U.S.N.										

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

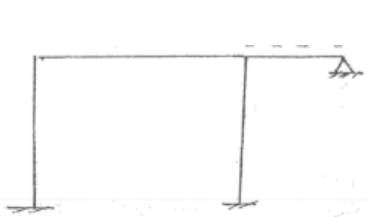
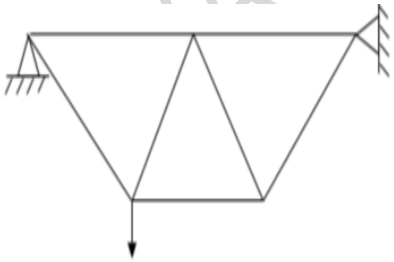
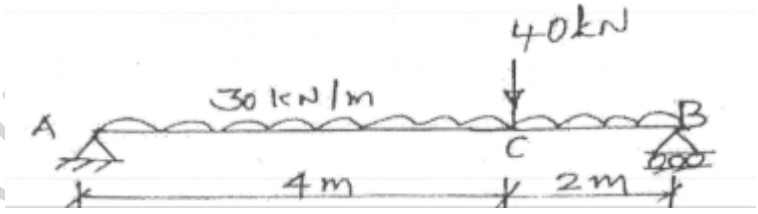
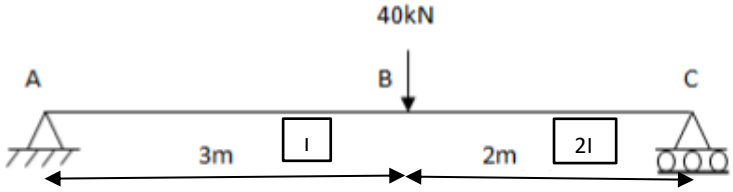
Autonomous Institute Affiliated to VTU

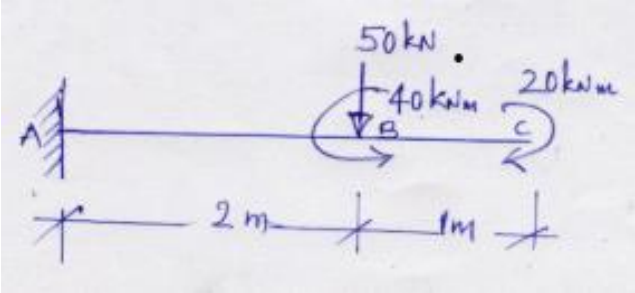
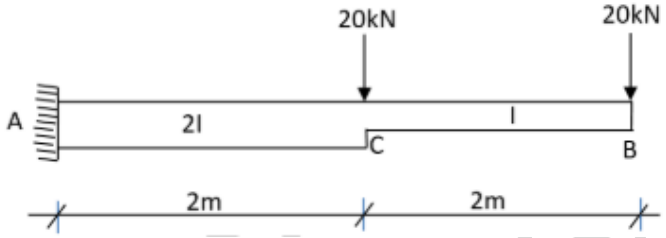
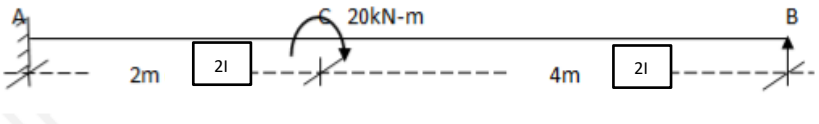
September / October 2024 Supplementary Examinations

