Code No.: **81124**

MR18-2018-19 Batch

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

M.TECH III SEMESTER REGULAR END EXAMINATIONS, NOVEMBER-2019

Subject: **Design of Prestressed Concrete Structures**

Branch/Specialization: **CE/Structural Engg.**

Time: 3 hours **Max. Marks: 70**

Answer ALL questions of the following **5x 14 Marks= 70 Marks**

1. a) Explain the Lee McCall system of prestressing [4M]

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 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]

OR

2. a) Explain the different types of losses of prestress in pre and post tensioned members [6M]

b) A concrete beam of dimension 100 mm × 300 mm is post-tensioned with 5 straight wires of 7mm diameter. The average prestress after short-term losses is 0.7fpk = 1200 N/mm2 and the age of loading is given as 28 days. Given that Ep = 200 × 103 MPa, Ec = 35000 MPa, find out the losses of prestress due to creep, shrinkage and relaxation. Neglect the weight of the beam in the computation of the stresses [8M]

3. a) Explain with sketches the IS CODE method of computing the moment of resistance of rectangular sections [4M]

b) The support section of a pre stressed concrete beam, 100mm wide and 250mm deep, is required to support an ultimate shear force of 80KN. The compressive prestress at the centroidal axis is 5 N/ mm^2. The cover to the tension reinforcement is 50 mm. if the characteristics tensile strength of steel in stirrups is 250N/mm^2, design suitable of steel in stirrups is 250 N/ mm^2 [10M]

OR

4) a) A pre tensioned prestressed concrete beam having a rectangular section, 300mm wide and 500mm deep has an effective cover of 40mm. If fck = 40N/mm^2, fp =1600 N/mm^2 and the area of prestressing steel A_P =561 mm^2. Calculate the ultimate flexural strength of the section using IS code provisions. [10M]

b) What are the different ways of improving the shear resistance of structural concrete members by prestressing techniques? [4M]

5. a) Discuss the various methods of predicting long term deflections [4M]

b) A concrete beam with a cross section 150 mm wide X 300 mm deep is Prestressed by a linearly varying cable carrying an effective prestressing force 350 kN. The span of the beam is 8 m. the beam supports a concentrated load of 20 kN at center of span. The cable has an eccentricity of 70 mm below the Centroidal axis the center and 25 mm above the Centroidal axis at the supports. Take $E_c = 38$ kN/mm^2. Neglecting all losses, find the central deflection of the beam as follows:

(i) Self weight + pre-stress and

(ii) Self weight + pre-stress + live load. [10M]

OR

6. a) Derive the equation of short term deflections of uncracked members by Mohr's theorems [6M]

b) A concrete beam having a rectangular section 100 × 300 mm is prestressed by a parabolic cable with an initial prestressing force of 240 kN. The cable has an eccentricity of 50 mm at the centre and concentric at the supports. If the span of the beam is 12 m and subjected to a live load of 5 kN/m. Calculate the short term deflection at midspan. Assume Ec = 38 kN/mm^2, creep coefficient = 2, loss of prestress = 20%. Estimate the long-term deflection [8M]

7. a) Write about the Magnel's method and Guyon's method for end block [4M]

b) A pre-tensioned beam is prestressed using 5 mm diameter wires with an initial stress of 80 percent of the ultimate tensile strength of steel (f_{pu} = 1600 N/mm^2). The cube strength of concrete at transfer is 30 N/mm^2 .

(i) Calculate the transmission length

(ii) compute the bond stress at ¼ and ½ the transmission length from the end and

(iii) Calculate the overall average bond stress. [10M]

OR

8. a) Define transmission length and how can we calculate it? [4M]

b) Estimate the transmission length at the ends of a pretensioned beam prestressed by 7-mm diameter wires. Assume the cube strength of concrete at transfer as 42 N/mm^2 [10M]

9) a) Explain with neat sketches the various methods of achieving continuity in prestressed concrete members. [4M]

b) A two span continuous beam ABC (AB = BC = 12 m) has a uniform cross section with a width of 100 mm and depth of 300 mm. A cable carrying an effective prestressing force of 500 kN is provided at a constant eccentricity of 75mm towards soffit of the beam.

i). Determine resultant moment developed at B due to prestressing only.

ii). Determine resultant moment developed at B when a load of 5kN/m is applied [10M]

OR

10. a) Explain about P and C lines. [6M]

b) What are the concordant and non-concordant cables used in continuous PSC members [8M]

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

M.TECH III SEMESTER REGULAR END EXAMINATIONS, NOVEMBER-2019

Subject: **Safety in Construction**

Branch/Specialization: **CE/Structural Engg.**

Time: 3 hours **Max. Marks: 70**

Answer ALL questions of the following **5x 14 Marks= 70 Marks**

1. a) Write about the safety fundamentals to be adopted in an industry [7]

   b) Explain the role of the various partners in safety management. [7]

(OR)

2. a) Enlist the various personal protective equipments and their importance in industrial safety

   b) Define safety, Explain the basic principles of safety. [7+7]

3. a) Explain briefly different types and classes of maintenance cost. [7+7]

   b) Distinguish between fixed ti\me maintenance and connect based maintenance. Give the merits and demerits.

(OR)

4. a) What are various maintenance categories? Explain their types and the basis of their selection.

   b) Explain the cost involved in maintenance and its relation with replacement economy. [7+7]

5. a) Write different types of Wear detection Methods. [7]

   b) Explain the electrochemical process of corrosion [7]

(OR)

6. a) Explain the prevention measures for corrosion [7]

   b) Explain briefly the various methods of lubrication [7]

7. a) Identify the personal protective equipments essential for safety of construction workers and discuss its importance in safety. [7]

   b) How are construction accidents classified? [7]

(OR)

8. a) Bring out the importance of safety in construction projects. [7]

   b) Discuss the different factors leading to accidents in construction projects [7]

9. a) What are the risks involved in erection and stripping of formwork? [7]

   b) What are the precautions to be taken for usage of grinding, welding and drilling machines? [7]

(OR)

10 a) What are the important safety guidelines for design, erection and use of scaffolds? [7]

   b) Discuss safety aspects of hand tools, power tools and pneumatic tools. [7]