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Roll No. | | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012

CIVIL ENGINEERING

V Semester

CE 9301 STRUCTURAL ANALYSIS-I

(Regulation 2008)

Time : 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Define: Flexural Rigidity of Beams
2. State the Principle of virtual work
3. Differentiate between determinate and indeterminate structures.
4. What is the degree of redundancy of a (i) propped cantilever (ii) Fixed beam
5. Why is slope deflection method known as stiffness method?
6. Name any two classical displacement methods used in the analysis of structures.
7. What is relative stiffness?
8. Define: Carry over factor.
9. Write the expression for fixed end moment for a beam subjected to sinking of support by an amount Δ.
10. What is compatibility Matrix?

Part – B (5 x 16 = 80 marks)

11. Find the horizontal displacement at joint B of the frame ABCD as shown in Fig. 11 by unit load method. Assume EI to be constant for all members.

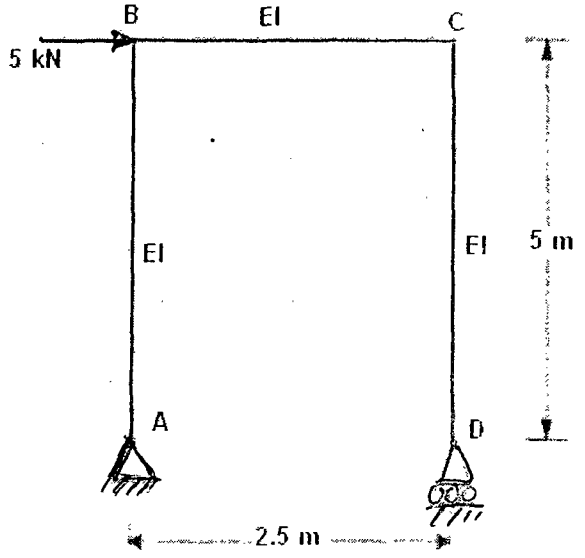

Fig. 11

12. a) Calculate the support reactions in the continuous beam having constant flexural rigidity EI throughout, due to vertical settlement of the support B by 5 mm as shown in the Fig.12a. Given E=200 GPa and $I = 4.0 \times 10^{-4}\ m^4$.

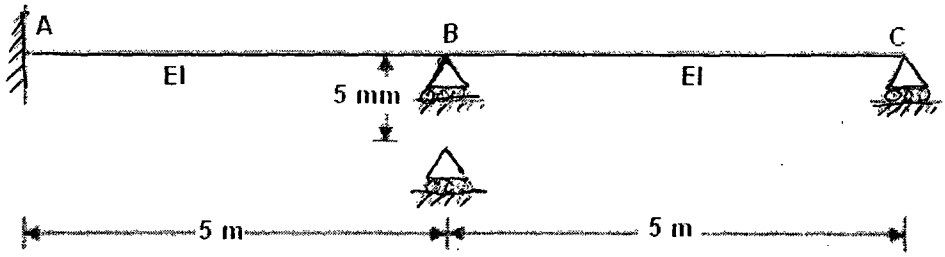

Fig. 12a

OR

b) Determine the forces in the truss shown in Fig.12.b by matrix flexibility method. All the members have same axial rigidity.

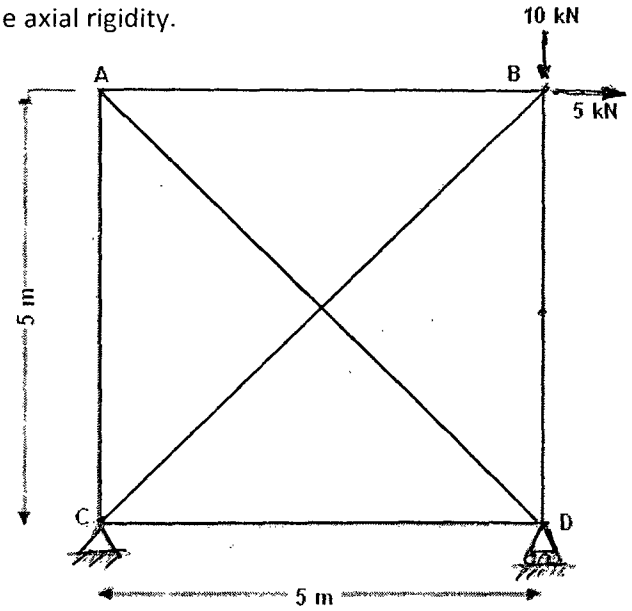

Fig. 12b

13. a) Analyse the rigid frame shown in Fig. 13.a using slope deflection method. Assume EI to be constant for all the members. Draw bending moment diagram and also sketch the elastic curve

