

# CBCS SCHEME



BCV401

USN

--	--	--	--	--	--	--	--	--	--

## 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
<p>(i) (ii) (iii) (iv) (v)</p> <p>Fig.Q.1(c)</p>					
1 of 4					

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.	12	L3	CO1

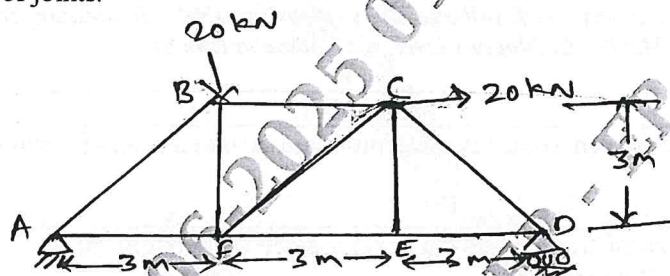


Fig.Q.2(c)

## 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.	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 $EI = 4000 \text{ kNm}^2$ ).	7	L3	CO2

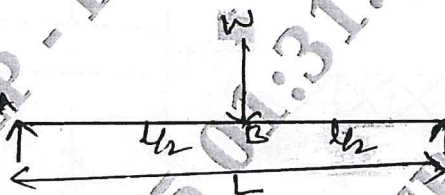


Fig.Q.3(b)

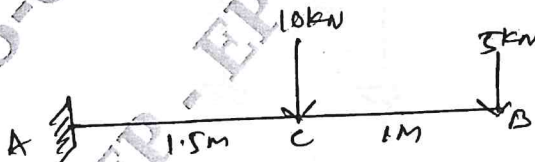
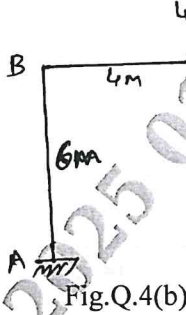
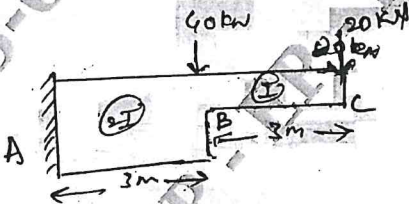


Fig.Q.3(c)

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. $EI = 16 \times 10^4 \text{ kN-m}^2$ .	7	L3	CO2
		 <p>Fig.Q.4(b)</p>			
	c.	Determine slope and deflection at the free end of a cantilever beam as shown in Fig.Q.4(c) $EI = 4 \times 10^5 \text{ kN-m}^2$ . Use moment area method.	7	L3	CO2
		 <p>Fig.Q.4(c)</p>			

## Module – 3

Q.5	a.	Show that the bending moment at any section of 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**

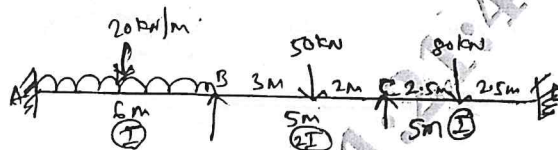


Fig.Q.7

OR

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

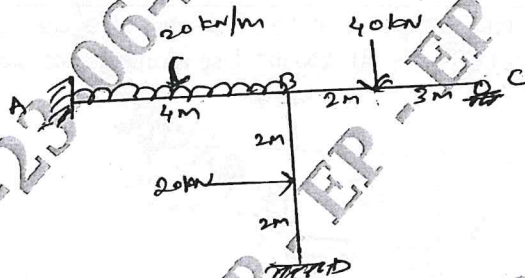


Fig.Q.8

## 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**

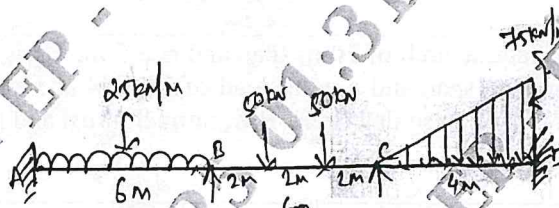


Fig.Q.9

OR

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

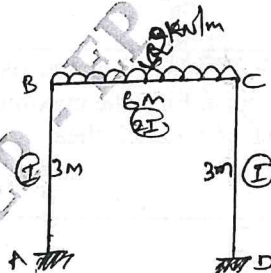


Fig.Q.10

\*\*\*\*\*