GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3150614 **Date:03/02/2021**

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.**

			Marks
Q.1	**(a)**	Define portal frame. Discuss the causes of sway in a portal frame.	**03**
	(b)	Define: 1) Distribution Factor 2) Relative stiffness	**04**
	(c)	Analyse the two storey portal frame shown in figure-1.Consider UDL Value=3 KN/Meter.	**07**
Q.2	**(a)**	Discuss the uses of slope deflection method.	**03**
	(b)	Derive shear equation in the case of analyzing the portal frame with side sway.	**04**
	(c)	Analyse the beam shown in figure-2 by slope deflection method. Also plot BMD.	**07**
Q.3	**(a)**	Discuss framed structures and enlist the types of framed structures.	**03**
	(b)	Discuss actions and displacements.	**04**
	(c)	Write the differences between Stiffness Method and Flexibility Method.	**07**
Q.4	**(a)**	State and prove the Castingliano's 1^{st}Theorem.	**03**
	(b)	Calculate the central deflection for a simply supported beam of length 'l' subjected to audl'w'throughout its span using Castingliano's 1^{st}Theorem.	**04**
	(c)	Analyse the beam shown in figure-3 by Flexibility Method.	**07**
Q.5	**(a)**	Discuss Castingliano's 2^{nd} Theorem.	**03**
	(b)	Determine the reactions at the supports for a propped cantilever beam of length 'l' subjected to a udl 'w'throughout its span using principle of minimum strain energy.	**04**
	(c)	For a cantilever beam, show that stiffness and flexibility matrices are reciprocal to each other.	**07**
Q.6	**(a)**	What is influence line diagram? What is the significance of influence line diagram?	**03**
	(b)	State Mullar Breslau's principle.	**04**
	(c)	Draw the influence line diagrams for support reactions V_a and V_b for a propped cantilever beam shown in figure-4.	**07**
Q.7	**(a)**	Calculate the deflection at the free end of a cantilever beam subjected to udl using Castingliano's 1^{st} Theorem.	**03**
	(b)	Discuss Castingliano's 2^{nd} Theorem to solve an indeterminate truss.	**04**
	(c)	Draw the Influence line diagram for Reactions at the supports and shear force and bending moments at any section C for a simply supported beam.	**07**
Q.8	**(a)**	Discuss limitations of Castingliano's 1^{st} Theorem.	**03**
	(b)	Write the characteristics of ILD for statically indeterminate structures.	**04**

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(c) A train of loads shown in figure-5 crosses a simply supported girder **07**

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of span 18m from left to right. Calculate maximum SF and BM at section 8m from left.

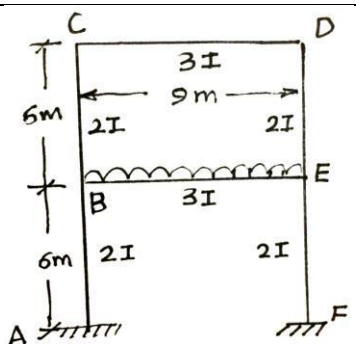

Figure-1

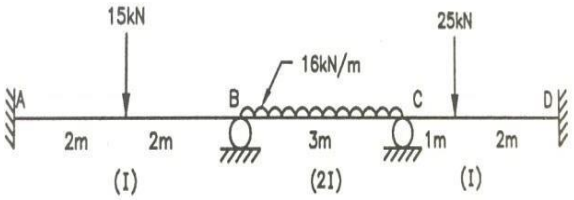

Figure-2

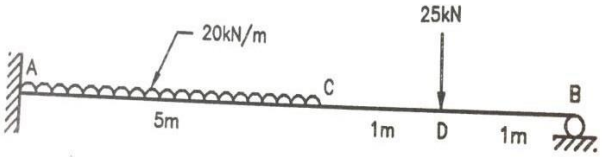

Figure-3

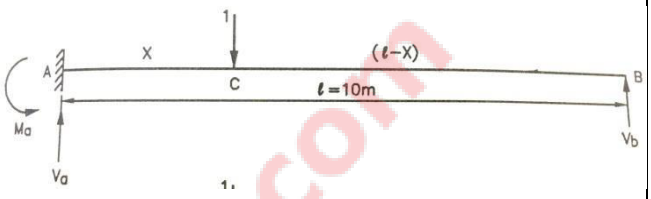

Figure-4

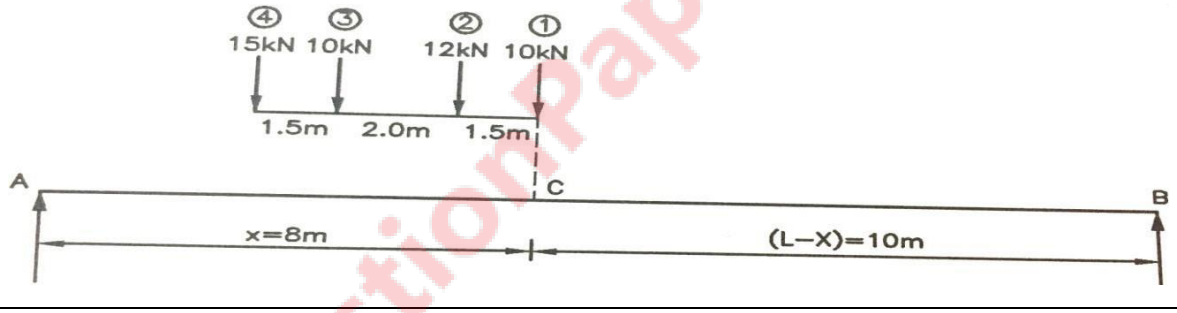

Figure-5

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