U.S.N.										

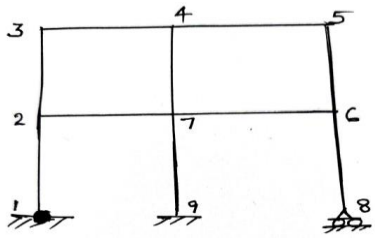
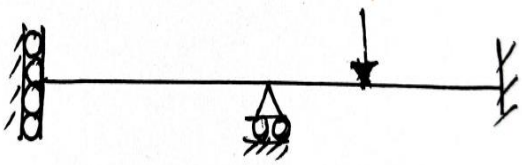
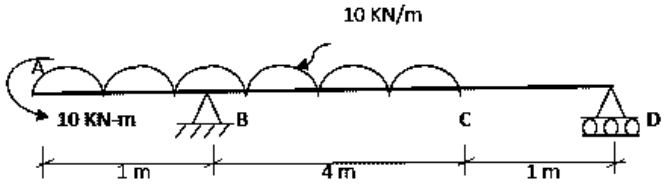
B.M.S. College of Engineering, Bengaluru-560019

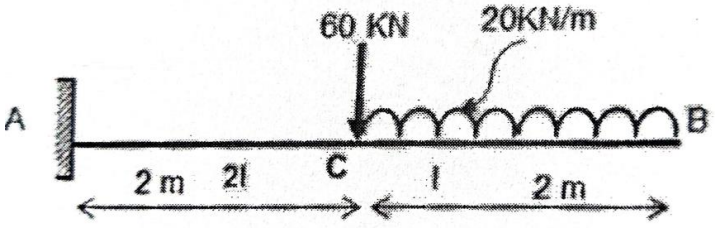
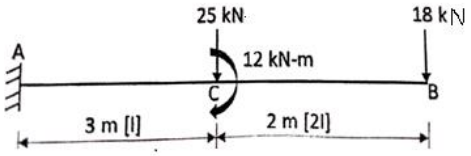
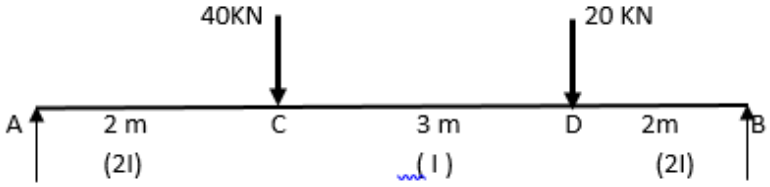
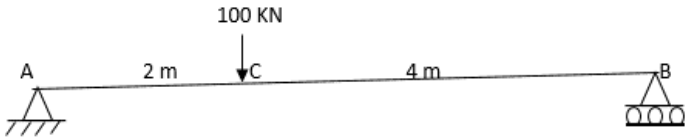
Autonomous Institute Affiliated to VTU

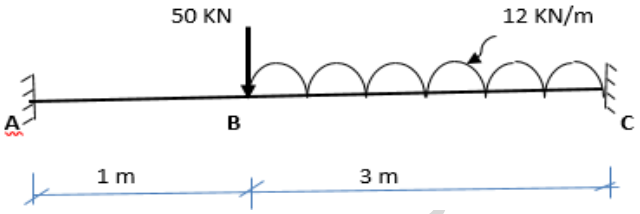
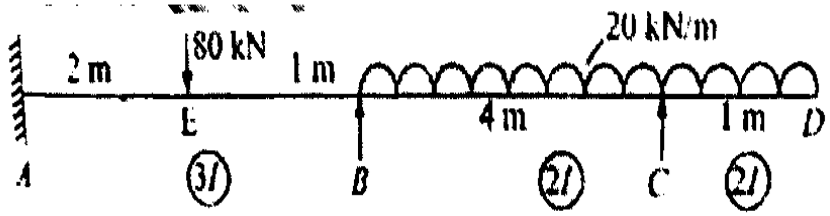
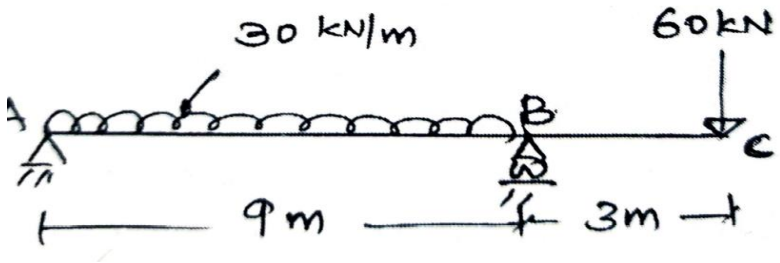
August 2024 Semester End Main Examinations

