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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Civil Engineering

Semester End Examination; February / March - 2022

Analysis of Indeterminate Structures

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Analyze the redundant truss structures by strain energy method.

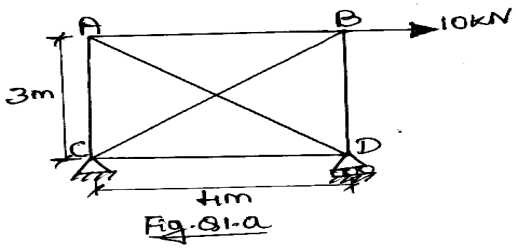
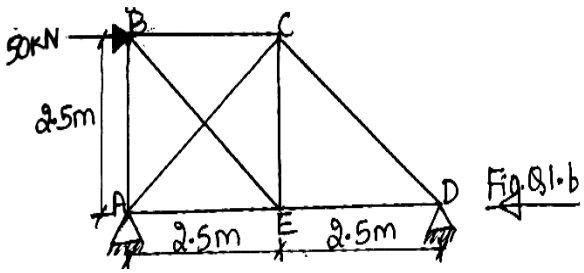
CO2: Analyze the continuous beams and frames by Slope Deflection method.

CO3: Analyze the continuous beams and frames by moment distribution method and Kani's method and understanding its iterative nature of obtaining solutions.

CO4: Analyze the continuous beams and frames by flexibility and stiffness matrix method of system approach.

***Note**: I) **PART - A** is compulsory. **Two** marks for each question.*

*II) **PART - B**: Answer any **ONE** full question (from a, b) for Maximum of **18 marks** from each unit.*

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	Define statically determinate structure with example.	2	L2	CO1	PO1,2
b.	Define slope and write the boundary conditions for fixed end and hinged end.	2	L1	CO2	PO1,2
c.	Define stiffness factor and distribution factor.	2	L1	CO3	PO1,2
d.	Write the advantages of kani's method.	2	L1	CO3	PO1,2
e.	Define flexibility coefficient f_{ij} and stiffness coefficient k_{ij}.	2	L1	CO4	PO1,2
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	Find the forces in all the members for the truss shown in Fig. Q1.a. The cross sectional area is 2000 mm^2 for all the members and E = 200 GPa.  Fig. Q1.a	18	L4	CO1	PO1,2
b.	Find the forces in all the members of the pin jointed plane frame shown in Fig. Q1.b. Take cross sectional area for all the members as 10 cm^2 and E = 200 GPa.  Fig. Q1.b	18	L4	CO1	PO1,2

Contd... 2

UNIT - II **18**

2 a. Analyse the continuous beam shown in Fig. Q2.a, by slope deflection method. Draw SFD and elastic curve.

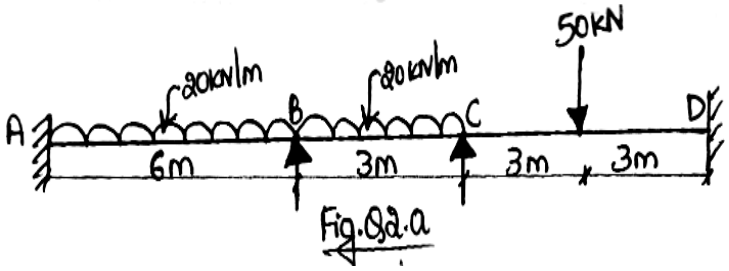


Fig.Q2.a

18 L4 CO2 PO1,2

b. Analyze the rigid jointed frame shown in Fig. Q2.b, by slope deflection method. Sketch BMD and the deflected shape of the frame.

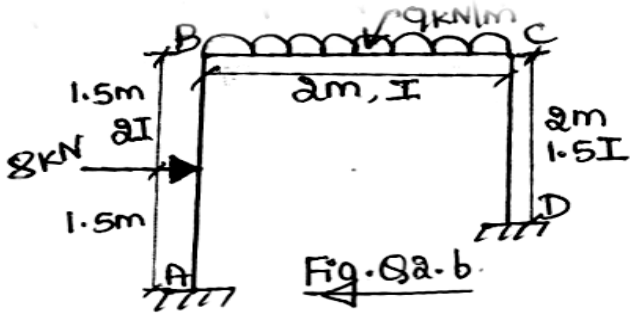


Fig.Q2.b

18 L4 CO2 PO1,2

UNIT - III **18**

3 a. Analyze the continuous beam shown in Fig. Q3.a, by moment distribution method. The support 'B' settles down by 10 mm relative to other supports. Sketch SFD and elastic curve. Take E = 200 GPa and $I = 1.2\times10^{-4}$ m^4.

