

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2016

00246

BICEE-017 : ADVANCED STRUCTURAL ANALYSIS

Time : 3 hours

Maximum Marks : 70

Note : Attempt any five questions. Assume any missing data suitably.

1. Develop the stiffness and flexibility matrices for the beam shown in Figure 1. Verify that two matrices are reciprocal of each other.

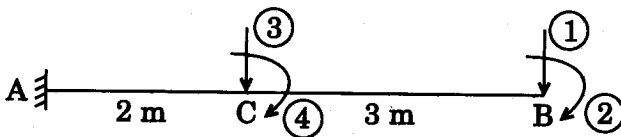


Figure 1

Also differentiate between flexibility and stiffness matrices.

14

2. Analyse the continuous beam ABCD as shown in Figure 2 by stiffness method. The beam has an internal hinge at B. (EI is constant) 14

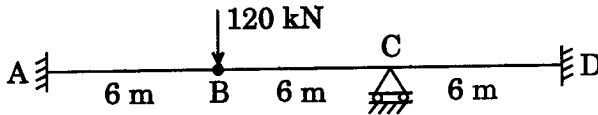


Figure 2

3. Analyse the pin jointed frame as shown in Figure 3 by flexibility method. The numbers in brackets are in mm^2 . If the member L_1U_2 of the frame is too long by 3 mm, determine the forces in the members of the frame due to self-straining only. Take $E = 200 \text{ kN/mm}^2$. 14

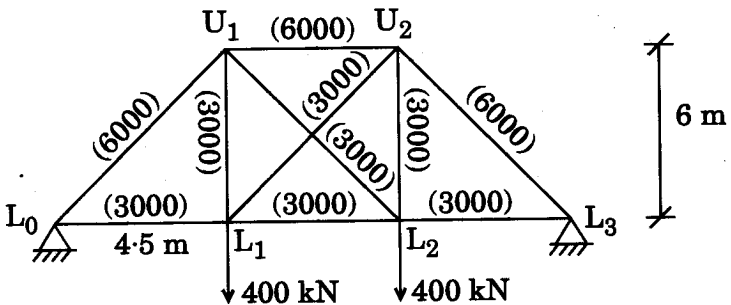


Figure 3

4. Analyse the frame shown in Figure 4 by direct stiffness method. Ignore axial deformations for the frame. 14

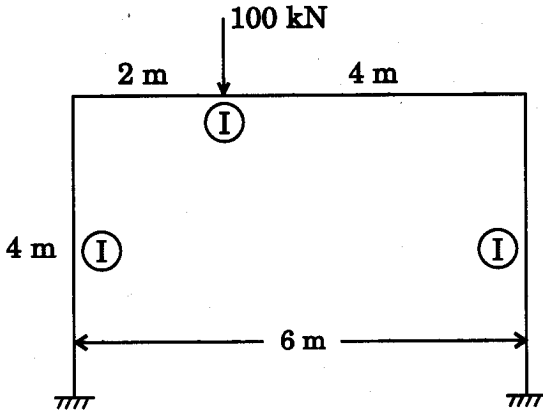


Figure 4

5. Analyse the building frame shown in Figure 5 by cantilever method, assuming that all the columns have the same area of cross-section. 14

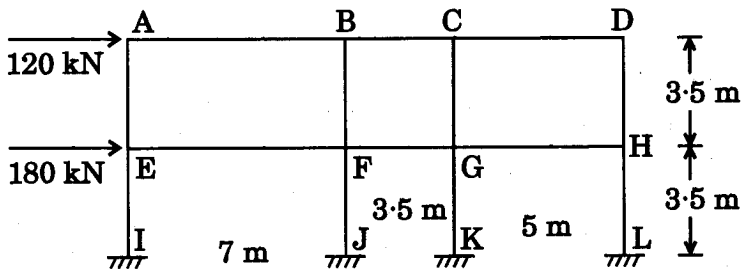


Figure 5

6. Analyse the bent frame as shown in Figure 6 by flexibility method. (EI is constant)

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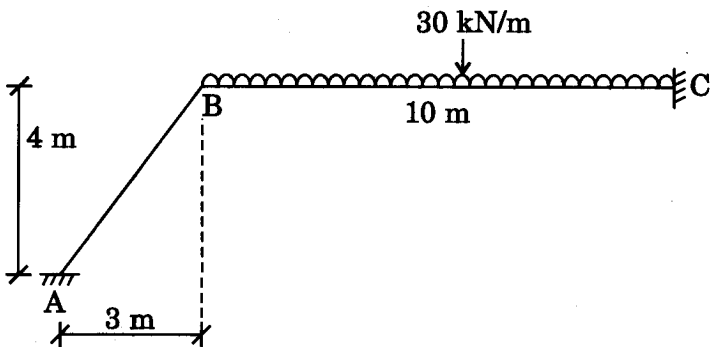


Figure 6

7. Write the steps for development of structural global matrix for a pin jointed frame by stiffness method. How can you find the forces in the members?

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