10. Figure 5-23 shows *Atwood's machine*, in which two containers are connected by a cord (of negligible mass) passing over a frictionless pulley (also of negligible mass). At time $t = 0$, container 1 has mass 1.50 kg and container 2 has mass 3.00 kg, but container 1 is losing mass (through a leak) at the constant rate of 0.200 kg/s. At what rate is the acceleration magnitude of the containers changing at (a) $t = 0$ and (b) $t = 3.00$ s? (c) When does the acceleration reach its maximum value?

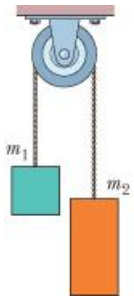

Figure 5-23 Problems 9 and 10.

12. Figure 5-24 shows three blocks attached by cords that loop over frictionless pulleys. Block *B* lies on a frictionless table; the masses are $m_A = 4.00$ kg, $m_B = 9.00$ kg, and $m_C = 12.0$ kg. When the blocks are released, what is the tension in the cord at the right?

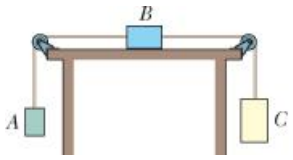

Figure 5-24 Problem 12.

13. In Fig. 5-25, two blocks are in contact on a frictionless table. A horizontal force is applied to the larger block. (a) If m_1 = 3.6 kg, m_2 = 1.8 kg, and F = 5.0 N, find the magnitude of the force between the two blocks. (b) What is that block -on-block magnitude if a force of the same magnitude F is applied to the smaller block but in the opposite direction. (c) Explain the difference.

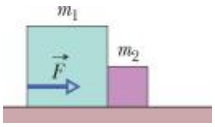

Figure 5-25 Problem 13.

16. Figure 5-27 gives, as a function of time t, the force component F_x that acts on a 5.00 kg ice block that can move only along the x axis. At t = 0, the block is moving in the positive direction of the axis, with a speed of 4.5 m/s. What are its (a) speed and (b) direction of travel at t = 11 s?

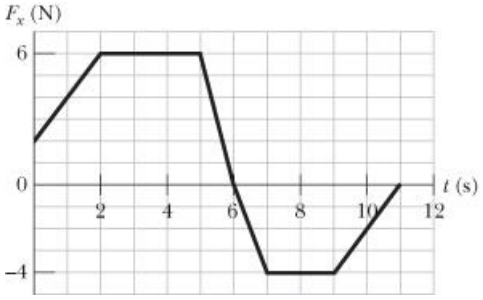

Figure 5-27 Problem 16.

36. In Fig. 5-31, a crate of mass m = 120 kg is pushed at constant speed up a frictionless ramp (θ = 35.0°) by a horizontal force. What are the magnitudes of

(a) $\vec{F}$ and (b) the force on the crate from the ramp?

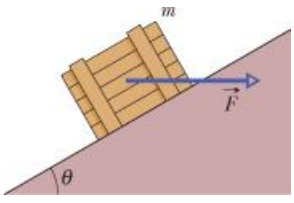

Figure 5-31 Problem 36.

51. Figure 5-38 shows a box of dirty money (mass m_1 = 4.0 kg) on a frictionless plane inclined at angle θ_1 = 25.0°. The box is connected via a cord of negligible mass to a box of laundered money (mass m_2 = 3.00 kg) on a frictionless plane inclined at angle θ_2 = 65.0°. The pulley is frictionless and has negligible mass. What is the tension in the cord?

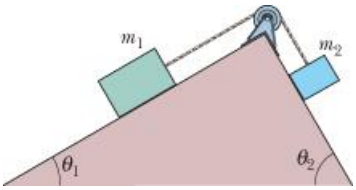

Figure 5-38 Problem 51.