Importance Of Chemisrty

- In meeting human needs for food, health care products and other products required for improving quality of life.
- In diverse areas as waether patterns, functioning of brain and operation of a computer.
- In chemical industries.

Properties of matter:

(i) Physical: propeties measured/observed without changing the identity or composition of substance. (Colour, Odour)
(ii) Chemical: properties measured/observed when a chemical reaction ocurs. (Acidity or Basicity, Combustibility)

Measurement of Matter:
-International system of units (SI):(Length-m)
-Mass is the amount of matter present in a substance
-Weight is the force exerted by gravity on an object.
-Uncertainity of measurement: Range of possible values within the true, value of the measurement lies.
Significant figures: Meaningful digits known with certainity.
-Precisions: Closeness of various measurements for same quantity.
-Accuracy: Ageement of a particular value to true value of results.

Atomic Mass Unit

Atomic Mass Unit (amu): A mass exactly equal to one-twelfth the mass of one carbon-12 atom.
Molecular Mass: Sum of atomic masses of the elements present in a molecule. One Mole is the amount of a substance that contains as many particles/ entities as there are atoms in exactly 12g (or 0.012 kg) of the ^{12}C isotope
Molar Mass: mass of one mole of a substance in grams.

$$\text{Mass Percent} = \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$$

$$\text{Molarity} = \frac{\text{No. of moles of solute}}{\text{Volume of solution in litres}} \times 100$$

$$\text{Molality} = \frac{\text{No. of moles of solute}}{\text{Mass of solute in kg}} \times 100$$

Mole Fraction

$$\text{Mole of Fraction of A} = \frac{n_a}{n_a + n_b}$$

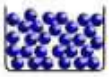
$$\text{Mole of Fraction of B} = \frac{n_b}{n_a + n_b}$$

States of Matter

(i) Solid: Particles are held very close to each other in an elderly fashion with no freedom of movement.

Have definite volumes and shape

(ii) Liquids: Particles are close and can move around.



Have definite volume but no definite shape

(iii) Gases: Particles are far apart and their movement is easy and fast.

Neither have definite volume nor definite shape

Classification

Mixtures

Two or more substances present in any ratio

Homogenous: Uniform Composition (Sugar Solution, air)

Hoterogenous: Non-Uniform Composition (Mixtures of salt and sugar)

Pure Substance

Fixed Composition

Compounds: two or more atoms of differnt elements (H_2O, NH_3)

Elements: Contains one type of particles i.e. atoms, molecules (Na, Cu)

How to Determine Emperical and Molecular Formula

Step 1: Conversion of mass percent to grams.
Step 2: Convert into number moles of each elements.
Step 3: Divide the mole value obtained above by the smallest number.
Step 4: Write emperical formula by mentioning the number after writing the symbols of respective elements.
Step 5: Writing molecular formula
(a) determining emperical formula mass. Add the atomic massses of various atoms present in the emperical formula.
(b) Divide mmolar mass by emperical fomula mass
(c) Multiply emperical formula by n obtained above.

Stoichiometry

Deals with the calculation of masses of the products and reactants involved in a reaction.

How to Balance a Chemical equation:
Step 1: Write correct formulas of reaction and products.
Step 2: Balance Number of C atoms
Step 3: Balance Number of H atoms
Step 4: Balance Number of O atoms
Step 5: Verify the number of atoms of each elements

Laws of Chemical Combination

(i) Gay Lussac's Law of Gaseous Volume: When gases combine or all produced in a chemical reaction they do so in simple ratio by volume provided all gases are at same temperature and pressure.
(ii) Avogadro Law: Equal volumes of gases at the same temperature and pressure should contain equal number of molecules
(iii) Dalton's Atomic Theory:
- Matter consists of indivisible atoms.
- All the atoms of a given elements have identical properties including indentical mass.
- Compounds are formal when atoms of different elements combine in a fixed rate.
- Atoms are neither created nor destroyed in chemical reaction

Law of Conservation of Mass: Matter can neither be created nor be destroyed.
Law of Definite Proportion: A given compound always contains exaclty the same proportion of elements. it was given by Joseph Proust.
Law of Multiple Proportions: if two elements can combine to form more than one compound, than one compound, the masses of one elements that combine with a fixed mass of other elemts are in ration of small whole numbers. It was given by Dalton.