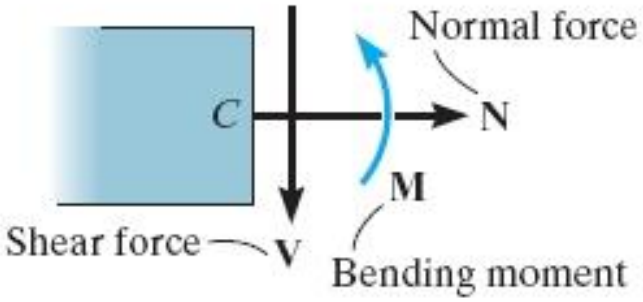
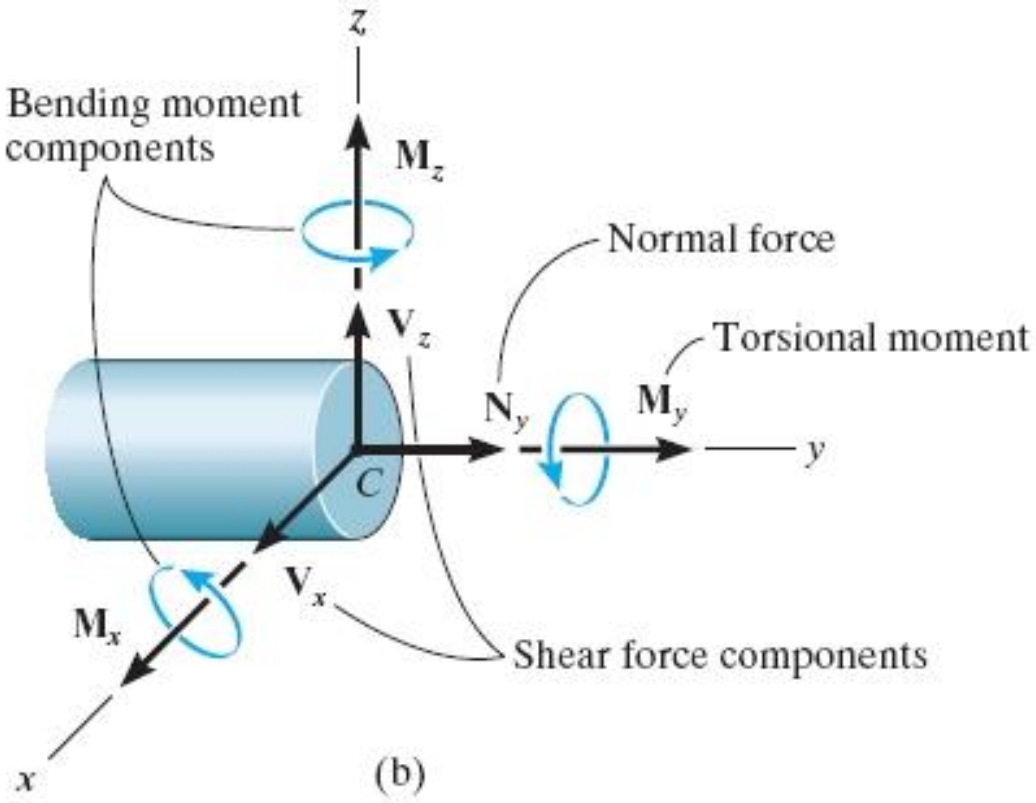
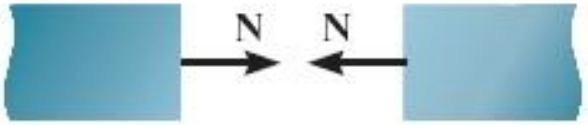

Normal force
C
N
M
Shear force
V
Bending moment

(a)

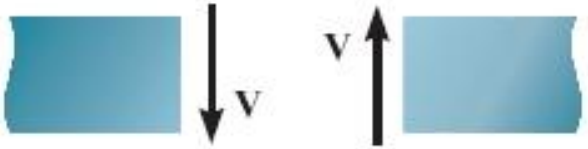

z
Bending moment components
M_z
Normal force
V_z
Torsional moment
N_y
M_y
y
C
V_x
M_x
Shear force components
x

(b)



