Regulation: R17 *Subject code: 1E7AA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Year I Semester Supplementary Examinations, July 2022

Prestressed Concrete

(Civil Engineering)

Maximum Marks: 70 Duration: 3 hours

Note:
1. **This question paper contains two parts A and B.**
2. **Part A is compulsory which carries 10 marks. Answer all questions in Part A.**
3. **Part B consists of 5 Units. Total 10 questions it consists.**
4. **Part-B each question carries 12 marks and may have a, b, c, d as sub questions.**

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 What is the basic principal of prestressed concrete?
2 What is debonding?
3 List the various types of loss of prestress in post tension members.
4 What is relaxation of stress in steel?
5 Write the types of shear cracks and show them in a sketch.
6 What are the different ways of improving the shear resistance by prestressing techniques?
7 What is transmission length?
8 Define the terms (a) End Block and (b) Bursting Tension.
9 Write any two advantages in using precast prestressed units with the in situ concrete.
10 Why the suitable control on deflection of prestressed concrete member is very essential? Give any reason.

Part-B

Answer All the following questions. (5X10M=50Marks)

11 Explain the various systems of prestressing with a neat typical sketch. (10)

OR

12 Write the advantages and limitations of prestressed concrete. (10)

13 a) What is anchorage slip? How do you compute the loss of stress due to anchorage slip? (5)
b) Explain the provisions made in IS:1343 for relaxation loss. (5)

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 1000 N/mm^2. The span of the beam is 8 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. (10)

15 Write the design provisions for shear reinforcement as per IS-1343 . (10)

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. (10)

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. (10)

OR

18 a) Explain about the transfer of prestressing force in pretension beams. (5)
b) Write down the IS:1343 provisions for transmission length. (5)

19 Write the advantages of using composite members in bridge construction. (10)

OR

20 Explain with examples the effect of tendon profile on deflections of prestressed concrete members. (10)