# Assignment 5

**PHY1001**

**NO LATE SUBMISSION IS ACCEPTED**

**28** In Fig. 6-34, two blocks are connected over a pulley. The mass of block $A$ is 15 kg, and the coefficient of kinetic friction between $A$ and the incline is 0.20. Angle $\theta$ of the incline is 30°. Block $A$ slides down the incline at constant speed. What is the mass of block $B$?

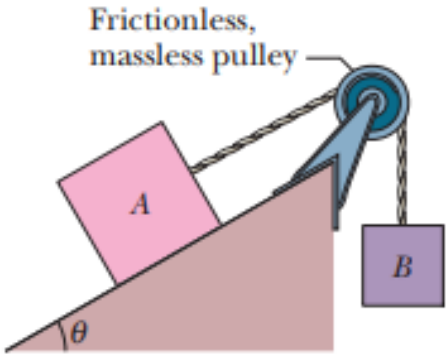


**Figure 6-34** Problem 28.

**34** In Fig. 6-39, a slab of mass $m_1 = 40$ kg rests on a frictionless floor, and a block of mass $m_2 = 12$ kg rests on top of the slab. Between block and slab, the coefficient of static friction is 0.60, and the coefficient of kinetic friction is 0.40. A horizontal force $\vec{F}$ of magnitude 120 N begins to pull directly on the block, as shown. In unit-vector notation, what are the resulting accelerations of (a) the block and (b) the slab?

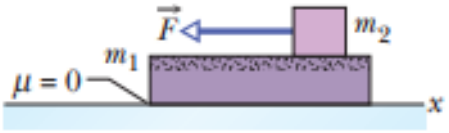


**Figure 6-39** Problem 34.

**36** A water droplet 4.0 mm in diameter is falling with a speed of 10 km/h at an altitude of 20 km. Another droplet 6.0 mm in diameter is falling at 25% of that speed and at 25% of that altitude. The density of air at 20 km is 0.20 kg/m$^3$ and that at 5.0 km is 0.70 kg/m$^3$. Assume that the drag coefficient $C$ is the same for the two drops. Find the ratio of the drag force on the higher drop to that on the lower drop.

**56** A banked circular highway curve is designed for traffic moving at 65 km/h. The radius of the curve is 200 m. Traffic is moving along the highway at 40 km/h on a rainy day. What is the minimum coefficient of friction between tires and road that will allow cars to take the turn without sliding off the road? (Assume the cars do not have negative lift.)

**59** In Fig. 6-47, a 1.34 kg ball is connected by means of two massless strings, each of length $L = 1.70$ m, to a vertical, rotating rod. The strings are tied to the rod with separation $d = 1.70$ m and are taut. The tension in the upper string is 35 N. What are the (a) tension in the lower string, (b) magnitude of the net force $\vec{F}_{net}$ on the ball, and (c) speed of the ball? (d) What is the direction of $\vec{F}_{net}$?

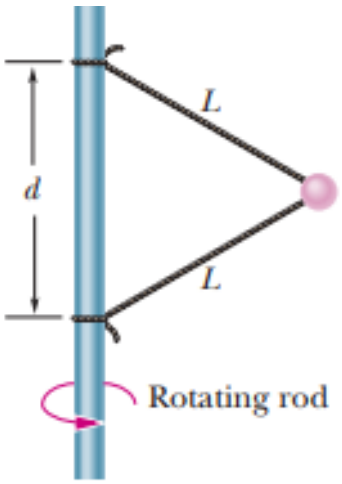


**Figure 6-47**
Problem 59.