

## Quiz 11.4 (V-B)

(Honors Chemistry)

<p>1. How many nitrogen ions are present in 4.75 moles of magnesium nitride?  <i>Answer must be in scientific notation with the correct units.</i></p>	
$\frac{4.75 \text{ mol Mg}_3\text{N}_2}{1 \text{ mol Mg}_3\text{N}_2} \times \frac{6.02 \times 10^{23} \text{ fu Mg}_3\text{N}_2}{1 \text{ fu Mg}_3\text{N}_2} \times \frac{2 \text{ ions N}^{3-}}{1 \text{ fu Mg}_3\text{N}_2}$	$5.72 \times 10^{24}$ ions $\text{N}^{3-}$
<p>2. What is its empirical formula of a compound containing 11.361-grams of arsenic and 3.639-grams of oxygen? <i>Show work!</i></p>	
$\% \text{As} = \frac{11.361 \text{ g}}{15.000 \text{ g}} \times 100 = 75.74\% \text{ As} \quad \left  \frac{1 \text{ mol As}}{75 \text{ g As}} = \frac{1.01 \text{ mol As}}{1.01} = 1 \times 2 = 2$	$\text{As}_2\text{O}_3$
$\% \text{O} = \frac{3.639 \text{ g}}{15.000 \text{ g}} \times 100 = 24.26\% \text{ O} \quad \left  \frac{1 \text{ mol O}}{16 \text{ g O}} = \frac{1.51 \text{ mol O}}{1.01} = 1.5 \times 2 = 3$	
<p>3. What is the density (in g/L) of nitrogen gas at STP? (<i>Scientific notation not needed</i>)</p>	
$\frac{28 \text{ g N}_2}{\text{mol}} \quad \left  \frac{1 \text{ mol N}_2}{22.4 \text{ L N}_2}$	$1.3 \text{ g/L N}_2$
<p>4. An unknown compound containing 40.0% carbon, 6.7% hydrogen and 53.3% oxygen has a molar mass of 180 g/mol. What is the molecular formula for the unknown compound?</p>	
$\frac{40.0 \text{ g C}}{12 \text{ g C}} = \frac{3.33 \text{ mol C}}{3.33} = 1 \quad \text{EF} = \text{CH}_2\text{O}$	
$\frac{6.7 \text{ g H}}{1 \text{ g H}} = \frac{6.7 \text{ mol H}}{3.33} = 2 \quad \text{MF} = \frac{180 \text{ g}}{30 \text{ g}} = 6$	
$\frac{53.3 \text{ g O}}{16 \text{ g O}} = \frac{3.33 \text{ mol O}}{3.33} = 1$	$6(\text{C}_1\text{H}_2\text{O}_1)$  $\text{C}_6\text{H}_{12}\text{O}_6$
<p>5. An unknown gas has a mass of 7.85 grams and a volume of 4.0 liters.          • Is the unknown gas <math>\text{NH}_3</math>, <math>\text{C}_3\text{H}_8</math>, <math>\text{NO}_2</math>, or <math>\text{CO}</math>? <i>Show work!</i></p>	
$\frac{7.85 \text{ g}}{4.0 \text{ L}} \times \frac{22.4 \text{ L}}{1 \text{ mol}} = 44 \text{ g/mol}$	$\text{C}_3\text{H}_8$