**RATU NAVULA COLLEGE**

**HOME-BASED LEARNING-2021**

**YEAR 11B: CHEMISTRY**

**WEEK 1**

**LESSON NUMBER 25**

**STRAND 3 REACTIONS**

**SUB-STRAND 3.1 CHEMICAL EQUATIONS AND CALCULATIONS**

**LEARNING OUTCOME**

* Writing the names and formula of common ionic and covalent compounds.

Chemical Formulae

* Are used to express the composition of molecules and ionic substance in terms of chemical symbols.

Example: water- H2O ; Carbon dioxide-CO2; Oxygen gas –O2

WRITING CHEMICAL FORMULA:

CROSSOVER –METHOD:

|  |  |
| --- | --- |
| STEPS : | EXAMPLE |
| 1. Write the cation( positive ion) first followed by the anion(negative ion). | Write the chemical formula of calcium hydroxide  Ca2+ OH- |
| 1. Write the charges above each symbol | 2+ -  Ca OH |
| 1. Cross the charges | 2+ -  Ca OH |
| 1. Put the charges as subscript (do not write the positive and negative signs)   NOTE:   * SUBSCRIPTS OF 1 ARE NEVER WRITTEN | Ca(OH)2 |

Exercise 1

1. Write the formula for the following compound:
2. Sodium chloride
3. Magnesium Chloride
4. Sodium carbonate
5. Name the following compound:
6. Al3O2
7. AgNO3

**LESSON NUMBER 26**

**STRAND 3 REACTIONS**

**SUB-STRAND 3.1 CHEMICAL EQUATIONS AND CALCULATIONS**

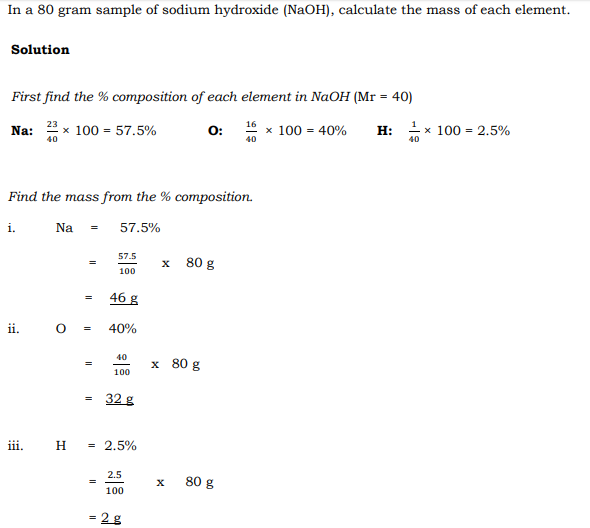
LEARNING OUTCOME

* Calculating the percentage composition from formula mass and molecular mass.

|  |  |  |
| --- | --- | --- |
|  | Molecular Mass | Formula Mass |
| Definition | -used to express the mass of molecules  - the mass is calculated by adding the atomic masses in the molecule.  - no unit; only atomic mass unit(a.m.u.) | -used to express the MASS OF IONIC COMPOUNDS.  -Similar to MOLECULAR MASS.  -no unit; only atomic mass unit  (a.m.u) |
| Example | CO2 :   |  |  |  |  | | --- | --- | --- | --- | | ELEMENT | ATOM | MASS | TOTAL | | C | 1 | 12 | 12 | | O | 2 | 16 | 32 | | 44amu | | CaCl2:   |  |  |  |  | | --- | --- | --- | --- | | ELEMENT | ATOM  MASS | MASS | TOTAL | | Ca | 1 | 40 | 40 | | Cl | 2 | 35.5 | 70 | | 110amu | |

**Law of Definite Composition**

* The law of definite composition was proposed by Joseph Proust based on his observations on the fixed composition of chemical compounds.
* This law states that chemical compounds are composed of a fixed ratio of elements as determined by mass.
* Elements combine in whole numbers: it is not possible to have a compound with portion an atom.

