U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

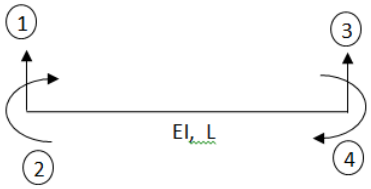
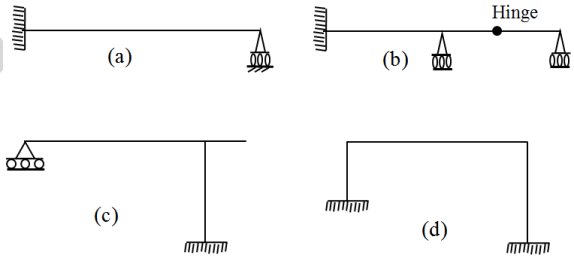
Branch: CIVIL ENGINEERING **Duration: 3 hrs.**

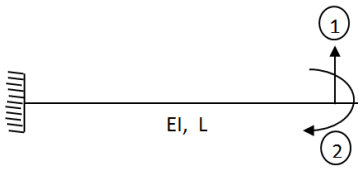
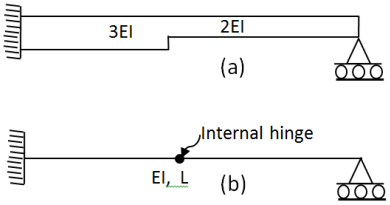
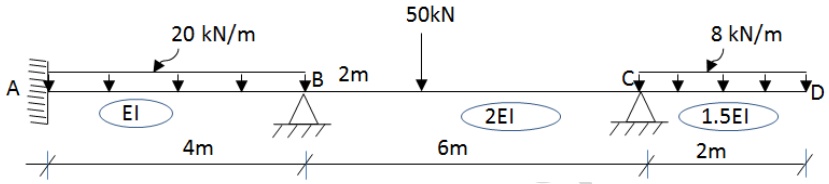
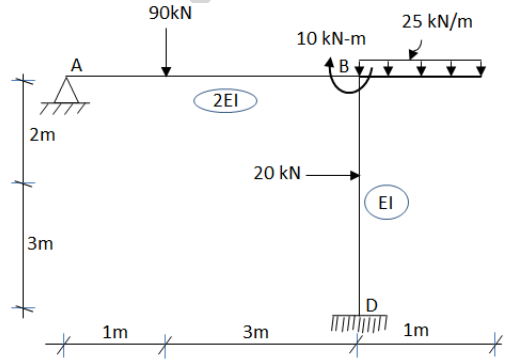
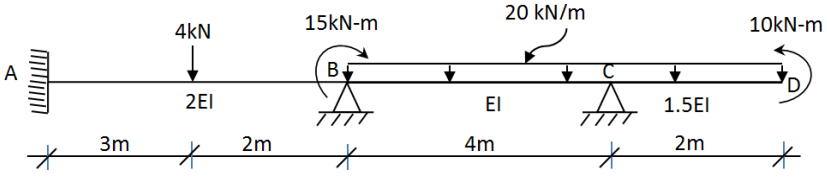
Course Code: 23CV6PECMA **Max Marks: 100**

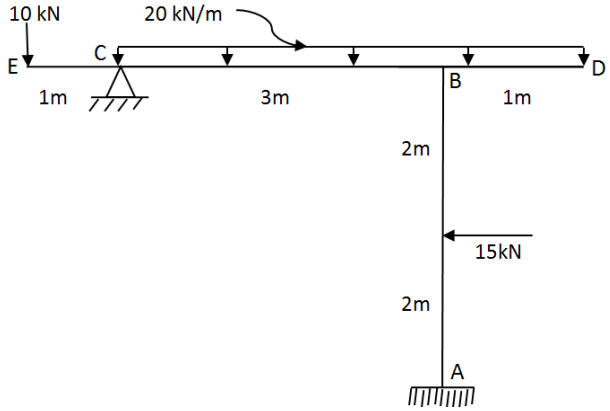
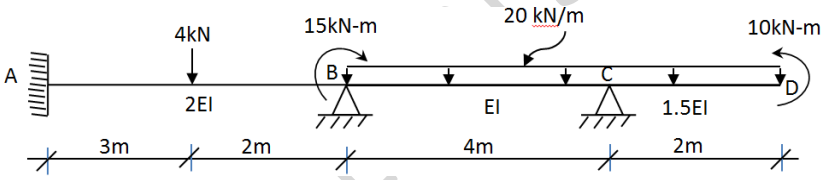
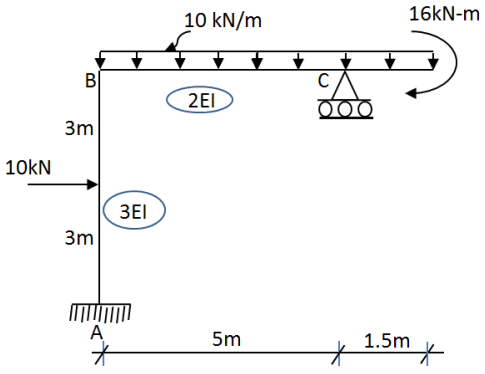
Course: Computational Methods of Structural Analysis