Positive normal force

Tensile



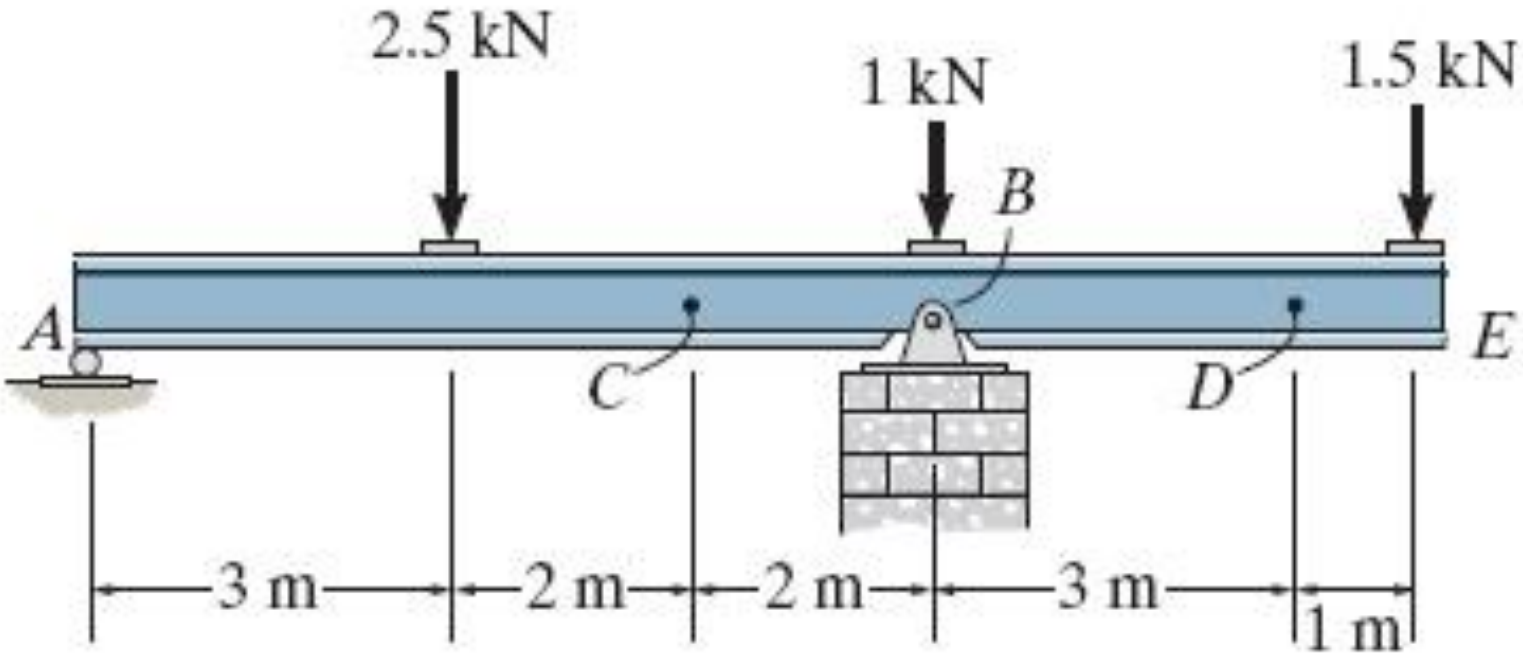
Trying to rotate clockwise

Positive shear

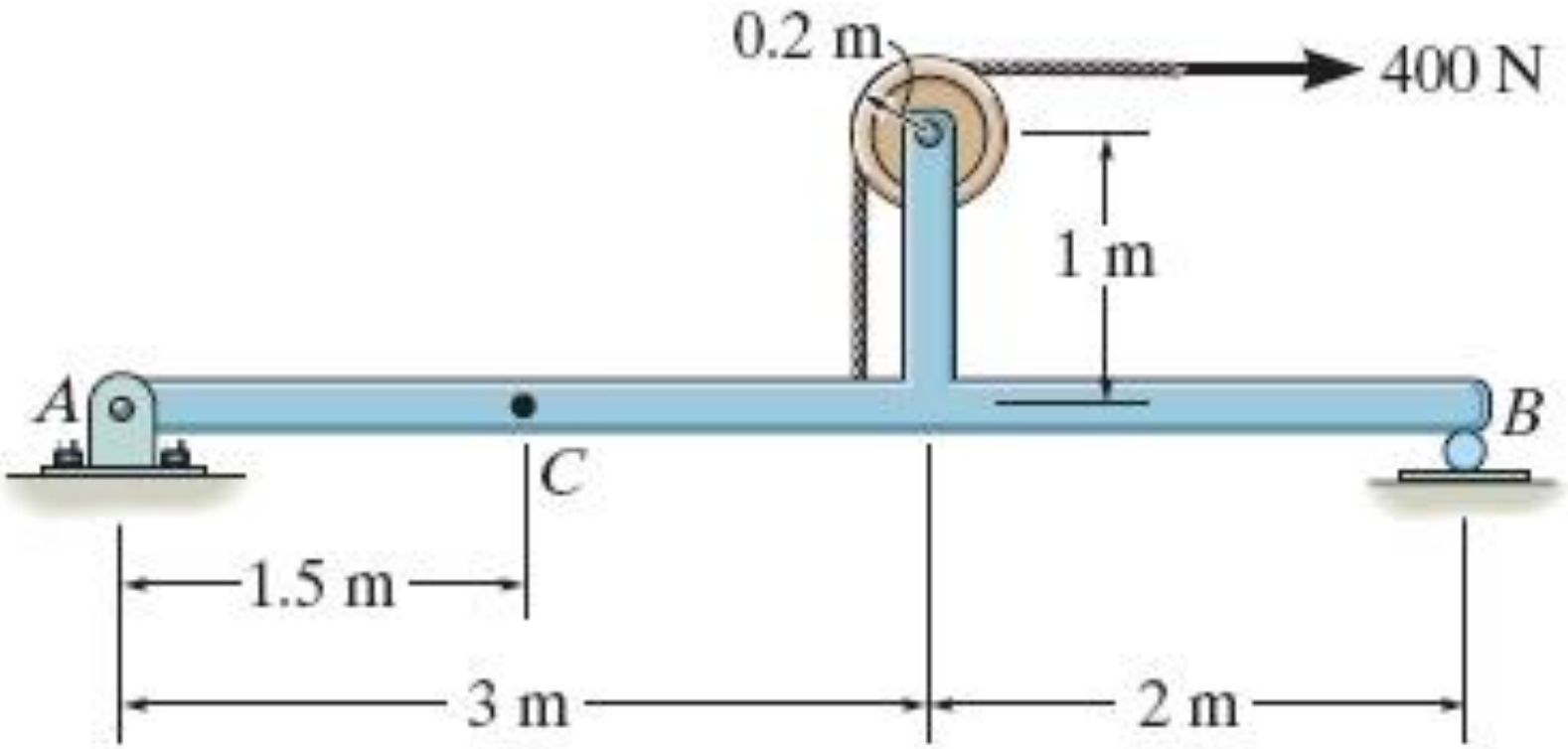
Positive moment

Trying to sag the center down

