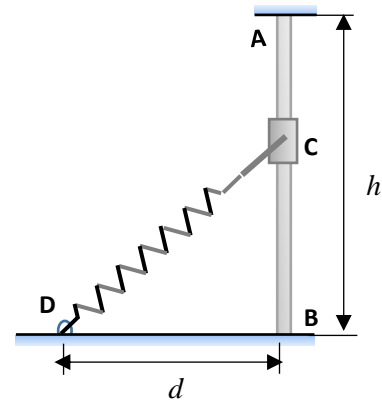


600 -gr collar **C** may slide along pole **AB**. The spring has an undeformed length of 250.0 mm and a spring constant of 135 N/m. Knowing that the collar is released from rest at **A** and that

$$h = 400.0 \text{ mm}$$

$$d = 300.0 \text{ mm}$$

- Drive a formula for the work of friction of the collar as it moves from **A** to **B**, in terms of all the known values, including coefficient of kinetic friction between collar and rod as μ_k .
- determine the speed of collar at **B** if there is friction between collar and rod with a coefficient of friction of $\mu_k = 0.2$
- determine the speed of collar at **B** if there is NO friction between collar and rod .



Note: You may need

$$\int d\theta / \cos\theta = \ln(1/\cos\theta + \tan\theta)$$

$$\int d\theta / \cos^2\theta = \tan\theta$$