U.S.N.										

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

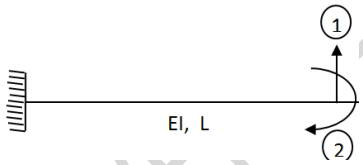
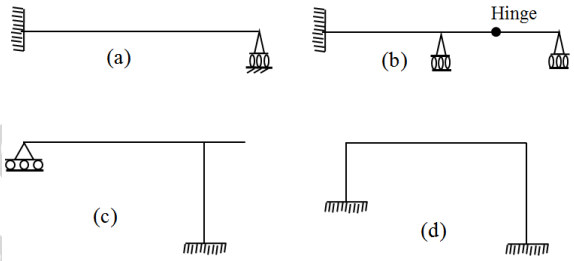
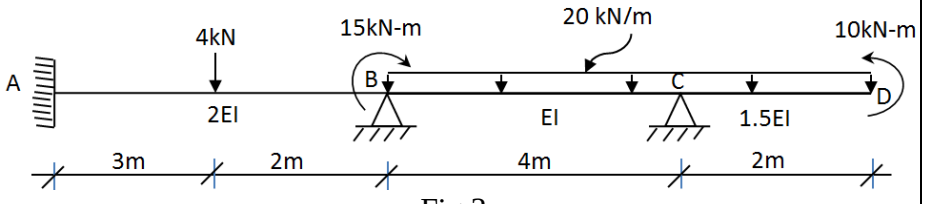
Autonomous Institute Affiliated to VTU

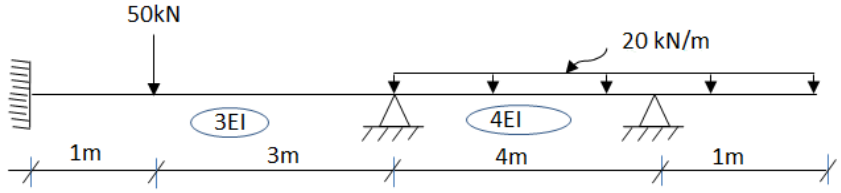
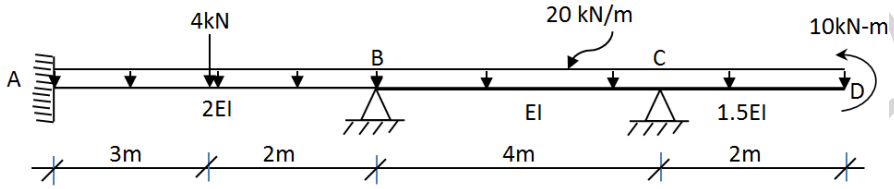
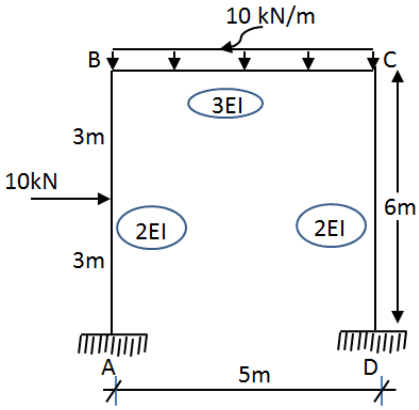
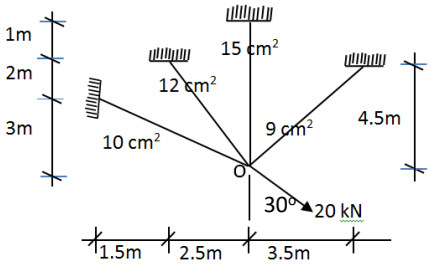
July 2023 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 20CV6PEMMA **Max Marks: 100**
Course: Matrix Method of Structural Analysis **Date: 17.07.2023**

Instructions: Answer any **five** full questions out of **six** questions.

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.

			CO	PO	Marks
1	a)	Define: (i) Static and kinematic Indeterminacy (ii) Stiffness and flexibility (iii) Degree of Redundancy (iv) Degrees of freedom	*CO1*	*PO1*	**08**
	b)	Derive the stiffness matrix of the beam element shown in the Fig.1 with respect to the given co-ordinates.  Fig. 1	*CO1*	*PO1*	**04**
	c)	Determine the degree of static and kinematic indeterminacy of the structures shown in Fig. 2.  Fig. 2	*CO1*	*PO1*	**08**
2		Analyse the continuous beam shown in Fig.3, by stiffness Method (element approach). End A is fixed and ends B & C are hinged. Draw the bending moment diagram and elastic curve.  Fig.3	*CO2*	*PO2*	**20**

	3		Analyse and sketch bending moment diagram and elastic curve for the beam shown in Fig. 4, by flexibility method (element approach).  Fig.4	*CO2*	*PO2*	**20**
	4		Analyze the continuous beam shown in Fig. 5 by Direct stiffness method and determine all the member end moments. Draw BMD and elastic curve.  Fig. 5	*CO3*	*PO2*	**20**
	5		Analyze the portal frame shown in Fig. 6, by Direct stiffness method. Draw Bending moment and elastic curve diagram.  Fig. 6	*CO3*	*PO2*	**20**
	6		Compute the displacements at node ‘O’ of the plane truss shown in Fig. 7 by forming stiffness matrix using displacement transformation matrix. Calculate also the axial forces in all members of the truss.  Fig. 7	*CO3*	*PO2*	**20**

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