Ideal Gas Law, Stoichiometry, Density & Molar Mass

Practice Problems

AP Chemistry

1. What volume does 50 grams of CO2 occupy if it is at 0oC and 700 mm Hg?
2. How many grams of CH4 are present if 300 mL of it is at 120 kPa and -25 oC?
3. What is the density of H2 gas at STP?
4. What is the density of air (assume 80% N2 and 20% O2) at STP?
5. What is the density of Xe gas at 22 oC and 740 mm Hg?
6. What is the molecular weight of a gas if 2.3 grams of it occupy 230 mL at a pressure of 750 mm Hg and a temperature of 75 oC?
7. A gas is 11.8% C, 69.6% Cl and 18.6% F. If 0.107 grams of it fills a 458 mL flask at 25 oC at a pressure of 21.3 mm Hg, what is the molecular formula of the compound?
8. A gas is 25.2% S and 74.8% F. If 0.0955 g are put in an 89 mL flask at 45 oC and a pressure of 83.8 mm Hg, what is the molecular formula of the gas?
9. Hydrogen and sulfur chemically combine to form the gas hydrogen sulfide, according to the reaction: H2 *(g)* + S *(s)* 🡪 H2S *(g)*. How many liters of hydrogen are required to be released from a vessel maintained at 15 atm and 0 oC to form 7.4 L of hydrogen sulfide at 94.65 kPa and 18.7 oC?
10. Assume that an exhaled breath of air consists of 74.8% N2, 15.3% O2, 3.7% CO2, and 6.2% water vapor. (a)If the total pressure of the gases is 0.980 atm, calculate the partial pressure of each component of the mixture. (b) If the volume of the exhaled gas is 455 mL and its temperature is 37 oC, calculate the number of moles of CO2 exhaled. (c) How many grams of glucose (C6H12O6) would need to be metabolized to produce this quantity of CO2?