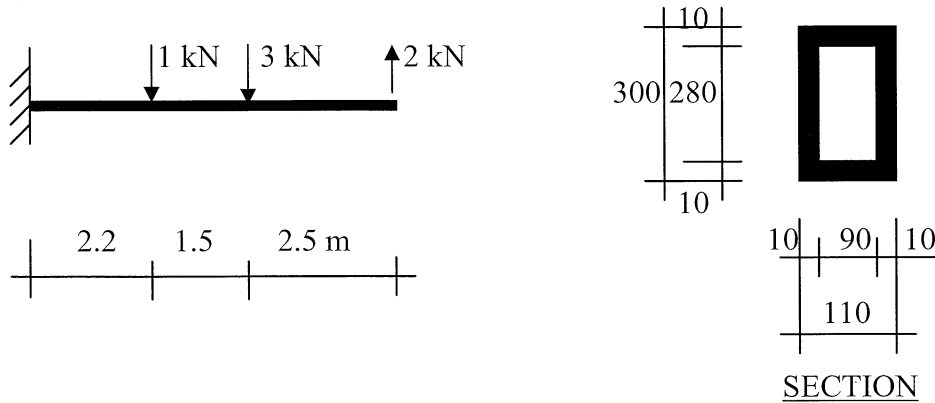
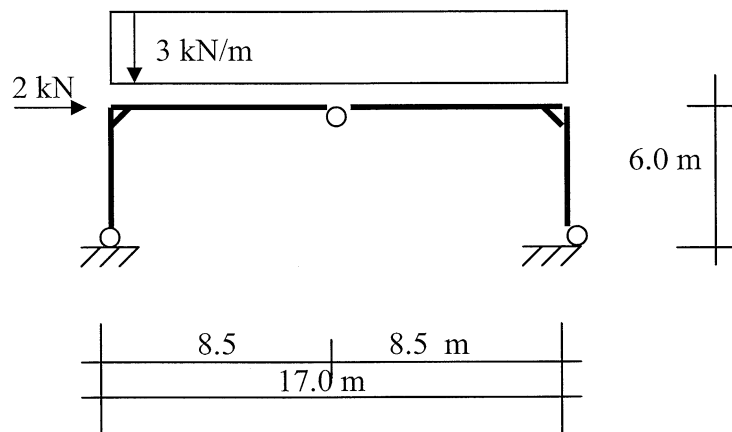


Question 2**(14 Marks)**

Calculate and draw the Shear Force and Bending Moment diagrams for this loaded cantilever beam. Also calculate the amount of deflection at the free end of the beam if the beam cross section is a rectangular steel tube (on edge), as per the section drawing below, with an E-value of $200\,000\text{ N/mm}^2$.

**Question 3****(15 Marks)**

- a) Calculate and draw the Bending Moment diagram for this loaded 3-pin Portal frame. Include all extreme values and any points of contra-flexure.



- b) If this frame was changed to a 2-pin portal frame by removing the pin-connection in the rafter, how would that effect the Bending Moment diagram? Sketch the new BMD and comment on the main differences. No calculations are required.

END OF QUESTIONS