

3. A reaction produces a gaseous mixture of carbon dioxide, carbon monoxide, and water vapor. After one reaction, the mixture was analyzed and found to contain 0.60 mol of  $\text{CO}_2$ , 0.30 mol of  $\text{CO}$ , and 0.10 mol of  $\text{H}_2\text{O}$ . If the total pressure of the mixture was 0.80 atm, what was the partial pressure of the  $\text{CO}$ ?

a. 0.080 atm

c. 0.24 atm

b. 0.13 atm

d. 0.48 atm

$$X_{\text{CO}} = \frac{0.30 \text{ mol}}{1.0 \text{ mol}} = 0.30$$

$$P_{\text{CO}} = (0.80 \text{ atm})(0.30) = 0.24 \text{ atm}$$

4. A sealed, rigid canister contains three gases: 28.0 g of nitrogen, 40.0 g of argon, and 36.0 g of water vapor. If the total pressure exerted by the gases is 2.0 atm, what is the partial pressure of the nitrogen?

a. 0.33 atm

b. 0.40 atm

c. 0.50 atm

d. 2.0 atm

$$\frac{28 \text{ g N}_2}{28 \text{ g/mol}} = 1 \text{ mol N}_2$$

$$\frac{40 \text{ g Ar}}{40 \text{ g/mol}} = 1 \text{ mol Ar}$$

$$\frac{36 \text{ g H}_2\text{O}}{18 \text{ g/mol}} = 2 \text{ mol H}_2\text{O}$$

$$X_{\text{N}_2} = \frac{1 \text{ mol}}{4 \text{ mol}} = 0.25 \times 2.0 \text{ atm}$$

Use the following information to answer questions 5–6.

An evacuated rigid container is filled with exactly 2.00 g of hydrogen gas and 10.00 g of neon. The temperature of the gas is held at  $0^\circ\text{C}$  and the pressure inside the container is a constant 1.0 atm.

5. What is the mole fraction of neon in the container?

a. 0.17

b. 0.33

c. 0.67

d. 0.83

$$\frac{2 \text{ g H}_2}{2 \text{ g/mol}} = 1 \text{ mol H}_2$$

$$\frac{10 \text{ g Ne}}{20 \text{ g/mol}} = 0.5 \text{ mol Ne}$$

$$X_{\text{Ne}} = \frac{0.5}{1.5}$$

6. What is the volume of the container?

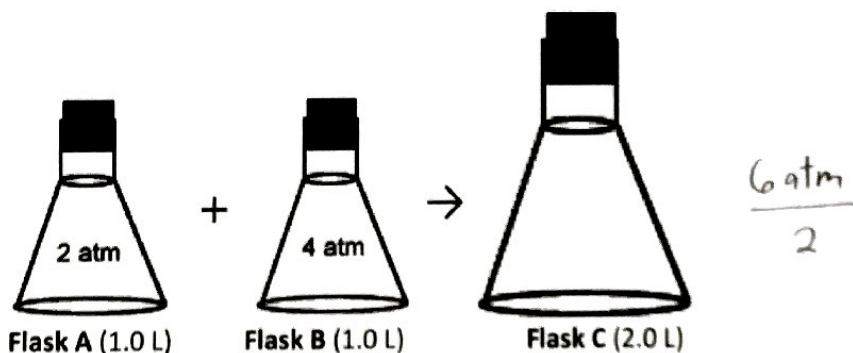
a. 11.2 L

b. 22.4 L

c. 33.5 L

d. 48.8 L

$$V = \frac{nRT}{P} = \frac{(1.5)(8/100)(273 \text{ K})}{1 \text{ atm}} = \frac{1.5 \times 8 \times 273}{100} = \frac{12 \times 273}{100} \approx \frac{12 \times 300}{100} = 12 \times 3 = 36 \text{ L}$$



7. Two one-liter flasks (Flask A and Flask B, shown above) are sealed at  $22^\circ\text{C}$ . Flask A contains nitrogen gas, and Flask B contains oxygen gas. If the contents of both flasks are combined into a previously evacuated two-liter flask (Flask C), what would be the total pressure in Flask C at  $22^\circ\text{C}$ ?

a. 6.0 atm

b. 4.0 atm

c. 3.0 atm

d. 2.0 atm

8. Nitrogen gas was collected over water at  $25^\circ\text{C}$ . If the vapor pressure of water at  $25^\circ\text{C}$  is 23 mmHg, and the total pressure in the container is measured at 781 mmHg, what is the partial pressure of the nitrogen gas?

a. 46 mmHg

b. 551 mmHg

c. 735 mmHg

d. 758 mmHg

$$P_{\text{N}_2} = 781 - 23 = 758$$