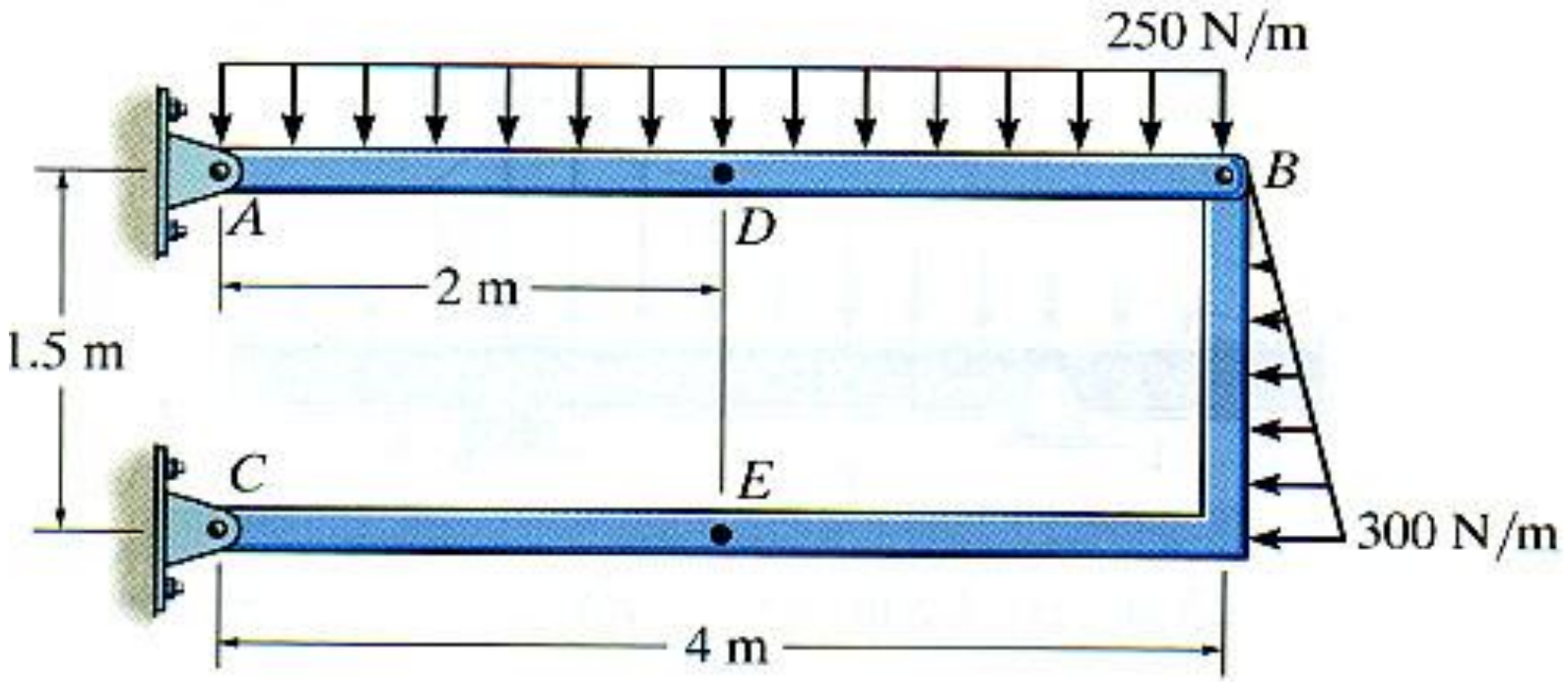
7-2. Determine the shear force and moment at points C and D.



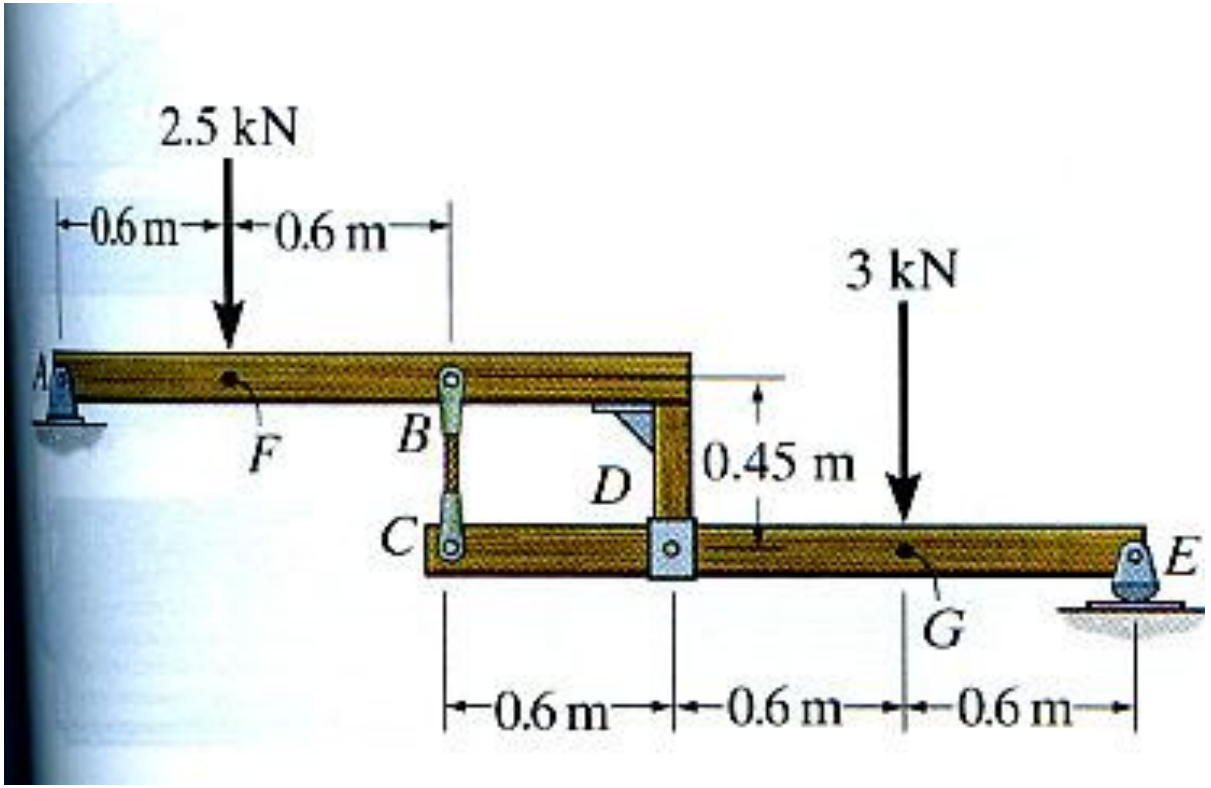
7-5. Determine the internal normal force, shear force and moment at point C.



