



SN: _____, Name: _____

Chapter 1-8, Serway; **ABSOLUTELY NO CHEATING!**

Please write the answers on the blank space or on the back of this paper to save resources.

- Two objects, A and B, are connected by hinges to a rigid rod that has a length L . The objects slide along perpendicular guide rails as shown in Figure 1. Assume object A slides to the left with a constant speed v . (a) Find the velocity v_B of object B as a function of the angle θ . (b) Describe v_B relative to v . Is v_B always smaller than v , larger than v , or the same as v , or does it have some other relationship?

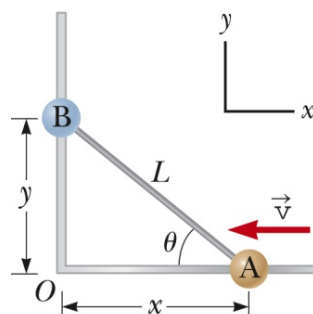


Figure 1

- A block of mass $m = 2.50$ kg is pushed a distance $d = 2.20$ m along a frictionless, horizontal table by a constant applied force of magnitude $F = 16.0$ N directed at an angle $\theta = 25.0^\circ$ below the horizontal as shown in Figure P7.1. Determine the work done on the block by (a) the applied force, (b) the normal force exerted by the table, (c) the gravitational force, and (d) the net force on the block.

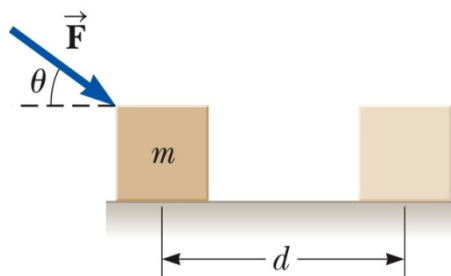


Figure P7.1

3. In the system shown in Figure P5.33, a horizontal force $\vec{F}_x$ acts on an object of mass $m_2 = 8.00$ kg. The horizontal surface is frictionless. Consider the acceleration of the sliding object as a function of F_x . (a) For what values of F_x does the object of mass $m_1 = 2.00$ kg accelerate upward? (b) For what values of F_x is the tension in the cord zero?

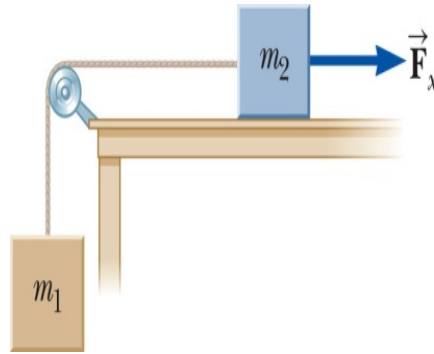


Figure P5.33

4. A pendulum, comprising a light string of length L and a small sphere, swings in the vertical plane. The string hits a peg located a distance d below the point of suspension (Fig. P8.67). (a) Show that if the sphere is released from a height below that of the peg, it will return to this height after the string strikes the peg. (b) Show that if the pendulum is released from rest at the horizontal position ($\theta = 90^\circ$) and is to swing in a complete circle centered on the peg, the minimum value of d must be $3L/5$.

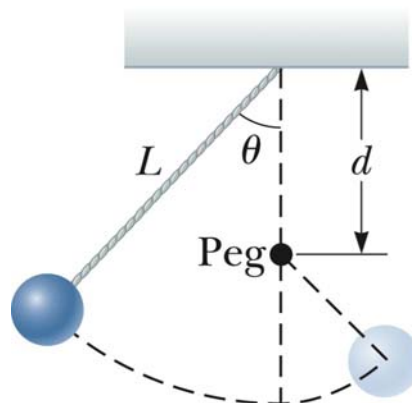


Figure P8.67