Example : For a sample of 3.011×10^{24} H_3PO_4 molecules

$$\text{Moles of } H_3PO_4 = \frac{3.01 \times 10^{24}}{6.022 \times 10^{23}} = 5 \quad ; \text{ weight of } H_3PO_4 = 5 \times 98 = 490 \text{ gm}$$

- Avogadro's hypothesis : At constant temperature and pressure, volume of the gaseous sample is directly proportional to number of gaseous moles, present.

$$\text{Moles of molecules} = \frac{\textit{volume of gas in lit. at S.T.P.}}{22.4 \textit{ lit.}}$$

Example : Calculate moles of molecule of NH_3 having 2.24 litre at S.T.P.

Solution : $\text{Moles of } NH_3 = \dfrac{2.24}{22.4} = 0.10$

- Loschmidt number : Number of molecules in 1 ml of gas at S.T.P. It is 2.687×10^{19}.
- Equivalent Weight : $= \dfrac{\text{Molecular weight}}{\text{n} - \text{factor}}$
- Calculation of n-factor :

(i) For any acid it is the number H^+ replaced or e-pair gained by its one molecule, i.e. its basicity.

Example : $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$

n-factor for $H_2SO_4 = 2$

$H_3PO_4 + NaOH \rightarrow NaH_2PO_4 + H_2O$

n-factor for $H_3PO_4 = 1$

$$H_3BO_3 + \ddot{N}H_3 \rightarrow HO-\overset{\displaystyle OH}{\underset{\displaystyle \uparrow NH_3}{B}}-OH$$

n-factor for $H_3BO_3 = 1$

(ii) For any base, it is the no of OH^- lost or H^+ gained or electron pair donated by its one molecule, i.e. its acidity.

Example : $HCl + NH_3 \rightarrow NH_4^+ + Cl^-$

n-factor for $NH_3 = 1$

$H_2SO_4 + Mg(OH)_2 \rightarrow MgSO_4 + 2H_2O$

n-factor for $Mg(OH)_2 = 2$

(iii) For any salt it is the total cation or anionic charge.

Example : For $Al_2(SO_4)_3$ n-factor = 6

(iv) For any radical, it is the charge over it.

Example : For SO_4^{2-} ; n-factor = 2

Solution : For PO_4^{3-} ; n-factor = 3

(v) For any oxidising agent it is no of electrons lost by it's one molecule.

Example : $K_2Cr_2O_7 \longrightarrow Cr^{3+}$

n-factor = 6