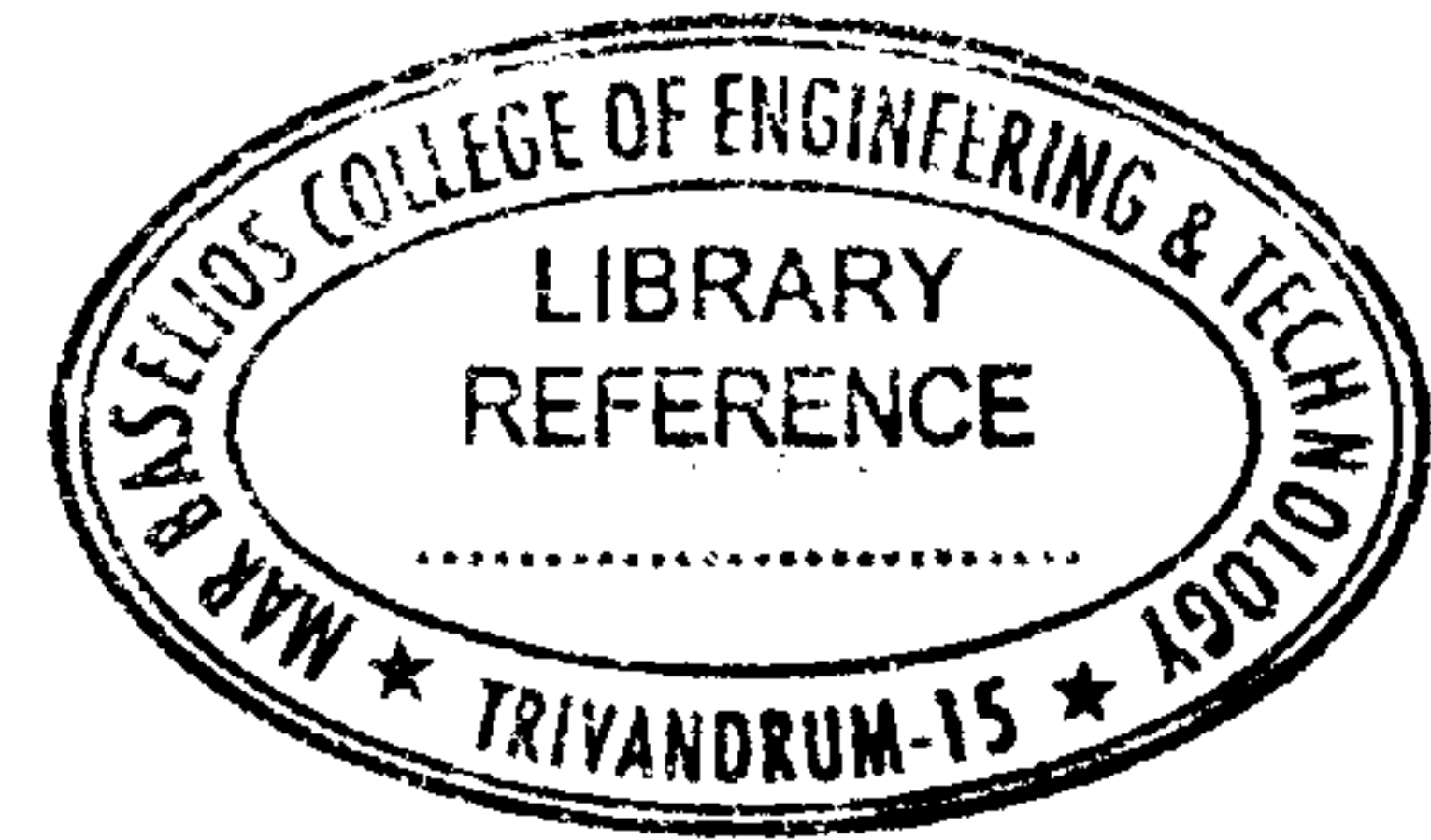




Reg. No. : .....

Name : .....



