

GRAM FORMULA MASS

Name _____

Determine the gram formula mass (the mass of one mole) of each compound below.

KMnO_4 _____

KCl _____

Na_2SO_4 _____

$\text{Ca}(\text{NO}_3)_2$ _____

$\text{Al}_2(\text{SO}_4)_3$ _____

$(\text{NH}_4)_3\text{PO}_4$ _____

$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ _____

$\text{Mg}_3(\text{PO}_4)_2$ _____

$\text{Zn}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 2\text{H}_2\text{O}$ _____

$\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$ _____

H_2CO_3 _____

$\text{Hg}_2\text{Cr}_2\text{O}_7$ _____

$\text{Ba}(\text{ClO}_3)_2$ _____

$\text{Fe}_2(\text{SO}_3)_3$ _____

$\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$ _____

PERCENTAGE COMPOSITION

Name _____

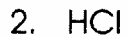
Determine the percentage composition of each of the compounds below.



K = _____

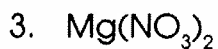
Mn = _____

O = _____



H = _____

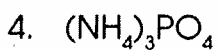
Cl = _____



Mg = _____

N = _____

O = _____

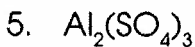


N = _____

H = _____

P = _____

O = _____



Al = _____

S = _____

O = _____

Solve the following problems.

6. How many grams of oxygen can be produced from the decomposition of 100. g of KClO_3 ? _____

7. How much iron can be recovered from 25.0 g of Fe_2O_3 ? _____

8. How much silver can be produced from 125 g of Ag_2S ? _____

DETERMINING EMPIRICAL FORMULAS

Name _____

What is the empirical formula (lowest whole number ratio) of the compounds below?

1. 75% carbon, 25% hydrogen

2. 52.7% potassium, 47.3% chlorine

3. 22.1% aluminum, 25.4% phosphorus, 52.5% oxygen

4. 13% magnesium, 87% bromine

5. 32.4% sodium, 22.5% sulfur, 45.1% oxygen

6. 25.3% copper, 12.9% sulfur, 25.7% oxygen, 36.1% water

DETERMINING MOLECULAR FORMULAS (TRUE FORMULAS)

Name _____

Solve the problems below.

1. The empirical formula of a compound is NO_2 . Its molecular mass is 92 g/mol. What is its molecular formula?

2. The empirical formula of a compound is CH_2 . Its molecular mass is 70 g/mol. What is its molecular formula?

3. A compound is found to be 40.0% carbon, 6.7% hydrogen and 53.5% oxygen. Its molecular mass is 60. g/mol. What is its molecular formula?

4. A compound is 64.9% carbon, 13.5% hydrogen and 21.6% oxygen. Its molecular mass is 74 g/mol. What is its molecular formula?

5. A compound is 54.5% carbon, 9.1% hydrogen and 36.4% oxygen. Its molecular mass is 88 g/mol. What is its molecular formula?

COMPOSITION OF HYDRATES

Name _____

A hydrate is an ionic compound with water molecules loosely bonded to its crystal structure. The water is in a specific ratio to each formula unit of the salt. For example, the formula $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ indicates that there are five water molecules for every one formula unit of CuSO_4 . Answer the questions below.

1. What percentage of water is found in $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$?

2. What percentage of water is found in $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$?

3. A 5.0 g sample of a hydrate of BaCl_2 was heated, and only 4.3 g of the anhydrous salt remained. What percentage of water was in the hydrate?

4. A 2.5 g sample of a hydrate of $\text{Ca}(\text{NO}_3)_2$ was heated, and only 1.7 g of the anhydrous salt remained. What percentage of water was in the hydrate?

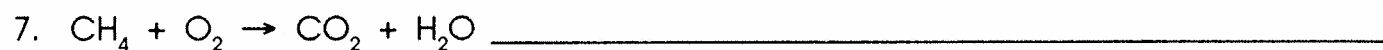
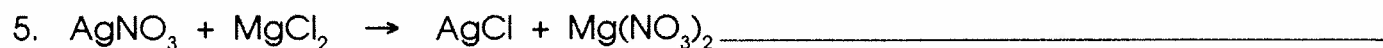
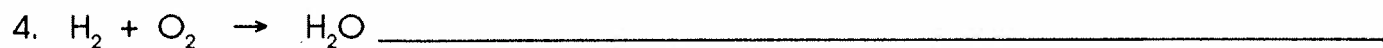
5. A 3.0 g sample of $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$ is heated to constant mass. How much anhydrous salt remains?

A 5.0 g sample of $\text{Cu}(\text{NO}_3)_2 \cdot n\text{H}_2\text{O}$ is heated, and 3.9 g of the anhydrous salt remains. What is the value of n?

BALANCING CHEMICAL EQUATIONS

Name _____

Rewrite and balance the equations below.



WORD EQUATIONS

Name _____

Write the word equations below as chemical equations and balance.

1. zinc + lead (II) nitrate yield zinc nitrate + lead
2. aluminum bromide + chlorine yield aluminum chloride + bromine
3. sodium phosphate + calcium chloride yield calcium phosphate + sodium chloride
- potassium chlorate when heated yields potassium chloride + oxygen gas
- aluminum + hydrochloric acid yield aluminum chloride + hydrogen gas
- calcium hydroxide + phosphoric acid yield calcium phosphate + water
- copper + sulfuric acid yield copper (II) sulfate + water + sulfur dioxide
- hydrogen + nitrogen monoxide yield water + nitrogen

CLASSIFICATION OF CHEMICAL REACTIONS

Name _____

Classify the reactions below as synthesis, decomposition, single replacement (cationic or anionic) or double replacement.



PREP
OF C

Predic
classif

1. m

2. a

3. sil

4. hy

5. zir

6. sul

7. so

8. ac

PREDICTING PRODUCTS OF CHEMICAL REACTIONS

Name _____

Predict the products of the reactions below. Then, write the balanced equation and classify the reaction.

1. magnesium bromide + chlorine

2. aluminum + iron (III) oxide

3. silver nitrate + zinc chloride

4. hydrogen peroxide (catalyzed by manganese dioxide)

5. zinc + hydrochloric acid

6. sulfuric acid + sodium hydroxide

7. sodium + hydrogen

8. acetic acid + copper