

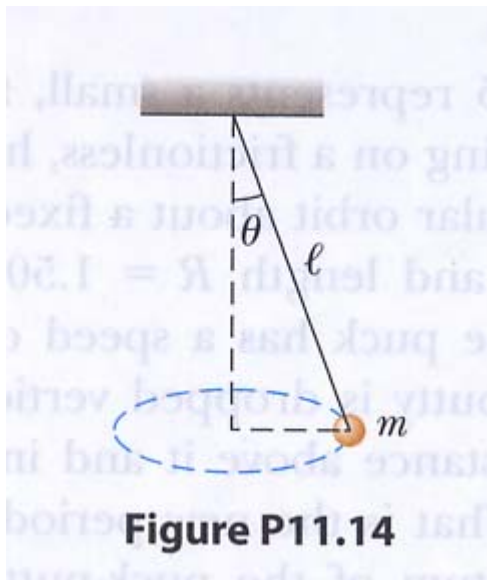
11A

● A solid sphere is released from height h from the top of an incline making an angle θ with the horizontal. Calculate the speed of the sphere when it reaches the bottom of the incline (a) in the case that it rolls without slipping and (b) in the case that it slides frictionlessly without rolling. (c) Compare the time intervals required to reach the bottom in cases (a) and (b).

11B

A conical pendulum consists of a bob of mass m in motion in a circular path in a horizontal plane as shown in Figure P11.14. During the motion, the supporting wire of length ℓ maintains the constant angle θ with the vertical. Show that the magnitude of the angular momentum of the bob about the circle's center is

$$L = \left(\frac{m^2 g \ell^3 \sin^4 \theta}{\cos \theta} \right)^{1/2}$$



11C

A projectile of mass m moves to the right with a speed v_i (Fig. P11.46a). The projectile strikes and sticks to the end

of a stationary rod of mass M , length d , pivoted about a frictionless axle through its center (Fig. P11.46b). (a) Find the angular speed of the system right after the collision. (b) Determine the fractional loss in mechanical energy due to the collision.

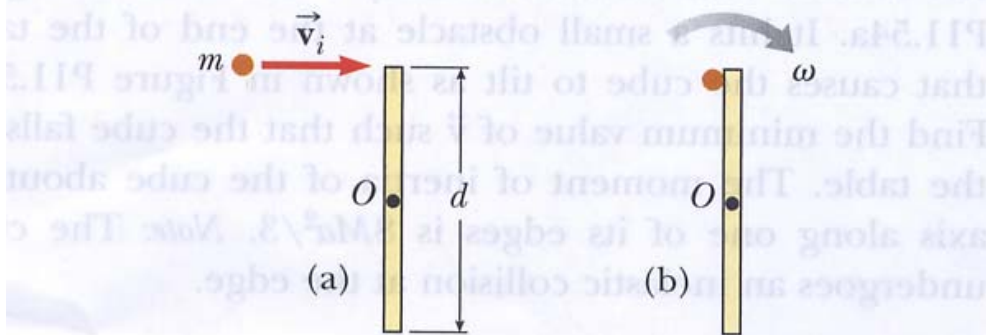


Figure P11.46