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10CV751

Seventh Semester B.E. Degree Examination, July/August 2021

Matrix Method of Structural Analysis

Time: 3 hrs. Max. Marks:100

Note: **1.** ***Answer any FIVE full questions.***
2. ***Missing data, if any, may be suitably assumed.***

1 a. Write the properties of flexibility matrix. **(05 Marks)**

b. State and explain the principle of contra gradience. **(05 Marks)**

c. Develop the flexibility matrix in the beam shown in Fig.Q1(c) with respect to the co-ordinates indicated. **(10 Marks)**

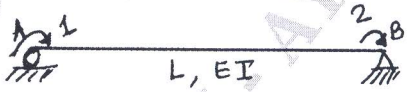

Fig.Q1(c)

2 Analyze the continuous beam shown in Fig.Q2 by flexibility method. Also draw the BMD.

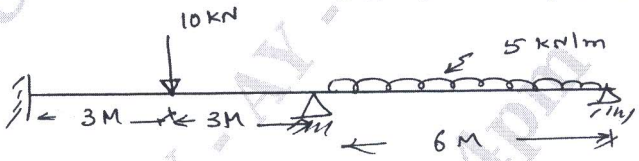

Fig.Q2 **(20 Marks)**

3 Analyse the frame shown in Fig. Q3 by flexibility matrix method. Draw BMD. Use element approach.

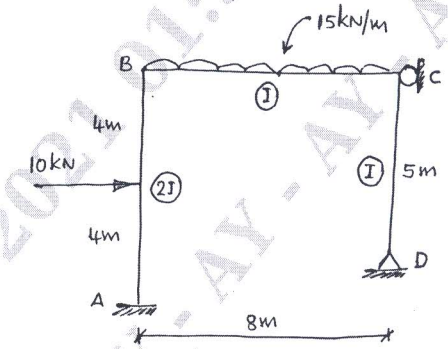

Fig.Q3 **(20 Marks)**

4 Find forces in members of truss shown in Fig.Q4, by flexibility method. Use force transformation approach.

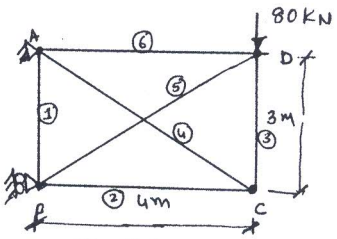

Fig.Q4 **(20 Marks)**

5 a. Mention the properties of stiffness matrix (any four only). **(04 Marks)**

b. Analyze the truss shown in Fig.Q5(b) by stiffness method.
"A" = hinge support, "D" = Roller support

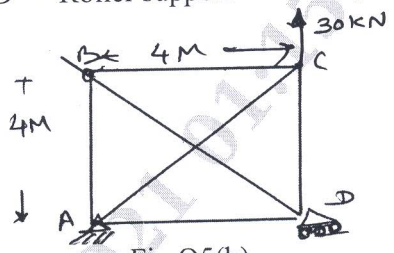

Fig.Q5(b) **(16 Marks)**

6 Analyse the frame shown in Fig. Q6 by displacement transformation matrix method. Draw BMD.

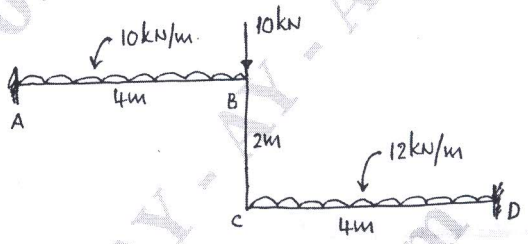

Fig.Q6 **(20 Marks)**

7 Analyse the frame shown in Fig.Q7 by direct stiffness method. Take E = 200 GPa, A = 0.04m^2 and I = 1.33 $\times 10^{-4}$ m^4. The flexural rigidity EI and axial rigidity AE are the same for both the beams.

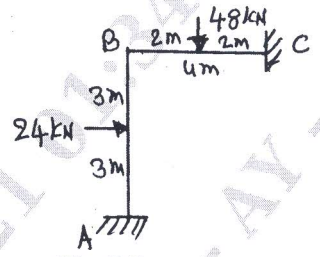

Fig.Q7 **(20 Marks)**

8 Analyze the frame shown in Fig.Q8 by direct stiffness method. Assume E = 200 GPa, I_{zz} = 1.33 $\times$ 10^{-5} m^4, A = 0.01 m^2. Flexural rigidity and axial rigidity are same for all members.

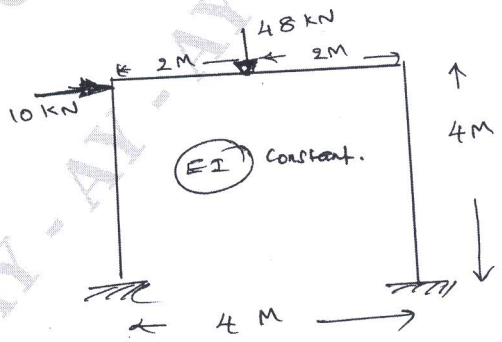

Fig.Q8 **(20 Marks)**

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