CBCS SCHEME

USN | | | | | | | | | | |

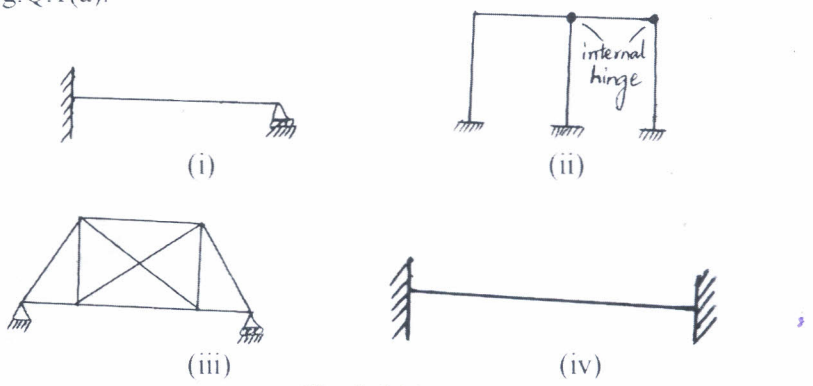
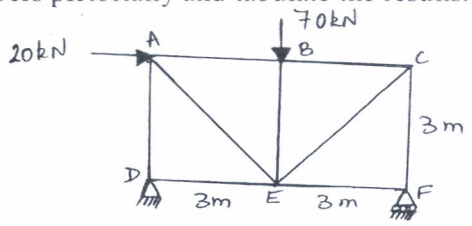
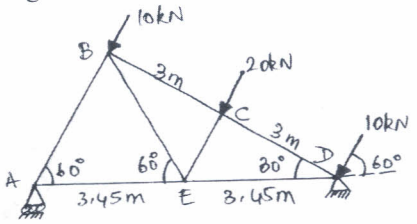
BCV401

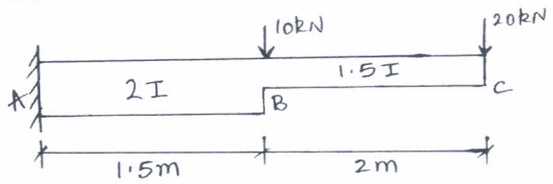
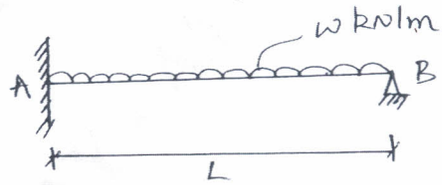
Fourth Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

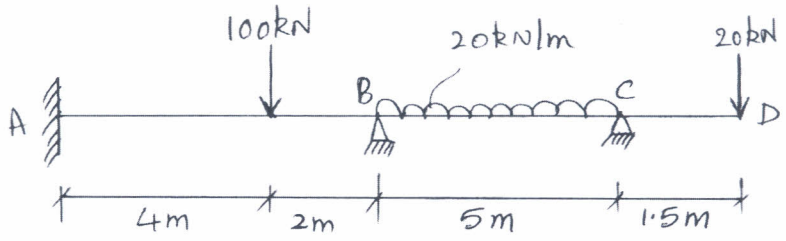
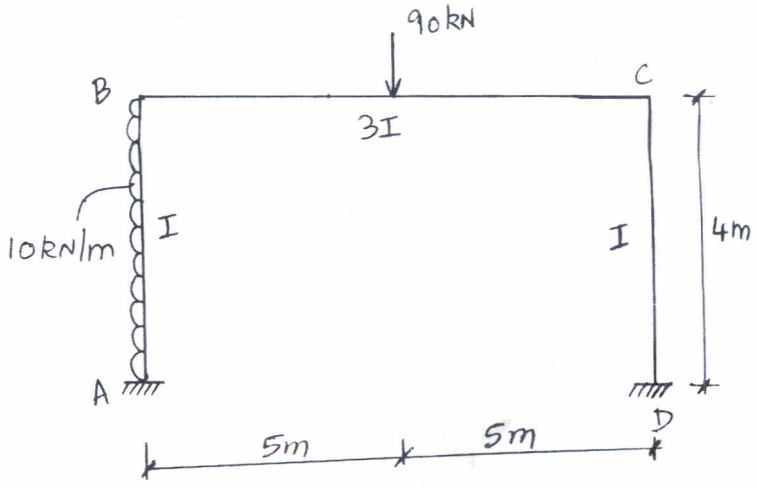
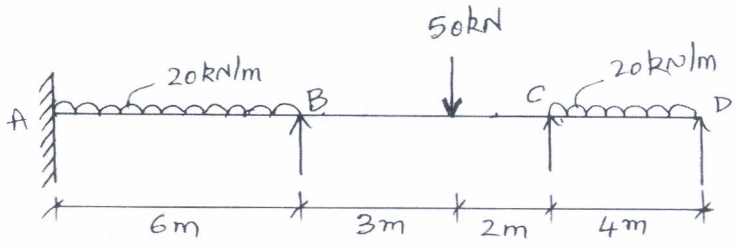
Analysis of Structures

