

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00393

December, 2016

BICE-011 : STRUCTURAL ANALYSIS – II

Time : 3 hours

Maximum Marks : 70

*Note : Attempt any **five** questions. All questions carry equal marks. Assume any missing data.*

1. A two-hinged parabolic arch has a span of 30 m and a central rise of 5 m. Calculate the maximum positive and negative bending moment at a section distant 10 m from the left support, due to a single point load of 10 kN rolling from left to right.

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2. A three-hinged circular arch consists of a portion AC of radius 3 m and rise of hinge C with respect to left abutment is 3 m. The right hand portion CB is of radius 8 m and the horizontal distance BC is 7 m. If a concentrated load of 10 kN acts at 6 m from the left hand end, determine the reactions at supports and maximum bending moment of the arch as shown in Figure 1.

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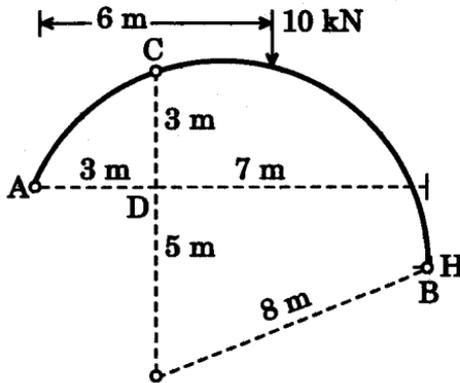


Figure 1

3. Analyse the rigid frame as shown in Figure 2 by slope deflection method.

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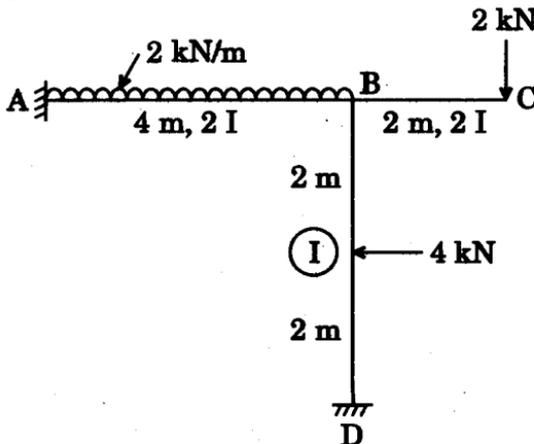


Figure 2

4. A horizontal beam ABCD is supported on hinged support and is continuous over three spans of 3 m each as shown in Figure 3. Draw the BMD if the support A settles by 10 mm, B settles by 30 mm and C settles by 20 mm. Take $I = 2.4 \times 10^6 \text{ mm}^4$, $E = 2 \times 10^5 \text{ N/mm}^2$. 14

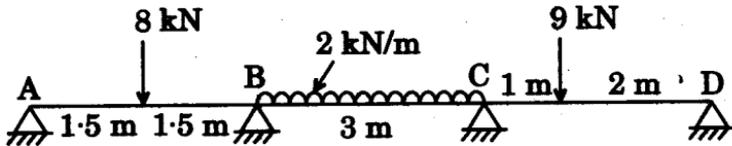


Figure 3

5. Determine the reaction components in the continuous beam as shown in Figure 4. 14

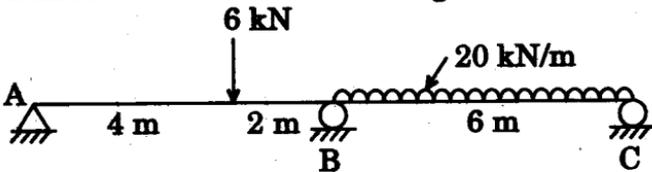


Figure 4

6. Using influence line diagram, determine the shear force and bending moment at section C in the simply supported beam as shown in Figure 5. 14

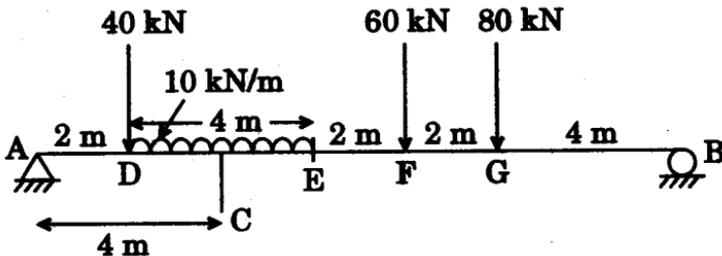


Figure 5

$AB = 14 \text{ m}$, $AD = 2 \text{ m}$, $DE = 4 \text{ m}$, $EF = FG = 2 \text{ m}$,
 $GB = 4 \text{ m}$.

7. Determine the horizontal displacement of roller support of the truss as shown in Figure 6. Cross-section of all top chord members are 6000 mm^2 and other members have 3000 mm^2 X-section. Take $E = 200 \text{ kN/mm}^2$.

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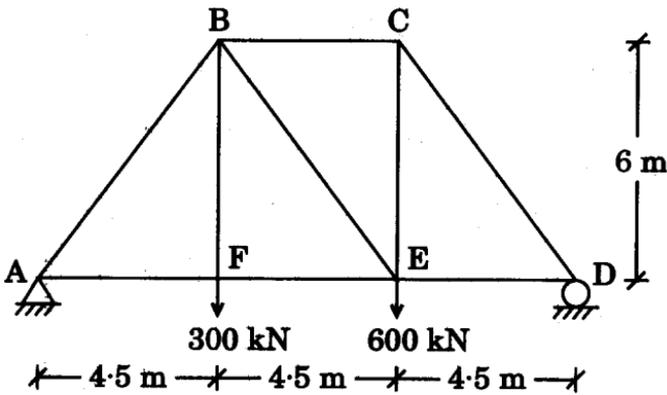


Figure 6

8. Determine the horizontal displacement and rotation at roller support in the frame shown in Figure 7 by Unit load method.

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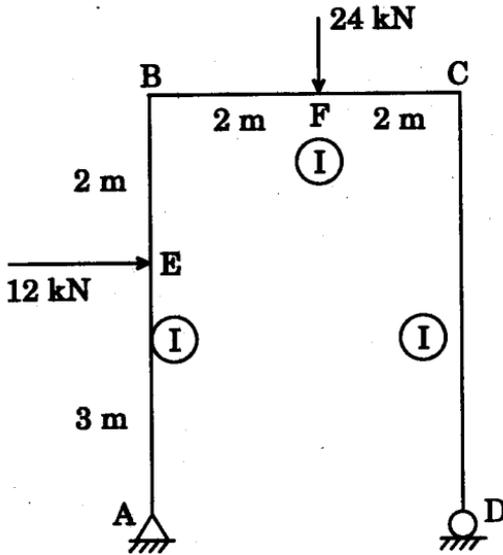


Figure 7