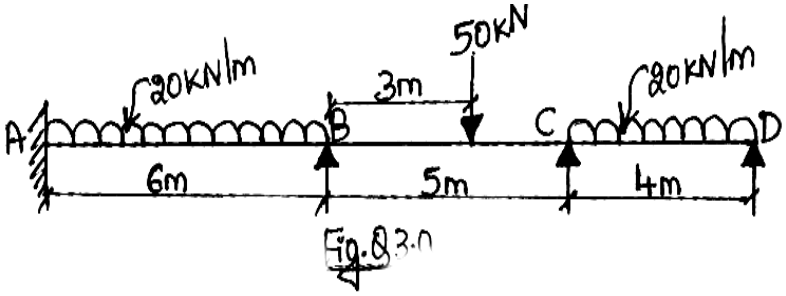


Fig.Q3.a

18 L4 CO2 PO1,2

b. Analyze the frame shown in Fig. Q3b, by moment distribution method. Draw BMD and elastic curve.

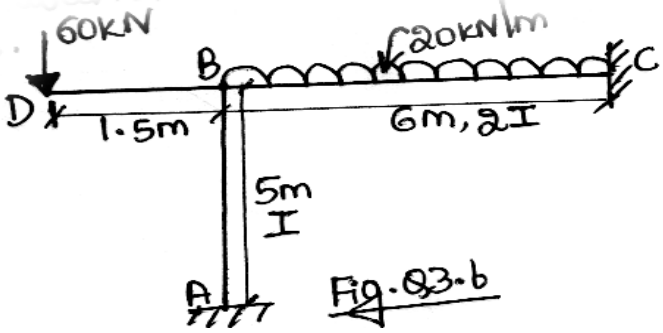


Fig.Q3.b

18 L4 CO3 PO1,2

Contd... 3

UNIT - IV **18**

4 a. Analyze the continuous beam shown in Fig. Q4.a, by Kani's method. Draw shear force diagram and bending moment diagram. Take EI as constant.

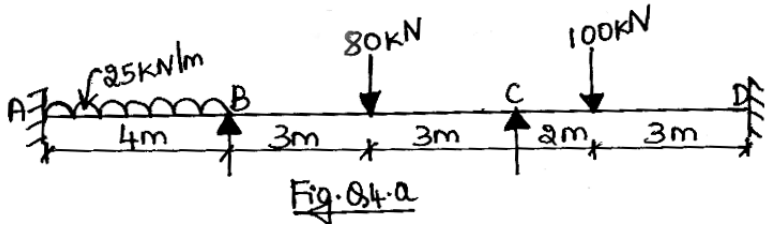


Fig.Q4.a

18 L4 CO3 PO1,2

b. Analyze the portal frame shown in Fig. Q.4.b by, Kani's method. Sketch the BMD and elastic curve.

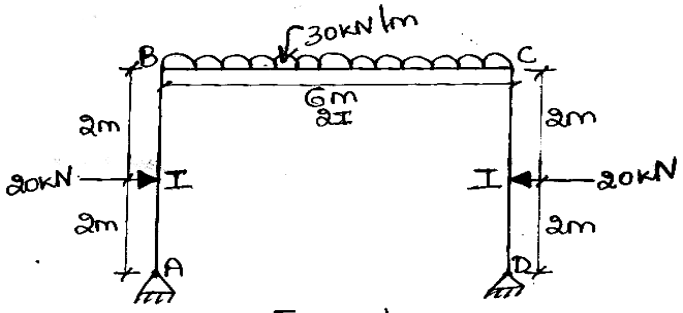


Fig.Q4.b

18 L4 CO4 PO1,2

UNIT - V **18**

5 a. Analyze the portal frame loaded as shown in Fig. Q5a. Using flexibility matrix method, draw BMD and elastic curve. Take EI as constant.

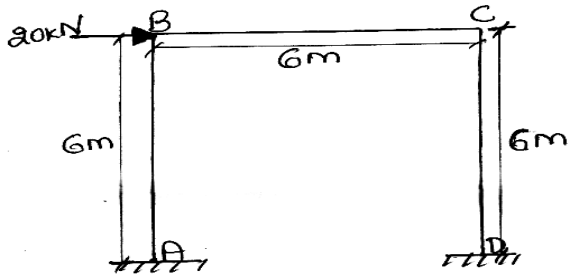


Fig.Q5.a

18 L4 CO4 PO1,2

b. Analyze the continuous beam shown in Fig. Q5.b using stiffness matrix method. Draw SFD and BMD. Take E = 200 GPa and I = 80,000 cm^4.

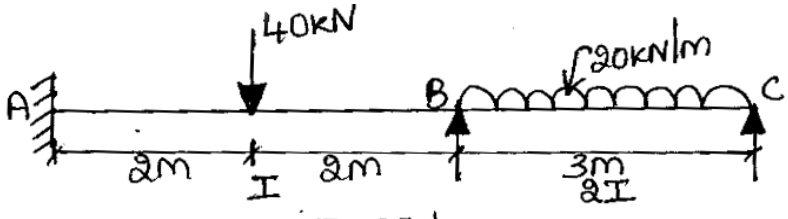


Fig.Q5.b

18 L4 CO4 PO1,2

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