

Stoichiometry Review Sheet

I. Part 1 – Multiple Choice

1. This section will account for 20 points on the test and will be OPEN NOTES.
2. Have the following notes and quizzes organized, highlighted, and reviewed.

- Measuring Matter
- Empirical & Molecular Formulas
- Stoichiometry

II. Part 2 – Performance Assessment

This section will account for 30 points on the test and will be CLOSED NOTES.

#1 - Number Of Atoms

1. Determine the number of Zn (zinc) atoms in 2.50 mol of Zn.

$$2.50 \text{ mol Zn} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol Zn}} = 1.51 \times 10^{24} \text{ atoms Zn}$$

#2 - Molar Mass

1. Calculate the molar mass of ethanol ($\text{C}_2\text{H}_5\text{OH}$).

$$\begin{array}{c|c|c} 2 \text{ mol C} \times \frac{12.01 \text{ g C}}{1 \text{ mol C}} & | & 6 \text{ mol H} \times \frac{1.01 \text{ g H}}{1 \text{ mol H}} \\ (= 24.02 \text{ g C}) & (+) & = 6.048 \text{ g H} \end{array} \left. \begin{array}{c} | & | \\ 1 \text{ mol O} \times \frac{16.00 \text{ g O}}{1 \text{ mol O}} \\ (+) = 16.00 \text{ g O} \end{array} \right) = 46.07 \text{ g/mol C}_2\text{H}_5\text{OH}$$

#3 - Mole-To-Grams

1. What is the mass of 3.25 mol of H_2SO_4 ?

$$\begin{array}{c|c|c} \textcircled{1} 2 \text{ mol H} \times \frac{1.01 \text{ g H}}{1 \text{ mol H}} = 2.016 \text{ g H} & | & 3.25 \text{ mol} \frac{98.09 \text{ g H}_2\text{SO}_4}{\text{mol H}_2\text{SO}_4} = 319 \text{ g H}_2\text{SO}_4 \\ \textcircled{2} 1 \text{ mol S} \times \frac{32.07 \text{ g S}}{1 \text{ mol S}} = 32.07 \text{ g S} & (+) & \boxed{98.09 \text{ g/mol H}_2\text{SO}_4} \\ \textcircled{3} 4 \text{ mol O} \times \frac{16.00 \text{ g O}}{1 \text{ mol O}} = 64.00 \text{ g O} & (+) & \end{array}$$

#4 - Grams-To-Moles

1. Determine the number of moles present in 22.6 g of AgNO_3 .

$$\begin{array}{c|c|c} \textcircled{1} 1 \text{ mol Ag} \times \frac{107.87 \text{ g Ag}}{1 \text{ mol Ag}} = 107.87 \text{ g Ag} & | & 22.6 \text{ g AgNO}_3 \times \frac{1 \text{ mol AgNO}_3}{169.88 \text{ g AgNO}_3} = 0.133 \text{ mol AgNO}_3 \\ \textcircled{2} 1 \text{ mol N} \times \frac{14.01 \text{ g N}}{1 \text{ mol N}} = 14.01 \text{ g N} & (+) & \boxed{169.88 \text{ g/mol AgNO}_3} \\ \textcircled{3} 3 \text{ mol O} \times \frac{16.00 \text{ g O}}{1 \text{ mol O}} = 48.00 \text{ g O} & (+) & \end{array}$$

#5 - Stoichiometry

1. How much chlorine gas, in grams, is obtained from the equation : $2\text{NaCl} \rightarrow 2\text{Na} + \text{Cl}_2$, if 2.50 mol of NaCl are used?

$$2.50 \text{ mol NaCl} \times \frac{1 \text{ mol Cl}_2}{2 \text{ mol NaCl}} = 1.25 \text{ mol Cl}_2 \left. \begin{array}{c} | \\ 1.25 \text{ mol Cl}_2 \times \frac{70.9 \text{ g Cl}_2}{1 \text{ mol Cl}_2} = 88.6 \text{ g Cl}_2 \end{array} \right)$$

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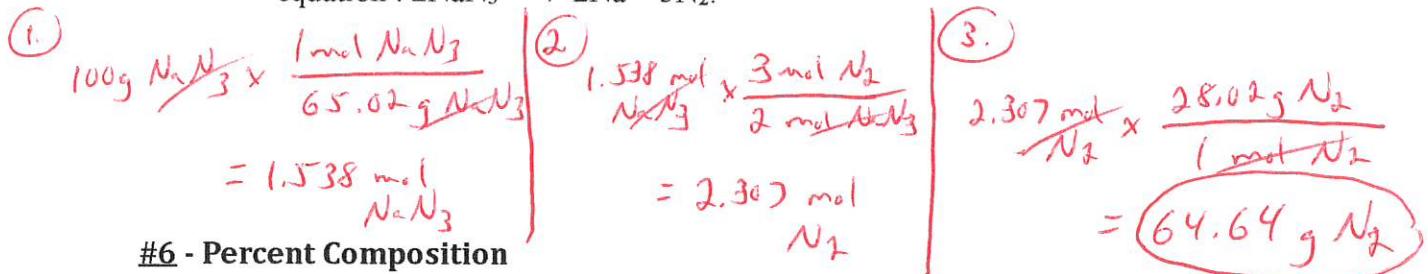
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2. How many moles of CS₂ and H₂S are produced when 1.50 mol of S₈ is used in the following equation : 2CH₄ + S₈ → 2CS₂ + 4H₂S?