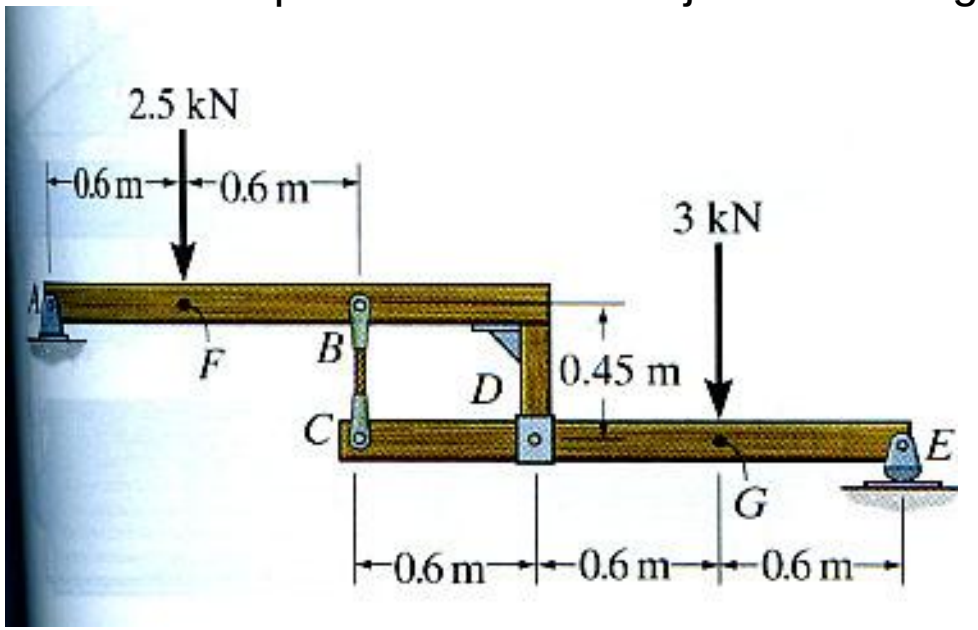
7-13/14. Determine the internal normal force, shear force and moment at points D and E of the two-member frame.



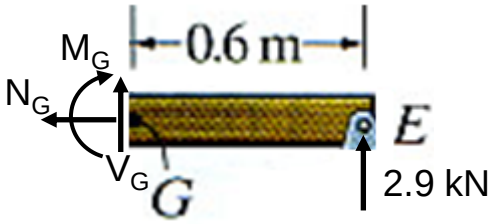
7-21. Determine the internal normal force, shear force and moment at points F and G of the compound beam. Point F is located just to the right of the 2.5 kN force while point G is located just to the right of the 3 kN force.



7-21. Determine the internal normal force, shear force and moment at points F and G of the compound beam. Point F is located just to the right of the 2.5 kN force while point G is located just to the right of the 3 kN force.



Correction:

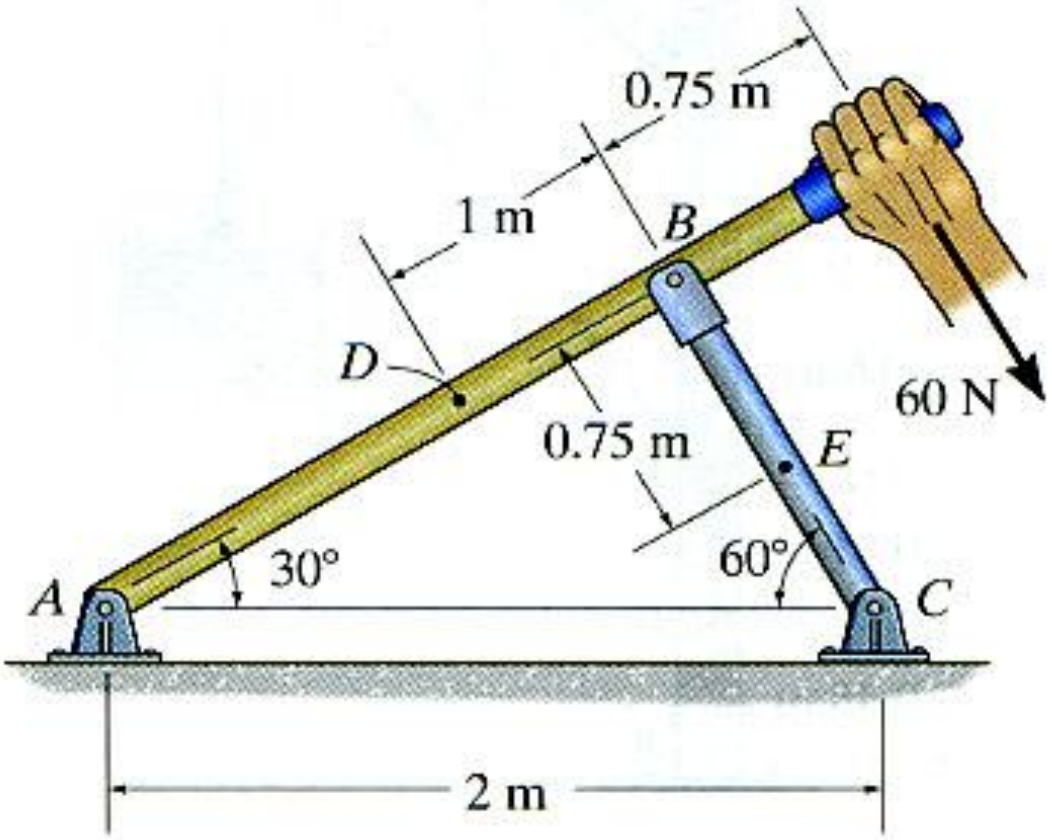


$$\sum F_x = 0 \Rightarrow N_G = 0\ \text{N}$$

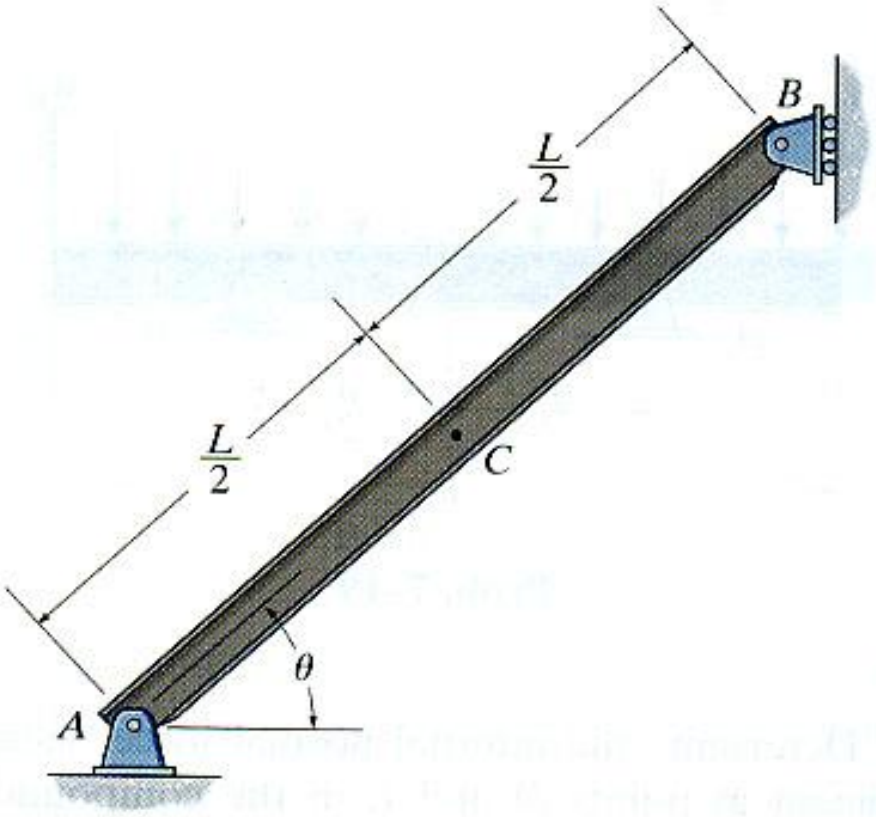
$$\sum F_y = 2.9 + V_G = 0 \Rightarrow V_G = -2.9\ \text{kN}$$

