thin 細的、薄的、瘦的

‘cylinder 圓柱， cy’lindrical 圓柱形的

dia’meter 直徑， radius (radii) 半徑

o’riginally 起初, o’riginal 最初的、有獨創性的，’origin 原點

‘vertical 垂直的;豎的,立式的

combi’nation 組合、聯合(體)

‘pivot vt.以...爲中心旋轉、n. 樞,樞軸;

‘nudge 輕推;推動，用肘輕推(以引起注意)

50. Review. A thin, cylindrical rod $\ell = 24.0$ cm long with mass $m = 1.20$ kg has a ball of diameter $d = 8.00$ cm and mass $M = 2.00$ kg attached to one end. The arrangement is originally vertical and stationary, with the ball at the top as shown in Figure P10.50. The combination is free to pivot about the bottom end of the rod after being given a slight nudge. (a) After the combination rotates through 90 degrees, what is its rotational kinetic energy? (b) What is the angular speed of the rod and ball? (c) What is the linear speed of the center of mass of the ball? (d) How does it compare with the speed had the ball fallen freely through the same distance of 28 cm?

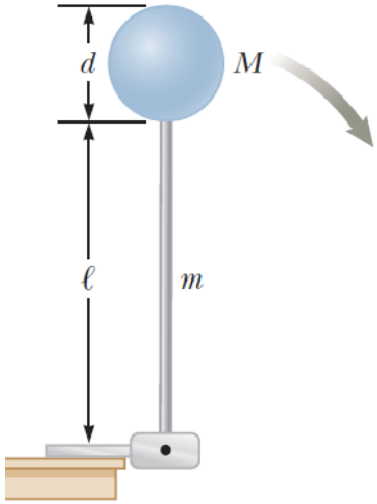

Figure P10.50

‘uniform 均勻的

‘instant 瞬間

‘magnitude 數量、大小

accele’ration 加速度

center of mass 質心

com’ponent 分量

67. **S** A long, uniform rod of length L and mass M is pivoted about a frictionless, horizontal pin through one end. The rod is nudged from rest in a vertical position as shown in Figure P10.67. At the instant the rod is horizontal, find (a) its angular speed, (b) the magnitude of its angular acceleration, (c) the x and y components of the acceleration of its center of mass, and (d) the components of the reaction force at the pivot.

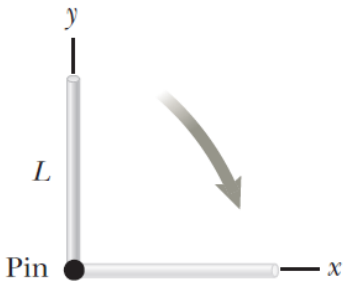

Figure P10.67

spool 線軸、捲軸

un’wind 解開;展開;鬆開;捲回, un’wound p.p.

‘solid cylinder 實心圓柱

slip 滑動

rolls without slipping 滾動而無滑動（不打滑之滾動）

76. **S** **Review.** A spool of wire of mass M and radius R is unwound under a constant force $\vec{\mathbf{F}}$ (Fig. P10.76). Assuming the spool is a uniform, solid cylinder that doesn’t slip, show that (a) the acceleration of the center of mass is $4\vec{\mathbf{F}}/3M$ and (b) the force of friction is to the *right* and equal in magnitude to $F/3$. (c) If the cylinder starts from rest and rolls without slipping, what is the speed of its center of mass after it has rolled through a distance d?

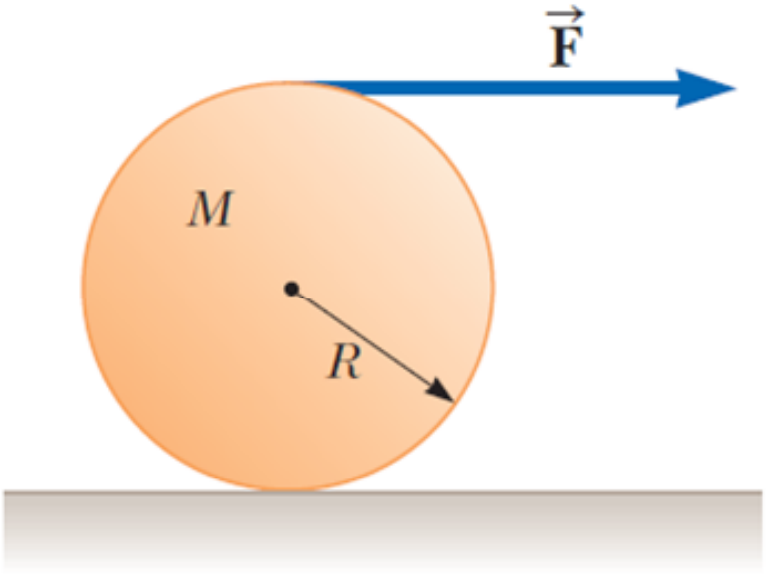

Figure P10.76

cord 細繩,粗線,索
wrap 纏繞、 包、裹
‘pulley 滑輪
‘incline n.斜面. in’cline vi. 傾斜; 有...傾向
coe’fficient 係數
In terms of 就...而論,在...方面

86. **S** A cord is wrapped around a pulley that is shaped like a disk of mass m and radius r. The cord's free end is connected to a block of mass M. The block starts from rest and then slides down an incline that makes an angle θ with the horizontal as shown in Figure P10.86. The coefficient of kinetic friction between block and incline is μ. (a) Use energy methods to show that the block's speed as a function of position d down the incline is

$$v = \sqrt{\frac{4Mgd(\sin\theta - \mu\cos\theta)}{m + 2M}}$$

(b) Find the magnitude of the acceleration of the block in terms of μ, m, M, g, and θ.

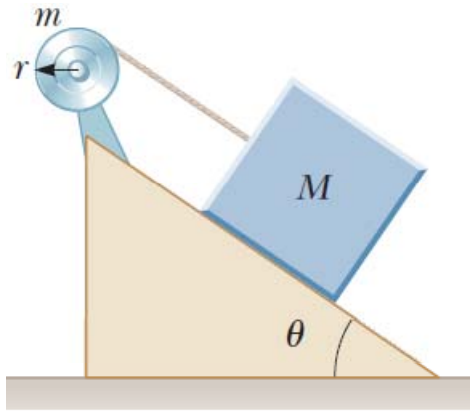

Figure P10.86