U.S.N.										

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

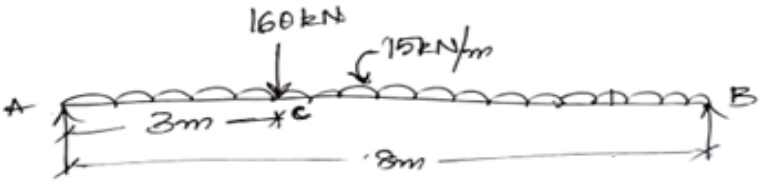
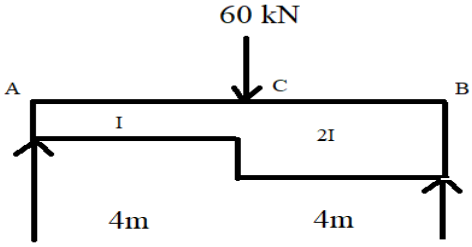
Autonomous Institute Affiliated to VTU

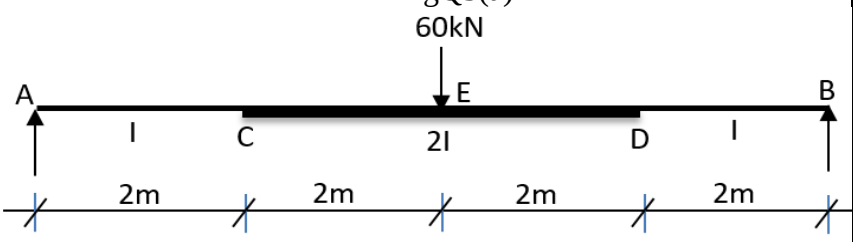
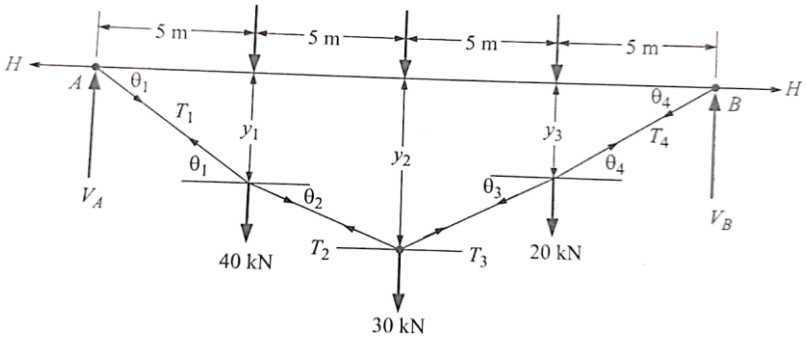
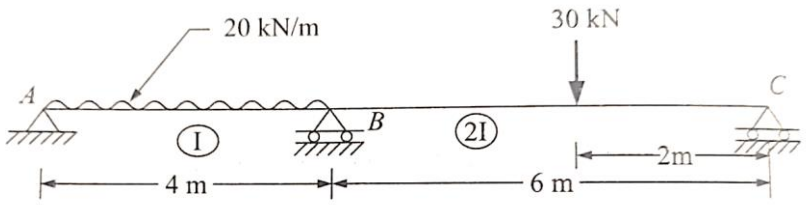
December / January 2024 Supplementary Examinations

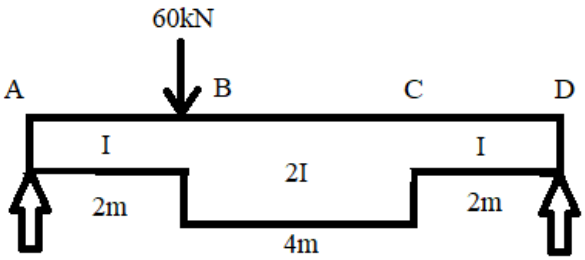
Programme: B.E. **Semester: IV**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 22CV4PCSTA **Max Marks: 100**
Course: STRUCTURAL ANALYSIS

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)		Explain determinate and indeterminate structures with examples.	CO1	PO1	**06**
	b)		Determine the slope of the beam at C using Macaulay's method for the beam shown in the figure below. Take EI = 40 x 10^3 kNm^2. 	CO1	PO1,2	**14**
			UNIT - II			
2	a)		Find the rotation and deflection at the free end of a cantilever beam carrying an udl of w kN/m for the first half of span from its support using moment area method. Take EI constant throughout the span L	CO 1	PO1,2	**08**
	b)		Determine the slope at A, B, C and deflection at C for the beam shown in the figure using conjugate beam method. 	CO 1	PO2	**12**
			OR			

	3	a)	State and explain the two Moment Area theorems with sketches.	*CO 1*	*PO1*	**06**
		b)	For the beam shown in FigQ3(a) find the deflection at the points 'C' & 'E' using conjugate beam method. FigQ3(a)  	*CO 1*	*PO1,2*	**14**
			UNIT III			
	4	a)	A light cable is suspended at 2 points 20m apart which are at same level. The cable supports point loads 40kN, 30kN and 20kN spaced at 5m c/c respectively. The dip at first point is found to be 0.8m. Determine the tension in different segments and also the total length of the cable shown in the figure below.  	*CO1*	*PO1,2*	**12**
		b)	Show that the bending moment is zero at all the points for a three hinged symmetrical parabolic arch of span"L" with central rise h subjected to udl w/ unit length throughout the span.	*CO1*	*PO1*	**08**
			UNIT - IV			
	5	a)	Analyze the propped cantilever beam with w kN/m udl throughout the span L by the method of Consistent Deformation. Assume (EI) is constant. Sketch BMD and SFD	*CO 1*	*PO1,2*	**08**
		b)	Analyze the two-span continuous beam shown in the figure using three moment equation. Also draw the BMD and SFD. Support B sinks by 2mm and support C sinks by 3mm EI=2.5×10^4 kNm^2  	*CO 1*	*PO2*	**12**

			UNIT - V			
	6	a)	Derive the equation for strain energy stored due to bending.	*CO 2*	*PO1*	**08**
		b)	Find the deflection under concentrated load using strain energy method for the beam shown below. Assume E = 200 kN/mm^2 and I = 1 x10^8 mm^4. 	*CO 2*	*PO1,2*	**12**
			OR			
	7	a)	A steel beam of uniform cross section is simply supported on a span of 10m and carries point loads of 50kN, 100kN, 150kN at a distance 2m, 5m, and 6m respectively from the left support. Compute the deflection under 150kN load using unit load method. Take EI = 4 x 10^4 kNm^2	*CO 2*	*PO1,2*	**12**
		b)	Using unit load method compute the deflection at mid span of a simply supported beam carrying a udl w kN/m throughout the span L. Assume uniform EI.	*CO 2*	*PO1,2*	**08**

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