Chapter 10 Practice Test

1. A given mass of oxygen occupies 560 ml when the pressure is 800 mm of Hg. What volume will the gas occupy at 700 mm Hg, provided the temperature remains constant?

$(800\ \text{torr})(560\ \text{mL}) = (700\ \text{torr})(V_2)$

$V_2 = 640\ \text{mL}$

2. Calculate the volume that will be occupied by 280 ml ~~of~~ hydrogen, measured at 780 mm Hg, when the pressure is changed to 720 mm Hg.

$(780\ \text{torr})(280\ \text{mL}) = (720\ \text{torr})(V_2)$

$V_2 = 303\ \text{mL}$

3. A gas has a volume of 91 ml at a temperature of 91°C. If the temperature is a reduced to 0°C and the pressure remains constant, what will be the new volume of the gas?

$\frac{91\ \text{mL}}{364\ \text{K}} = \frac{V_2}{273\ \text{K}}$ $V_2 = 68.25\ \text{mL}$

4. A gas measures 140 ml at 73°C. Find its volume at standard temperature if the pressure remains constant.

$\frac{140\ \text{mL}}{346\ \text{K}} = \frac{V_2}{273\ \text{K}}$ $V_2 = 110\ \text{mL}$

5. To what temperature must a sample of gas at 100°C and 560 torr be heated in order increase the pressure to 760 torr?

$\frac{560\ \text{torr}}{373\ \text{K}} = \frac{760\ \text{torr}}{T_2}$ $T_2 = 506\ \text{K} = 233^\circ\text{C}$

6. A sample of hydrogen exerts a pressure of 1.20 atmospheres at a temperature of 25°C. What pressure does the gas exert at 100 °C?

$\frac{1.20\ \text{atm}}{298\ \text{K}} = \frac{P_2}{373\ \text{K}}$ $P_2 = 1.50\ \text{atm}$

7. A gas collected when the temperature is 15°C and the pressure is 700 mm Hg measures 1220 ml. Calculate its volume at 25°C and 760 mm Hg.

$$\frac{(700\ \text{torr})(1220\ \text{mL})}{288\ \text{K}} = \frac{(760\ \text{torr})(V_2)}{298\ \text{K}}$$

$$V_2 = 1163\ \text{mL}$$

8. A 500 mL sample of a gas at a temperature of 23°C exerts a pressure of exactly one atmosphere. What pressure does the gas exert when the volume increases to 800mL and the temperature increases to 85 °C?

$$\frac{(1\ \text{atm})(500\ \text{mL})}{296\ \text{K}} = \frac{(P_2)(800\ \text{mL})}{358\ \text{K}} \qquad P_2 = .756\ \text{atm}$$

9. A metal canister contains a mixture of neon, argon and radon. The neon exerts a pressure of 0.42 atmospheres, the argon exerts a pressure of 0.18 atmospheres, and the total pressure in the container is 1.30 atmospheres. What is the pressure exerted by the radon gas?

$$P_{total} = P_{Ne} + P_{Ar} + P_{Rn}$$

$$1.30\ \text{atm} = .42\ \text{atm} + .18\ \text{atm} + P_{Rn}$$

$$P_{Rn} = 0.70\ \text{atm}$$

10. A 1.00 liter pressurized gas cylinder contains a mixture of oxygen and nitrogen. When the temperature is 25 °C, the partial pressure of oxygen is 425 torr and the partial pressure of nitrogen is 325 torr. What is the total pressure in the container at 150 °C?

$$P_{total} = 425\ \text{torr} + 325\ \text{torr} = 750\ \text{torr}$$

$$\frac{750\ \text{torr}}{298\ \text{K}} = \frac{P_2}{423\ \text{K}} \qquad P_2 = 1065\ \text{torr}$$

11. If 35 mL of hydrogen gas exerts a pressure of 355 torr at a temperature of 15°C, what temperature CHANGE, in Celsius degrees, must take place in order for the gas to occupy 25 mL at a pressure of 800 torr?

$$\frac{(355\ \text{torr})(35\ \text{mL})}{288\ \text{K}} = \frac{(800\ \text{torr})(25\ \text{mL})}{T_2}$$

$$T_2 = 464\ \text{K} \qquad \Delta T = 464\ \text{K} - 288\ \text{K} = 176\ \text{K} = 176^\circ\text{C}$$