$$\sum M_G = M_G + 0.6 \cdot 2.9 = 0 \Rightarrow M_G = 1740\ \text{kN} \cdot \text{m}$$

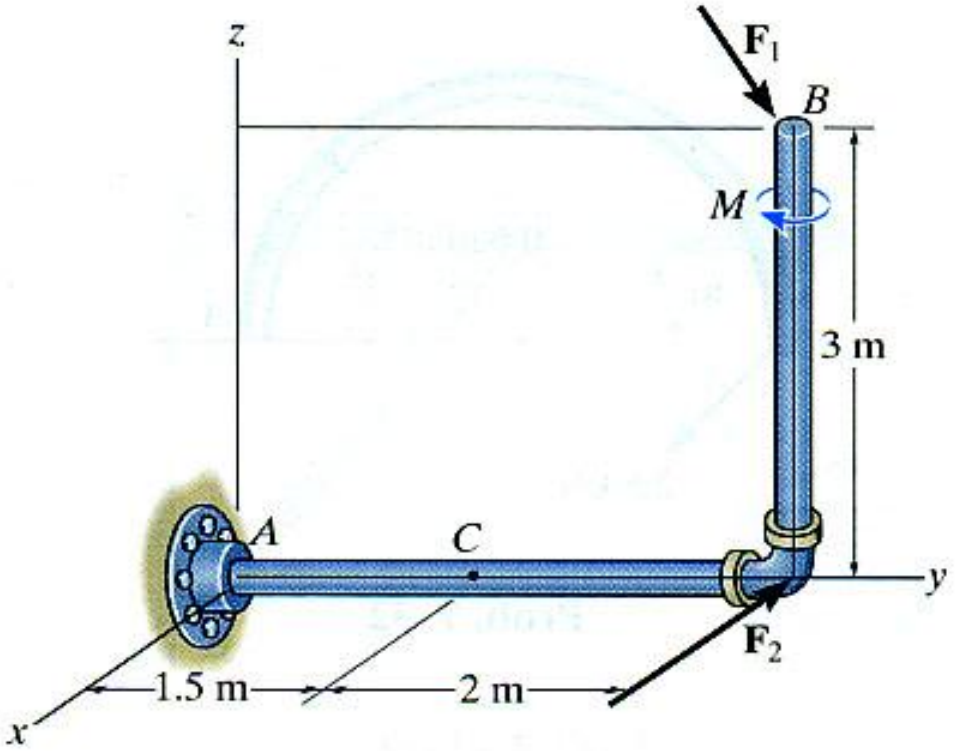
7-23. Determine the internal normal force, shear force and moment at points D and E in the two members.



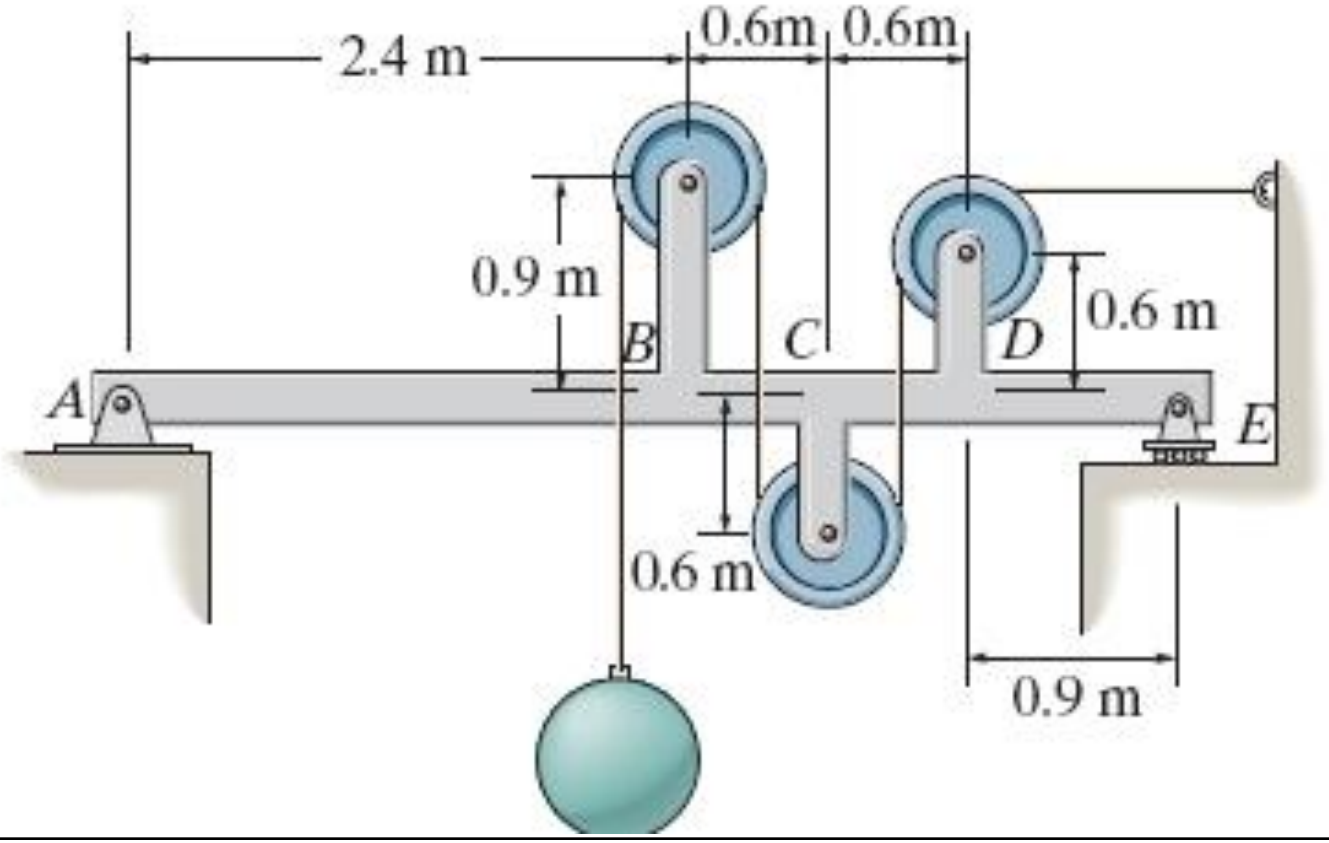
7-26. The beam has a weight w per unit length. Determine the internal normal force, shear force, and moment at point C due to its weight.



