

<p>Question 1 (4 points)</p> <p style="text-align: center;">Do Not Write Here</p>	<p>A quarter is found to have a mass of 5.34 grams. Using unit analysis, show what the mass of the quarter is in milligrams.</p> $\frac{5.34 \text{ g}}{1} \times \frac{1000 \text{ mg}}{1 \text{ g}} = 5,340 \text{ mg}$
<p>Question 2 (12 Points)</p> <p style="text-align: center;">Do Not Write Here</p>	<p>How many protons, neutrons and electrons are there in an atom of the isotopes represented by:</p> <p>1. $^{107}_{47}\text{Ag}$ Protons: 47 Neutrons: 60 Electrons: 47</p> <p>2. $^{16}\text{O}^{2-}$ Protons: 8 Neutrons: 8 Electrons: 10</p>
<p>Question 3 (12 Points)</p> <p style="text-align: center;">Do Not Write Here</p>	<p>1. An ion from a given element has 13 protons and 10 electrons.</p> <p>What is the charge on the ion? +3</p> <p>What is the name of the element? Aluminum</p> <p>What is the symbol for the ion? Al³⁺</p> <p>2. For the element potassium:</p> <p>What is the charge on the ion expected to form? +1</p> <p>What is the symbol for the ion? K⁺</p> <p>How many electrons are present in the ion? 18</p>
<p>Question 4 (12 Points)</p> <p style="text-align: center;">Do Not Write Here</p>	<p>1. What is the name for SO₄²⁻ ? The Sulfate ion</p> <p>What is the formula for the phosphate ion ? PO₄³⁻</p> <p>What is the formula for the chlorate ion ? ClO₃⁻</p> <p>2. What is the formula for the ammonium ion ? NH₄⁺</p> <p>What is the name for OH⁻ ? The Hydroxide ion</p> <p>What is the formula for the hydrogen sulfate ion ? HSO₄⁻</p>

Question 5
(12 Points)

1. The compound **CaBr₂** is an ionic compound. What are the ions of which it is composed?



2. What is the formula of the compound formed between the ions **F⁻** and **Fe²⁺**?



3. What is the name of the compound with the formula **Ca(CN)₂**?

Calcium cyanide

4. What is the name of the compound with the formula **NaHCO₃**?

Sodium hydrogen carbonate

5. What is the name of the compound with the formula **KOH**?

Potassium hydroxide

6. What is the formula for **barium nitrate**?



7. What is the formula for **potassium carbonate**?



8. What is the formula for **calcium phosphate**?



9. What is the formula for **xenon trioxide**?



10. What is the formula for **nitrogen dioxide**?



11. What is the formula for **sulfur tetrafluoride**?



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Question 6
(9 Points)

1. How many **GRAMS** of **sulfur** are present in **4.34** moles of **SO₂**?

$$\frac{4.34 \text{ mol SO}_2}{1} \times \frac{1 \text{ mol S}}{1 \text{ mol SO}_2} = 4.34 \text{ mol S}$$

$$\frac{4.34 \text{ mol S}}{1} \times \frac{32.07 \text{ g S}}{1 \text{ mol S}} = 139.18 \text{ g S}$$

2. How many **MOLES** of **oxygen** are present in **3.06** grams of **SO₂**?

$$\frac{3.06 \text{ g SO}_2}{64.07 \text{ g SO}_2} \times \frac{1 \text{ mol SO}_2}{1} = 0.0477 \text{ mol SO}_2$$

$$\frac{0.0477 \text{ mol SO}_2}{1} \times \frac{2 \text{ mol O}}{1 \text{ mol SO}_2} = 0.0955 \text{ mol O}$$

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Question 7
(14 Points)1. How many **GRAMS** of **phosphorus** are present in **1.86** grams of **PCl₅**?

$$\frac{1.86\text{g PCl}_5}{208.22\text{g PCl}_5} \times \frac{1\text{ mol PCl}_5}{1\text{ mol PCl}_5} = 0.00893\text{ mol PCl}_5$$

$$\frac{0.00893\text{ mol PCl}_5}{1\text{ mol PCl}_5} \times \frac{1\text{ mol P}}{1\text{ mol PCl}_5} = 0.00893\text{ mol P}$$

$$\frac{0.00893\text{ mol P}}{1\text{ mol P}} \times \frac{30.97\text{g}}{1\text{ mol P}} = 0.277\text{g P}$$

