Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2024

Subject Code:2150608 Date:20-11-2024

Subject Name: Structural Analysis-II

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. **Simple and non-programmable scientific calculators are allowed.**

Q.1	**(a)**	Write the differences between statically determinate and indeterminate structures.	**03**
	(b)	A simply supported beam subjected udl ‘w’ per unit run over its entire span. Determine deflection at centre of a beam. Take EI = constant.	**04**
	(c)	Discuss Castigliano’s second theorem to solve an indeterminate truss.	**07**
Q.2	**(a)**	Give characteristics of flexibility Matrix.	**03**
	(b)	Determine reaction at prop B using unit load method, for a beam shown in Figure 1.	**04**
	(c)	Analyse the beam shown in Figure 2 by slope deflection method and draw shear force and bending moment diagram.	**07**
		OR	
	(c)	Using the slope deflection method, analyse the given frame shown in Figure 3.	**07**
Q.3	**(a)**	Define: Sway. What are the causes for Sway in portal frames?	**03**
	(b)	Analyse the beam shown in Figure 4 by moment distribution method and draw bending moment diagram.	**04**
	(c)	Solve above example, Q: 3(b), if support A and C are fixed.	
		OR	
Q.3	**(a)**	Define: (i) Carry over moment (ii) Absolute maximum bending moment (iii) Distribution factor	**03**
	(b)	Write assumptions made in slope deflection method.	**04**
	(c)	A beam AB having span 12 m with concentrated loads 40kN and 20 kN at 4 m and 6 m from left support A. Find the reactions at A and B using ILD.	**07**
Q.4	**(a)**	Write importance of the influence line diagram.	**03**
	(b)	Explain Muller Breslau principle with appropriate sketches.	**04**
	(c)	Using influence line diagram, determine the shear force and bending moment at section C in 4 m. Refer Figure 5.	**07**
		OR	
Q.4	**(a)**	Write assumptions made in cantilever method of approximate analysis.	**03**
	(b)	Which are the characteristics of ILD for statically indeterminate structure?	**04**
	(c)	What is qualitative influence line and quantitative influence line?	**07**

Q.5	**(a)**	Write about the types of skeletal structures.	**03**
	(b)	Which are the properties of stiffness matrix?	**04**
	(c)	Analyse the given frame, Figure 6, by stiffness matrix method. EI is uniform throughout. Determine displacement only.	**07**

OR

Q.5	**(a)**	How size of flexibility matrix is decided?	**03**
	(b)	Explain DQ, DQL, F, and Q in flexibility method.	**04**
	(c)	Differentiate: Stiffness method and Flexibility method. Which method is suitable for general computer programming? Why?	**07**

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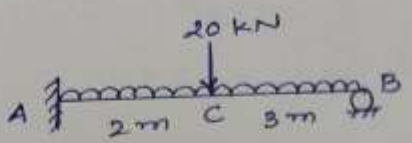


Figure · 1

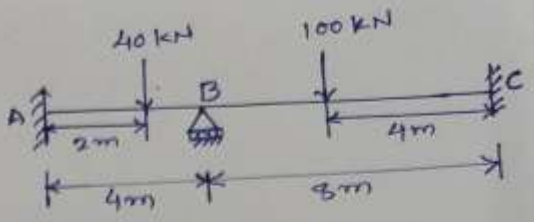
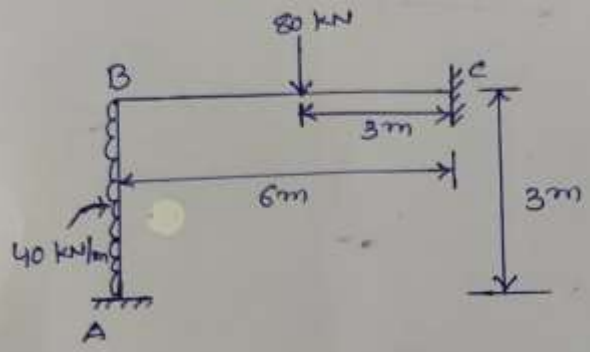


Figure : 2



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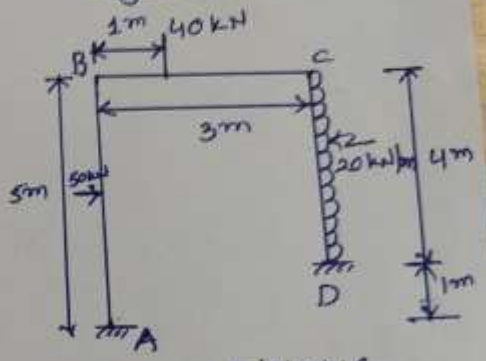

Figure:6

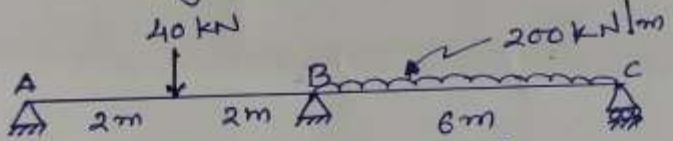

Figure: 4

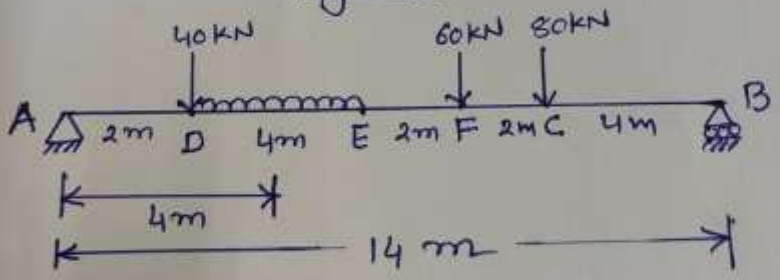

Figure: 5