$$\textcircled{1} \quad 1.50 \text{ mol } S_8 \times \frac{2 \text{ mol } CS_2}{1 \text{ mol } S_8} = \textcircled{3.00 \text{ mol } CS_2}$$

$$\textcircled{2} \quad 1.50 \text{ mol } S_8 \times \frac{4 \text{ mol } H_2S}{1 \text{ mol } S_8} = \textcircled{6.00 \text{ mol } H_2S}$$

3. Determine the mass of N₂ produced from the decomposition of 100 g of NaN₃ in the equation : 2NaN₃ → 2Na + 3N₂.



#6 - Percent Composition

1. Calculate the percent by mass of each element in sodium sulfate (Na₂SO₄).

$$\textcircled{1} \quad 2 \text{ mol Na} \times \frac{22.99 \text{ g Na}}{1 \text{ mol Na}} = 45.98 \text{ g Na}$$

$$\textcircled{2} \quad 1 \text{ mol S} \times \frac{32.07 \text{ g S}}{1 \text{ mol S}} = \textcircled{32.07 \text{ g S}}$$

$$\textcircled{3} \quad 4 \text{ mol O} \times \frac{16.00 \text{ g O}}{1 \text{ mol O}} = \textcircled{64.00 \text{ g O}}$$

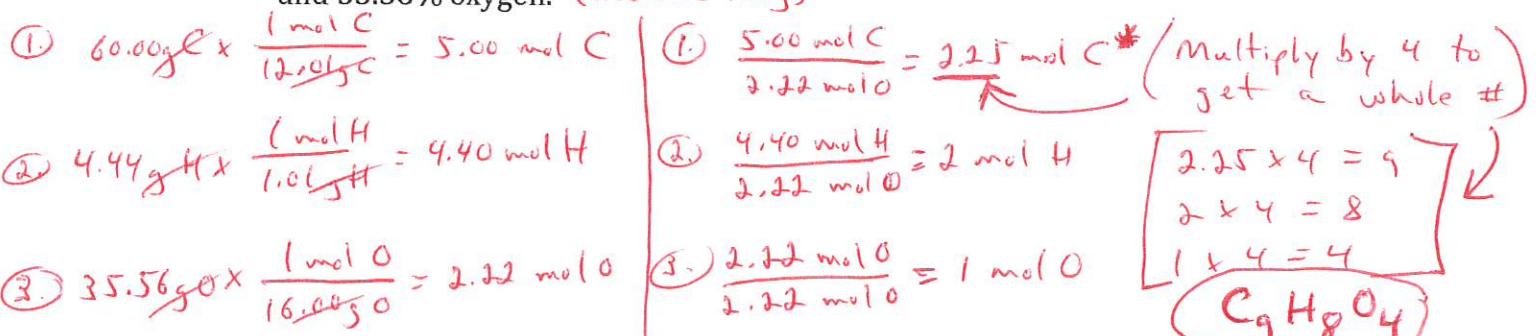
$$\textcircled{1} \quad \frac{45.98 \text{ g}}{142.05 \text{ g}} \times 100 = \textcircled{32.37\% \text{ Na}}$$

$$\textcircled{2} \quad \frac{32.07 \text{ g}}{142.05 \text{ g}} \times 100 = \textcircled{22.58\% \text{ S}}$$

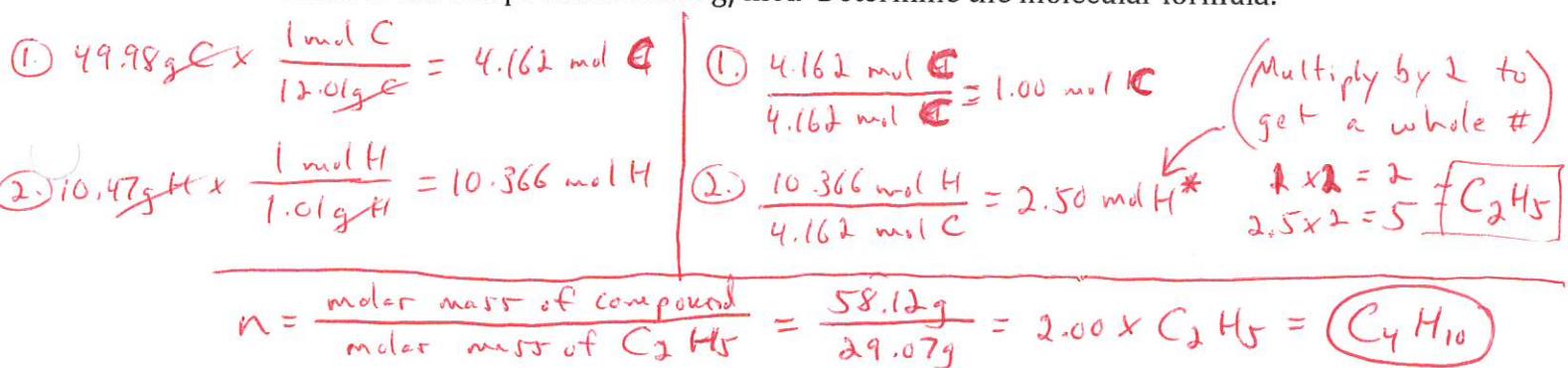
$$\textcircled{3} \quad \frac{64.00 \text{ g}}{142.05 \text{ g}} \times 100 = \textcircled{45.05\% \text{ O}}$$

#7 - Empirical / Molecular Formulas

1. Determine the empirical formula for aspirin, which is 60.0% carbon, 4.44% hydrogen, and 35.56% oxygen. (assume 100g)



2. A compound was found to contain 49.98 g of carbon and 10.47 g of hydrogen. The molar mass of the compound is 58.12 g/mol. Determine the molecular formula.



1

2

3