Name Key Hour _____

Quiz 11.4 (V-C)

(Honors Chemistry)

1. An unknown gas has a mass of 3.75 grams and a volume of 3.0 liters.
   - Is the unknown gas NH_3, C_3H_8, NO_2, or CO? *Show work!*

$$\frac{3.75\text{g}}{3.0\text{L}} \left| \frac{22.4\text{L}}{1\text{mol}} \right. = 28\text{ g/mol}$$

CO

2. How many bromine ions are present in 3.21 moles of calcium bromide? *Answer must be in scientific notation with the correct units.*

$$3.21\text{mol } CaBr_2 \left| \frac{6.02\times10^{23}\text{ fu } CaBr_2}{1\text{mol } CaBr_2} \right| \frac{2\text{ ions } Br^-}{1\text{ fu } CaBr_2}$$

3.86×10^{24} ions Br^-

3. What is the empirical formula of a compound containing 11.842-grams carbon, 2.648-grams hydrogen, and 10.51-grams oxygen? *Show work!*

$$\%C = \frac{11.842\text{g}}{25.000\text{g}}\times100 = 47.37\text{g C} \left| \frac{1\text{mol C}}{12\text{g C}} \right. = \frac{3.95\text{ mol C}}{2.63} = 1.5\times2 = 3$$

$$\%H = \frac{2.648\text{g}}{25.000\text{g}}\times100 = 10.59\text{g H} \left| \frac{1\text{mol H}}{1\text{g H}} \right. = \frac{10.59\text{mol H}}{2.63} = 4\times2 = 8$$

$$\%O = \frac{10.51\text{g}}{25.000\text{g}}\times100 = 42.04\text{g O} \left| \frac{1\text{mol O}}{16\text{g O}} \right. = \frac{2.63\text{mol O}}{2.63} = 1\times2 = 2$$

$C_3H_8O_2$

4. An unknown compound contains 54.6% carbon, 9.0% hydrogen, and 36.4% oxygen with a molar mass of 132.0 g/mol. What is the molecular formula of unknown compound?

$$54.6\text{g C} \left| \frac{1\text{mol C}}{12\text{g C}} \right. = \frac{4.55\text{mol C}}{2.275} = 2$$

$$9.0\text{g H} \left| \frac{1\text{mol H}}{1\text{g H}} \right. = \frac{9.0\text{mol H}}{2.275} = 4$$

$$36.4\text{g O} \left| \frac{1\text{mol O}}{16\text{g O}} \right. = \frac{2.275\text{mol O}}{2.275} = 1$$

EF = C_2H_4O

$$MF = \frac{132.0\text{g}}{44\text{g}} = 3$$

$3(C_2H_4O)$

$C_6H_{12}O_3$

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

$$\frac{38\text{g } F_2}{\text{mol}} \left| \frac{1\text{mol}}{22.4\text{L}} \right.$$

1.7 g/L F_2