

Ideal Gas Law and Dalton's Law of Partial Pressures
CHEM 1305
Quiz

1. Oxygen (O_2) has volume of 4 liters with a pressure of 5 atm. The temperature is 300 K. Calculate the grams.

$$PV = nRT$$

$$n = \frac{PV}{RT}$$

$$n = \frac{(5 \text{ atm})(4 \text{ liters})}{(0.0821)(300 \text{ K})} = 0.81 \text{ moles}$$

$$g = (\text{moles})(\text{mol wt}) = (0.81 \text{ moles})(32 \text{ amu}) = 25.9 \text{ grams}$$

2. Given 100 grams of nitrogen (N_2) with a volume of 10 liters at a temperature of 27 °C, calculate the pressure.

$$PV = nRT$$

$$P = \frac{nRT}{V}$$

$$n = \frac{\text{grams}}{\text{mol wt}} = \frac{100 \text{ g}}{28 \text{ amu}} = 3.6 \text{ moles}$$

$$P = \frac{(3.6 \text{ moles})(0.0821)(300 \text{ K})}{(10 \text{ liters})} = 8.87 \text{ atm}$$

3. Calculate the total pressure if there was 780 torr of N_2 , 210 torr of O_2 , and 10 torr of Ar gas.

$$P_t = P_{O_2} + P_{N_2} + P_{Ar}$$

$$P_t = 780 \text{ torr} + 210 \text{ torr} + 10 \text{ torr} = 1000 \text{ torr}$$