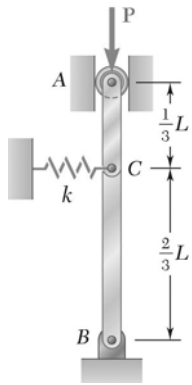
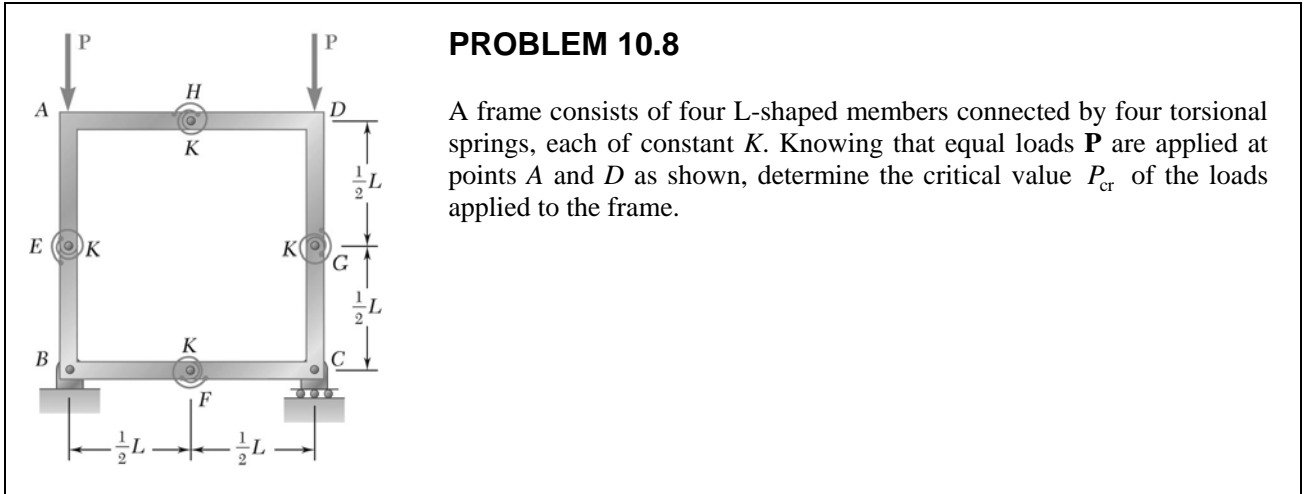


# Homework10



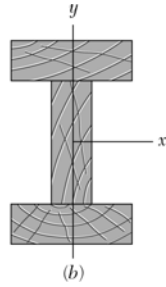
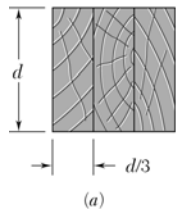
### PROBLEM 10.4

Two rigid bars  $AC$  and  $BC$  are connected as shown to a spring of constant  $k$ . Knowing that the spring can act in either tension or compression, determine the critical load  $P_{cr}$  for the system.



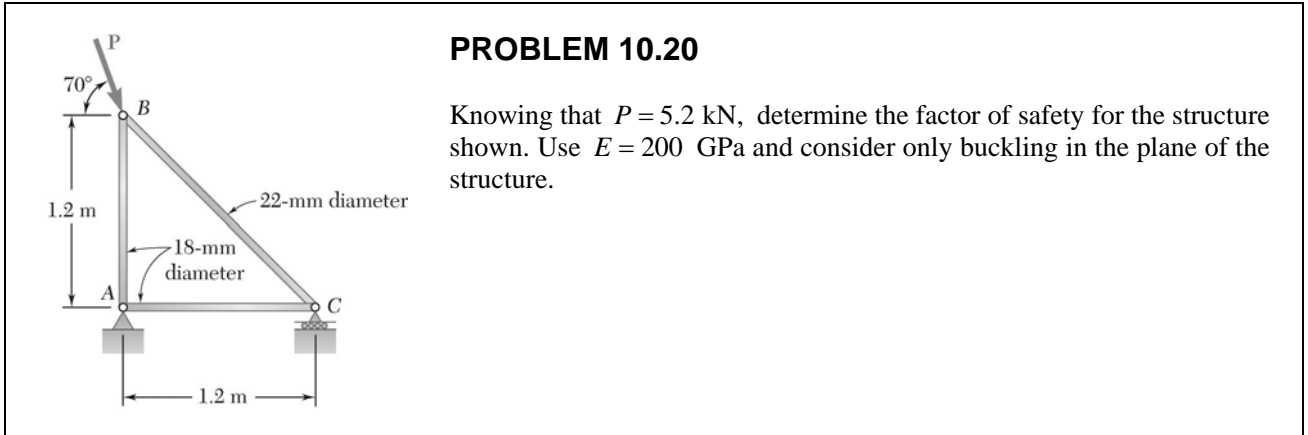
**PROBLEM 10.8**

A frame consists of four L-shaped members connected by four torsional springs, each of constant  $K$ . Knowing that equal loads  $\mathbf{P}$  are applied at points  $A$  and  $D$  as shown, determine the critical value  $P_{cr}$  of the loads applied to the frame.



### PROBLEM 10.13

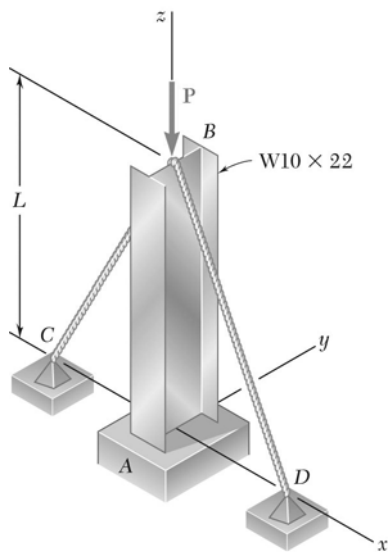
A column of effective length  $L$  can be made by gluing together identical planks in either of the arrangements shown. Determine the ratio of the critical load using the arrangement  $a$  to the critical load using the arrangement  $b$ .



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**Vivek Shenoy: Brown University**

### PROBLEM 10.25



Column  $AB$  carries a centric load  $\mathbf{P}$  of magnitude 15 kips. Cables  $BC$  and  $BD$  are taut and prevent motion of point  $B$  in the  $xz$  plane. Using Euler's formula and a factor of safety of 2.2, and neglecting the tension in the cables, determine the maximum allowable length  $L$ . Use  $E = 29 \times 10^6$  psi.