**Seventh Semester B.Tech. Degree Examination, October 2018  
(2013 Scheme)**

**13.703 : ADVANCED STRUCTURAL ANALYSIS (C)**

Time : 3 Hours

Max. Marks : 100

**Instruction :** Answer *all* questions from Part A and *any one* question from *each* Module in Part B.

**PART – A**

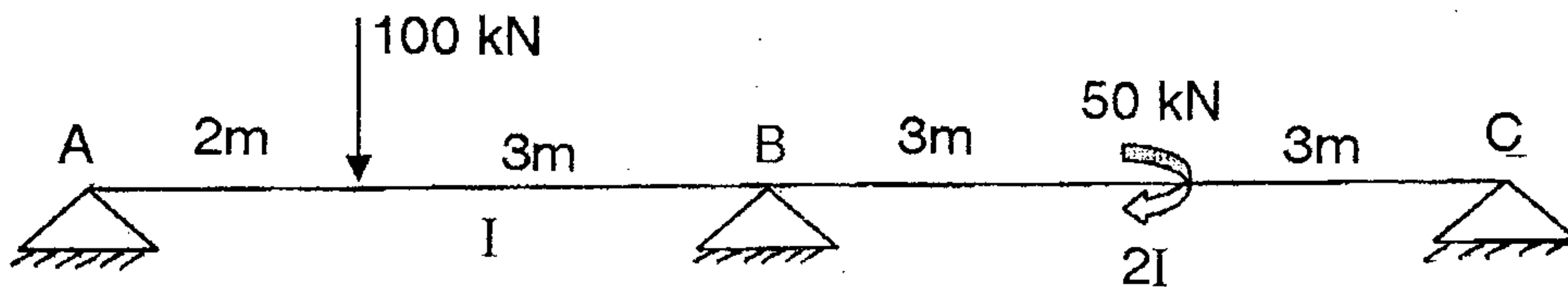
- I. a) Differentiate between static indeterminacy and kinematic indeterminacy with examples.
- b) Using flexibility method, find the slope at midspan of a cantilever subjected to moment  $M$  at centre.
- c) Explain Equilibrium matrix and Compatibility matrix with examples.
- d) Differentiate between plane stress and plane strain problems with example.
- e) Explain displacement function and the requirements to be satisfied by displacement function in FEM. **(5×4=20 Marks)**

