20. (II) A shop sign weighing 245 N is supported by a uniform 155-N beam as shown in Fig. 9–54. Find the tension in the guy wire and the horizontal and vertical forces exerted by the hinge on the beam.

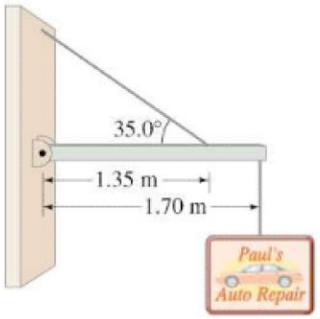

FIGURE 9–54
Problem 20.

21. (II) A traffic light hangs from a pole as shown in Fig. 9–55. The uniform aluminum pole AB is 7.50 m long and has a mass of 12.0 kg. The mass of the traffic light is 21.5 kg. Determine (*a*) the tension in the horizontal massless cable CD, and (*b*) the vertical and horizontal components of the force exerted by the pivot A on the aluminum pole.

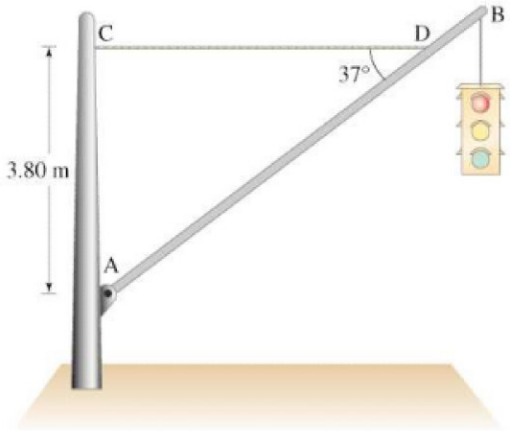

FIGURE 9–55 Problem 21.

22. (II) The 72-kg-man's hands in Fig. 9–56 are 36 cm apart. His CG is located 75% of the distance from his right hand toward his left. Find the force on each hand due to the ground.

FIGURE 9–56 Problem 22.

23. (II) A uniform meter stick with a mass of 180 g is supported horizontally by two vertical strings, one at the 0-cm mark and the other at the 90-cm mark (Fig. 9–57). What is the tension in the string (*a*) at 0 cm? (*b*) at 90 cm?

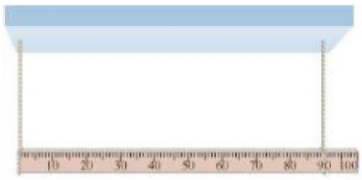

FIGURE 9–57
Problem 23.

24. (II) The two trees in Fig. 9–58 are 7.6 m apart. A backpacker is trying to lift his pack out of the reach of bears. Calculate the magnitude of the force $\vec{\mathbf{F}}$ that he must exert downward to hold a 19-kg backpack so that the rope sags at its midpoint by (*a*) 1.5 m, (*b*) 0.15 m.

FIGURE 9–58 Problem 24.

25. (III) A door 2.30 m high and 1.30 m wide has a mass of 13.0 kg. A hinge 0.40 m from the top and another hinge 0.40 m from the bottom each support half the door's weight (Fig. 9–59). Assume that the center of gravity is at the geometrical center of the door, and determine the horizontal and vertical force components exerted by each hinge on the door.

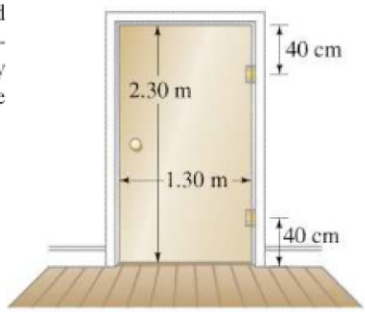

FIGURE 9–59
Problem 25.

26. (III) A uniform ladder of mass m and length l leans at an angle θ against a frictionless wall, Fig. 9–60. If the coefficient of static friction between the ladder and the ground is μ, determine a formula for the minimum angle at which the ladder will not slip.

FIGURE 9–60
Problem 26.