

**I. Fill in the blanks with the most appropriate term:**

Common names of substances like "milk of magnesia" or "lime" usually give no information about the chemical composition of a compound. Consequently, chemists rely on a chemical \_\_\_\_\_ when representing a chemical compound. \_\_\_\_\_ compounds are composed of a metal and a nonmetal while \_\_\_\_\_ compounds are formed between nonmetals. In formulas for binary ionic compounds, the \_\_\_\_\_ ion (or \_\_\_\_\_) is always written first and named first. The \_\_\_\_\_ ion (or \_\_\_\_\_) is then written and named, with the ending changed to \_\_\_\_\_. \_\_\_\_\_ are used to show the number of each ion in the formula. The \_\_\_\_\_ system of nomenclature is used for compounds of metals that have more than one charge. Ions made up of more than one element are called \_\_\_\_\_ ions, and the ending is NOT changed when naming the compound! \_\_\_\_\_ are used to show the number of atoms of each element when naming a molecular compound. Carbon compounds are a special type of molecular compound with the prefix denoting the number of \_\_\_\_\_ atoms and the suffix denoting the type of \_\_\_\_\_.

A chemical reaction can be represented by a chemical \_\_\_\_\_. The starting substances that undergo a chemical change are called the \_\_\_\_\_. The new substances formed are called the \_\_\_\_\_. Following the Law of Conservation of \_\_\_\_\_, a chemical equation must be balanced. When balancing an equation, \_\_\_\_\_ are placed in front of the reactants and products so that the same number of atoms of each \_\_\_\_\_ is on each side of the equation. An equation must never be balanced by changing the \_\_\_\_\_ in the chemical formula of a substance.

Special abbreviations are used to show the physical state of a substance in a reaction. The symbol for a liquid is \_\_\_\_\_; for a solid, \_\_\_\_\_; for a gas, \_\_\_\_\_ or \_\_\_\_\_; and for a precipitate (an \_\_\_\_\_ solid), a \_\_\_\_\_ or \_\_\_\_\_. A substance that is dissolved in water is designated \_\_\_\_\_.

We recognize five general types of reactions. In a \_\_\_\_\_ reaction, the reactants are two or more \_\_\_\_\_ and/or compounds and a more \_\_\_\_\_ product is formed. A \_\_\_\_\_ reaction is just the opposite; a single compound is broken down into two or more simpler substances. In a \_\_\_\_\_ reaction, the reactants and products take the general form of  $A + BY \rightarrow AY + B$ . An \_\_\_\_\_ series must be used to determine if this type reaction will actually take place. An element in the \_\_\_\_\_ series can replace any element \_\_\_\_\_ it on the list, but cannot replace any element \_\_\_\_\_ it on the list. A \_\_\_\_\_ reaction involves the exchange of cations (\_\_\_\_\_ ions) between two compounds generally in an \_\_\_\_\_ solution. One of the reactants in a \_\_\_\_\_ reaction is atmospheric \_\_\_\_\_; the products of the complete combustion of a hydrocarbon are \_\_\_\_\_ and \_\_\_\_\_. If the combustion is incomplete (which means not enough \_\_\_\_\_ is present), the poisonous, colorless, odorless gas \_\_\_\_\_ is also formed.

## **II. Writing and naming formulas**

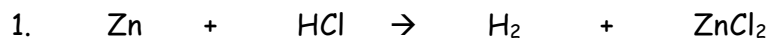
Write either the name or formula for the following compounds, whichever is appropriate.

1. phosphorus pentachloride \_\_\_\_\_
2.  $CH_4$  \_\_\_\_\_
3. zinc phosphate \_\_\_\_\_

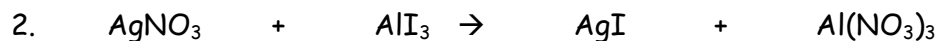
4.  $C_4H_8$  \_\_\_\_\_
5.  $CCl_4$  \_\_\_\_\_
6. ammonium thiosulfate \_\_\_\_\_
7. aluminum citrate \_\_\_\_\_
8. tin (II) oxide \_\_\_\_\_
9.  $Fe_2O_3$  \_\_\_\_\_
10. copper (II) iodate \_\_\_\_\_

### III. Balancing Equations

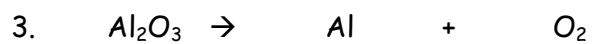
Balance the following equations. Tell which type of reaction each represents.



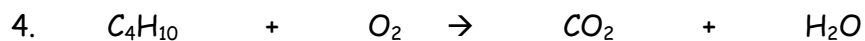
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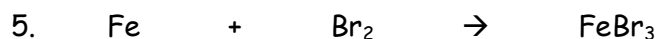
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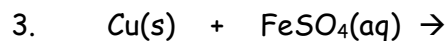
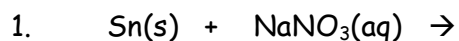
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#### **IV. Activity Series**

Use the activity series to write balanced chemical equations for each of these single replacement reactions. If no reaction will occur, write "NR".



#### **V. Word Equations**

Substitute symbols and formulas for words and then balance the following equations. Be sure to use abbreviations to denote physical states.

1. When solid potassium nitrate is heated, it decomposes to solid potassium nitrite, and oxygen gas is evolved.

2. Solid lithium hydroxide reacts with carbon dioxide to form solid lithium carbonate and liquid water.

## VI. Predicting Products

1. In a common synthesis reaction, sodium metal is lowered into a bottle of chlorine gas. Predict the product, substitute symbols and formulas for names, and then balance the equation. Be sure to use abbreviations to denote physical states.
  
2. Aluminum sulfate and calcium hydroxide are used in a water purification process. When each is dissolved in water, they react to produce two insoluble products. Predict the products, substitute symbols and formulas for names, and then balance the equation. Be sure to use abbreviations to denote physical states.