

# REDOX REACTION

Rxn in which both reduction and oxidation occurs simultaneously is called as Redox Rxn.

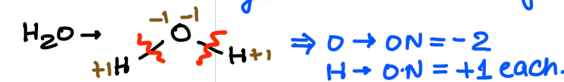
→ Oxidation Rxn:- oxidation no. ↑↑

→ Reduction Rxn:- oxidation no. ↓↓

Oxidation No. = change present on the atom when all its bonds are broken.

Oxidation No. is based on the EN

more EN ⇒ -ve change      less EN ⇒ +ve change



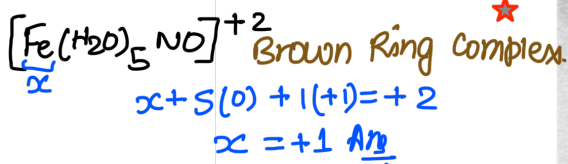
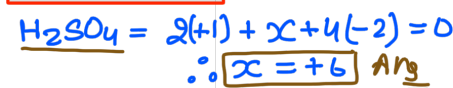
**OXYGEN :-** 95% ON = -2

Except peroxide ( $\text{H}_2\text{O}_2$ ),

superoxide ( $\text{O}_2^-$ ) = -1 ∴  $[\text{O}] = -\frac{1}{2}$

**AMALGAM:-** mixture, no  $e^-$  trans. fee, O.S = zero. Eg Na-Hg

**FINDING X:-**



**MINIMUM AND MAXIMUM O.N.:-**

Valid only for  $\text{G}_{14}$  to  $\text{G}_{17}$ .

Max ON = valence electron

Min ON = valence electron - 8

|                 | Min ON     | Max ON |
|-----------------|------------|--------|
| $\text{G}_{14}$ | $4-8 = -4$ | +4     |
| $\text{G}_{15}$ | $5-8 = -3$ | +5     |
| $\text{G}_{16}$ | $6-8 = -2$ | +6     |
| $\text{G}_{17}$ | $7-8 = -1$ | +7     |

Some important examples;

$\text{H}_2\text{SO}_5$  Caro's Acid; 'x' method not valid here.

→ +6

$\text{H}_2\text{S}_2\text{O}_8$  Marshall's Acid; +6

$\text{CuO}_5$  Butterfly str.;

Max OS of Cu = +6

Max OS of Mn = +7

$\text{K}_3\text{CuO}_8$ ; Cu → OS = +5

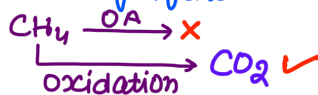
**REDUCING & OXIDISING AGENT**

Reducing A → itself undergo oxidation

Oxidising A → itself undergo reduction

**NOTE;** An element having an highest ON can only act as oxidising agents.

**NOTE;** An element having lowest ON can only act as a reducing agent.



**NOTE;** An element having intermediate ON can act as both O.A and R.A.

**SOME SPECIAL CASE OF ON**

Carbon Suboxide:  $\text{C}_3\text{O}_2$ ;  $x = +\frac{4}{3}$   
Fractional ON = Average ON.

Tribromo Octa oxide :-  $\text{Br}_3\text{O}_8$ ;  
ON =  $+\frac{16}{3}$  NO. of Br atoms.

**N-FACTOR OR VALENCY FACTOR**

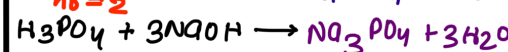
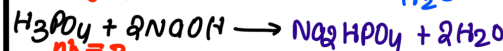
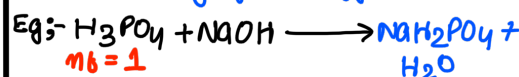
Just a no. of Acid, Base, Salts, change on the elements.

**ACIDS** NO. of  $\text{H}^+$  ions given or the NO. of  $\text{OH}^-$  ions taken.



Count only that H which is attached to the oxygens.

**NOTE;**  $n_f$  for same substance can vary for different Rxn.



→ if nothing given then take  $\text{H}_3\text{PO}_4$  as  $n_f = 3$  → max value.

**Base;** NO. of  $\text{OH}^-$  ions given NO. of  $\text{H}^+$  ions taken



**Salts;** Electrically neutral.

→ Total +ve charge

→ Total -ve charge

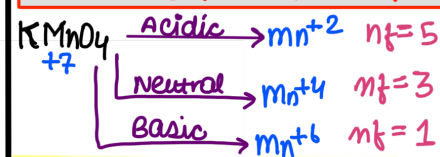


**Change;**  $n_f = \text{change present on it}$

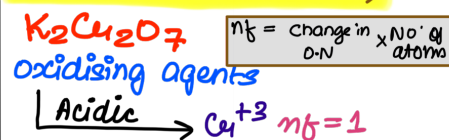


**Elements;**  $n_f$  is the valency  
 $\text{Na} \rightarrow n_f = 1$ ,  $\text{Mg} \rightarrow n_f = 2$

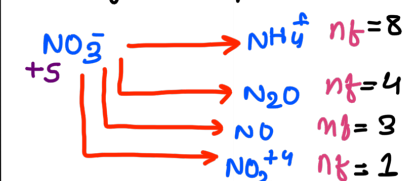
**N-FACTORS FOR THE RXN**



**Titration - Self Indicator;**

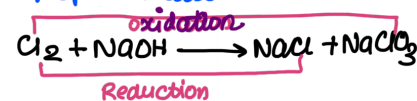


**Titration;**



**DISPROPORTIONATION RXN:-**

oxidation and Reduction on the same element is called disproportionation Rxn.



$$n_f = \frac{n_1 \times n_2}{n_1 + n_2} \quad n_1 = \text{ON of Red}^m$$

$$n_2 = \text{O.N. of Ox}^n$$

**EQUIVALENT WEIGHT:-**

Equivalent weight =  $\frac{\text{molar mass}}{n_f}$

**NORMALITY:-** (N)

$$N = \frac{\text{No. of gram equivalent}}{\text{vol. of solution (lit.)}}$$

**gram eq. =**  $\frac{\text{given mass}}{\text{eq. mass}}$

**Eq. mass =**  $\frac{\text{molar mass}}{n_f}$

**RELATION OF N & M:-**

$$N = M \times n_f$$

**RELATION BETWEEN MOLES & GRAM EQUIVALENT:-**

$$\text{Gram eq} = \text{moles} \times n_f$$

**LAW OF CHEMICAL EQU**

on balanced eq,  $A + B \rightarrow C + D$

gram eq. A = gram eq. B = so on!!

