



II B.Tech II Sem Regular End Examination, August 2021

**STRUCTURAL ANALYSIS - I**

(CIVIL)

**Time: 3 Hours.**

**Max. Marks: 70**

Note: 1. Answer any FIVE questions.

2. Each question carries 14 marks and may have a, b as sub questions.

- 1 Using method of joints determine the forces in all the members of pin jointed plane truss as shown in figure-1 14M CO1 L3

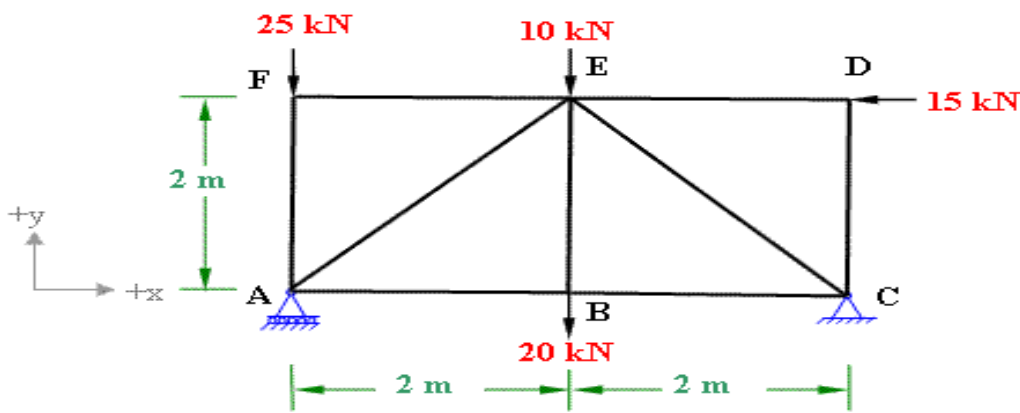


Figure -1

- 2 Using method of Tension Co efficient determine the forces in all the members of pin jointed plane truss as shown in figure-2 14M CO1 L3

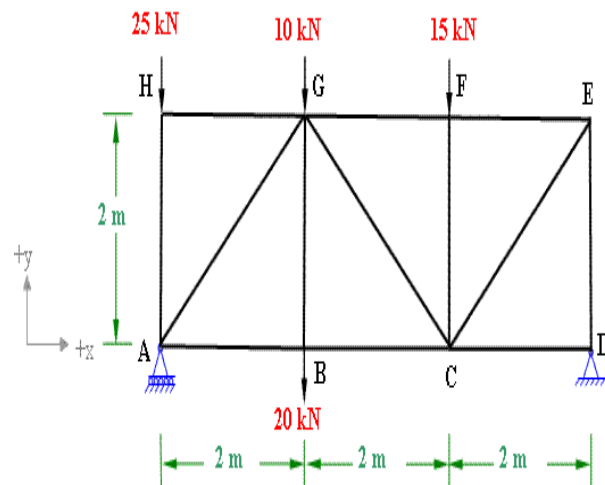


Figure 2

- 3 a) State and prove Castiglione's Second theorem. 7M C02 L2  
 b) Using Strain Energy theorem Calculate slope  $\theta_A$  and  $\theta_B$  and deflection at the center of a simply supported beam (AB) of span L carrying a clockwise couple M kN-m at the center of the beam 7M C02 L3
- 4 a) A 3 hinged semicircular arch of radius R carries a load of 2W at a section the radius vector corresponding to which makes an angle  $\alpha$  with the horizontal. Find the horizontal thrust at each support. Assume uniform flexural rigidity. 7M C02 L3  
 b) Analyze and draw S.F.D & B.M.D for a propped cantilever beam subjected to a Point load of W kN at the center of the span L. 7M C03 L4
- 5 a) State the advantages and disadvantages of fixed beams. 5M C03 L1  
 b) A fixed beam of span 5 m carries two point loads of 60kN and 50 kN at 2m and 3m from the left end respectively. Determine the fixed end moments and draw BMD and SFD. 9M C03 L2
- 6 Analyze the continuous beam shown in Figure-3 by Three Moment Equation. 14M C04 L4

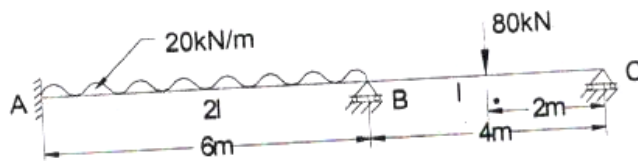


Figure -3

- 7 Analyze the continuous beam shown in Figure -4 by Slope Deflection Method. If the supports B and C sink by 8 mm and 10 mm respectively. Take  $I = 5 \times 10^7 \text{ mm}^4$  and  $E = 200 \text{ kN/mm}^2$ . 14 M C04 L4

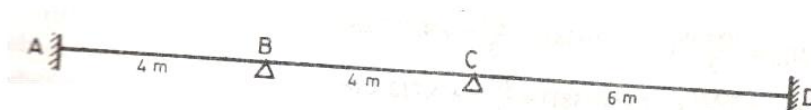


Figure-4

- 8 a) Two point loads of 180 kN and 240kN spaced at 5m apart cross a girder of 25 m span from left to right with 180 kN leading. Construct the maximum shearing force and bending moment diagrams stating the absolute maximum values. 7M C05 L3  
 b) Define ILD and construct a ILD for shear force for a simply supported beam Carrying a point load W Explain how this generated ILD can be used for calculating shear and bending moment for a simply supported beam carrying u.d.l shorter than the span. 7M C05 L4