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## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE- SEMESTER-V (NEW) EXAMINATION - WINTER 2020** 

Subject Code:2150608 Date:20/01/2021

**Subject Name:Structural Analysis-II** 

Time: 10:30 AM TO 12:30 PM **Total Marks: 56** 

## **Instructions:**

- 1. Attempt any FOUR questions out of EIGHT questions.
- 2. Make suitable assumptions wherever necessary.

	<b>3.</b> ]	rigures to the right indicate full marks.	
Q.1	(a) (b)	Explain the term: Distribution factor, Carry over factor, Carry over moment. State and explain Castigliano's first theorem.	03 04
	(c)	Using Castigliano's second theorem, find the reaction at point B of the propped cantilever beam as shown in the <b>Fig. 1.</b>	07
Q.2	(a)	Write down equation for fixed end moment for the fixed beam in the case of sinking of support.	03
	<b>(b)</b>	Write only slope deflection equations for the frame shown in Fig. 1.	04
	(c)	Analyze and draw the SFD & BMD for the beam shown in <b>Fig. 2</b> by slope deflection method.	07
Q.3	(a)	Find out distribution factor for the frame shown in Fig. 2.	03
	<b>(b)</b>	Find out distribution factor for the frame shown in <b>Fig. 3.</b>	04
	<b>(c)</b>	Analyze and draw the SFD & BMD for the beam shown in <b>Fig. 2</b> by Moment	07
		distribution method.	
Q.4	(a)	Define Stiffness and Flexibility.	03
	(b)	Derive the Stiffness Matrix [S] for the beam as shown in <b>Fig. 2.</b>	04
	(c)	Analyze the frame shown in Fig. 3 by Moment distribution method	07
Q.5	(a)	Define sway. What are the causes for sway in portal frames?	03
	<b>(b)</b>	State and explain Muller Breslau principle for influence line.	04
	(c)	Draw the ILD for reaction $V_a$ , $V_b$ and $V_c$ for the two span continuous beam as shown in Fig 4. Compute ordinates at 2 m interval.	07
Q.6	(a)	Write properties of stiffness matrix.	03
	<b>(b)</b>	A simply supported beam AB has span 8 m. Draw ILD for R <sub>a</sub> , R <sub>b</sub> ,V <sub>x</sub> , M <sub>x</sub> for	04
		section X at 3 m from left hand support.	
	(c)	Analyse the beam shown in <b>Fig.5</b> using stiffness matrix method.	07
Q.7	(a)	State Castiglione's first and second theorem with its usefulness.	03
	<b>(b)</b>	Derive the stiffness matrix [S] only for the beam shown in Fig. 6.	04
	(c)	Analyse the frame as shown in <b>Fig. 7</b> using stiffness matrix method.	07
Q.8	(a)	Enlist the difference between stiffness matrix method and flexibility matrix	03

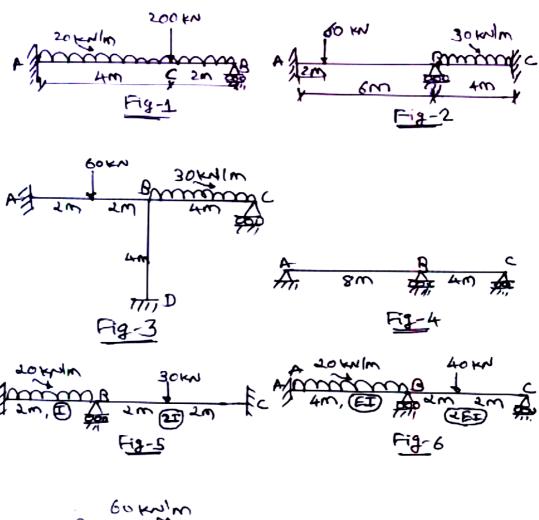
method.

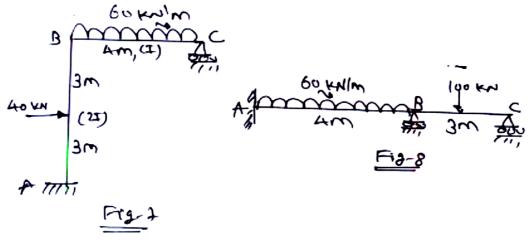


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- (b) Formulate the flexibility matrix for the beam shown in **Fig. 6.**
- 04 07
- (c) Find the matrices:  $[D_Q]$ ,  $[D_{QL}]$ , [F] and [Q] with usual notations for the beam shown in **Fig. 8.** Use Flexibility method assuming moment  $(M_a)$  and moment  $(M_b)$  as redundant.





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