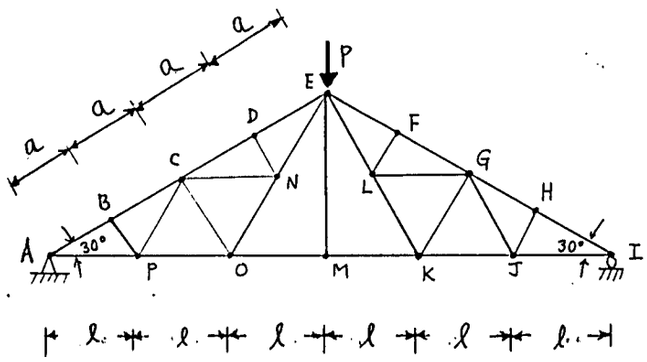


(NOTE : $a = \ell \cos 30°$)

(Figure 1)

1. (20 %)

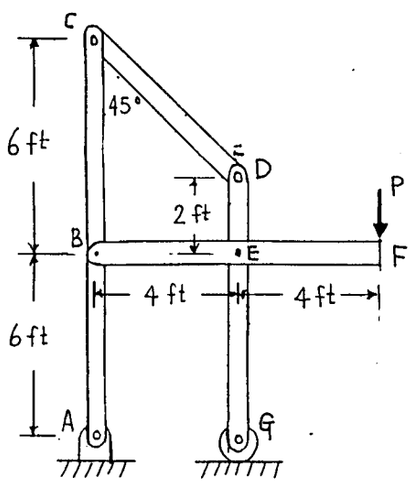
Consider the truss in Figure 1. Determine the forces in

(a) member DN

(b) member DM

(c) member EM

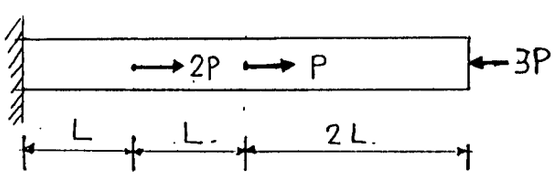
(d) member DE



(Figure 2)

2. (20 %)

Draw the shear and bending moment diagrams for member BF of the pin-connected frame. (Figure 2)



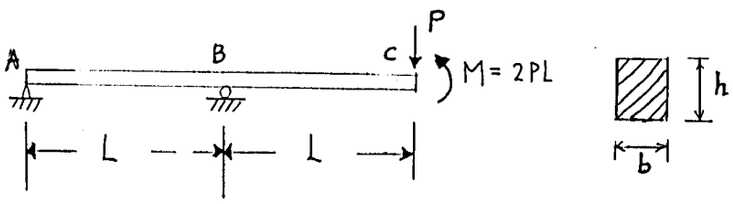
(Figure 3)

3. (20 %)

A steel pipe with Young's modulus E is loaded as shown in Figure 3. The cross-sectional area of the pipe is A

(a) Calculate the deflection δ at the free end.

(b) Find the distance x from the left-hand support to the point at which the deflection is zero.

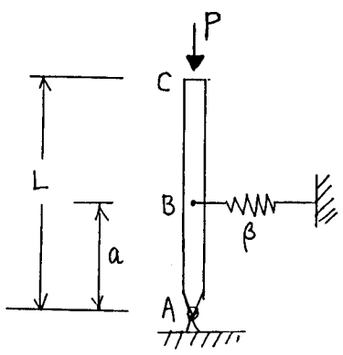


(Figure 4)

4. (20%) A beam is of rectangular cross section shown in Figure 4.
   (a) Draw the shear force diagram
   (b) Draw the bending moment diagram
   (c) Calculate the maximum normal stress in the beam.
   (d) Compute the deflection at point C

5. (20%)

Determine the critical load P_{cr} for the rigid bar-spring system shown in Figure 5.



β: spring constant

(Figure 5.)