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$R = 62.4 \text{ L}\cdot\text{torr}/\text{mol}\cdot\text{K}$

$R = 0.0821 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K}$

$PV = nRT$

$P_1V_1T_2 = P_2V_2T_1$

1. The lid is tightly sealed on a rigid flask containing 2.00 L O₂ at 15°C and 0.723 atm. If the flask is heated to 55°C, what is the pressure in the flask?

$$P_1 V_1 T_2 = P_2 V_2 T_1$$

$$(0.723 \text{ atm})(2.00 \text{ L})(328 \text{ K}) = P_2 (2.00 \text{ L})(288 \text{ K})$$

$$P_2 = 0.823 \text{ atm} \text{ or } 626 \text{ mm Hg}$$

2. A sample of gas occupies 175 mL at 22°C and 218 mm Hg. What is the pressure of the gas if the volume is decreased to 122 mL and the temperature increased to 75°C?

$$P_1 V_1 T_2 = P_2 V_2 T_1$$

$$(218 \text{ mmHg})(175 \text{ mL})(348 \text{ K}) = P_2 (122 \text{ mL})(295 \text{ K})$$

$$P_2 = 369 \text{ mm Hg}$$

3. The pressure in a 10.0 L flask is 0.912 atm at 78°C. How many moles of gas are in the flask?

$$PV = nRT$$

$$n = \frac{PV}{RT} = \frac{(0.912 \text{ atm})(10.0 \text{ L})}{(0.0821 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K})(351 \text{ K})}$$

$$n = 0.316 \text{ mol}$$

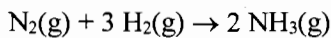
4. Calculate the density (in g/L) of Ar at 305 K and 342 mm Hg.

Density = $\frac{g}{L}$ so using 1 mole of Ar - 39.95 g

Solve for volume: $V = \frac{(1 \text{ mol})(62.4 \text{ L}\cdot\text{torr})}{(0.0821 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K})(305 \text{ K})} = 55.6 \text{ L}$

$$\text{Density} = \frac{39.95 \text{ g}}{55.6 \text{ L}} = 0.718 \text{ g/L}$$

5. Ammonia gas is synthesized according to the balanced equation below.



If 2.50 L N₂ react with 7.00 L H₂, what is the theoretical yield (in liters) of NH₃? Assume that the volumes of reactants and products are measured at the same temperature and pressure.

$$\frac{2.50 \text{ L N}_2}{1 \text{ L N}_2} = 5.00 \text{ L NH}_3$$

$$\frac{7.00 \text{ L H}_2}{3 \text{ L H}_2} = 4.67 \text{ L NH}_3$$

Based on L. Reactant

6. A mixture of H₂ and Ne is placed in a 5.00 L flask at 20°C. The partial pressure of the H₂ is 1.4 atm and the partial pressure of the Ne is 2.1 atm. What is the mole fraction of H₂?

$$\frac{1.4}{(1.4 + 2.1)} = 0.40$$