus of elasticity of 28 kN/mm^2. If the differential shrinkage is 100×10^{-6} units, determine the shrinkage stress developed in the precast unit. Assume any other missing data. [10]	CO5	L3
		OR		
20.		Distinguish between propped and un-propped constructions methods in composite construction using stress diagrams at various stages of construction. [10]	CO5	L4