**IDX G10 Chemistry S**

**Study Guide Issue #S1 Midterms**

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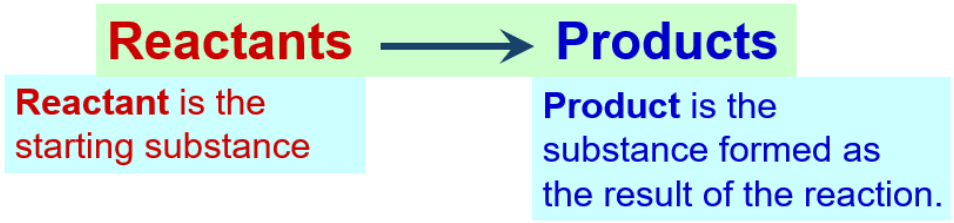
# Chapter 11.1

- Chemical reaction: a process in which atoms of substances are rearranged to form different substances.
- An arrow rather than an equal sign is used to separate the reactants from the products. The arrow is read as "reacts to produce" or "yield".
- When there are two or more reactants, or two or more products, a plus sign separates each reactant or each product.
- Chemical equation is a representation of a chemical reaction; the formulas of the reactants (on the left) are connected by an arrow with the formulas of the products (on the right).




- Skeleton equations: Equations that show just the formulas of the reactants and products (they are unbalanced)
- Physical states: resembled by adding a symbol after each formula. In which, for Solid is (s), liquid is (l), gas is (g), a substance dissolved in water or in an aqueous solution is (aq)
- A catalyst is a substance that speeds up the reaction but is not used up in the reaction.
    - A catalyst is neither a reactant nor a product, so its formula is written above the arrow in a chemical equation
- Law of Conservation of Mass: In any chemical change, mass is conserved.
    - In deference to the law of conservation of mass, in any chemical change, mass is conserved.
- To balance the equation, place numbers before the formula (coefficient).

## Chapter 11.2

- The five general type of reactions include
    - Direct combination (DC)
    - Decomposition (D)
    - Single replacement (SR)
    - Double replacement (DR)
    - Combustion (C)
- Direct combination: two or more reactants but only 1 product
- Decomposition: only 1 reactant but two or more products
- Single replacement: is a chemical change in which one element replaces a second element in a compound

- E.g. $A + BC \rightarrow B + AC$
- And the element that's being replaced must be of the same type (both be metal or nonmetal)
- And the element being replaced must be less active than the one that replace it
- Only the top 3 active irons could react with water (produce H2 and OH-)
- The nonmetals that could react should be only from the 7A group (not true but true in this midterm test)
- And the activity of the nonmetals from high to low is the same order from high to low (down a group) in the 7A group
- Cu and Fe are all 2+ charged in this reaction

- Double replacement: a chemical change involving an exchange of positive ions between two compounds
  - E.g. $AB+CD \rightarrow CB + AD$
  - For a double-replacement reaction to occur, one of the following is usually true
  - One of the products is only slightly soluble and precipitates form from solution.
    - E.g. $Na_2S(aq) + Cd(NO_3)_2(aq) \rightarrow CdS(s) + 2NaNO_3(aq)$
  - One of the products is gas.
    - E.g. $2NaCN(aq) + H_2SO_4(aq) \rightarrow 2HCN(g) + Na_2SO_4(aq)$
  - One product is a molecular compound such as water.
    - E.g. $Ca(OH)_2(aq) + 2HCl(aq) \rightarrow CaCl_2(aq) + 2H_2O(l)$
- Combustion reactions: chemical change in which an element or a compound reacts with oxygen, often producing energy in the form of heat and light
  - E.g. $C_xH_y + O_2 \rightarrow CO_2 + H_2O$(unbalanced), and then balance it according to the question

P.S. Always remember to balance the equation!!