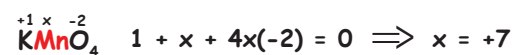


# REDOX REACTIONS

## OXIDATION NUMBER

### RULES TO ASSIGN OXIDATION NUMBER

- 1) Oxidation number of an element in free elemental state or Uncombined state zero
- 2) In polyatomic ion, the algebraic sum of all the oxidation numbers of atoms of the ion must equal the charge on the ion
- 3) The oxidation number of oxygen in most of the compounds is -2  
In peroxides -1  
In superoxides  $-1/2$   
In  $O_2 F_2$  +1  
In  $OF_2$  +2
- 4) Oxidation number of hydrogen is +1 in most of its compounds (In metal hydrides -1)
- 5) Oxidation number of fluorine is always -1 in its compounds
- 6) Alkali metals have oxidation number +1 and alkaline earth metals have oxidation number +2 always in its compounds
- 7) The algebraic sum of the oxidation number of all the atoms in a compound must be zero.

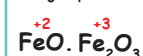


## POINTS TO REMEMBER

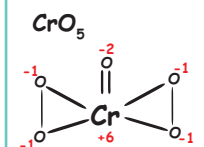
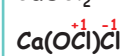
Carbon suboxide



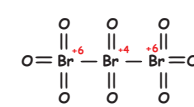
$Fe_3O_4$



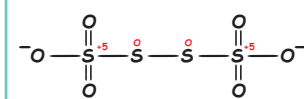
$CaOCl_2$



Tribromooctaoxide



Tetrathionate ion



**OXIDISING AGENT (OXIDANTS):**  
A reagent which can increase the oxidation number.

**REDUCING AGENT (REDUCTANTS):**  
A reagent which can decrease the oxidation number.

**OXIDATION:**  
Increase in the oxidation number

**REDUCTION:**  
Decrease in the oxidation number



**PHYSICS WALLAH**

**REDOX REACTIONS:**  
Reactions which involve change in oxidation number of the interacting species

## BALANCING OF REDOX REACTION

- 1) Identify oxidation and reduction
- 2) Make total increase and total decrease in O.N equal
- 3) Balance atoms except O & H
- 4)

ACIDIC	BASIC
Balance	Balance
- Oxygen with $H_2O$	- Charge with $OH^-$
- Hydrogen with $H^+$	- Oxygen with $H_2O$

## REDOX REACTION

### TYPES OF REDOX REACTIONS

#### COMBINATION REACTION

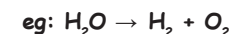
A redox reaction in the form  $A+B \rightarrow C$

Either A and B or both A and B must be in the elemental form for such a reaction to be a redox reaction.



#### DECOMPOSITION REACTION

Reaction leads to the breakdown of a compound into two or more components at least one of which must be in the elemental state.



#### DISPLACEMENT REACTION

An ion (or an atom) in a compound is replaced by an ion (or an atom) of another element.



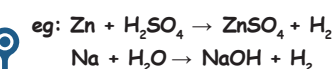
##### METAL DISPLACEMENT

A metal in a compound can be displaced by another metal in the uncombined state.



##### NON-METAL DISPLACEMENT

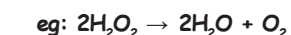
Non-metal in a compound can be displaced by a metal or a non-metal



#### DISPROPORTIONATION REACTIONS

In a disproportionation reaction an element in one oxidation state is simultaneously oxidised and reduced.

It always contains an element that can exist in at least three oxidation states.



##### Comproportionation reaction:

A reaction in which an element in a higher oxidation state reacts with the same element in a lower oxidation state to give the element in an intermediate oxidation state



Highest O.S— Undergoes Reduction—Oxidising agent  
Lowest O.S — Undergoes Oxidation—Reducing agent  
Intermediate O.S — Oxidation & Reduction  
—Oxidising Agent & Reducing Agent