CBCS SCHEME

USN: LAY23CV422

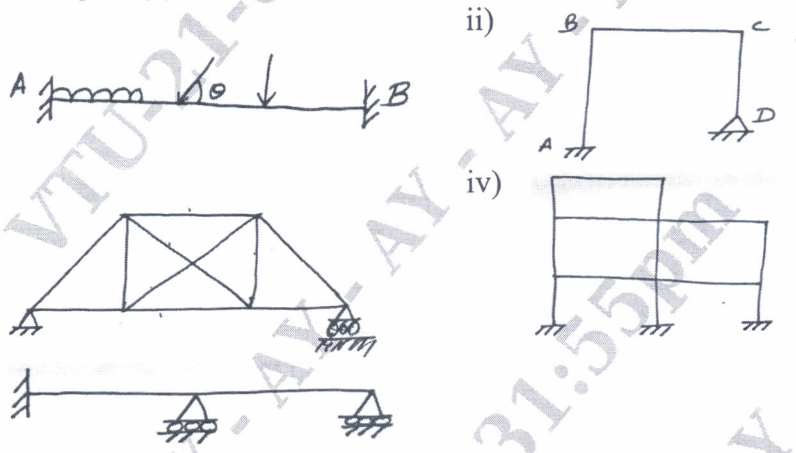
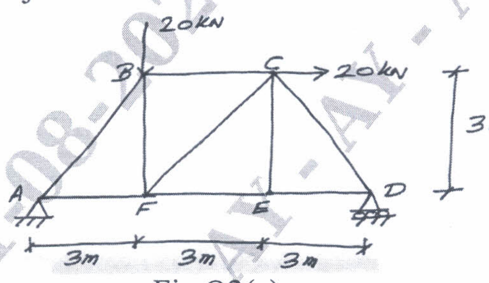
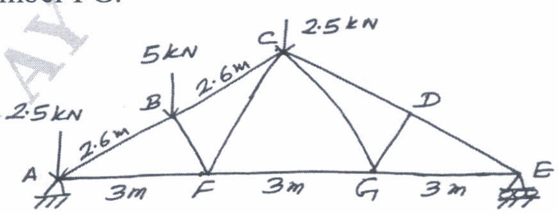
BCV401

Fourth Semester B.E./B.Tech. Degree 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.	Differentiate between statically determinate and indeterminate beams with an example for each.	06	L1	CO1
	b.	Define degree of freedom. What is the degree of freedom for a : (i) Fixed support (ii) Hinged support	04	L1	CO1
	c.	Determine static and kinematic indeterminacy for the following structures shown in Fig.Q1(c).  Fig.Q1(c)	10	L3	CO1
		OR			
Q.2	a.	Determine the forces in all the members of the truss shown in Fig.Q2(a), adopting method of joints.  Fig.Q2(a)	10	L3	CO1
	b.	Determine the forces in all the members listed below using method of sections. [Refer Fig.Q2(b)] (i) Force in member CD (ii) Force in member CG (iii) Force in member FG.  Fig.Q2(b)	10	L3	CO1

Module – 2

Q.3 a. Determine slope and deflection under the load for the beam as shown in Fig.Q3(a), using moment area method. — 10 | L3 | CO2

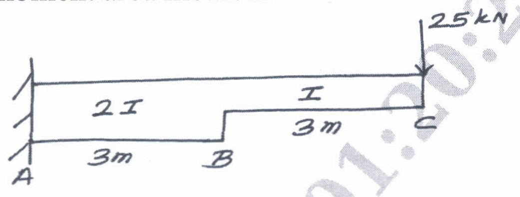


Fig.Q3(a)

b. Calculate the slope at support A and deflection at the centre of a simply supported beam as shown in Fig.Q3(b) by moment area method. — 10 | L3 | CO2

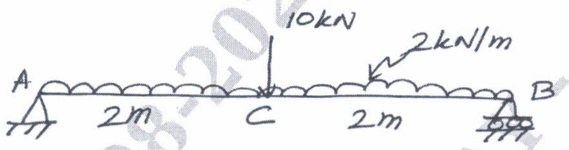


Fig.Q3(b)

OR

Q.4 a. Obtain an expression for strain energy stored in a member when it is subjected to (i) Bending moment (ii) Shear — 10 | L2 | CO2

b. Find the deflection under the load for the beam shown in Fig.Q4(b), by using Castiglino's theorem. Take $E = 2 \times 10^8$ kN/m^2 and $I = 14 \times 10^{-6}$ m^4. — 10 | L3 | CO2