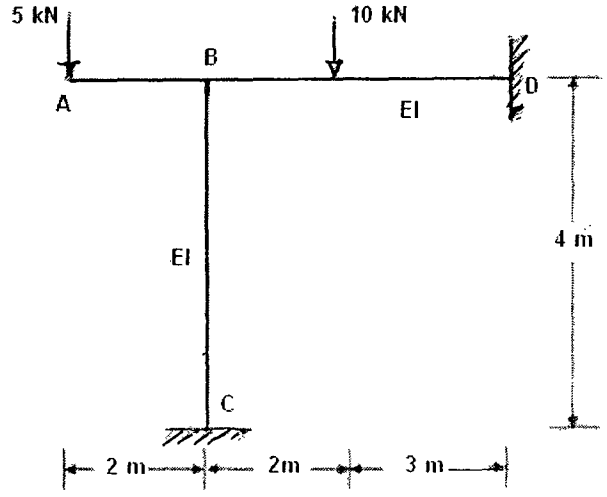

Fig. 13a

OR

b) Analyse the rigid frame as shown in Fig.13.b using slope deflection method and draw the bending moment diagram. The moment of inertia for all the members is shown in the figure. Neglect axial deformations.

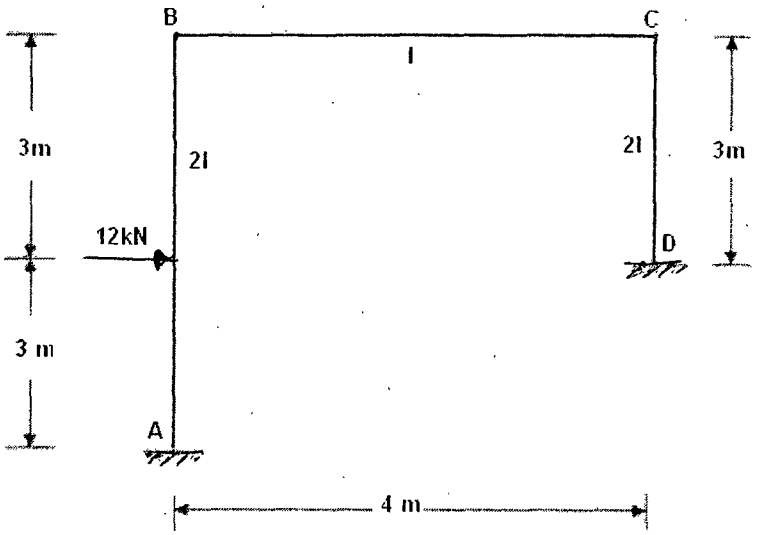

Fig. 13b

14. a) Draw the bending moment diagram for the continuous beam ABCD loaded as shown in Fig.14a.The relative moment of inertia of each span of the beam is also shown in the figure. Use Moment distribution method.

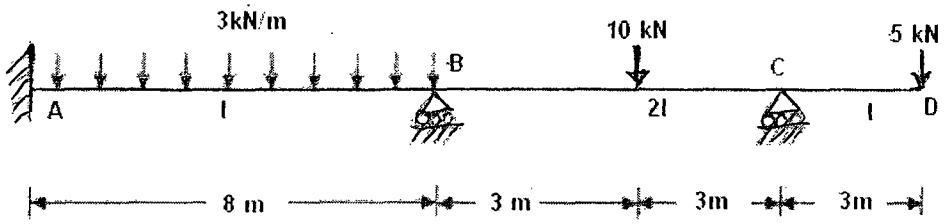

Fig. 14a

OR

b) Analyse the rigid frame shown in Fig.14.b by moment-distribution method. Moment of inertia of different members are shown in the diagram.

