Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 140603 **Date: 08/06/2017**

Subject Name: Structural Analysis-2

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Assume value of E = $2x10^5$n/mm^2 and value of I = $2x10^8$mm^4 where ever required.**

Q.1	**(a)**	Explain Muller-Breslau's theorem is helpful in drawing influence line diagram. Hence sketch the influence line diagrams for R_A, R_B, R_C, R_D and R_E for a four span continuous beam supported by hinge at A and rollers at B, C, D and E.	**07**
	(b)	Write short notes on different types of prestressing used in prestressed concrete giving merits and demerits of each. Also name the various losses occur in the prestressed concrete.	**07**
Q.2	**(a)**	State and explain Castigliano's theorems. Also explain minimum strain energy theorem.	**07**
	(b)	A prestressed concrete beam of span of 15m has width 450mm and depth of 1200mm. it is prestressed by a cable force of 2000kN at the position of 200mm from bottom. It is loaded by all inclusive udl of 20kN/m. Calculate the stresses at the top and bottom fibers before application of loads and after applications of loads. Assume that total prestress losses are 15%	**07**
		OR	
	(b)	Analyze the fixed beam as shown in the figure.1 and draw the bending moment and shear force diagrams.	**07**
Q.3	**(a)**	Analyze the beam as shown in the figure.2 by consistent deformation method and draw the bending moment and shear force diagrams.	**07**
	(b)	Calculate the vertical displacement at the tip of cantilever beam as shown in the figure. 3 by Castigliano's theorem.	**07**
		OR	
Q.3	**(a)**	Analyze the beam as shown in the figure.2 by minimum strain energy method and draw the bending moment and shear force diagrams.	**07**
	(b)	Calculate the vertical displacement at the tip of the cantilever bent as shown in the figure.4 by Castigliano's theorem.	
Q.4		Analyze the portal frame shown in the figure.5 by Moment distribution method and draw the bending moment diagram.	**14**
		OR	
Q.4		Analyze the portal frame shown in the figure.5 by kani's method and draw the bending moment diagram.	**14**
Q.5	**(a)**	Analyze the continuous beam shown in the figure.6 by Slope Deflection Equation Method and hence draw bending moment and shear force diagrams.	**07**
	(b)	For a continuous beam ABC has hinged support at A and roller supports at B and C. If span AB = 6m and span BC = 6m, calculate and sketch the ordinates for reaction at support B at every 2m interval.	**07**
		OR	

Q.5 Analyze the portal frame shown in the figure.5 by Slope Deflection Equation method and draw the bending moment diagram. **14**

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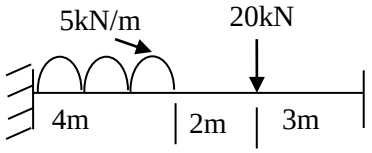

Figure.1

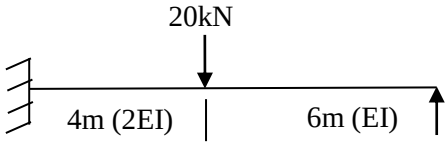

Figure.2

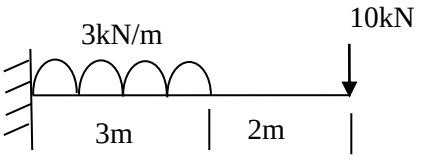

Figure.3

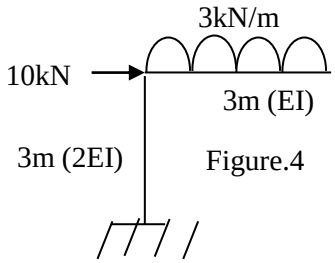

Figure.4

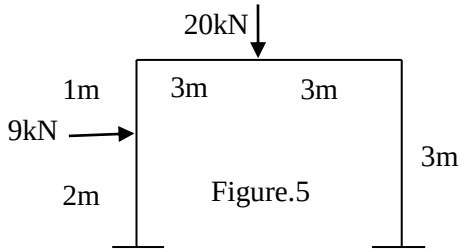

Figure.5

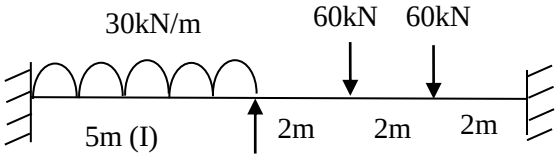

Figure.6