10. The uniform solid block in Fig. 10-24 has mass 0.212 kg and edge lengths $a = 3.5$ cm, $b = 10$ cm, and $c = 0.85$ cm. Calculate its rotational inertia about an axis through one corner and perpendicular to the large faces.

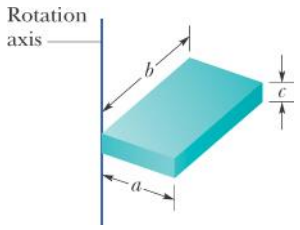

Figure 10-24 Problem 10.

14. In Fig. 10-27, a wheel of radius 0.20 m is mounted on a frictionless horizontal axle. A massless cord is wrapped around the wheel and attached to a 2.0 kg box that slides on a frictionless surface inclined at angle $\theta = 20°$ with the horizontal. The box accelerates down the surface at 2.0 m/s^2. What is the rotational inertia of the wheel about the axle?

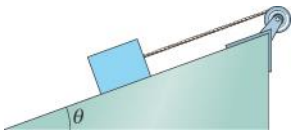

Figure 10-27 Problem 14.

20. Our Sun is 2.3×10^4 ly (light-years) from the center of our Milky Way galaxy and is moving in a circle around that center at a speed of 250 km/s. (a) How long does it take the Sun to make one revolution about the galactic center? (b) How many revolutions has the Sun completed since it was formed about 4.5×10^9 years ago?

24. A yo-yo-shaped device mounted on a horizontal frictionless axis is used to lift a 30 kg box as shown in Fig. 10-31. The outer radius R of the device is 0.50 m, and the radius r of the hub is 0.20 m. When a constant horizontal force $\vec{F}_{app}$ of magnitude 140 N is applied to a rope wrapped around the outside of the device, the box, which is suspended from a rope wrapped around the hub, has an upward acceleration of magnitude 0.80 m/s^2. What is the rotational inertia of the device about its axis of rotation?

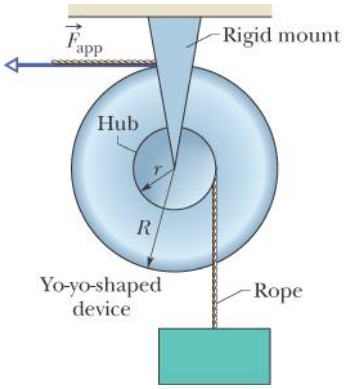

Figure 10-31 Problem 24.

41. In Fig. 10-36, two blocks, of mass m_1 = 400 g and m_2 = 600 g, are connected by a massless cord that is wrapped around a uniform disk of mass M = 500 g and radius R = 12.0 cm. The disk can rotate without friction about a fixed horizontal axis through its center; the cord cannot slip on the disk. The system is released from rest. Find (a) the magnitude of the acceleration of the blocks, (b) the tension T_1 in the cord at the left, and (c) the tension T_2 in the cord at the right.

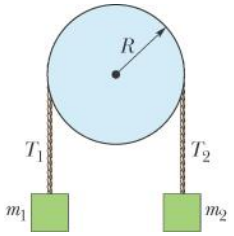

Figure 10-36 Problems 41.

56. The thin uniform rod in Fig. 10-43 has length 1.25 m and can pivot about a horizontal, frictionless pin through one end. It is released from rest at angle $\theta = 55°$ above the horizontal. Use the principle of conservation of energy to determine the angular speed of the rod as it passes through the horizontal position.

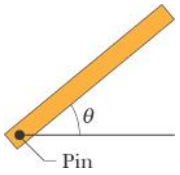

Figure 10-43 Problem 56.