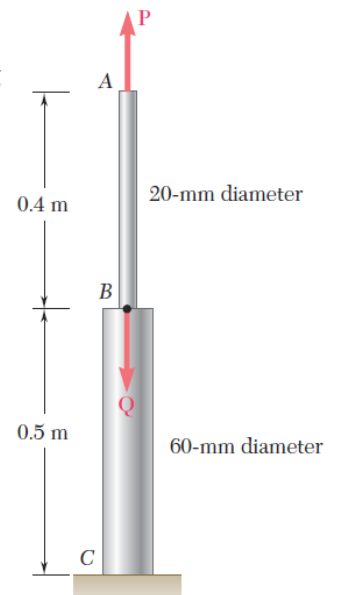


**ME 231**  
**Homework 2**

- 2.1** A nylon thread is subjected to a 8.5-N tension force. Knowing that  $E = 3.3$  GPa and that the length of the thread increases by 1.1%, determine (a) the diameter of the thread, (b) the stress in the thread.
- 2.6** A control rod made of yellow brass must not stretch more than 3 mm when the tension in the wire is 4 kN. Knowing that  $E = 105$  GPa and that the maximum allowable normal stress is 180 MPa, determine (a) the smallest diameter rod that should be used, (b) the corresponding maximum length of the rod.
- 2.11** A block of 10-in. length and  $1.8 \times 1.6$ -in. cross section is to support a centric compressive load  $P$ . The material to be used is a bronze for which  $E = 14 \times 10^6$  psi. Determine the largest load that can be applied, knowing that the normal stress must not exceed 18 ksi and that the decrease in length of the block should be at most 0.12% of its original length.
- 2.20** The rod  $ABC$  is made of an aluminum for which  $E = 70$  GPa. Knowing that  $P = 6$  kN and  $Q = 42$  kN, determine the deflection of (a) point  $A$ , (b) point  $B$ .



- 2.27** Link  $BD$  is made of brass ( $E = 105$  GPa) and has a cross-sectional area of  $240$  mm<sup>2</sup>. Link  $CE$  is made of aluminum ( $E = 72$  GPa) and has a cross-sectional area of  $300$  mm<sup>2</sup>. Knowing that they support rigid member  $ABC$ , determine the maximum force  $P$  that can be applied vertically at point  $A$  if the deflection of  $A$  is not to exceed  $0.35$  mm.

