PROBLEM 16.131

A driver starts his car with the door on the passenger’s side wide open ($\theta = 0$). The 80-lb door has a centroidal radius of gyration $k = 12.5$ in., and its mass center is located at a distance $r = 22$ in. from its vertical axis of rotation. Knowing that the driver maintains a constant acceleration of $6 \text{ ft/s}^2$, determine the angular velocity of the door as it slams shut ($\theta = 90^\circ$).

PROBLEM 16.141

At the instant shown, the 6 m long, uniform 50-kg pole $ABC$ has an angular velocity of $1 \text{ rad/s}$ counterclockwise and Point C is sliding to the right. A 500 N horizontal force $P$ acts at $B$. Knowing the coefficient of kinetic friction between the pole and the ground is 0.3, determine at this instant $(a)$ the acceleration of the center of gravity, $(b)$ the normal force between the pole and the ground.

PROBLEM 16.147*

The 6-lb cylinder $B$ and the 4-lb wedge $A$ are held at rest in the position shown by cord $C$. Assuming that the cylinder rolls without sliding on the wedge and neglecting friction between the wedge and the ground, determine, immediately after cord $C$ has been cut, $(a)$ the acceleration of the wedge, $(b)$ the angular acceleration of the cylinder.