

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

$$\text{Moles of } \text{H}_3\text{PO}_4 = \frac{3.01 \times 10^{24}}{6.022 \times 10^{23}} = 5 ; \text{ weight of } \text{H}_3\text{PO}_4 = 5 \times 98 = 490 \text{ gm}$$

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

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

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

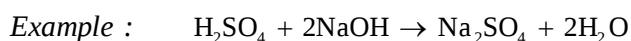
$$\text{Solution : Moles of } \text{NH}_3 = \frac{2.24}{22.4} = 0.10$$

- Loschmidt number : Number of molecules in 1 ml of gas at S.T.P. It is 2.687×10^{19} .

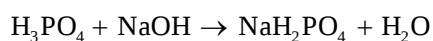
$$\text{Equivalent Weight} : = \frac{\text{Molecular weight}}{\text{n - factor}}$$

- Calculation of n-factor :

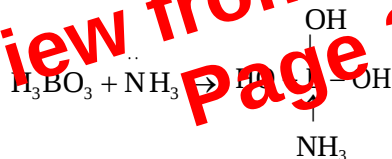
(i) For any acid it is the number H^+ replaced or e-pair gained by its one molecule, i.e. its basicity.



n-factor for $\text{H}_2\text{SO}_4 = 2$

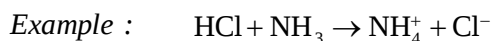


n-factor for $\text{H}_3\text{PO}_4 = 1$

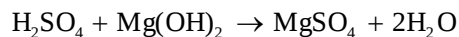


n-factor for $\text{H}_3\text{BO}_3 = 1$

(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.



n-factor for $\text{NH}_3 = 1$



n-factor for $\text{Mg}(\text{OH})_2 = 2$

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

Example : For $\text{Al}_2(\text{SO}_4)_3$ 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 its one molecule.



n-factor = 6

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