1. The simply supported beam shown in FIGURE 1 is 10 m long with $E = 200 \times 10^9$ Pa and $I = 150 \times 10^{-6}$ m^4.
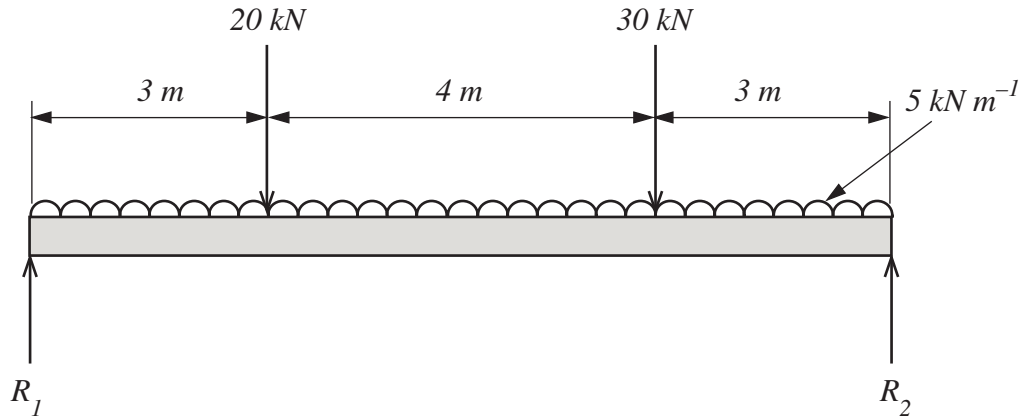

FIG. 1

For the beam in FIGURE 1:

(a) (i) Determine the position and magnitude of the maximum bending moment.

   (ii) Plot a graph of the deflection along the length of the beam (calculate the deflection at 1 m intervals).

(b) What I value for the beam would be required to halve the maximum deflection of the beam ?

(c) The calculation for the maximum bending moment is to be verified experimentally using a strain gauge bonded to the outer surface of the beam, at the point where the maximum bending moment occurs. Derive an equation which could be used to calculate the bending moment from the measured strain value. State the meaning of all symbols used in your equation.