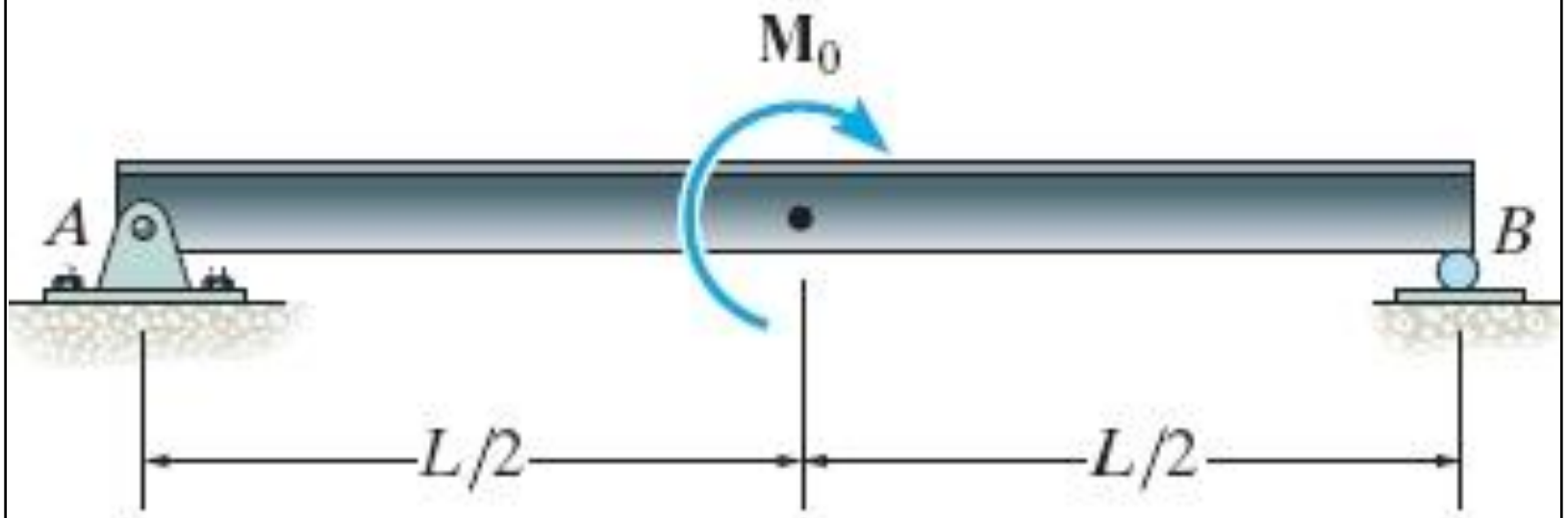
7-34. Determine the x, y, z components of the internal loading at point C in the pipe assembly. Neglect the weight of the pipe. The load is $\mathbf{F}_1$ = (-24**i** – 10**k**)kN, $\mathbf{F}_2$ = -80**i** kN, and **M** = -30**k** kN.m.



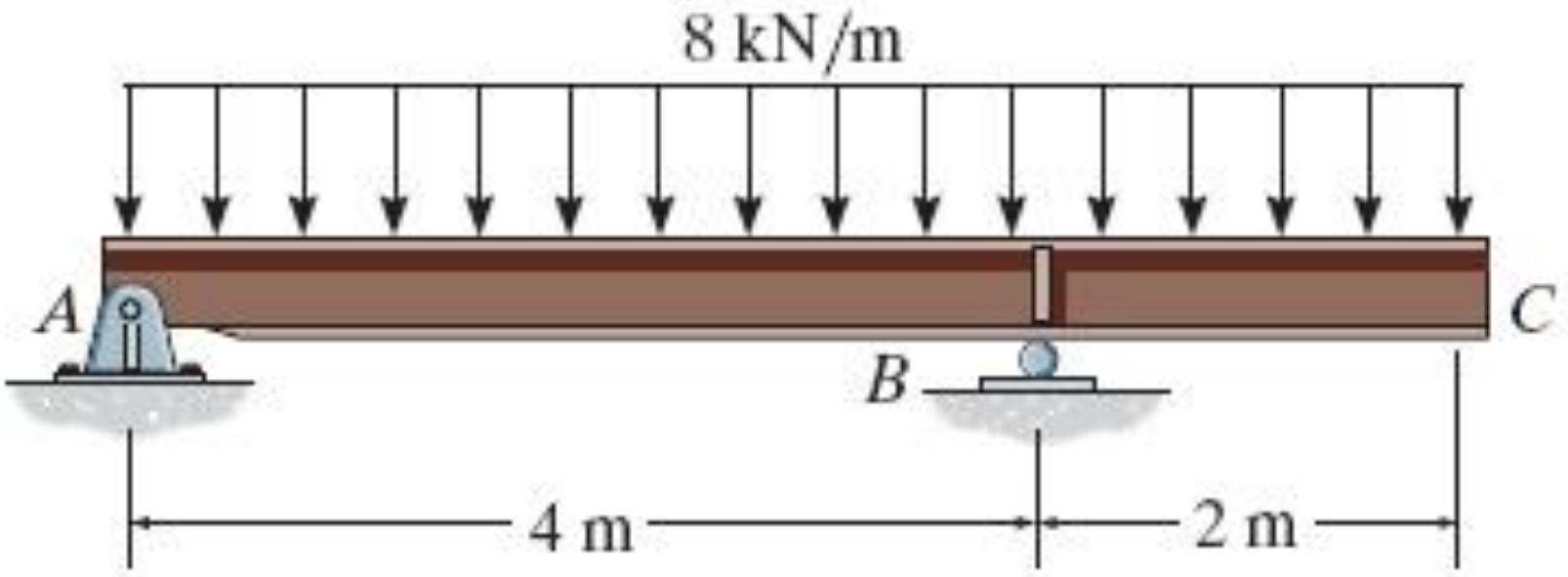
7-42. Draw the shear and moment diagrams for the beam ABCDE. All pulleys have a radius of 0.3 m. Neglect the weight of the beam and pulley arrangement. The load weighs 1.5 kN.



