

Part I

Instructions : Use Separate Answer scripts for each part

Prob. 1 Determine the vertical and horizontal deflection at the free end C in the frame shown in Figure 1. Take $E = 200 \text{ kN/mm}^2$ and $I = 30 \times 10^7 \text{ mm}^4$. Use Castigliano's theorem. (25)

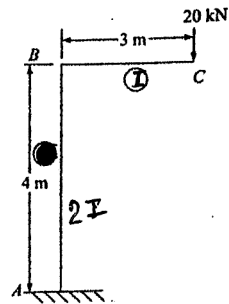


Figure 1

Prob. 2 A symmetric three-hinged parabolic arch of span 20 m and rise 3 m is subjected to a 300 kN concentrated load moving from left to right (Figure 2). Determine the maximum positive and negative bending moments at 5 m from the left support. Determine the absolute maximum bending moment also. Note: A, B and C are hinged joints. (20)

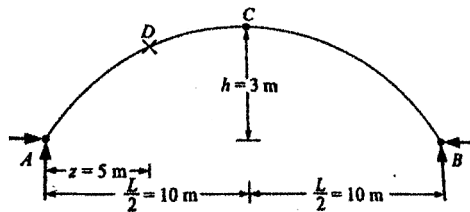


Figure 2

Prob. 3 A tied 3-hinged arch (Figure 3) is subjected to the loading shown. Determine the components of reaction at A and C and the tension in the cable. Note: Joint C is a roller. (15)

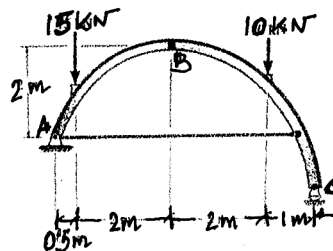


Figure 3

Ref. No.: Ex/CE/PC/B/T/224/2025

B.E. CIVIL ENGINEERING SECOND YEAR SECOND SEMESTER EXAM 2025

Subject: STRUCTURAL MECHANICS II

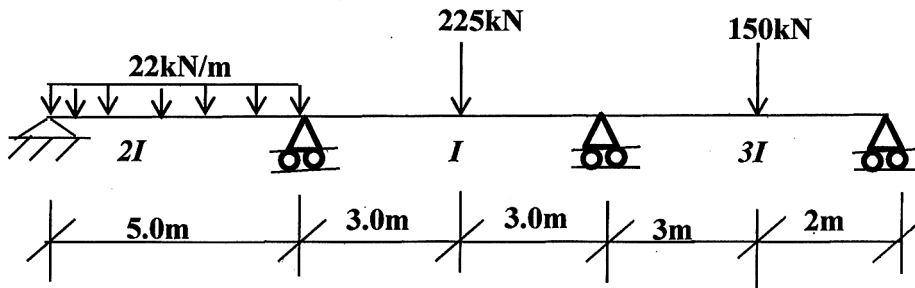
Full Marks:100

Time: 3hours

(Use Separate Answer scripts for each Part)

Part- II (Marks 40)

1. Determine the bending moment at different locations of the continuous beam shown below. Also draw the bending moment and shear force diagrams. Use **Three moments theorem**. (25)



2. Find slope and deflection at point B and D. Use **conjugate beam method**. (15)

