

Code No: 154CB

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, March - 2022

STRUCTURAL ANALYSIS - I

(Civil Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

1. Analyze the pin jointed truss as shown in figure 1 by the method of joints. [15]

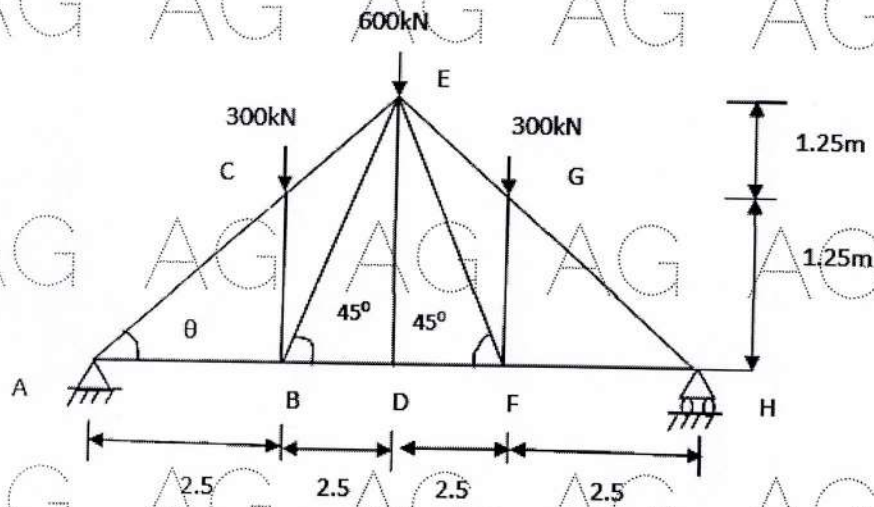


Figure: 1

2. Analyze the truss shown in figure 2 by method of sections. [15]

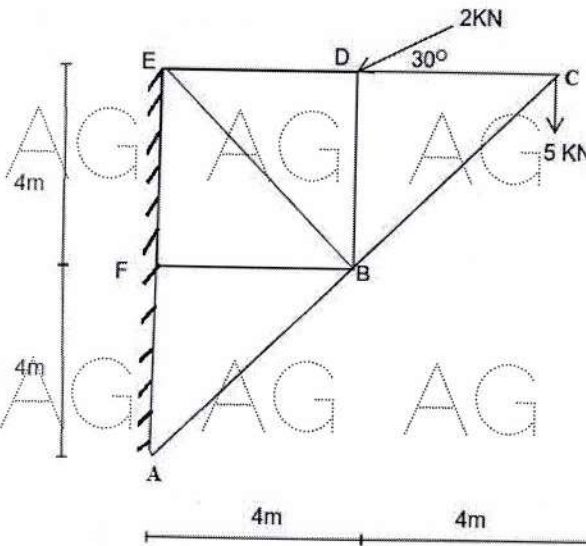


Figure: 2

3. An unsymmetrical 3-hinged parabolic arch is loaded as shown in figure 3. Locate the position of third hinge C and determine
- Support reactions.
 - NF and RSF at section 'D' 10 m away from A.
 - Location and magnitude of maximum BM in portion CB
- Also draw BMD for the arch. [15]

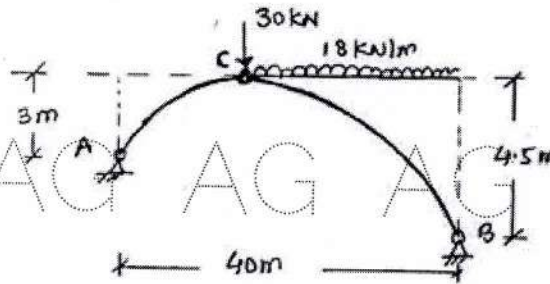


Figure: 3

4. Determine the horizontal and vertical component of deflection at the Point 'C' of the frame shown in figure 4. Take $E=200 \times 10^3 \text{ N/mm}^2$ and $I=6 \times 10^7 \text{ mm}^4$. Use Strain Energy method. [15]

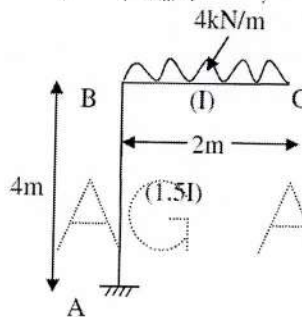


Figure: 4

5. A propped cantilever beam is shown in figure 5. Calculate the prop Reaction and also draw the BM and SF diagrams. [15]

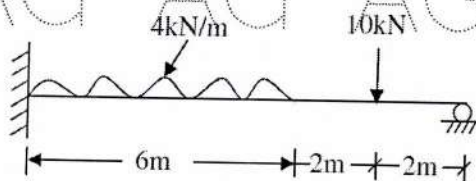


Figure: 5

6. A fixed beam AB of length 3 m carries a point load of 45 kN at a distance of 2 m from A. If the flexural rigidity is of the beam is $1 \times 10^4 \text{ kNm}^2$, determine (a) the fixed end moments at A and B. (b) Deflection under the load and (c) maximum deflection. [15]

7. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 10 kN per metre length, while a concentrated vertical load of 100 kN acts at the mid span AB. Calculate the moments by slope deflection method. [15]

8. For the simply supported beam AB of span 5m subjected to a train of concentrated loads moving from left to right as shown in Figure 6. Using influence lines find the absolute maximum bending moment and the equivalent uniformly distributed load. [15]

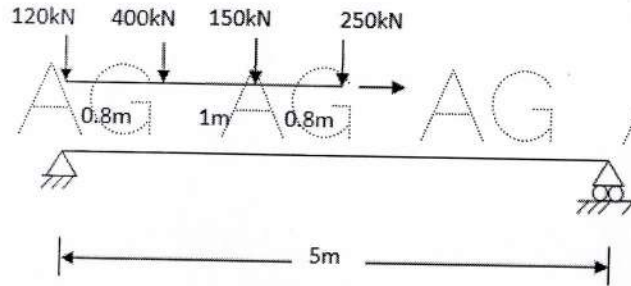


Figure: 6

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