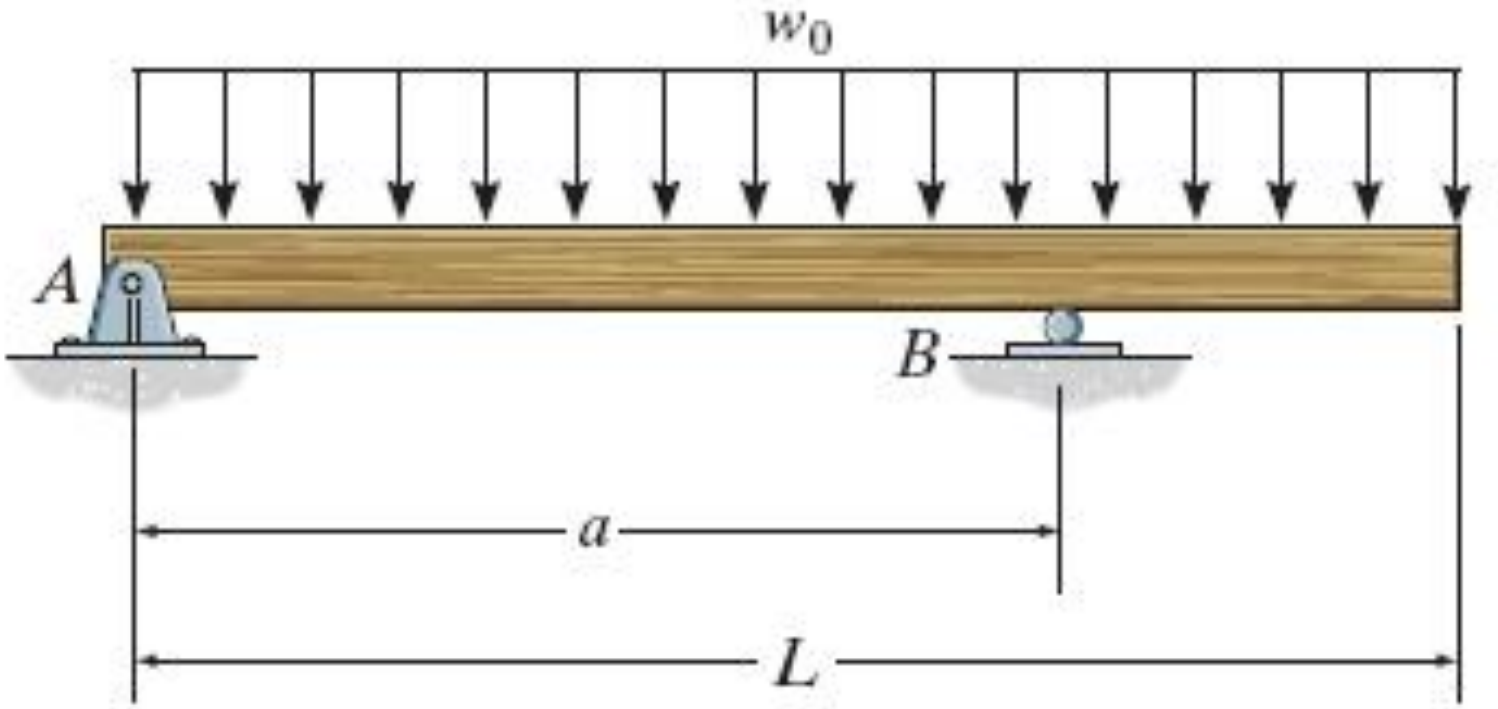
7-45. If L = 9 m, the beam will fail when the maximum shear force V_{max} = 5 kN or the maximum moment M_{max} = 22 kN.m. Determine the largest couple moment, M_0, the beam will support.