**PART – B**

**(4×20=80 Marks)**

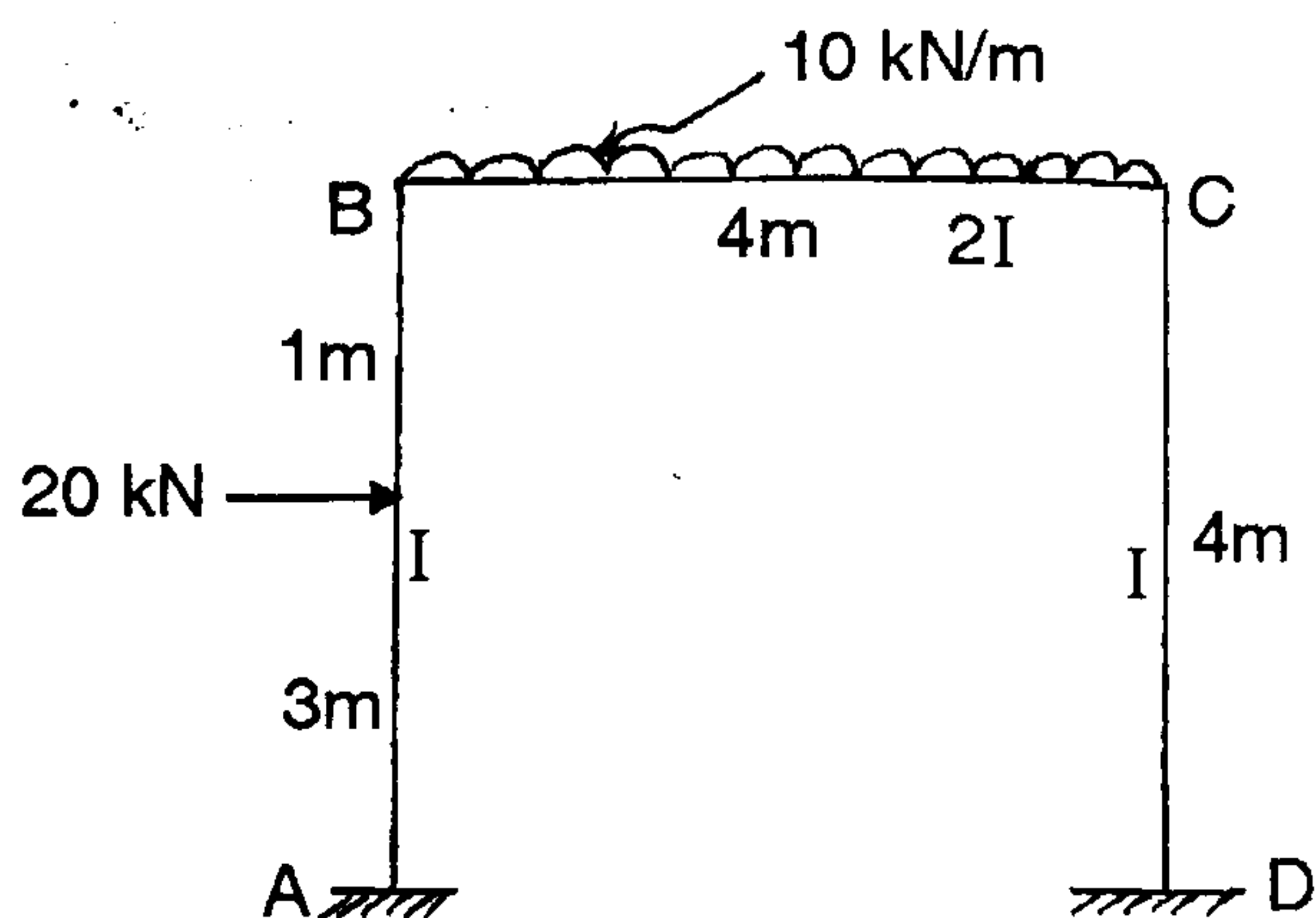
**Module – I**

- II. Analyze the beam by stiffness matrix method. Draw the bending moment and shear force diagram.