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Find the static and kinematic indeterminacies of the following structures. Refer Fig.Q.1(a).  Fig.Q.1(a)	8	L3	CO1
	b.	Analyze the truss shown in Fig.Q.1(b) using method of joints. Indicate the forces in the members pictorially and tabulate the results.  Fig.Q.1(b)	12	L3	CO1
		OR			
Q.2	a.	Explain with examples, statically determinate and indeterminate structures.	6	L2	CO1
	b.	Find the forces in the members BC, BE and ED for the truss shown in Fig.Q.2(b). Use method of sections. Sketch appropriate figures by indicating sectional diagrams.  Fig.Q.2(b)	14	L3	CO1

		Module – 2			
Q.3	**a.**	State and explain Mohr's theorems.	**6**	**L1**	**CO2**
	b.	Analyze the beam shown in Fig.Q.3(b) using moment area method. Take EI = 15000kN-m^2.  Fig.Q.3(b)	**14**	**L3**	**CO2**
		OR			
Q.4	**a.**	State principle of virtual displacements and forces.	**5**	**L1**	**CO2**
	b.	Derive the expression for strain energy due to bending.	**10**	**L2**	**CO2**
	c.	State and explain Castigliano's theorems.	**5**	**L1**	**CO2**
		Module – 3			
Q.5		A three hinged parabolic arch having supports at different levels is of span 60m. Its abutments A and B are at depths of 15m and 30m from crown C. The arch carries UDL of 40kN/m over the portion AC and a point load of 200kN at a point 10m from B. Find the reactions, normal thrust, radial shear and bending moment at 15m from support A.	**20**	**L3**	**CO3**
		OR			
Q.6	**a.**	Explain the method of deriving equations for cable profile and tension in the cable when it is supported at the same level and subjected to UDL.	**6**	**L2**	**CO3**
	b.	A cable of uniform section is suspended between two supports of 100m span. It carries a UDL of 10kN/m spread over the horizontal span. The lowest point of the cable sags 10m below the supports. Find: i) Maximum and minimum tension in the cable. ii) Minimum cross-sectional area of the cable required, if the allowable stress is 300MPa. iii) Length of the cable.	**14**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Analyze the propped cantilever shown in Fig.Q.7(a) by using slope-deflection method. Draw bending moment and shear force diagrams.  Fig.Q.7(a)	**8**	**L4**	**CO4**

	b.	Analyze the continuous beam ABCD shown in Fig.Q.7(b) by slope-deflection method. Draw bending moment diagram. Take EI constant.  Fig.Q.7(b)	12	L4	CO4
		OR			
Q.8		Analyze the portal frame subjected to loads as shown in Fig.Q.8. Consider sway effects also draw bending moment diagram. By slope deflection method.  Fig.Q.8	20	L4	CO4
		Module – 5			
Q.9		Analyze the continuous beam shown in Fig.Q.9 by moment distribution method. The support B sinks by 10mm. Take E = 2×10^5N/mm^2 and I = 120×10^{-6}m^4.  Fig.Q.9	20	L4	CO5

OR

Q.10	**a.**	Explain fixed end moments for different loading conditions with relevant diagrams.	**5**	**L2**	**CO5**
	b.	Analyze the frame shown in Fig.Q.10(b) by moment distribution method and draw bending moment diagram. Assume EI constant.	**15**	**L4**	**CO5**

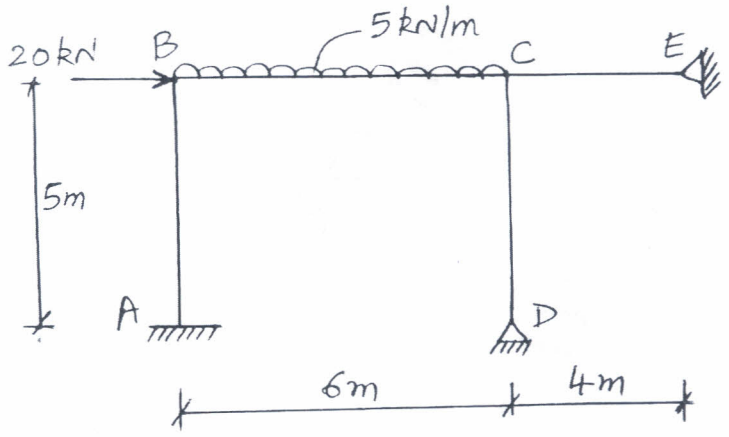


Fig.Q.10(b)

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