# Assignment 1

## Question 1

**3–48** Consider a double-fluid manometer attached to an air pipe shown in Fig. P3–48. 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:* 5.0

Correction: 1.34

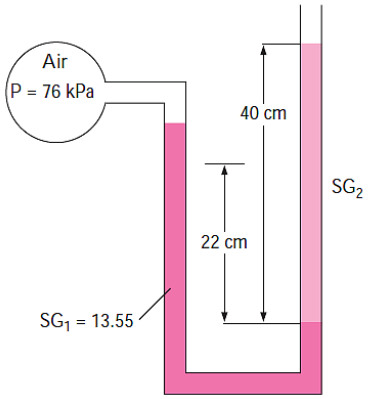


FIGURE P3–48

## Question 2

(Note: Please convert to SI.)

**3–68E** The flow of water from a reservoir is controlled by a 5-ft-wide L-shaped gate hinged at point A, as shown in Fig. P3–68E. If it is desired that the gate open when the water height is 12 ft, determine the mass of the required weight W. *Answer:* 30,900 lbm

Correction: 49,374 lb

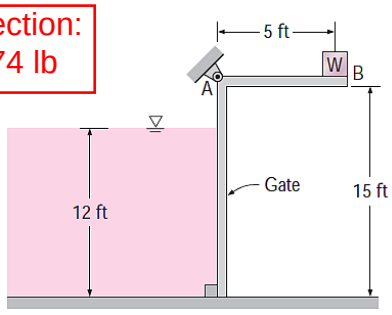


FIGURE P3–68E

## Question 3

**3–85** Consider a large cubic ice block floating in seawater. The specific gravities of ice and seawater are 0.92 and 1.025, respectively. If a 10-cm-high portion of the ice block extends above the surface of the water, determine the height of the ice block below the surface. *Answer:* 87.6 cm

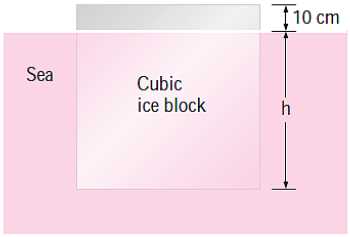


FIGURE P3–85

## Question 4

**3–88** One of the common procedures in fitness programs is to determine the fat-to-muscle ratio of the body. This is based on the principle that the muscle tissue is denser than the fat tissue, and, thus, the higher the average density of the body, the higher is the fraction of muscle tissue. The average density of the body can be determined by weighing the person in air and also while submerged in water in a tank. Treating all tissues and bones (other than fat) as muscle with an equivalent density of $\rho_{muscle}$, obtain a relation for the volume fraction of body fat $x_{fat}$. *Answer:* $x_{fat} = (\rho_{muscle} - \rho_{ave})/(\rho_{muscle} - \rho_{fat})$.

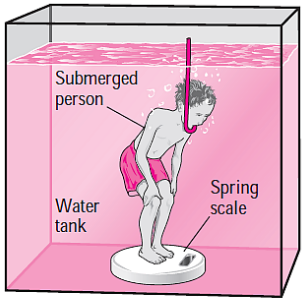


FIGURE P3–88E