UNIT-1 SOME BASIC CONCEPTS OF CHEMISTRY - SYNOPSIS MODULE- 1/5

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Reference: NCERT XIth Chemistry Textbook- 1
New Course Chemistry XIth - Volume 1 Publishers- Pradeep
ABC of Chemistry XIth - Volume 1 Publishers- Modern
Conceptual Chemistry XIth - Volume 1 Publishers- S. Chand
ISC chemistry XIth - Publishers- Nageen prakashan

Importance and scope of chemistry- brief introduction

Classification based on physical state of matter- solid, liquid, and gas

Classification based on chemical aspect of matter-

Pure substances- Elements and Compounds

Mixtures- Homogeneous and Heterogeneous

Atoms are smallest particle of matter which may or may not exist independently

Molecules are smallest particle of a substance (element or compound) which can exist independently

Atomicity- It is the number of atoms present in a molecule

Depending on the number of atoms present molecules can be classified as Mono atomic- Only a single atom is present Ex- Noble gases

Di atomic- Two atoms of same or different type are present Ex- O_2, CO, HBr, F_2 etc

Tri atomic- Three atoms of same or different type are present Ex- O_3, SO_2, N_2O etc

Poly atomic- More than three atoms of same or different type are present Ex- P_4, S_8, HNO_3, H_2SO_4, C_2H_6 etc

Molecules are further classified into two types based on the type of atoms present in them-

Homoatomic molecules- They have same type of atoms present in them. Ex- H_2, O_2, Cl_2 etc

Hetero atomic molecules- They have different type of atoms present in them. Ex- CO, HCl, CO_2, HNO_3 etc

Atomic mass unit (amu) - Quantity of mass equal to 1/12 of mass of an atom of C-12 isotope

Relative atomic mass- Relative mass of an element as compared to 1/12 the mass of an atom of C-12 isotope

Unified mass (u) – When mass of carbon-12 is taken as exactly 12.0000 and mass of other elements is expressed in comparison to it

Gram atomic mass/ Gram atom- Quantity of element whose mass in grams is numerically equal to the atomic mass of that element

Average relative atomic mass- Averaging the relative atomic masses of all known isotopes of the given element in the ratio of their occurrence in nature

Example- Chlorine occurs in3:1 ratio by mass in 2 forms ^{35}Cl, ^{37}Cl

Average mass= 35 x 3 + 37 x 1/ 3+ 1 = 35.5

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Equivalent mass/weight (EW)– Number of parts by mass of a given substance which combines with or displaces directly or indirectly 1.008 parts by mass of hydrogen, or 8 parts by mass of oxygen, or 35.5 parts by mass of chlorine

Gram equivalent weight (GEW)- mass in grams of a substance numerically equal to its equivalent weight

Equivalent weight of element= atomic mass of element / valency

Equivalent weight/mass of a normal salt= Formula weight of the salt/ Total charge on cationic part

Equivalent weight/mass of an acid salt= Formula weight of the salt/ Number of replaceable H atoms present

Equivalent weight/mass of an acid= Molecular weight of acid/ Basicity of acid

Equivalent weight/ mass of a base= Molecular weight of acid/ Acidity of base

Equivalent weight/mass of an oxidant or reductant= Formula mass/ Number of electrons lost or gained by one molecule

Relation between GEW, GAM and Valency GAM= GEW X Valency

Molar mass- Is an average relative mass of a single molecule of the given substance be it a molecule or an element as compared to 1/12 mass of an atom of C-12

Molar mass can be obtained by summing up the atomic masses of all the atoms present in the molecule

Gram molecular mass/ Gram molecule- Quantity of substance whose mass in grams is numerically equal to the molecular mass of the given substance

Formula mass- In case of ionic compounds where the compound does not exist in discrete molecules, the sum of atomic masses of the atoms present as ions in such compounds is considered to determine its formula mass.