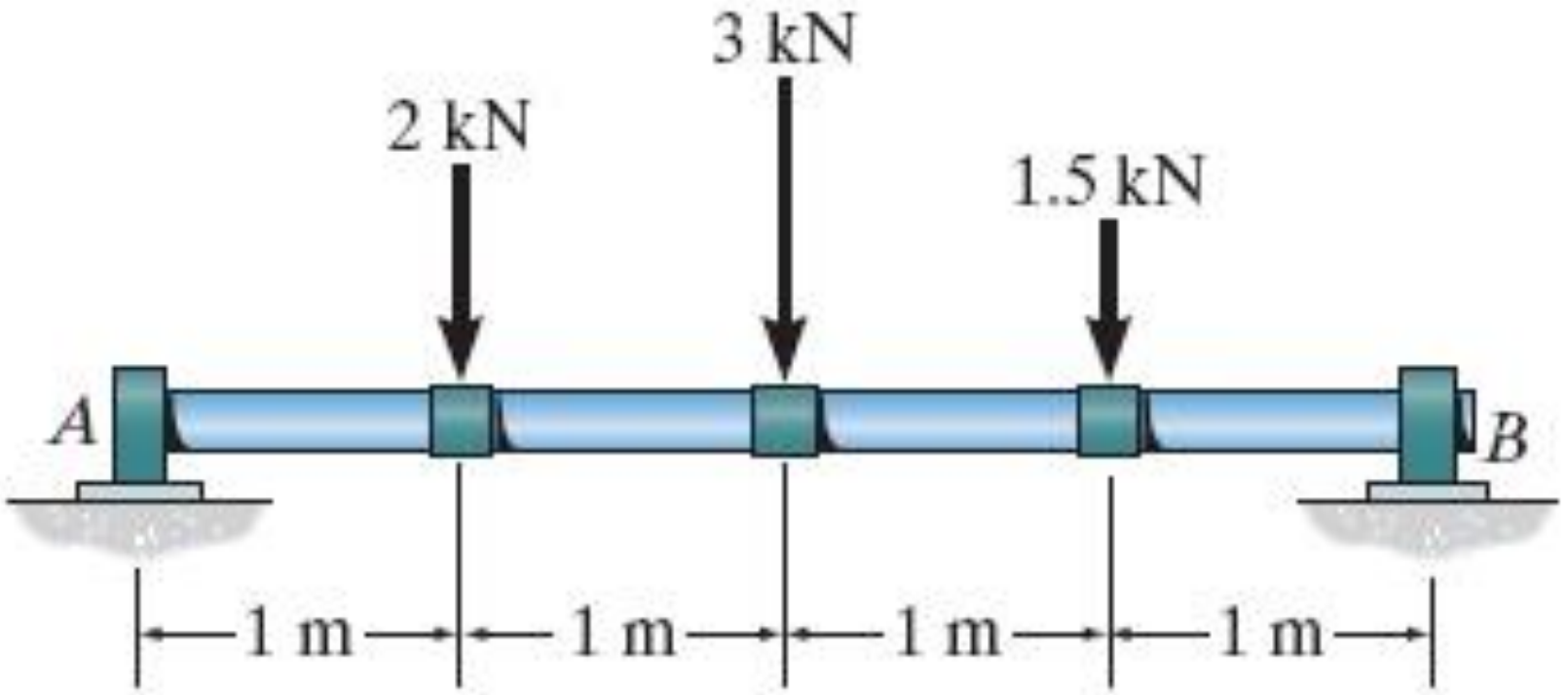
7-48. Draw the shear and moment diagrams for the overhanging beam.



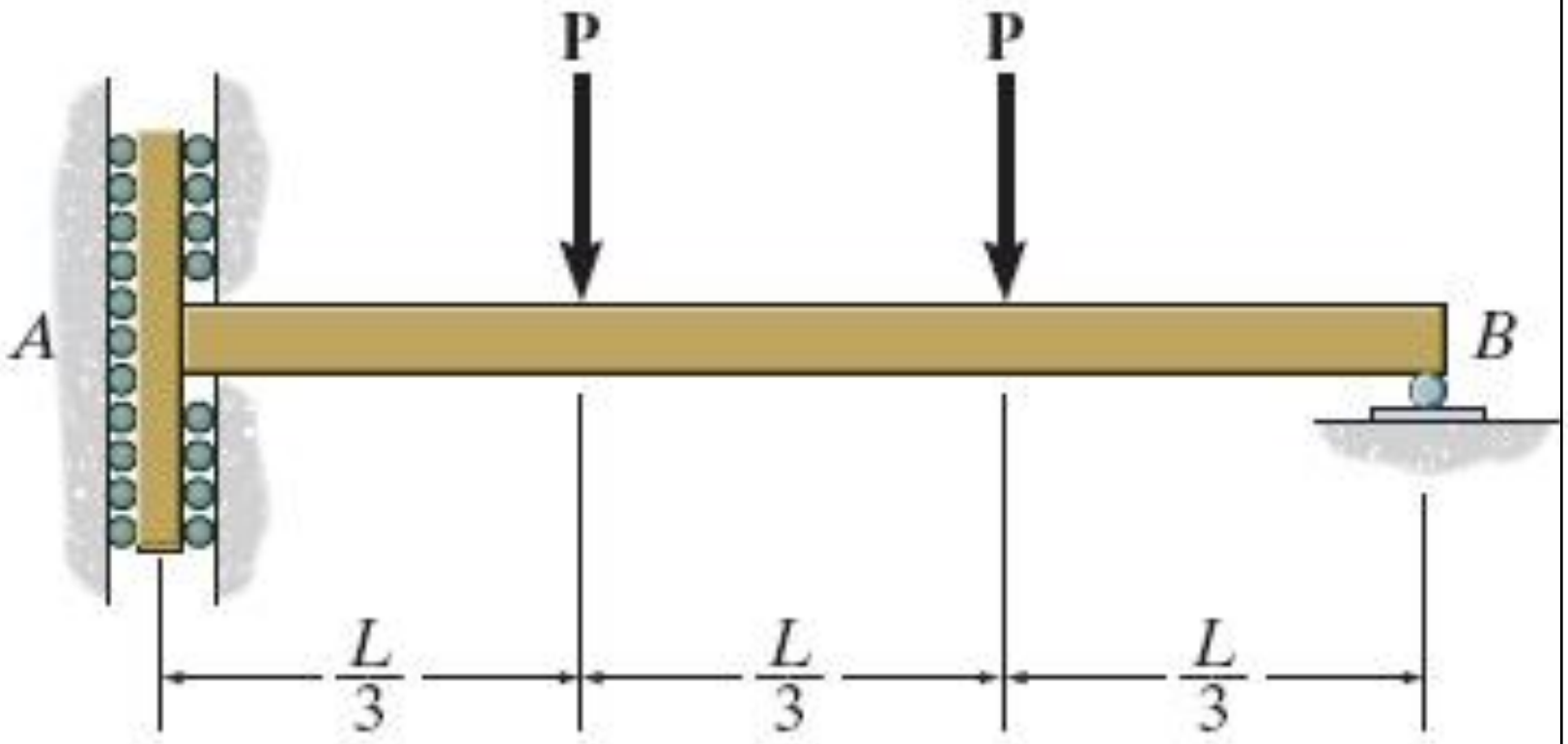
7-60. Determine the placement, a, of roller support B so that the maximum moment within span AB is equal to the moment at support B.



7-65. The shaft is supported by a smooth thrust bearing at A and a smooth journal bearing at B. Draw the shear and moment diagrams for the shaft.



7-70. Draw the shear and moment diagrams for the beam. The support at A offers no resistance to vertical load.



7-84. Draw the shear and moment diagrams for the beam.