Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (OLD) – • EXAMINATION – SUMMER 2016

Subject Code: 712007N **Date:21/05/2016**

Subject Name: Pre Stressed Concrete

Time:02:30 pm to 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Clearly explain the term "Pre stressed concrete". Differentiate pre stressed concrete from normal concrete. Discuss the limitations of pre stressed concrete.	**07**
	(b)	What is partial pre stressing? Clearly explain with appropriate example.	**07**
Q.2	**(a)**	Explain the design steps for pre stressed concrete section as per IS: 1343.	**07**
	(b)	Which are the various methods of pre stressing? Discuss post tensioning in detail.	**07**
		OR	
	(b)	Clearly mention the difference between pre tensioning and post tensioning.	**07**
Q.3	**(a)**	What is a continuous pre stressing? When it is used? Discuss limitations and advantages of continuous pre stressing.	**07**
	(b)	Discuss all properties of all the materials used in pre stress concrete in detail.	**07**
		OR	
Q.3	**(a)**	Which are the losses take place during pre stressing? Explain all in detail.	**07**
	(b)	Explain limit state deign of pre stressed members and explain limit state of collapse in flexure, compression, tension and shear.	**07**
Q.4	**(a)**	A rectangular beam of 300mm x 600mm is pre stressed by a cable carrying force of 300kN at the eccentricity of 90mm. the beam is subjected to the uniform load of 4kN/m for the entire span of 7m. if the modulus of rupture for the concrete is 4.5N/mm^2 and self weight of the beam is 25kN/m^3 find the cracking moment for the beam.	**07**
	(b)	A rectangular beam of 230mm x 610mm cross section dimensions, is subjected to a uniform load of 20kN/m. The span of a beam is 10m. The beam is simply supported and having neutral axis located at half depth of the cross section dimension. If the losses are 20% and permissible tensile stress at transfer is 2.5 N/mm^2, find the cross section dimensions of the beam.	**07**
		OR	
Q.4	**(a)**	A pre tensioned concrete beam of 230mm x 540mm cross section dimensions having the effective cover of 40mm. If Fck = 40 Mpa, Fp =1600 Mpa and the pre stressing area as Ap = 500mm^2, calculate the ultimate flexural strength of section as per guide lines of IS: 1343.	**07**
	(b)	A beam of rectangular cross section of 300mm x 540mm is simply supported with a span of 7m. The beam is subjected to a UDL of 5kN/m including the self weight for full length. If the beam is pre stressed with 15 wires of 6mm diameter at 80mm distance from the bottom of the beam, and the steel pre stress is 850N/mm^2 find the stresses in the extreme fibres and draw the stress distribution diagram of the mid span section.	**07**

Q.5	**(a)**	Explain the effect of shear and bond strength in the pre stressed concrete members. Explain the design for shear and bond of pre stressed concrete member as per the design code.	**07**
	(b)	Discuss the limitations of pre stressed concrete technique. Which are the basic aspects and factors affecting the pre stressing method for the cast in situ and pre cast concrete members?	**07**

OR

Q.5	**(a)**	Explain following terms for pre stressed concrete. 1. Pressure line, 2. Load balancing, 3. Limiting the eccentricity of Pre stressing force.	**07**
	(b)	Discuss basic assumptions made in the pre stress concrete concepts. Explain the homogeneous beam concept and area and moment of inertia concepts for the pre stress concrete members in detail.	**07**

****