

School of Engineering
B.TECH Civil Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

Sem IV - G1UA403B - Structural Analysis

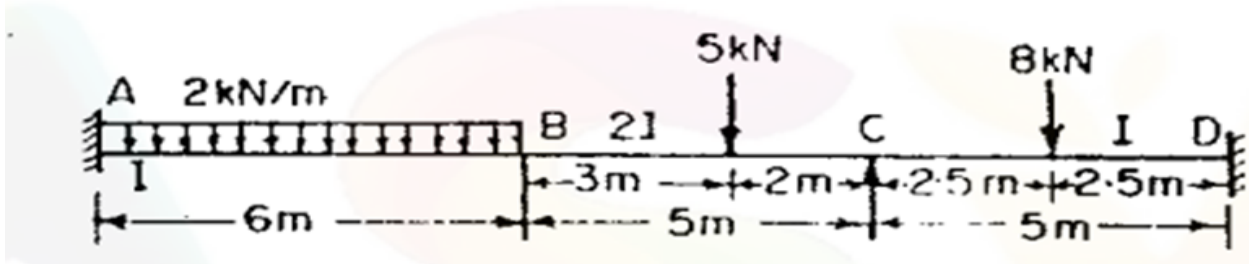
General Instructions

Answer to the specific question asked

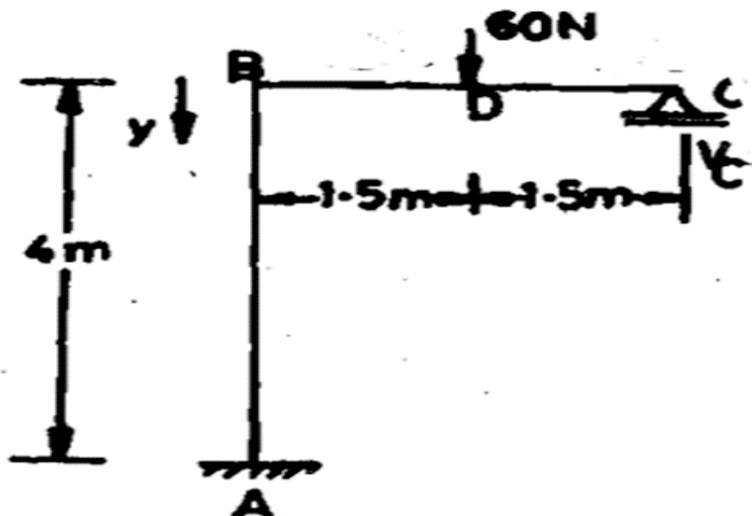
Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) What is an Influence Line Diagram (ILD)? K1 (2)
- 2) Define the terms "compatibility equation" and "equilibrium equation" as they relate to the slope deflection method. K2 (4)
- 3) How will you calculate the horizontal thrust in a two hinged parabolic arch if there is a rise in temperature K2 (6)
- 4) Analyse for reactions, the beam shown in figure using three moment equation K3 (9)



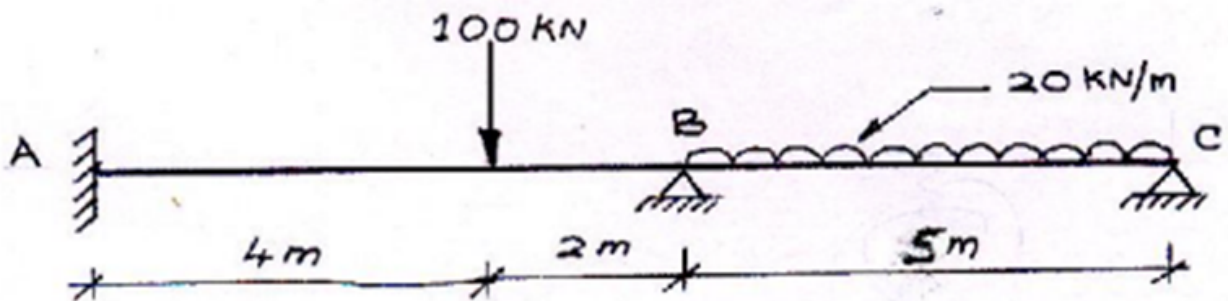
- 5) Analyse the portal frame shown in figure .using strain energy method. K3 (9)



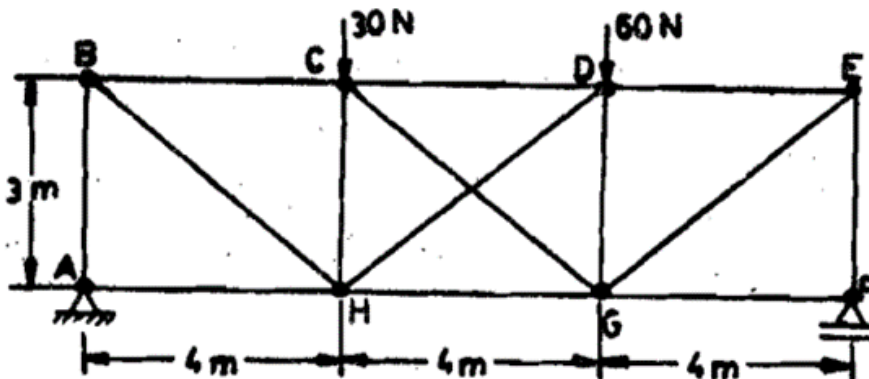
6) A three hinged parabolic arch of span 30m and rise 5m carries a uniformly distributed load of 40kN per meter on the whole span and a point load of 200kN at a distance of 5m from the right end. Find and examine the horizontal thrust, resultant reaction, bending moment and normal thrust at a section 5m from the left end K5 (10)

7) A parabolic arch hinged at the ends has a span of 60m and a central rise of 12m. A concentrated load of 8 kN acts at 15m from the left hinge. The second moment of area varies as the secant of the inclination of the arches calculate the horizontal thrust and the reactions at the hinge. Also calculate the net bending moment at the section. K4 (12)

8) Analyze two span continuous beam in fig ABC by slope deflection method. Then draw Bending moment & Shear force diagram. Take EI constant K5 (15)



9) Determine the forces in the members of the truss loaded as shown in fig using strain energy method . The sectional area of vertical member = 3000 mm²; horizontal member = 4000 mm² and diagonal members = 5000 mm² each. The members are of same material. K5 (15)



10) Which of the two arches, viz. circular and parabolic is preferable to carry a uniformly distributed load? K6 (18)