SSLC -Chemistry -Class -14

Unit 2 : Gas Laws and Mole Concept

Molecular Mass and Gram Molecules Mass

Molecular mass is the sum of atomic masses of a molecule .

Eg: Molecular mass of water (H_2O).

1+1+16=18

Eg: Molecular mass of Ammonia (NH_3).

14+1+1+1=17

The mass in grams equal to the molecular mass of the substance is called Gram Molecular Mass (GMM) of that substance.

- The amount of a substance in grams equal to its molecular mass is called Gram Molecular Mass.

Number of Molecules

Let us analyse the following table .

Element/ Compound	Molecular Mass	Mass in grams	GMM	No. of molecules
Hydrogen H_2	2	2g	1GMM	6.022×10^{23} molecules
Oxygen O_2	32	32g	1GMM	6.022×10^{23} molecules
Nitrogen N_2	28	28g	1GMM	6.022×10^{23} molecules
Water H_2O	18	18g	1GMM	6.022×10^{23} molecules
Ammonia NH_3	17	17g	1GMM	6.022×10^{23} molecules

If you take 32g of Oxygen (O_2) it contains 1 GMM of Oxygen. It contains 6.022×10^{23} molecules of Oxygen.

One mole molecules

6.022×10^{23} molecules are called one mole molecule.

1 GMM = 1 Mole = 6.022×10^{23} molecules.

Questions

1) Calculate the molecular mass of following molecules.

(Atomic mass C=12,Cl=35.5, H=1, O=16, S=32,Ca=40)

a) HCl

b) H_2SO_4

c) $CaCl_2$

d) $C_6H_{12}O_6$

2) Calculate the number of molecules and GMM present in each sample?
(Atomic mass H=1, O=16, S=32 ,Ca=40 ,N=14)

a) 140g Nitrogen (N_2)
b) 72g Water
c) 170g Ammonia (NH_3)

3) Calculate the number of molecules present in each sample ?
1. 360 g glucose (Molecular mass = 180)
2. 10 g Hydrogen (Molecular mass = 2)

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