

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway

FIRST SEMESTER EXAMINATIONS, 2000

B.E. DEGREE EXAMINATION

STRUCTURAL ANALYSIS I

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Time allowed: *Two hours*

Answer Question 1 and two other questions

1. For each of the linear elastic plane structures shown in Figure 1:

- (i) Sketch the deflected shape,
- (ii) Sketch the bending moment diagram.

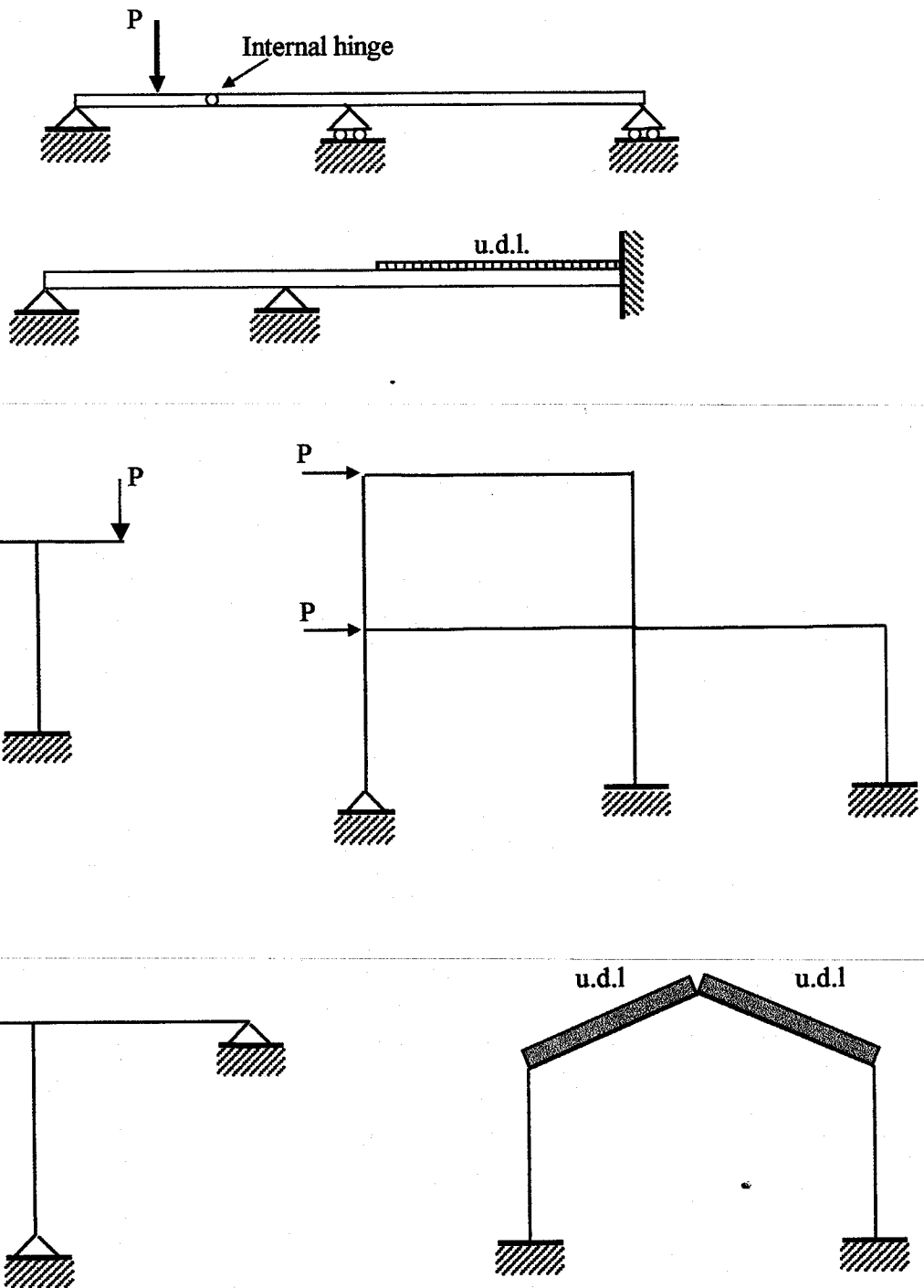


Figure 1

2. Using the general stiffness method, assemble the structure stiffness matrix for the linear elastic plane frame shown in Figure 2. Evaluation of the individual terms in the stiffness matrix is *not* required. Find the reduced stiffness equation after imposition of the boundary conditions. Evaluate the nodal load vector.

