

Quiz 11.4 (V-A)

(Honors Chemistry)

1. What is the density (in g/L) of oxygen gas at STP? (*Scientific notation not needed*)

$$\frac{32\text{g}}{\text{mol}} \bigg| \frac{1\text{mol}}{22.4\text{L}}$$

$$1.4\text{ g/L O}_2$$

2. An unknown gas has a mass of 2.66 grams and a volume of 3.5 liters.

- Is the unknown gas NH_3 , C_3H_8 , NO_2 , or CO ? *Show work!*

$$\frac{2.66\text{g}}{3.5\text{L}} \bigg| \frac{22.4\text{L}}{1\text{mol}} = 17\text{g/mol}$$



3. What is the empirical formula for a compound containing 7.971-grams potassium, 10.608-grams chromium, and 11.421-grams oxygen? *Show work!*

$$\%K = \frac{7.971\text{g}}{30\text{g}} \times 100 = 26.57\text{gK} \bigg| \frac{1\text{mol K}}{39\text{g K}} = \frac{0.68\text{mol K}}{0.68} = 1 \times 2$$

$$\%Cr = \frac{10.608\text{g}}{30\text{g}} \times 100 = 35.36\text{gCr} \bigg| \frac{1\text{mol Cr}}{52\text{g Cr}} = \frac{0.68\text{mol Cr}}{0.68} = 1 \times 2$$

$$\%O = \frac{11.421\text{g}}{30\text{g}} \times 100 = 38.07\text{gO} \bigg| \frac{1\text{mol O}}{16\text{g O}} = \frac{2.38\text{mol O}}{0.68} = 3.5 \times 2$$



4. How many aluminum ions are present in 5.43 moles of aluminum sulfide? *Answer must be in scientific notation with the correct units.*

$$\frac{5.43\text{mol Al}_2\text{S}_3}{1\text{mol Al}_2\text{S}_3} \bigg| \frac{6.02 \times 10^{23}\text{ fu Al}_2\text{S}_3}{1\text{ fu Al}_2\text{S}_3} \bigg| \frac{2\text{ ions Al}^{3+}}{1\text{ fu Al}_2\text{S}_3}$$

$$6.54 \times 10^{24}\text{ ions Al}^{3+}$$

5. An unknown compound containing 65.5% carbon, 5.5% hydrogen, and 29.0% oxygen has a molar mass of 110 g/mol. What is the molecular formula for the unknown compound?

$$\frac{65.5\text{gC}}{12\text{gC}} \bigg| \frac{1\text{mol C}}{12\text{gC}} = \frac{5.46\text{mol C}}{1.81} = 3 \quad \text{EF} = \text{C}_3\text{H}_3\text{O}$$

$$\frac{5.5\text{gH}}{1\text{gH}} \bigg| \frac{1\text{mol H}}{1\text{gH}} = \frac{5.5\text{mol H}}{1.81} = 3 \quad \text{MF} = \frac{110\text{g}}{55\text{g}} = 2$$

$$\frac{29.0\text{gO}}{16\text{gO}} \bigg| \frac{1\text{mol O}}{16\text{gO}} = \frac{1.81\text{mol O}}{1.81} = 1$$