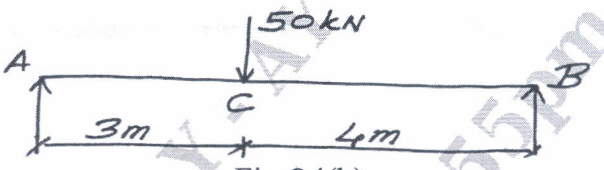


Fig.Q4(b)

Module – 3

Q.5 a. A symmetrical 3-hinged parabolic arch has a span of 25 m. It carries a UDL of intensity 20 kN/m over the entire span and 2 point loads of 20 kN each at 3 m and 6 m from the left support. Compute the reactions at the supports and also find the bending moment, radial shear and normal thrust at a section 4m from the left end. Take central rise as 5m. — 12 | L3 | CO3

b. Show that the shape of parabolic arch is a funicular shape for a three hinged arch subjected to UDL over its entire span. — 08 | L2 | CO3

OR

Q.6 A symmetrical unstiffened suspension cable is parabolic in shape and has a span of 300 m and a dip of 30 m. It supports a UDL of 20 kN/m over the whole span. If the maximum allowable stress is 150 N/mm^2, determine the length and area of the cable. What would be the increase in length and sag for a rise of temperature of 50°F. Given, coefficient of expansion, $\alpha = 6 \times 10^{-6}$ per °F. — 20 | L3 | CO3

Module – 4

Q.7 Analyze the beam completely by slope deflection method, when support B sinks by 1 mm and support C rises by 0.5 mm. Take EI = 30000 kN.m^2. Refer Fig.Q7. Draw BMD, SFD and Elastic Curve. — 20 | L3 | CO4

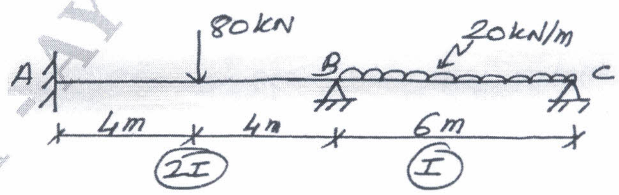
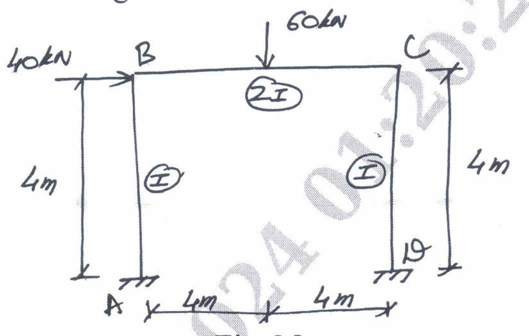
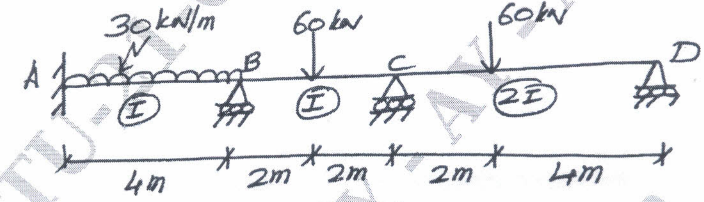
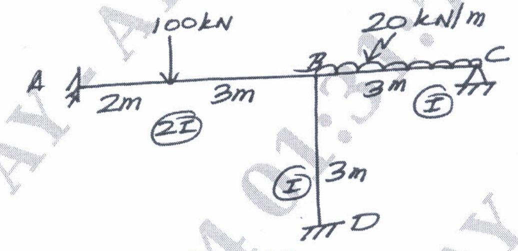


Fig.Q7

		OR			
Q.8		Analyze the portal frame shown in Fig.Q8 by slope-deflection method. Draw bending moment diagram.  Fig.Q8	**20**	**L3**	**CO4**
		Module – 5			
Q.9		Analyze the continuous beam shown in Fig.Q9 by moment distribution method. Draw bending moment and shear force diagram.  Fig.Q9	**20**	**L3**	**CO5**
		OR			
Q.10		Analyze the frame by moment distribution method. Draw BMD and SFD. Refer Fig.Q10.  Fig.Q10	**20**	**L3**	**CO5**

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