2. How many **GRAMS** of **PCl₅** can be produced from **2.29** grams of **chlorine** ?

$$\frac{2.29\text{g Cl}}{35.45\text{g Cl}} \times \frac{1\text{ mol Cl}}{1\text{ mol Cl}} = 0.0646\text{ mol Cl}$$

$$\frac{0.0646\text{ mol Cl}}{5\text{ mol Cl}} \times \frac{1\text{ mol PCl}_5}{1\text{ mol PCl}_5} = 0.0129\text{ mol PCl}_5$$

$$\frac{0.0129\text{ mol PCl}_5}{1\text{ mol PCl}_5} \times \frac{208.22\text{g PCl}_5}{1\text{ mol PCl}_5} = 2.69\text{g PCl}_5$$

Do Not
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(6 Points)The percent by weight of **carbon** in **C₃H₆O₃**

$$\text{Molar Mass C}_3\text{H}_6\text{O}_3 = 3(12.01) + 6(1.01) + 3(16.00) = 90.09\text{g}$$

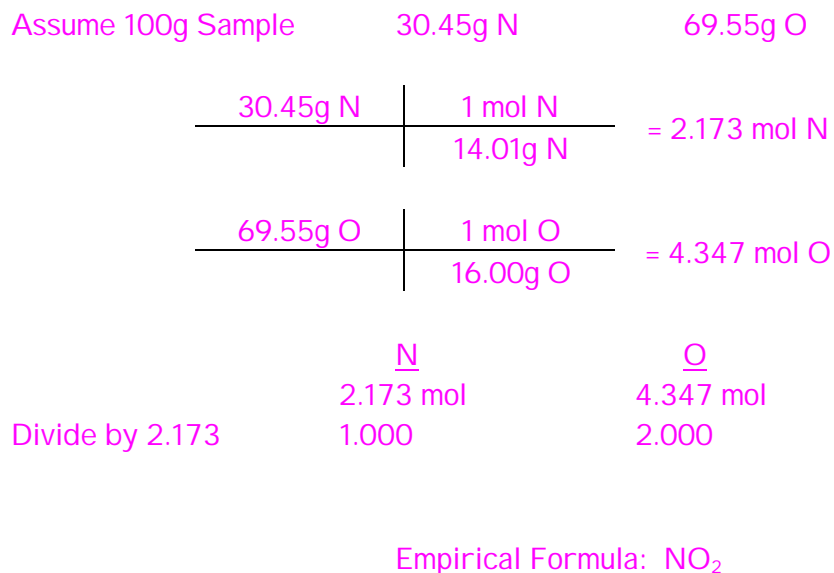
$$\text{Carbon Content} = 3(12.01) = 36.03\text{g}$$

$$\% \text{ by weight} = (36.03/90.09) \times 100 = 39.99\%$$

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Question 9
(10 Points)

1. A compound is found to contain **30.45 % nitrogen** and **69.55 % oxygen** by weight. Determine the empirical formula for this compound.



2. If the molecular weight for this compound was found to be **46.01 g/mol**. The molecular formula for this compound is.

Molar Mass of Empirical Formula: $14.01 + 2(16.00) = 46.01\text{g}$

Molecular Formula = Empirical Formula = NO_2

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Question 10
(9 Points)

When the following molecular equations are balanced using the smallest possible integer coefficients, the values of these coefficients are:

- $\text{Ca(OH)}_2(\text{aq}) + 2 \text{HCl}(\text{aq}) \longrightarrow \text{CaCl}_2(\text{aq}) + 2 \text{H}_2\text{O}(\text{l})$
- $2 \text{NO}(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2 \text{NO}_2(\text{g})$
- $2 \text{Fe}_2\text{O}_3(\text{s}) + 3 \text{C}(\text{s}) \longrightarrow 4 \text{Fe}(\text{s}) + 3 \text{CO}_2(\text{g})$

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