No. of Printed Pages : 3

BICE-016

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

December, 2017

00102

BICE-016 : STRUCTURAL ANALYSIS – III

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Assume missing data, if any. Use of scientific calculator is allowed.*

1. Analyse the structure loaded as shown in Figure 1 by moment distribution method. Draw the bending moment diagram. *14*

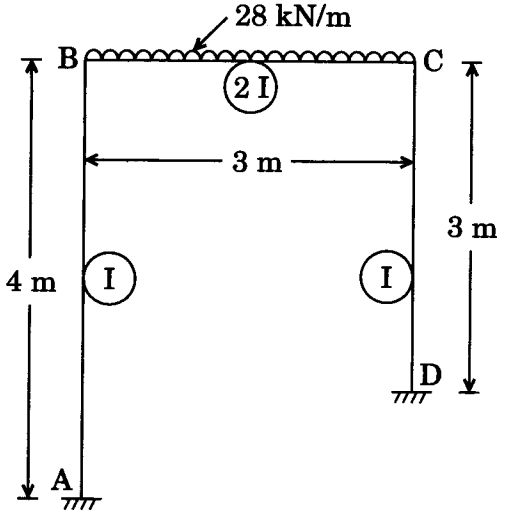
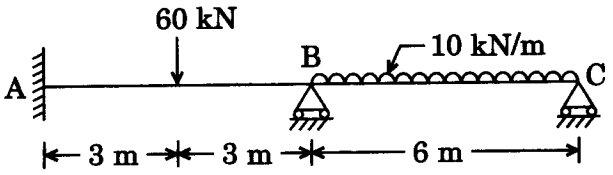


Figure 1

2. Derive an expression for the bending moment in a rectangular section where the stress distribution is partially elastic and partially plastic. Also draw the moment curvature curve. *14*

3. Analyse the beam as shown in Figure 2 by Kani's method. *14*



EI = constant

Figure 2

4. (a) What do you mean by degree of static indeterminacy and kinetic indeterminacy ? *7*

(b) Discuss the Müller-Breslau principle for influence lines. *7*

5. (a) With the help of an example, differentiate between Flexibility method and Stiffness method. *7*

(b) Generate the stiffness matrix for the beam with respect to coordinates as shown in Figure 3. *7*

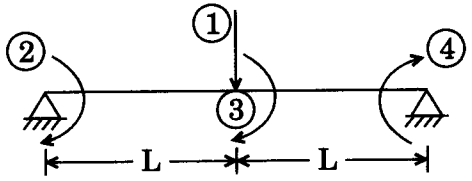


Figure 3

6. Determine the load factor of the portal frame as shown in Figure 4, if plastic moment capacity of all the members is 36 kNm. *14*

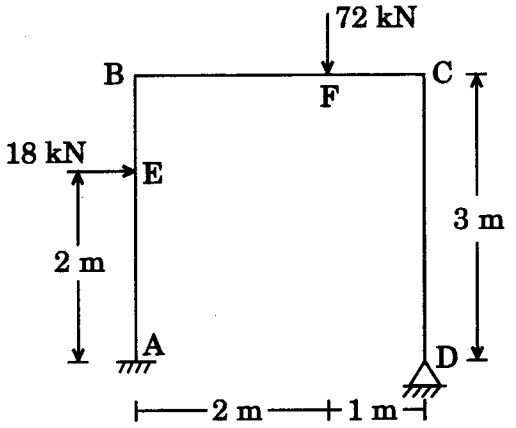
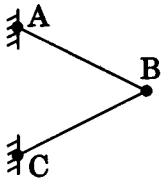


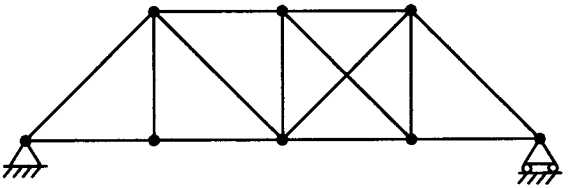
Figure 4

7. (a) A symmetrical fixed end parabolic arch is subjected to a rise of temperature t°C. The span and rise of the arch is L and h respectively. Assuming $I = I_0 \sec \theta$, find the support reaction due to temperature change. *7*

(b) Determine degree of indeterminacy for the the following trusses : $2 \times 3\frac{1}{2} = 7$



(i)



(ii)