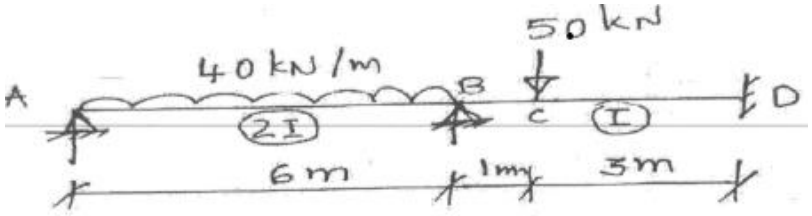
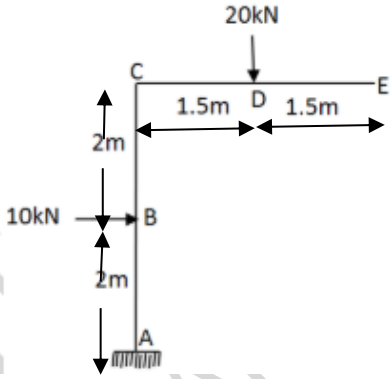
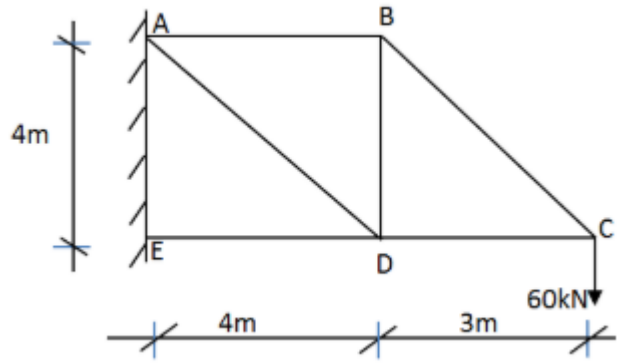
Programme: B.E. **Semester: IV**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 22CV4PCSTA **Max Marks: 100**
Course: STRUCTURAL ANALYSIS

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)	Determine the static and kinematic indeterminacies of structure shown in Fig 1(a&b)  Fig-1(a)  Fig-1(b)	CO1	PO 1,2	**06**
	b)	Determine the maximum slope and deflection under the 40kN load for the beam shown in fig 2 Macaulay's method. Assume EI is constant.  Fig-2	CO1	PO1,2	**14**
		UNIT - II			
2	a)	Analyze the beam shown in fig 3 for deflection under the load. Use conjugate beam method.  Fig-3	CO1	PO1,2	**10**

		b)	For the beam shown in Fig4 find the slope and deflection at the free end C by moment-area method. Assume EI constant.  Fig-4	*CO1*	*PO1,2*	**10**
			OR			
	3	a)	Find the maximum deflection and maximum slope for the beam shown in Fig 5 using conjugate beam method. Take E=200 GPa, $I=1.2x10^8\ mm^4$  Fig-5	*CO1*	*PO1, 2*	**10**
		b)	Calculate maximum deflection and slope at A for the beam shown in Fig-6 using Moment area method. Assume EI is constant.  Fig-6	*CO1*	*PO1, 2*	**10**
			UNIT - III			
	4	a)	A three hinged parabolic arch of span 36m and central rise 6m is subjected to an udl of intensity 40kN/m acting symmetrically on the arch, over a length of 20m.Determine the normal thrust, radial shear and bending moment at a section 6m from left support.	*CO1*	*PO1,2*	**10**
		b)	A cable is supported from two points A and B 80m apart. A is 6m below B and the lowest point of the cable is 12m below point A. The cable supports an udl of intensity 24kN/m over the entire span. Determine the size of the cable if the stress in cable is not to exceed $300N/mm^2$.	*CO1*	*PO1,2*	**10**
			UNIT - IV			
	5	a)	Analyze the given structure as shown in fig 7 by consistent deformation method.  Fig-7	*CO2*	*PO1, 2*	**10**

		b)	Analyze the continuous beam shown in fig 8 using Clapeyron's theorem of three moments. Support at A sinks by 2mm and Support at B sinks by 3mm.Take E=200GPa,I=2*10^8 mm^4 .Sketch the BMD and SFD.  Fig-8	*CO1*	*PO1, 2*	**10**
			UNIT - V			
	6	a)	Determine the vertical deflection at the free end of the rigid frame shown in fig 9 using unit load method. Assume EI is constant.  Fig-9	*CO2*	*PO1, 2*	**15**
		b)	State and explain Castigliano's first theorem	*CO2*	*PO1, 2*	**05**
			OR			
	7	a)	Determine the vertical deflection at point C in the truss shown in fig 10 below using unit load method. The cross-sectional area of members AD & DE are 1500 mm^2 while those of other members are 1000 mm^2 . Take E = 200 kN/mm^2 .  Fig-10	*CO2*	*PO1, 2*	**15**
		b)	Derive the expression for strain energy due to bending.	*CO2*	*PO1,2*	**05**

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