PROBLEM 1.34

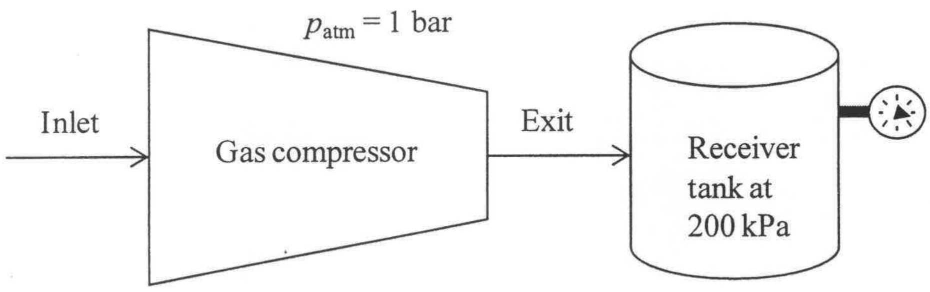

Fig. P1.34

Converting the local atmospheric pressure to kPa, we get $p_{atm} = 100$ kPa. Since the pressure in the tank, 200 kPa, is greater than the atmospheric pressure, the Bourdon reading is a *gage* pressure. Using the following relationship, $p_{gage} = p_{abs} - p_{atm}$ the Bourdon reading is 100 kPa. ⟵

PROBLEM 1.35

See Fig. P1.35. Applying the principles discussed in Sec. 1.6.1, the atmospheric pressure is

$$p_{atm} = \rho_m g L \Rightarrow L = \frac{p_{atm}}{\rho g} = \frac{100 \times 10^3 \, N/m^2}{\left(13.59 \frac{g}{cm^3}\right)\left|\frac{1 kg}{10^3 g}\right|\left|\frac{10^2 cm}{1 m}\right|^3 \left(9.81 \frac{m}{s^2}\right)} \left|\frac{1 \, kg \cdot m/s^2}{1 \, N}\right|$$

$$= 0.75 \, m \left|\frac{10^3 \, mm}{1 \, m}\right|$$

$$= 750 \, mm \, Hg$$ ⟵

Converting to in. Hg,

$$L = 750 \, mm \, Hg \left|\frac{1 cm}{10 mm}\right|\left|\frac{1 in.}{2.54 cm}\right| = 29.53 \, in. \, Hg$$ ⟵

PROBLEM 1.36

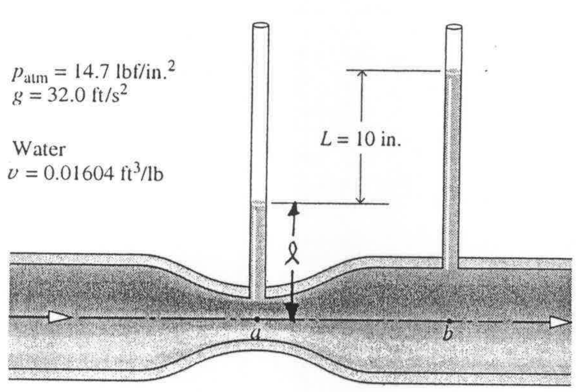

Fig. P1.36

$$p_a = p_{atm} + \rho g \ell$$

$$p_b = p_{atm} + \rho g (\ell + L)$$

$$\therefore (p_b - p_a) = \rho g L$$

$$= \left(\frac{1}{0.01604 \, ft^3/lb}\right)\left(32.0 \frac{ft}{s^2}\right)\left(\frac{10}{12} ft\right)\left|\frac{1 \, lbf}{32.2 \, lb \cdot ft/s^2}\right|$$

rounded

$$= +51.63 \frac{lbf}{ft^2}\left|\frac{1 \, ft^2}{144 \, in^2}\right|$$

$$= +0.36 \, lbf/in^2$$ ⟵

increases