USN | 1 | A | Y | 2 | 4 | C | V | 4 | 0 | 2 |
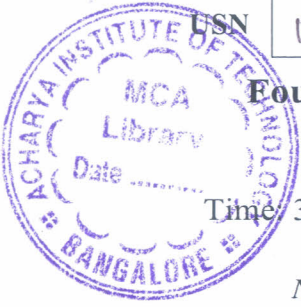
BCV401

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
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.	Difference between statically determinate and indeterminate beams with example.	6	L1, L2	CO1
	b.	Define degree of freedom. What is the degree of freedom for a i) Fixed support ii) Hinged support.	4	L1, L2	CO1
	c.	Determine static and kinematic indeterminacy for the following shown in Fig.Q.1(c).	10	L3	CO1

Fig.Q.1(c)

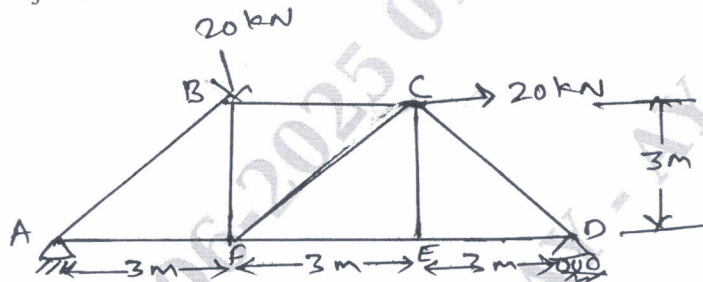|		**OR**			
Q.2	a.	Difference between linear and non linear system.	3	L1, L2	CO1
	b.	What are the assumptions in the analysis of trusses?	5	L1, L2	CO1
	c.	Determine the forces in all the members of the truss shown in Fig.Q.2(c) by method of joints. Fig.Q.2(c)	12	L3	CO1

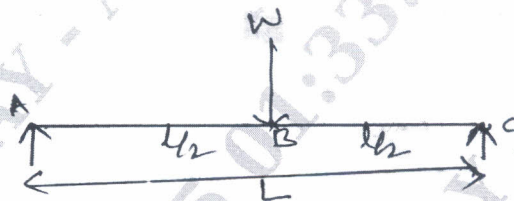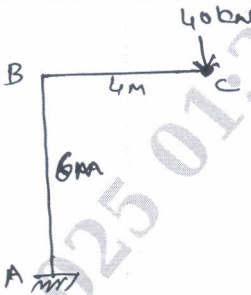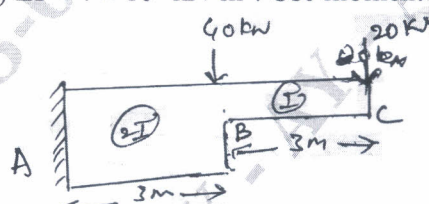|		**Module – 2**			
Q.3	a.	Derive the expression for strain energy stored in an prismatic element subjected to pure bending.	6	L3	CO2
	b.	Determine slope and deflection for the simply supported beam subjected to point load at mid span shown in Fig.Q.3(b) by moment area method. Fig.Q.3(b)	7	L3	CO2
	c.	Determine the slope and deflection at the free end of a cantilever beam as shown in Fig.Q.3(c) by moment area method (Take EI = 4000 kNm^2). Fig.Q.3(c)	7	L3	CO2
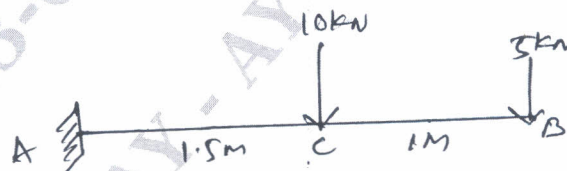
		OR			
Q.4	**a.**	Derive an expression for strain energy due to shear force.	6	L3	CO2
	b.	Determine the vertical deflection at point 'C' for the frame shown in Fig.Q.4(b) using Castigliano's theorem. EI = 16×10^4 kN-m^2. Fig.Q.4(b)	7	L3	CO2
	c.	Determine slope and deflection at the free end of a cantilever beam as shown in Fig.Q.4(c) EI = 4×10^5 kN-m^2. Use moment area method. Fig.Q.4(c)	7	L3	CO2
		Module – 3			
Q.5	**a.**	Show that the bending moment at any section as a three hinged parabolic arch of span 'l' and rise 'h' carrying udl of w/m over the entire span is zero.	6	L3	CO3
	b.	A three hinged parabolic arch of 20 m span and rise 5 m, carries a UDL of 40 kN/m on the entire span and a point load of 200 kN at 5 m from right end. Determine reaction, also determine BM, normal thrust and radial shear at 5 m from left support.	14	L3	CO3
		OR			
Q.6	**a.**	A cable of span 20 m and dip 4 m carries a UDL of 20 kN/m over the entire span. Find: i) Maximum tension in the cable ii) Minimum tension in the cable iii) Length of cable.	10	L3	CO3
	b.	A three hinged parabolic arch of span 20 m and rise 4 m carries a UDL of 20 kN/m over the left half of span. Find the maximum BM for the arch and also determine normal thrust and radial shear at a point 5 m from left support.	10	L3	CO3

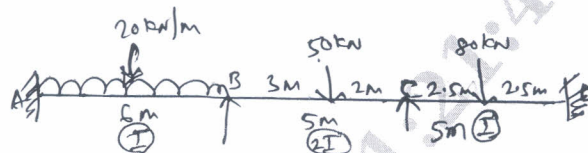|				
	Module – 4			
Q.7	Analyze the continuous beam shown in Fig.Q.7 by using slope deflection method. Draw BMD, SFD and elastic curve.	20	L4	CO4

Fig.Q.7

	OR			
Q.8	Analyze the portal frame shown in Fig.Q.8 by slope deflection method, draw BMD and elastic curve:	20	L4	CO4

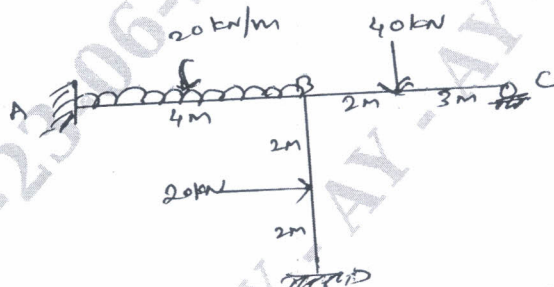Fig.Q.8

	Module – 5			
Q.9	Analyze the continuous beam shown in Fig.Q.9 by moment distribution method. Draw BMD and elastic curve.	20	L4	CO5

Fig.Q.9

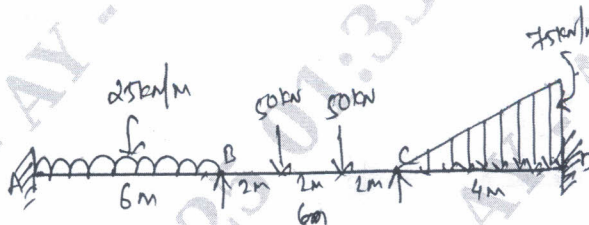|				
	OR			
Q.10	Analyze the portal frame as shown in Fig.Q.10 by moment distribution method and draw BMD.	20	L4	CO5

Fig.Q.10

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