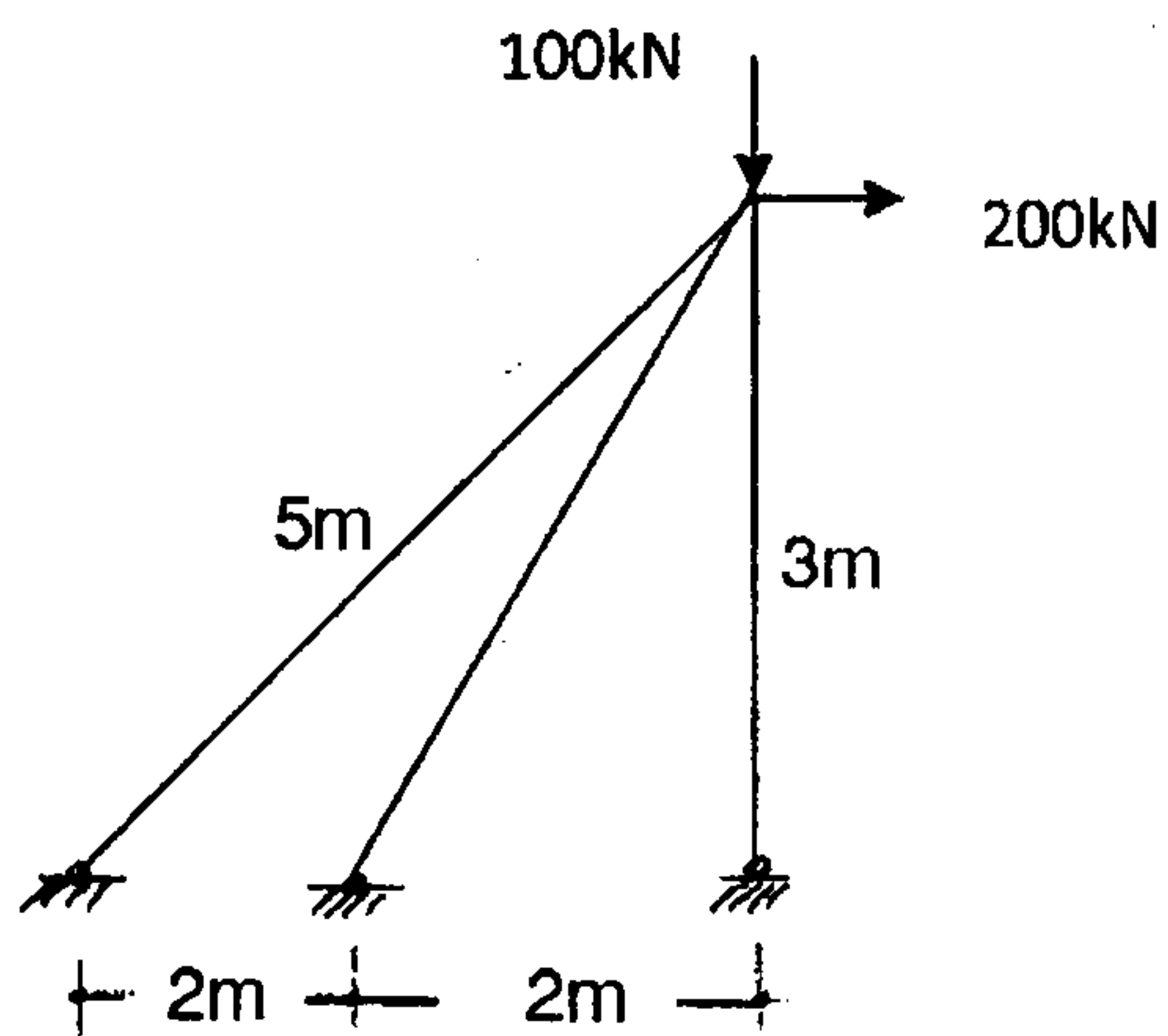


- III. Analyze the portal frame given below by stiffness matrix method and draw the bending moment diagram.



### Module - II

- IV. Find the member forces in the truss shown below using direct stiffness method :  
(AE same for all members).

