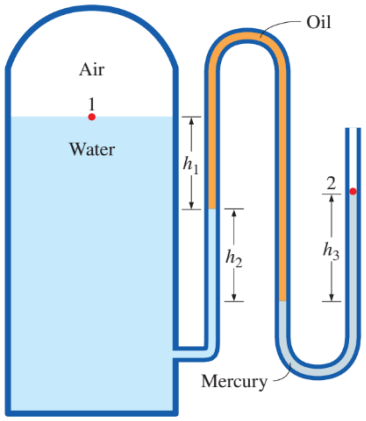
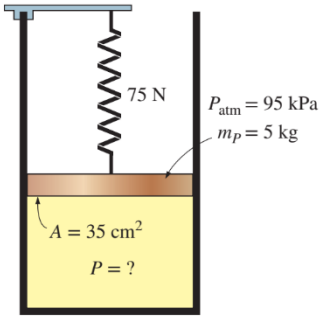
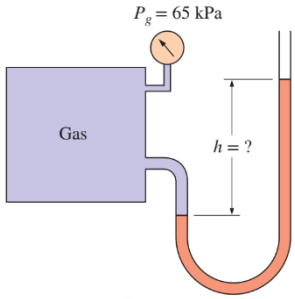
3–13 The water in a tank is pressurized by air, and the pressure is measured by a multifluid manometer as shown in Fig. P3–13. Determine the gage pressure of air in the tank if $h_1 = 0.4$ m, $h_2 = 0.6$ m, and $h_3 = 0.8$ m. Take the densities of water, oil, and mercury to be 1000 kg/m^3, 850 kg/m^3, and 13,600 kg/m^3, respectively.



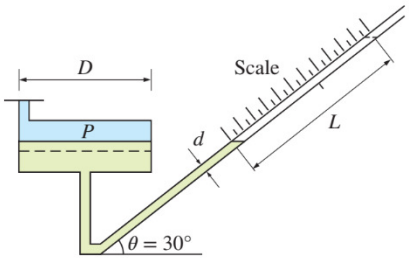
3–25 A gas is contained in a vertical, frictionless piston–cylinder device. The piston has a mass of 5 kg and a cross-sectional area of 35 cm^2. A compressed spring above the piston exerts a force of 75 N on the piston. If the atmospheric pressure is 95 kPa, determine the pressure inside the cylinder. *Answer:* 130 kPa



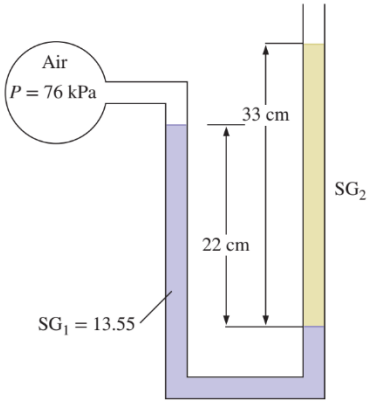
3–28 Both a gage and a manometer are attached to a gas tank to measure its pressure. If the reading on the pressure gage is 65 kPa, determine the distance between the two fluid levels of the manometer if the fluid is (*a*) mercury ($\rho = 13{,}600$ kg/m^3) or (*b*) water ($\rho = 1000$ kg/m^3).



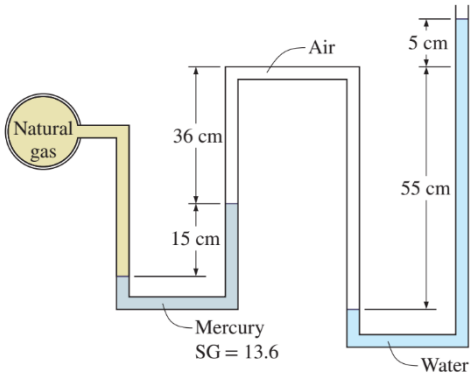
3–31 The manometer shown in the figure is designed to measure pressures of up to a maximum of 100 Pa. If the reading error is estimated to be ±0.5 mm, what should the ratio of d/D be in order for the error associated with pressure measurement not to exceed 2.5% of the full scale.



3–37 Consider a double-fluid manometer attached to an air pipe shown in Fig. P3–37. If the specific gravity of one fluid is 13.55, determine the specific gravity of the other fluid for the indicated absolute pressure of air. Take the atmospheric pressure to be 100 kPa. *Answer:* 1.62



3–38 The pressure in a natural gas pipeline is measured by the manometer shown in Fig. P3–38 with one of the arms open to the atmosphere where the local atmospheric pressure is 98 kPa. Determine the absolute pressure in the pipeline.



3–46 The pressure difference between an oil pipe and water pipe is measured by a double-fluid manometer, as shown in Fig. P3–46. For the given fluid heights and specific gravities, calculate the pressure difference $\Delta P = P_B - P_A$.