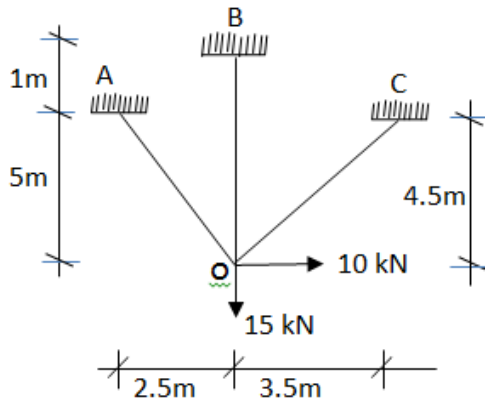
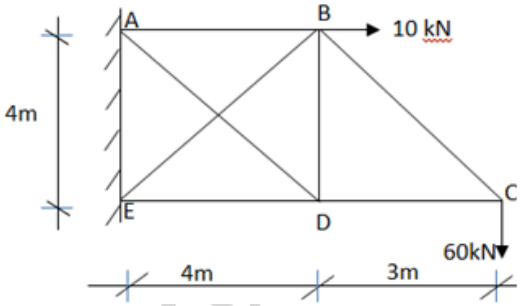
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)		Discuss the following in the context of structural analysis: (i) Degrees of freedom (ii) Local and global coordinate systems	CO1	PO1	**04**
	b)		Develop stiffness matrices for the beam element shown in the Fig.1 with respect to the given co-ordinates.  Fig. 1	CO1	PO1	**08**
	c)		Determine the degree of static indeterminacy and kinematic indeterminacy of the structural members shown in Fig. 2.  Fig. 2	CO1	PO1	**08**
			OR			
2	a)		Discuss the following: (i) Stiffness and Flexibility (ii) Static and kinematic degree of indeterminacy	CO1	PO1	**08**
	b)		Develop flexibility and stiffness matrices for the beam element shown in the Fig.3 with respect to the given co-ordinates.	CO1	PO1	**08**

			 Fig. 3			
		c)	Determine the degree of static indeterminacy and kinematic indeterminacy of the structural members shown in Fig. 4.  Fig. 4	*CO1*	*PO1*	**04**
			UNIT - II			
3			Analyse and sketch bending moment diagram and elastic curve for the beam shown in Fig. 5 by adopting flexibility method.  Fig. 5	*CO1*	*PO1* *PO2*	**20**
			OR			
4			Analyse and sketch bending moment diagram and elastic curve for the portal frame shown in Fig. 6 by adopting flexibility method.  Fig. 6	*CO1*	*PO1* *PO2*	**20**
			UNIT - III			
5			Analyse the continuous beam shown in Fig.7, by stiffness Method. Draw the bending moment diagram and elastic curve.  Fig. 7	*CO1*	*PO1* *PO2*	**20**

			OR			
	6		Analyze the frame shown in Fig. 8 by stiffness method and determine all the member end moments. Draw BMD and elastic curve.  Fig. 8	*CO1*	*PO1* *PO2*	**20**
			UNIT - IV			
	7		Analyse the continuous beam shown in Fig. 9, by direct stiffness method. Support 'B' and 'C' sinks by 5mm and 2mm respectively. Draw BMD and elastic curve. Given EI = 6000 kN-m^2.  Fig. 9	*CO2*	*PO1* *PO2*	**20**
			OR			
	8		Analyse the simple frame shown in Fig. 10, by direct stiffness method. Draw BMD and elastic curve.  Fig. 10	*CO2*	*PO1* *PO2*	**20**
			UNIT - V			
	9		Compute the displacements at node 'O' of the plane truss shown in Fig. 11 by using stiffness method. Also calculate axial forces in all the members of the truss. All members in the truss having same sectional area and young's modulus.	*CO1*	*PO1* *PO2*	**20**

			 Fig. 11			
			OR			
	10		Find the forces in all the members of the pin jointed truss shown in Fig. 12 by using direct stiffness method. All members in the truss having same sectional area and young's modulus.  Fig. 12	*CO2*	*PO1* *PO2*	**20**

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