Example 2

Note :Exercise 2 is (i)-(iii)

**LESSON NUMBER 27**

**STRAND 3 REACTIONS**

**SUB-STRAND 3.1 CHEMICAL EQUATIONS AND CALCULATIONS**

**LEARNING OUTCOME:**

* Writing Chemical equation from chemical statements and vice-versa.

**Chemical Equation:**

* A way of illustrating(denoting) a chemical reaction using the symbols for the participating particles ( atoms, molecules, ions, etc) ;

For Example:

2Mg(s) + O2(g) 2MgO(g)

That is:

Note: 1. Single arrow ( ) –irreversible reactions ; Double arrow( )- reversible reactuons.

1. The different phases of the reaction are indicated as follows: (s)-solid; (g)-gas; (l)-liquid; (aq)-aqueous .
2. The coefficient eg; 2Mg indicates the relative numbers of molecules reacting.

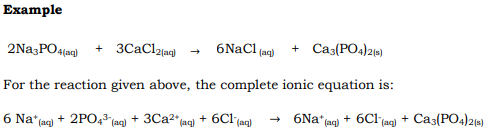
**OBTANING NET IONIC EQUCATION**

Ionic equation

Indicates the reactant and/ or products that exists primarily as ions in aqueous solution.

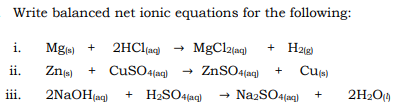
**To get a net ionic equation:**

1. write the balanced molecular equation
2. write the balanced complete ionic equation
3. cross out the spectator ions that are present
4. write the leftover as the net ionic equation





**Exercise**

****

**LESSON NUMBER 28**

**STRAND 3 REACTIONS**

**SUB-STRAND 3.1 CHEMICAL EQUATIONS AND CALCULATIONS**

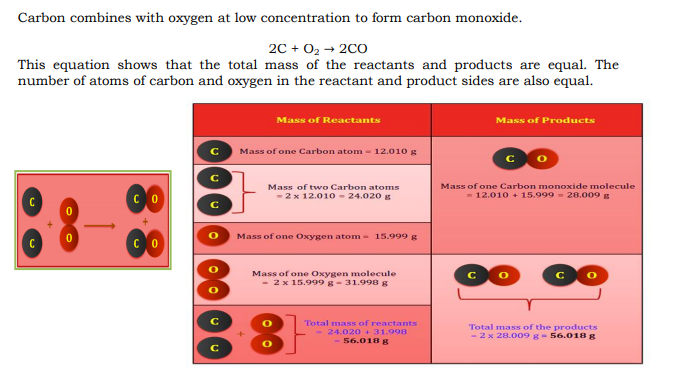
**LEARNING OUTCOME:**

* Define and verify the Law Of conservation of Mass

**Law of conservation of mass**

* The law of conservation of mass was established in 1789 by French Chemist Antoine Lavoisier
* This law states that mass is neither created nor destroyed in any ordinary chemical reaction.
* Therefore the mass of the reactants will always be equal to the mass of the products.

**Example**



**Example 2**



**Examples showing the Law of Conservation of Mass**

1. In an experiment where 50 g of sodium was reacted with 76 g of chlorine to form sodium chloride salt, it was found that 126 g of the salt was formed.



2. When 24.8 g of copper carbonate is strongly heated, it produces 16 g of copper oxide and. . 8.8g of carbon dioxide gas.



3. When a 10 g sample of iron reacts with oxygen to form 18.2 g of ferric oxide, 8.2 g of . . . oxygen was needed.



**Exercise**

1. If 178.8 g of water is separated into hydrogen and oxygen gas and the hydrogen gas has a mass of 20.0g, what is the mass of the oxygen gas produced?

****

1. From a laboratory process, a student collects 28.0 g of hydrogen and 224.0 g of oxygen. How

much water was originally involved in the process?