

5A

A bag of cement of weight F_g hangs in equilibrium from three wires as shown in Figure P5.18. Two of the wires make angles θ_1 and θ_2 with the horizontal. Assuming the system is in equilibrium, show that the tension in the left-hand wire is

$$T_1 = \frac{F_g \cos \theta_2}{\sin (\theta_1 + \theta_2)}$$

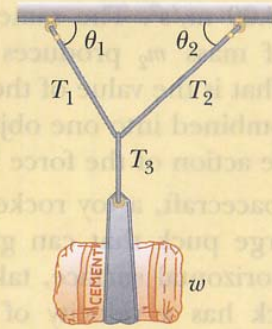
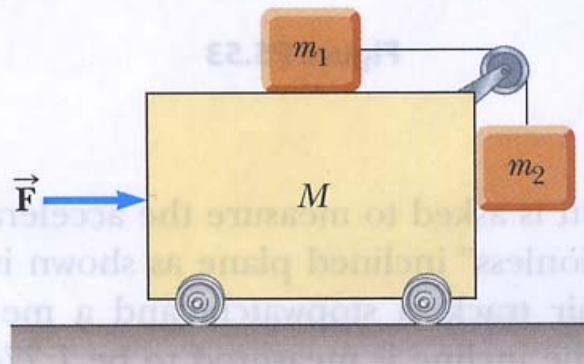


Figure P5.18 Problems 18 and 19.

5B

What horizontal force must be applied to the cart shown in Figure P5.57 so that the blocks remain stationary relative to the cart? Assume all surfaces, wheels, and pulley are frictionless. Notice that the force exerted by the string accelerates m_1 .



5C

A time-dependent force, $\vec{F} = (8.00\hat{i} - 4.00t\hat{j})$ N, where t is in seconds, is exerted on a 2.00-kg object initially at rest. (a) At what time will the object be moving with a speed of 15.0 m/s? (b) How far is the object from its initial position when its speed is 15.0 m/s? (c) Through what total displacement has the object traveled at this moment?