[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

May-24-0394

CE-401 (Structural Analysis-I)

B.Tech. 4th (CBCS)

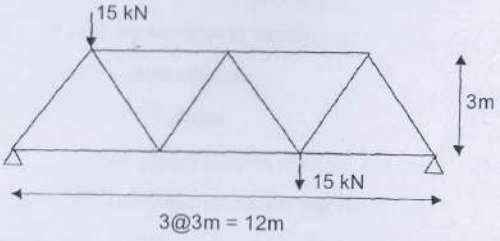
Time : 3 Hours Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

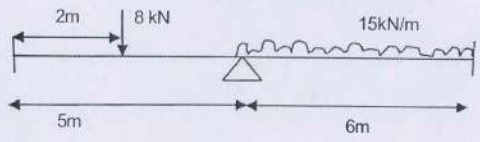
Note : Attempt one question each from Section A, B, C & D. Section E is compulsory. Assume the missing data.

SECTION - A

1. Find the forces in horizontal members in the truss as shown in the Fig. below using method of joints:- (10)

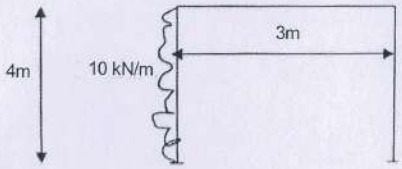


2. Analyse the beam using Moment Distribution Method:- (10)



SECTION - B

3. Analyse the frame using Strain Energy Method:- (10)



4. Analyze the propped cantilever beam of span 4m carrying a point load of 10 kN at the centre of the beam, using unit load method. (10)

SECTION - C

5. A three hinged parabolic arch has a span of 100 m and a rise of 25 m. It carries an udl of 2 kN/m over the left half of the span and point load of 50 kN at 20 m from the right springing. Determine the bending moment, normal thrust and radial shear at a section 40 m from the right springing. (10)

6. A 2-hinged stiffening girder of a suspension bridge of span 90m is subjected to point loads of 210 kN and 220 kN at distance of 9m and 36m from the left end. Find the shear force and bending moment for the girder at distance of 18m from the left end. Cable has central depth of 10m. Find the maximum tension in the cable. (10)

SECTION - D

7. A beam ABC of uniform section is hinged at the collinear supports at its center and ends. The span of AB = 5m and BC = 4m. Draw the influence lines for bending moment at the central support. (10)

[P.T.O.]

8. A single rolling load of 12 kN rolls along a girder of 25 m span. Draw the diagrams of maximum B.M. and maximum S.F. positive and negative. Determine the absolute maximum S.F. and B.M. (10)

SECTION - E (Compulsory)

9. (a) Define static indeterminacy of the structure.

   (b) Discuss principle of superposition.

   (c) Discuss Maxwell's reciprocal theorem.

   (d) Define Macaulay's method of beam analysis.

   (e) Define flexural rigidity.

   (f) Explain relative stiffness.

   (g) Discuss the principle of virtual work method.

   (h) Explain normal thrust and radial shear in arches.

   (i) Discuss the concept of influence lines.

   (j) Discuss Muller Breslau principle. (10×2=20)