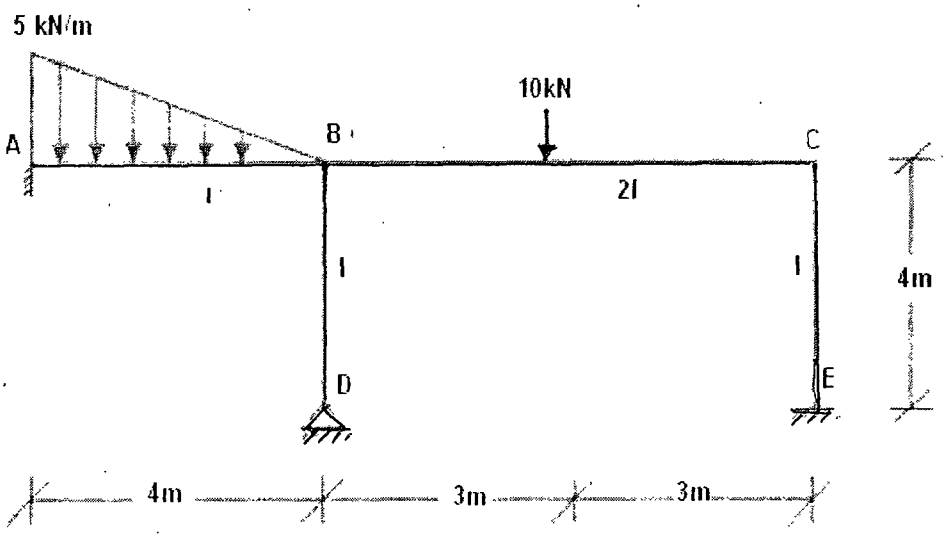

Fig. 14b

15. a) Analyze the truss shown in Fig.15a using stiffness method and find the member forces. The axial rigidity of the members in MN are shown in the figure.

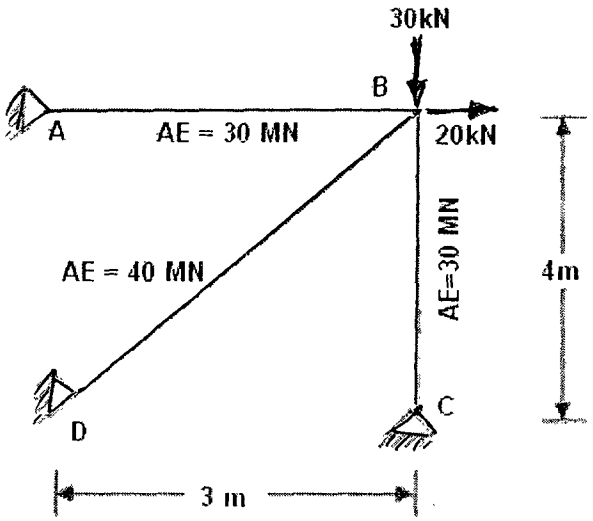

Fig. 15a

OR

b) Analyze the rigid frame shown in Fig 15b by direct stiffness matrix method. Assume E=200 GPa, I_{zz} = 1.33 x 10^{-4} m^4 and A = 0.04 m^2. The flexural rigidity EI and axial rigidity EA are the same for both the members.

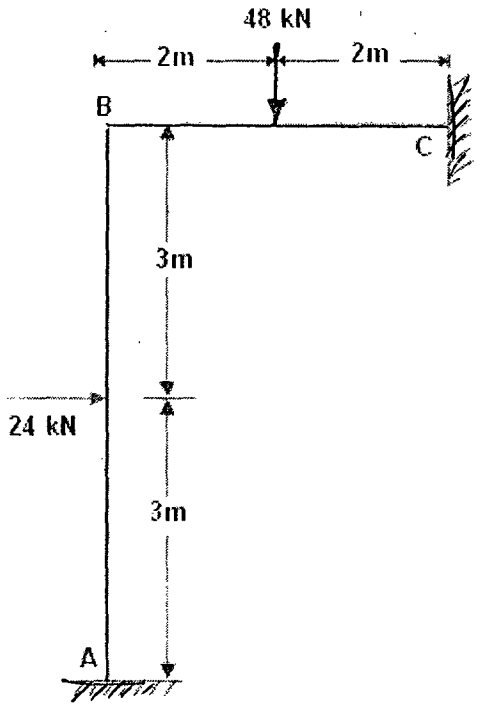

Fig. 15b