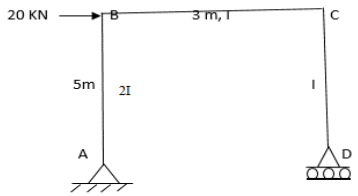
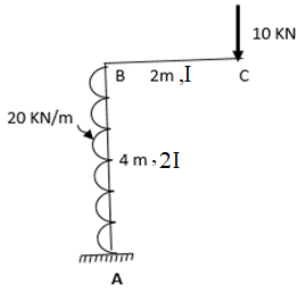
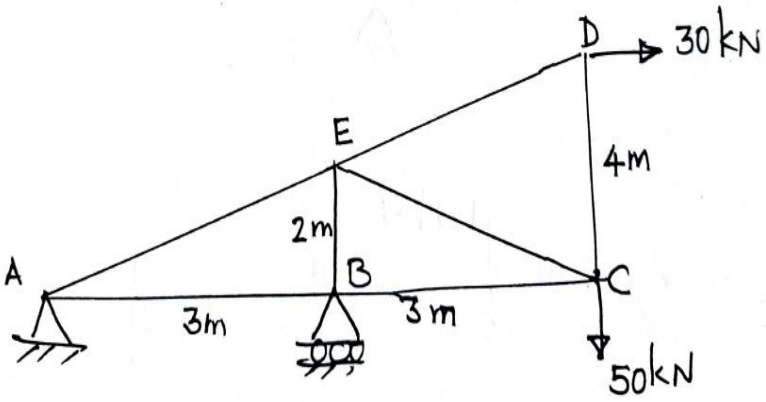
Programme: B.E. **Semester: IV**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 23CV4PCSTA **Max Marks: 100**
Course: Structural Analysis

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

		UNIT – I	*CO*	*PO*	Marks
1	a)	Determine the static indeterminacy of the structure shown in FigQ1(a).  FigQ1(a).	*CO* 1	*PO1*	**4**
	b)	Determine the kinematic indeterminacy of the structure shown in FigQ1(b) .  FigQ1(b)	*CO* 1	*PO1*	**4**
	c)	Evaluate the deflection at the point 'C' of the beam shown in FigQ1(c) using Macaulay's method. EI is constant and is equal to 20,000 KN-m^2  FigQ1(c)	CO1	*PO1*	**12**

			UNIT – II			
	2	a)	Evaluate the slope and deflection at the point B for the cantilever beam shown in FigQ2(a) using Conjugate Beam method. Take E=2x 10^5 N/mm^2 and I =6x10^8 mm^4.  FigQ2(a)	***CO*** 1	***PO1***	**10**
		b)	Analyze the cantilever beam shown in FigQ2(b) for slope and deflection at the point 'B' using moment area method. Take EI=26000 KNm^2.  FigQ2(b)	***CO*** 1	***PO1***	**10**
			OR			
	3	a)	For the beam shown in Fig Q3(a) determine the slope at B and deflection at the point C using Conjugate beam method  Fig Q3(a)	***CO*** 1	***PO1***	**10**
		b)	Evaluate the slope at B and the deflection under 100 KN point load for the beam shown in Fig Q3(b) using Moment area method. Assume EI=12000 KN –m ^{2}  Fig Q3(b)	***CO*** 1	***PO1***	**10**

			UNIT - III			
	4	a)	A parabolic cable is suspended from two points 'A' and 'B' 80 m apart. A is 5 m below B and the lowest point on the cable is 10 m below A. The cable supports an UDL of intensity 24 KN/m over the entire span. Compute the following (i) Vertical reactions at the supports (ii) Maximum tension in the cable (iii) Length of the cable	***CO*** 1	***PO1 PO2***	**10**
		b)	A three hinged parabolic arch of span 36 m and central rise 6 m carries an udl of 40 KN/m over the right half of the span and a point load of 50 KN at 8 m from left support. Determine the bending moment, normal thrust and radial shear at a section 10 from left support.	***CO*** 1	***PO1 PO2***	**10**
			UNIT – IV			
	5	a)	Analyze the fixed beam shown in Fig Q 5(a). Obtain the reactions at the supports.  Fig Q 5(a)	***CO*** 1	***PO1 PO2***	**7**
		b)	Analyze the continuous beam shown in FigQ5 (b) using Clapeyrons' theorem and draw the BMD and SFD. During loading support, A sinks by 4 mm ad B rises by 2 mm. Take EI=3,000 KNm$^{2.}$.  FigQ5 (b)	***CO*** 1	***PO1 PO2***	**13**
			UNIT – V			
	6	a)	Determine the deflection at the point 'C' of the beam shown in FigQ6(a) by Castigliano's first theorem. Take EI constant. Assume E=200 GPa, I=8x 10 ^{8} mm^{4}  FigQ6(a)	***CO*** 2	***PO1***	**10**

		b)	Determine the horizontal displacement at 'D' of the rigid frame shown in Fig Q6(b) using Unit load method.  Fig Q6(b)	***CO*** 2	***PO1***	**10**
			OR			
	7	a)	Determine the vertical displacement of the point C of the rigid frame shown in Fig Q7(a) using Castigliano's first theorem  Fig Q7(a)	***CO*** 2	***PO1***	**8**
		b)	Determine the vertical deflection at point 'D'of the pin jointed truss shown in FigQ7(b) using Unit load method. Assume E=200 GPa and areas of all members as 1000 mm^2.  FigQ7(b)	***CO*** 2	***PO1*** ***PO2***	**12**

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