

Mid-West University
Examinations Management Office

End Semester Examinations 2081

Bachelor level/ B.E. Hydropower/ 4th Semester

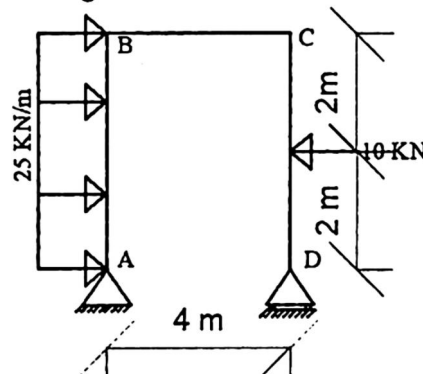
Time: 3 hours

Subject: Theory of Structure (HE441/HE206)

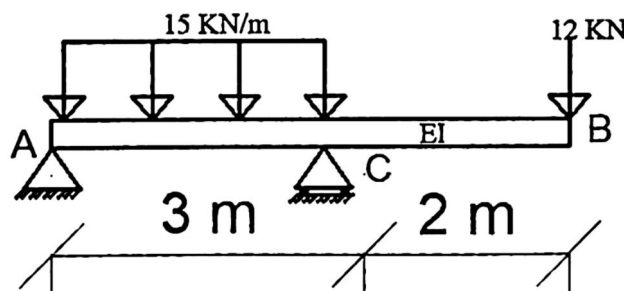
Full Marks: 50

Pass Marks: 25

- Attempt all the questions
 - Figures in the margin indicate full marks.
 - Assume suitable values, with a stipulation, if necessary.
 - Candidates are required to answer the questions in their own words as far as possible.
1. Differentiate between linear and non-linear behavior of structure and explain their uses in the theory of structure [4+2]
 2. What do you mean by Strain energy and complementary strain? Derive an expression for strain energy due to Bending. [4]
 3. A rectangular beam 200 mm X 100 mm is freely supported over a span of 2 m. A load of 10 KN is dropped on the middle of the beam from a height of 40 mm. Find the maximum instantaneous deflection and stress induced in the beam. Take $E = 1.1 \times 10^4$ Gpa [4]
 4. Determine the horizontal deflection and rotation at roller support in the given frame. Take flexural rigidity EI is constant throughout [4]

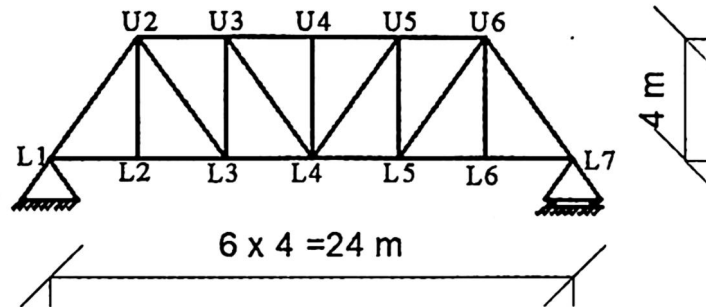


5. Determine the slope and deflection at B in the given beam using the moment area method and conjugate beam method [8]



6. A bridge of 50 m long and a train of wheel load 150 kN, 130 kN, 140 kN, 80 kN, 80 kN at center to center distance of 2 m, 1 m, 1.5 m and 1.5 m respectively. 150 kN load is leading load. Determine the Absolute bending moment and shear force. [5]

7. Draw the influence line diagram for forces in the members U3L4, U3U4 and U3L3 of the given truss. [5]



8. A three-hinged symmetric Parabolic arch has a span of 40 m and a rise of 8m. Determine the bending moment, normal thrust, and radial shear at 11 m from left support if the arch is subjected to a uniformly distributed load of intensity 20 KN/m over left-portion and a concentrated load of 40 KN at 25 m from the left springing. [8]
9. The suspension cable is suspended from two piers 180m apart, left support being 5m above the other. The cable carries uniformly distributed load of 15KN/m in plan and has its lowest point 10m below the lower support. The ends of the cables are attached to dadles on rollers on top of piers and the back stays which may be assumed straight are inclined at 60° to the vertical. Determine; [6]
- Maximum tension in the cable
 - The length of the cable
 - Maximum thrust on the pier

The End