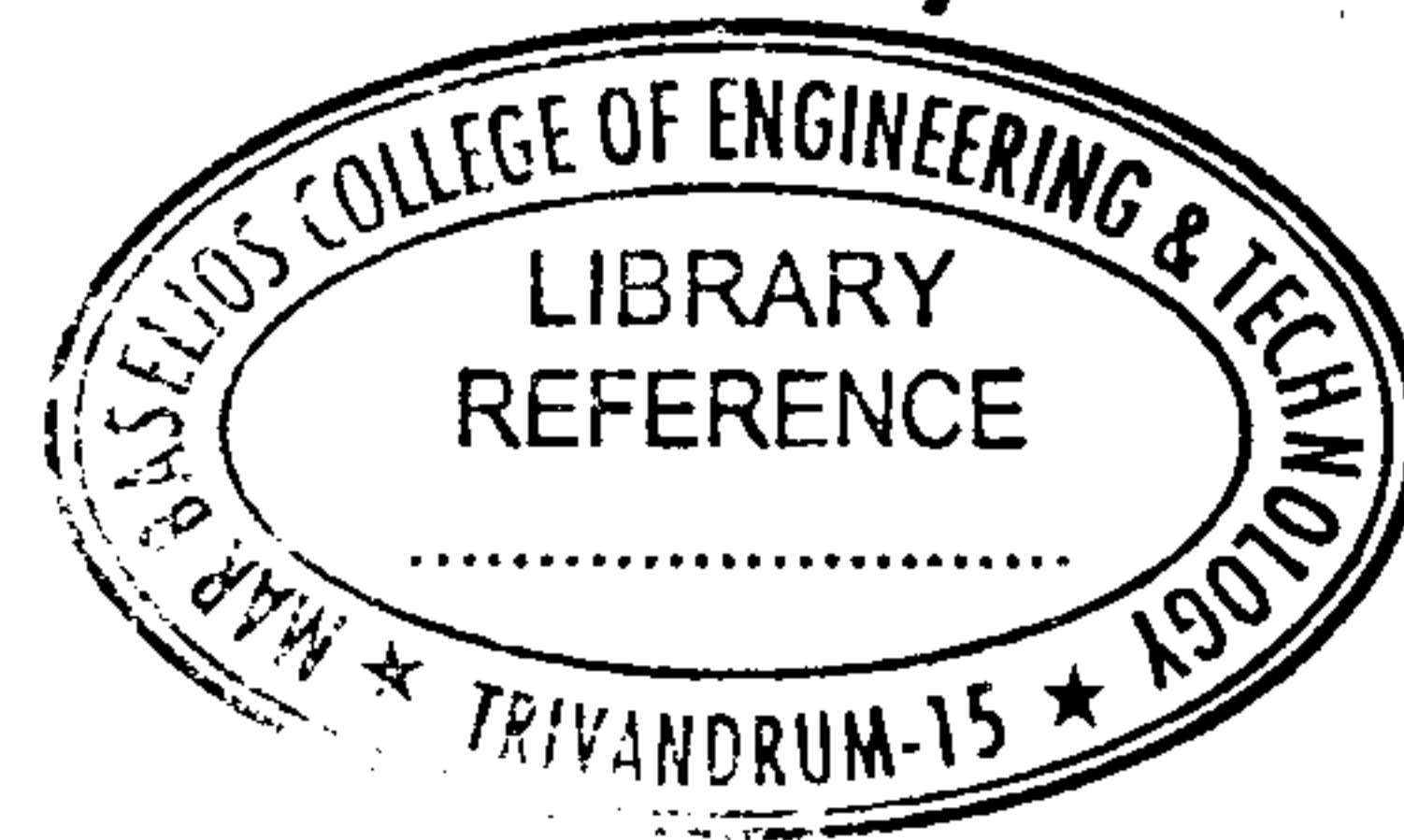
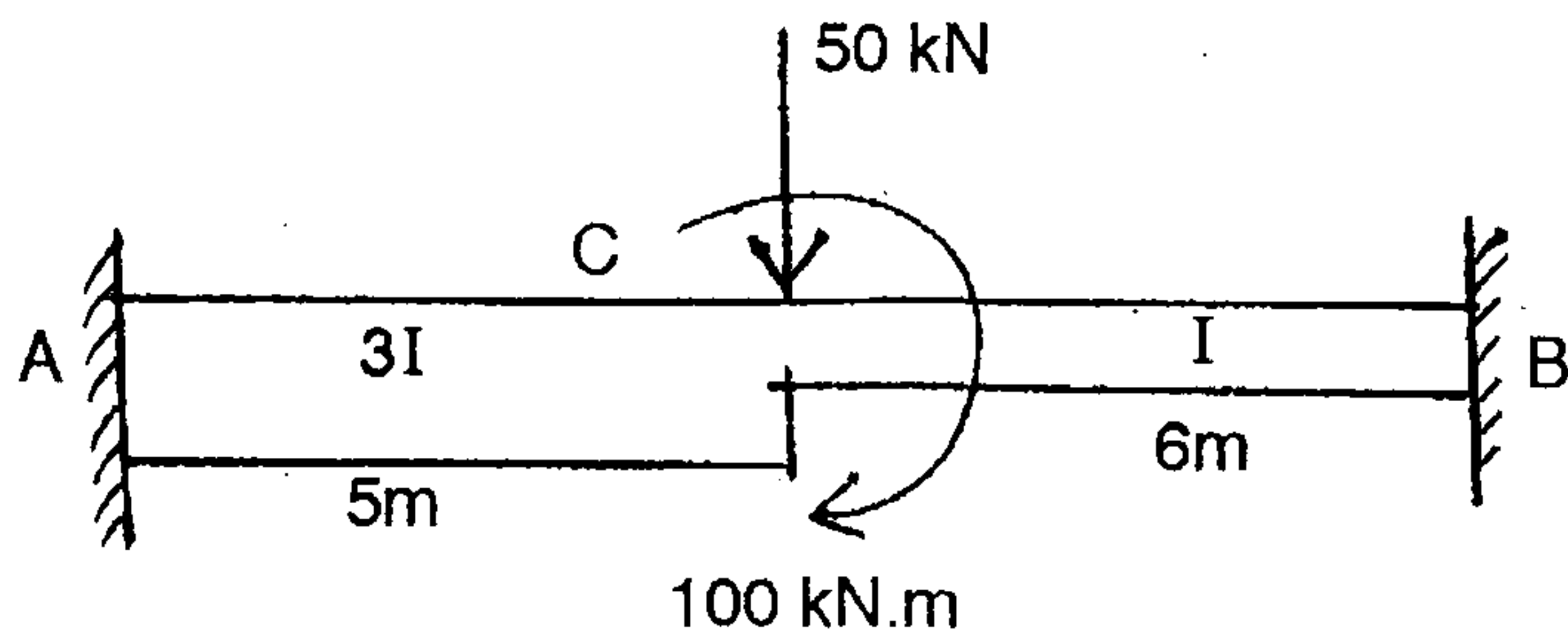


- V. Find the displacement at centre and slope at supports of a simply supported beam of span 6m subjected to point load 100 kN at 2m from left support, using flexibility method.

