

10A

A car traveling on a flat (unbanked) circular track accelerates uniformly from rest with a tangential acceleration of 1.70 m/s^2 . The car makes it one-quarter of the way around the circle before it skids off the track. Determine the coefficient of static friction between the car and track from these data.

10B

The top in Figure P10.39 has a moment of inertia equal to $4.00 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ and is initially at rest. It is free to rotate about the stationary axis AA' . A string, wrapped around a peg along the axis of the top, is pulled in such a manner as to maintain a constant tension of 5.57 N . If the string does not slip while it is unwound from the peg, what is the angular speed of the top after 80.0 cm of string has been pulled off the peg?

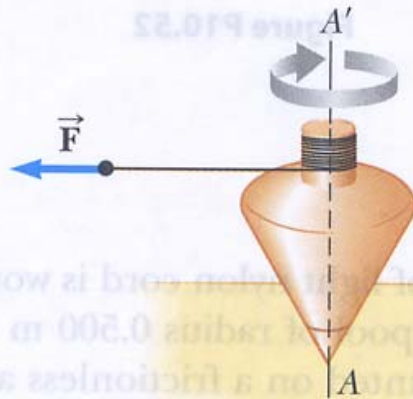


Figure P10.39

10C

A uniform, hollow, cylindrical spool has inside radius $R/2$, outside radius R , and mass M (Fig. P10.61). It is mounted so that it rotates on a fixed, horizontal axle. A counterweight of mass m is connected to the end of a string wound around the spool. The counterweight falls from rest at $t = 0$ to a position y at time t . Show that the torque due to the friction forces between spool and axle is

$$\tau_f = R \left[m \left(g - \frac{2y}{t^2} \right) - M \frac{5y}{4t^2} \right]$$

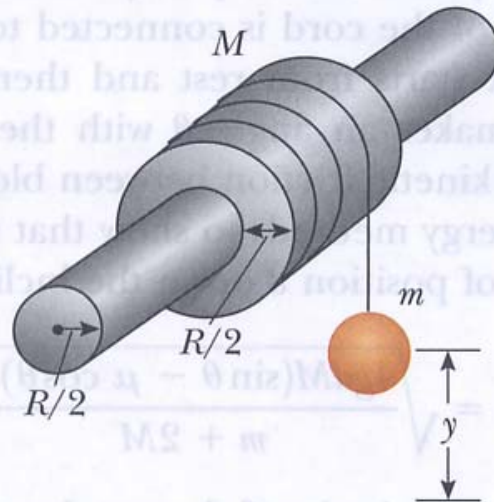


Figure P10.61