



R20 Regulation

Subject code:3E8AA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VIII Semester Regular Examinations, April 2024

PRESTRESSED CONCRETE STRUCTURES (CIVIL ENGINEERING) (Professional Elective)

Maximum Marks: 70

Date:22.04.2024 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 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.

IS1343 CODE BOOK IS ALLOWED

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	Write the principle of post tensioning?	1	L1
2	Define prestressed concrete.	1	L1
3	What is the creep of concrete in prestressed concrete structures?	2	L1
4	Limit of relaxation of stress in steel	2	L1
5	In what ways shear resistance can be increased?	3	L1
6	Under what situations would you recommend use of unbounded tendons?	3	L2
7	Define the transmission length.	4	L1
8	Write how prestressing force is transferred to concrete in pretensioned members?	4	L1
9	Write advantages of using composite construction?	5	L1
10	Distinguish between propped and unpropped constructions.	5	L1

Part-B

Answer All the following questions (5X10M=50Marks)			
11	A. Explain the advantages of prestressed concrete over reinforced concrete constructions. [5] B. State different types of prestressing with their important features. [5]	1	L1,L2
OR			
12	A. Explain load balancing concept in pre stressed concrete. [5] B. Distinguish between linear and circumferential prestressing. [5]	1	L2
13	A. A concrete beam is prestressed by a cable carrying an initial prestressing Force of 800 KN, Cross sectional area 400mm ² calculate percentage loss of stress due to shrinkage of concrete assume beam is post-tensioned Es=200 GPa, Ec=28 GPa, age of concrete at transfer 28 days. [5] B. A concrete beam is prestressed by a cable carrying 1000 KN, Cross sectional area of wires is 600mm ² calculate percentage loss of stress due to creep of concrete assume beam is prestressed Es=250 GPa, Ec=28 GPa, age of concrete at transfer 28 days. Assume any data required. [5]	2	L3
OR			

14	A. Explain loss due to elastic shortening in post tensioned and pre tensioned concrete structures. [5] B. Discuss about types of losses of prestress in pre-tensioned members. [5]	2	L2,L3
15	A.A pretensioned prestressed concrete beam having rectangular section with 150 mm width 500 mm over all depth is prestressed by tendons of effective area 465 mm ² at an effective depth of 300 mm assume $F_{ck}=40 \text{ N/mm}^2$ $F_{pu}=1600 \text{ N/mm}^2$ estimate ultimate flexural strength of the section using provisions Indian standard code. [5] B. A precast pretensioned T beam has a flange width 1100 mm and thickness of 150 mm width and depth of rib are 300 and 1500 mm respectively. High tensile steel tendon cross sectional area 4700 mm ² are located at an effective depth of 1600 mm , $F_{ck}=40 \text{ N/mm}^2$ $F_{pu}=1600 \text{ N/mm}^2$ calculate the flexural strength of the T-section using Indian standard code provisions. [5]	3	L4
	OR		
16	Discuss the design procedure for shear reinforcement as per IS 1343. [10]	3	L4
17	A pretensioned beam 8 m span has symmetrical I section flanges are 200 mm wide and 60 mm thick web thickness is 80 mm over all depth of girder is 400 mm member is prestressed by 8 wires of 5 mm diameter initial stress in wire is 1300 N/mm ² cube strength of concrete at transfer is 42 N/mm ² . Determine max vertical stress developed in transfer zone. [10]	4	L4
	OR		
18	A. Explain with sketches the variation of bond stress, stress in steel and concrete in the transmission zone of pre tensioned members. [5] B. Outline the various methods by which bond between concrete and steel tendons can be improved. [5]	4	L3
19	A. List the various factors influencing the deflections of prestressed concrete members.[5] B. Discuss the various methods of predicting long term deflections of uncracked prestressed concrete members. [5]	5	L3
	OR		
20	A. Deck of a prestressed concrete culvert is made up of slab 500 mm thick slab spanning 10 m supports total udl of comprising dead and live loads 24 KN/m ² modulus of elasticity of concrete is 40 KN/mm ² concrete slab is prestressed by a straight cable each containing 12 wires of 7 mm diameter stressed to 1200 N/ mm ² constant eccentricity of 195 mm cables spaced at 330 mm estimate short term deflection. [5] B. Explain the effects of Tendon profile on deflection with neat sketch. [5]	5	L4,L3