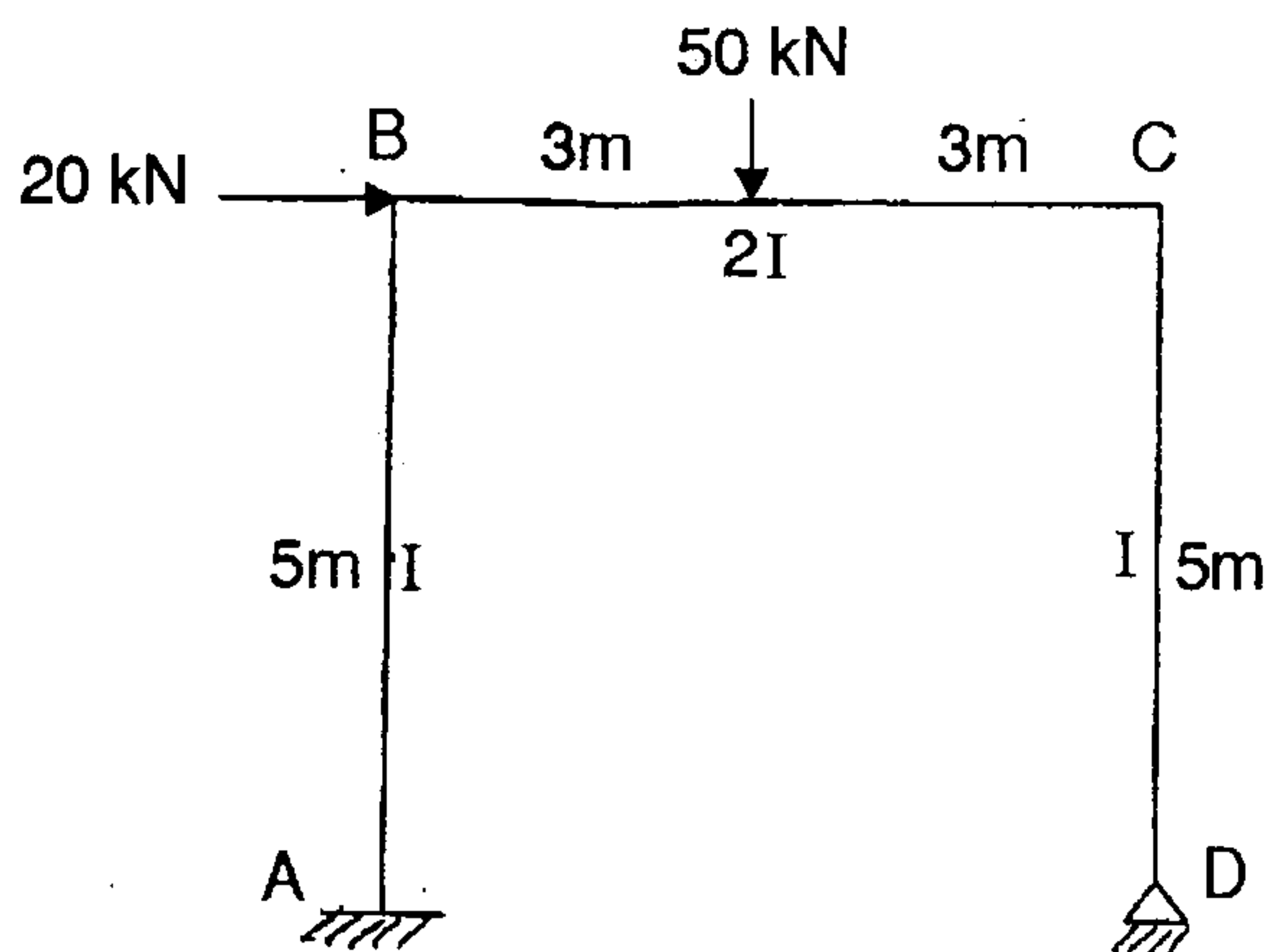


**Module – III**

VI. Analyse the beam by flexibility method and draw the BMD and SFD.



VII. Analyse the frame by flexibility matrix method and draw the bending moment diagram.



**Module – IV**

VIII.a) Derive the shape functions of a three noded line element and sketch their variations. 10

b) The length of a line element is 12 units. Node 1 and node 2 are end nodes and node 3 is mid node. Find the displacement of point P which is 8 units from left end, if the displacements of node 1, 2 and 3 are 4 units, 7 units and 6 units respectively. 10

IX. Develop the stiffness matrix for a truss element using FEM concept.