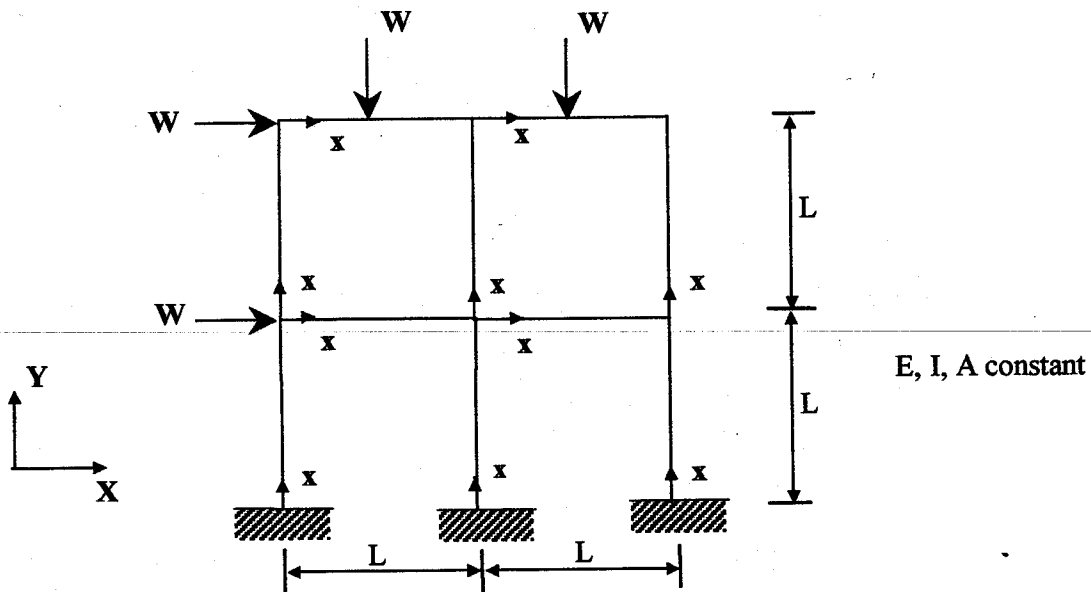


Figure 2

3. Use the moment distribution method to determine the bending moment distribution in the linear elastic frame shown in Figure 3. Assume EI is constant for all members. Draw and dimension the bending moment diagram.

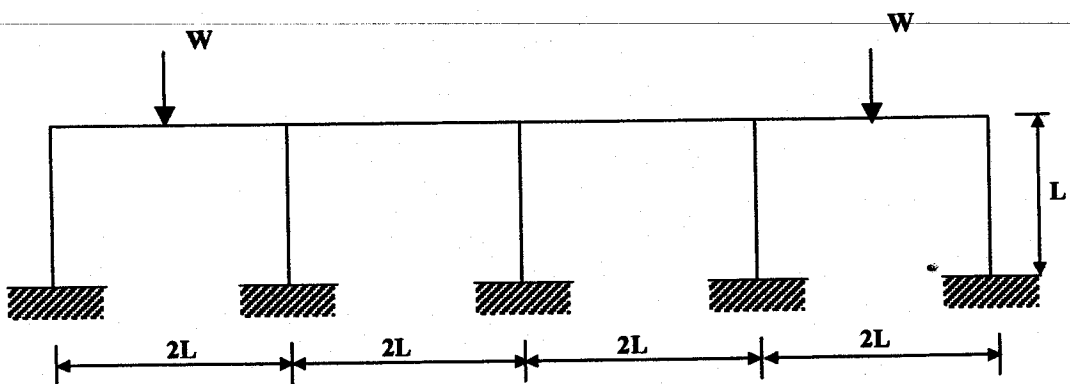


Figure 3

4. Determine the bending moment distribution in the linear elastic frame structure shown in Figure 4. Assume EI constant for all members.

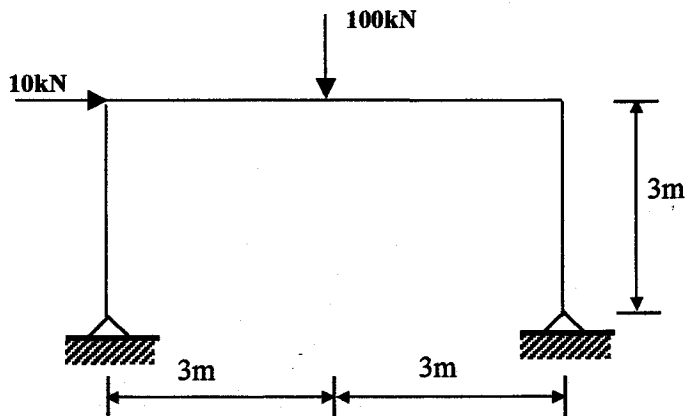


Figure 4