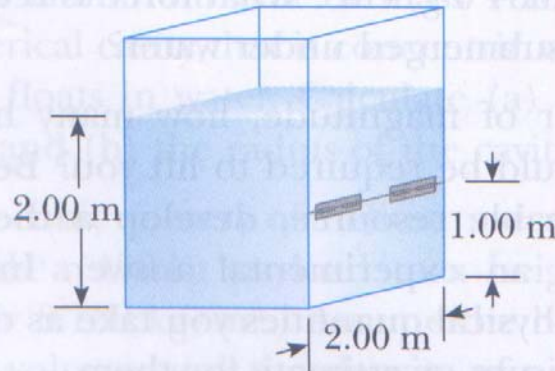


14A

The tank in Figure P14.12 is filled with water 2.00 m deep. At the bottom of one sidewall is a rectangular hatch

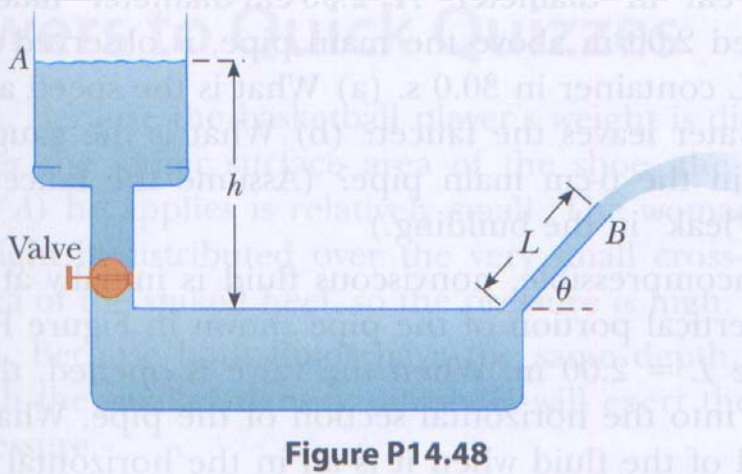


**Figure P14.12**

1.00 m high and 2.00 m wide that is hinged at the top of the hatch. (a) Determine the force the water causes on the hatch. (b) Find the torque caused by the water about the hinges.

14B

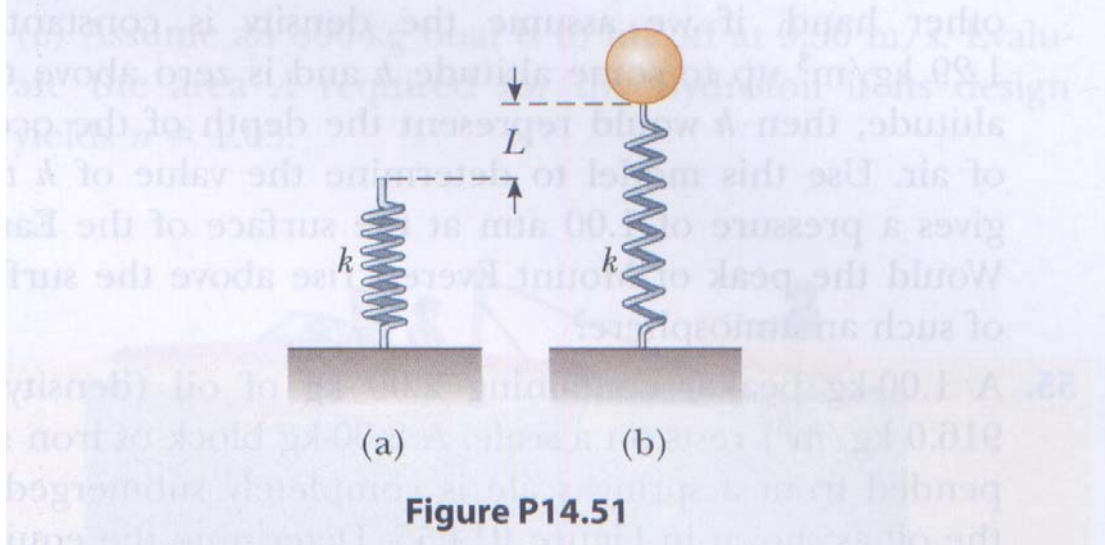
Figure P14.48 shows a water tank with a valve at the bottom. If this valve is opened, what is the maximum height attained by the water stream coming out of the right side of the tank? Assume  $h = 10.0$  m,  $L = 2.00$  m, and  $\theta = 30.0^\circ$  and assume the cross-sectional area at  $A$  is very large compared with that at  $B$ .



**Figure P14.48**

14C

A light spring of constant  $k = 90.0 \text{ N/m}$  is attached vertically to a table (Fig. P14.51a). A  $2.00\text{-g}$  balloon is filled with helium (density  $= 0.180 \text{ kg/m}^3$ ) to a volume of  $5.00 \text{ m}^3$  and is then connected to the spring, causing the spring to stretch as shown in Figure P14.51b. Determine the extension distance  $L$  when the balloon is in equilibrium.



**Figure P14.51**