

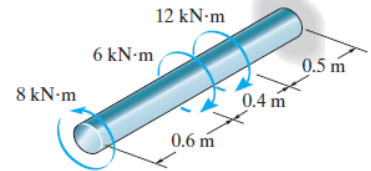
ME 304 Mechanical Engineering Design (1)

Homework(5)

Q1

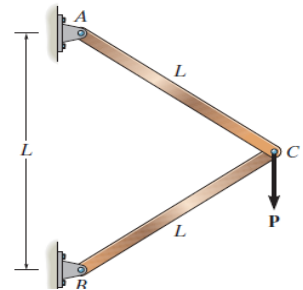
Determine the torsional strain energy in the A-36 steel shaft. The shaft has a radius of 40 mm.

It of inertia



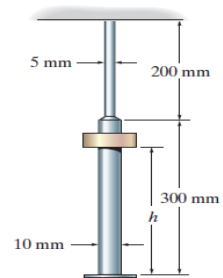
Q2

Determine the vertical displacement of joint C. AE is constant.



Q3

The composite aluminum bar is made from two segments having diameters of 5 mm and 10 mm. Determine the maximum height h from which the 5-kg collar should be dropped so that it produces a maximum axial stress in the bar of $\sigma_{\max} = 300$ MPa, $E_{\text{al}} = 70$ GPa, $\sigma_Y = 410$ MPa.



Q4 using Castigliano's theorem

Determine the vertical displacement of joint C on the truss. Each A-36 steel member has a cross-sectional area of $A = 300$ mm².

