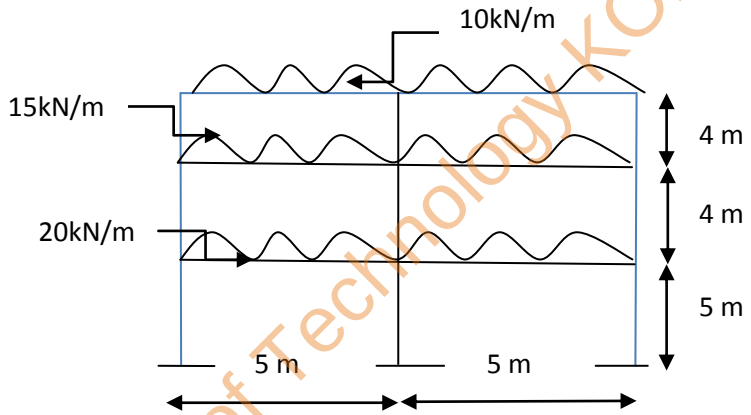
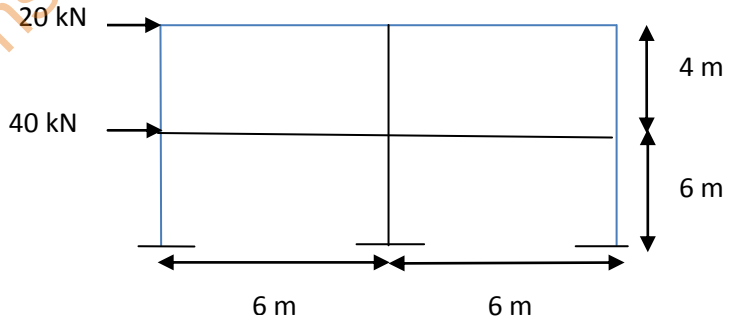
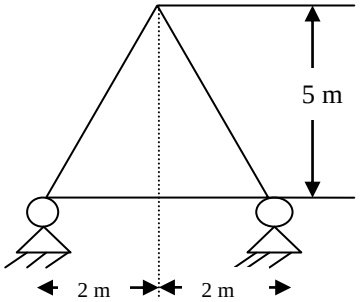
2022
(DECEMBER)

STRUCTURAL ANALYSIS III

Full Marks : 100
Pass Marks : 30
Time : Three hours

The figures in the margin indicate full marks for the questions.
*Answer **any five** questions.*
"Assumptions made should be clearly stated"
"Illustrate answers with real sketches whenever required"

1		Analyse the building frame subjected to vertical loading as shown in Figure 1. The dead load of the column is 3.5 kN/m. Also draw the BMD.  Figure 1	20
2	a)	Analyse the building frame shown in Figure 2 using the portal method.  Figure 2	4+3+3=10
2	b)	Analyse the building frame shown in Figure 2 in question no 2 a using the cantilever method.	10
3	a)	What is the difference between flexibility matrix method and stiffness matrix method of analysis? Derive the expression for flexibility matrix of a	

		structure having two coordinates.	2+8 = 10
	b)	How is the structure stiffness matrix developed? Write down the expression for stiffness matrix of a structure having 'n' coordinates.	6+4= 10
4		Construct the structure stiffness matrix for the truss shown in Figure 4. AE is constant.  	20
5	a)	Write five basic criteria for occurring plastic hinge.	5
	b)	Show that for a circular beam section, $M_p = 1.7\ M_y$.	5
	c)	Show that load factor= F.O.S. × shape factor	10
6	a)	A simply supported beam of length 'l' carries a point load at center. Find the length of the plastic hinge, if the shape factor for the beam section is K_s.	10
	b)	What is collapse mechanism? What are the different types of collapse mechanism, give examples.	2+8 = 10

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