Seat No.: _____ Enrolment No._____

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.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the term: Distribution factor, Carry over factor, Carry over moment.	**03**
	(b)	State and explain Castigliano's first theorem.	**04**
	(c)	Using Castigliano's second theorem, find the reaction at point B of the propped cantilever beam as shown in the **Fig. 1.**	**07**
Q.2	**(a)**	Write down equation for fixed end moment for the fixed beam in the case of sinking of support.	**03**
	(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 **Fig. 2** by slope deflection method.	**07**
Q.3	**(a)**	Find out distribution factor for the frame shown in **Fig. 2.**	**03**
	(b)	Find out distribution factor for the frame shown in **Fig. 3.**	**04**
	(c)	Analyze and draw the SFD & BMD for the beam shown in **Fig. 2** by Moment distribution method.	**07**
Q.4	**(a)**	Define Stiffness and Flexibility.	**03**
	(b)	Derive the Stiffness Matrix [S] for the beam as shown in **Fig. 2.**	**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)	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)	A simply supported beam AB has span 8 m. Draw ILD for R_a, R_b,V_x, M_x for section X at 3 m from left hand support.	**04**
	(c)	Analyse the beam shown in **Fig.5** using stiffness matrix method.	**07**
Q.7	**(a)**	State Castiglione's first and second theorem with its usefulness.	**03**
	(b)	Derive the stiffness matrix [S] only for the beam shown in **Fig. 6**.	**04**
	(c)	Analyse the frame as shown in **Fig. 7** using stiffness matrix method.	**07**
Q.8	**(a)**	Enlist the difference between stiffness matrix method and flexibility matrix method.	**03**

(b) Formulate the flexibility matrix for the beam shown in **Fig. 6.** **04**

(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. **07**

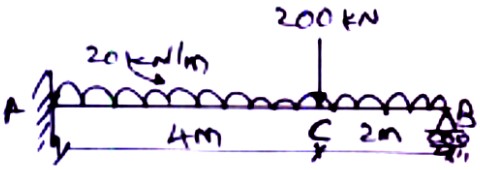

Fig-1

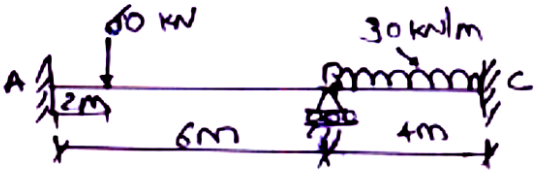

Fig-2

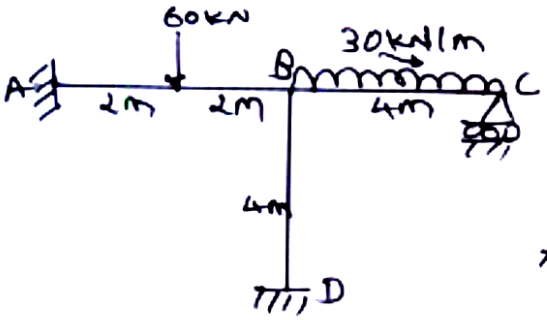

Fig-3

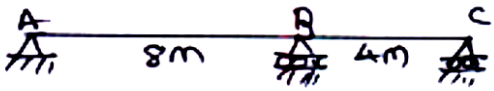

Fig-4

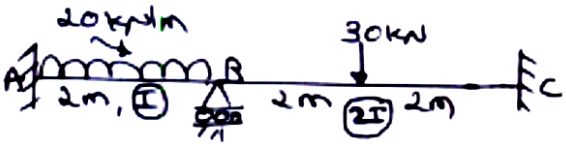

Fig-5

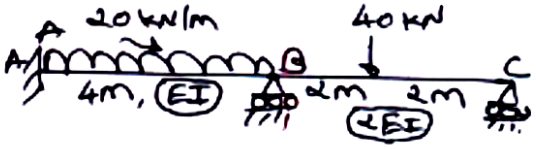

Fig-6

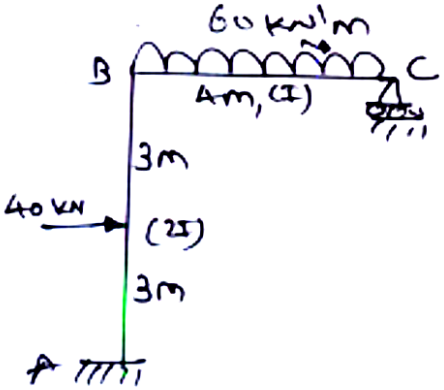

Fig-7

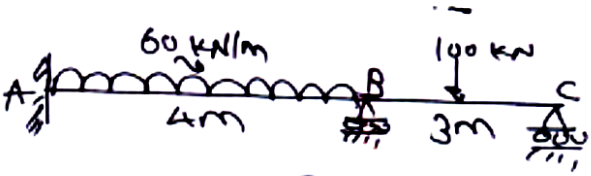

Fig-8

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