U.S.N | | | | | | | | | | |

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; Feb. - 2021

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* ***Two*** *sub questions (from a, b, c) for Maximum of* ***18 marks*** *from each unit.*

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

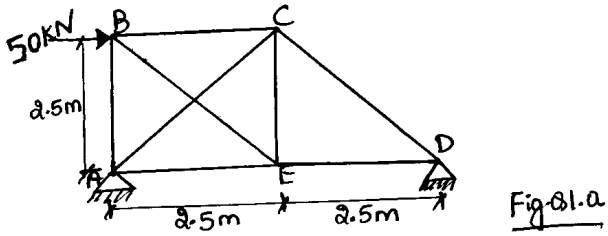

Fig.Q1.a

b. Analyze the truss shown in Fig. Q1. b by strain energy method. Use reaction R_{CV} and member '*BF*' as redundant. Take E = 200 GPa.

Note: number in parenthesis are area in cm^2

18 L4 CO1 PO 1,2

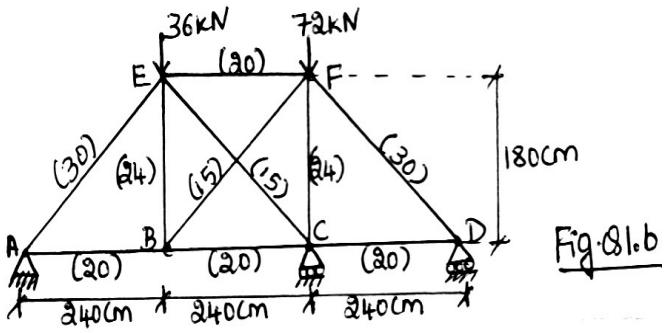

Fig.Q1.b

Contd… 2

UNIT - II **18**

2 a. Analyze the continuous beam shown in Fig. Q2.a by slope deflection method. Draw BMD and Elastic curve. Take *EI* as 12×10^3 kN-m^2.

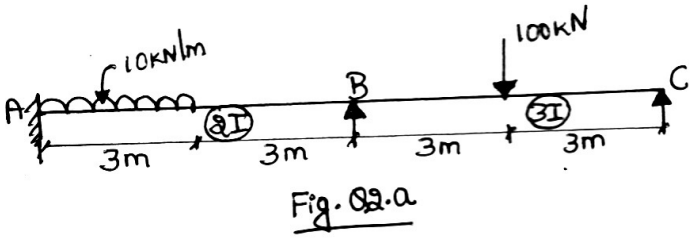

Fig. Q2.a

18 L4 CO2 PO 1,2

b. Analyze the rigid jointed frame shown in Fig. Q2.b by slope deflection method. Plot BMD and sketch the deflected shape of the frame. Take *EI* as constant.

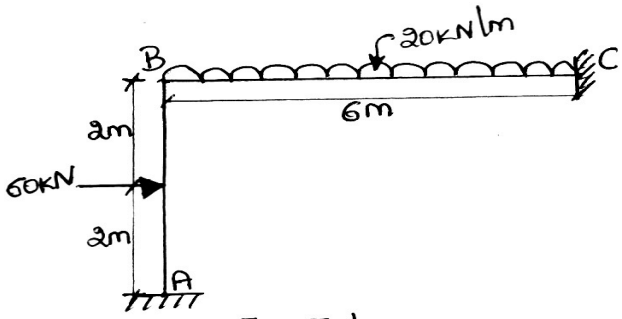

Fig. Q2.b

18 L4 CO2 PO 1,2

UNIT - III **18**

3 a. Analyze the continuous beam shown in Fig. Q3.a by moment distribution method. Draw SFD and BMD. Take $E = 200$ GPa and $I = 1.2 \times 10^{-4}$ m^4

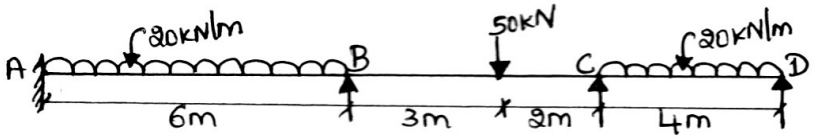

Fig. Q3.a

18 L4 CO3 PO 1,2

b. Analyze the portal frame shown in Fig. Q3.b by moment distribution method. Draw BMD and Elastic curve.

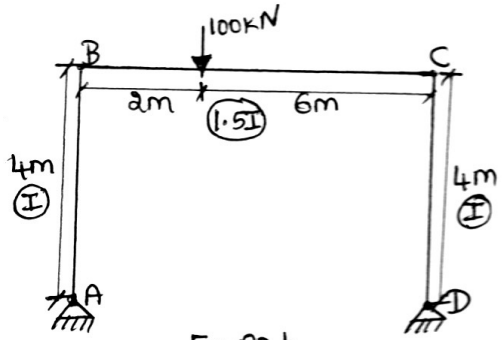

Fig. Q3.b

18 L4 CO3 PO 1,2

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 BMD.

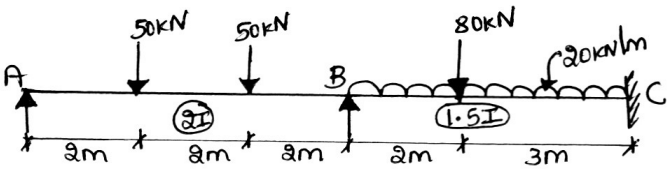

Fig. Q4.a

18 L4 CO3 PO 1,2

b. Analyze the portal frame shown in Fig.Q4.b by Kani's method. Sketch the BMD and Elastic curve. Take EI as constant.

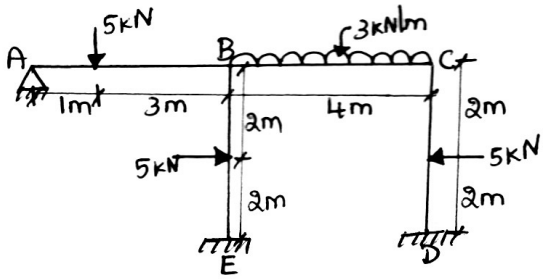

Fig. Q4.b

18 L4 CO3 PO 1,2

UNIT - V **18**

5 a. Analyze the frame shown in Fig.Q5.a using Flexibility matrix method. Draw BMD and elastic curve.

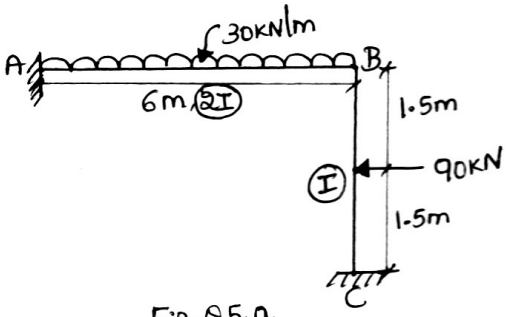

Fig. Q5.a

18 L4 CO4 PO 1,2

b. Analyze the continuous beam shown in Fig. Q5.b using stiffness matrix method. Draw BMD and elastic curve. Here support '*B*' settles down by 10 mm. Take *EI* as constant.

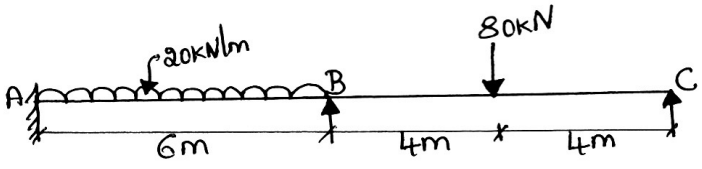

Fig. Q5.b

18 L4 CO4 PO 1,2

* * *