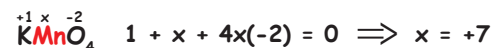


REDOX REACTIONS

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.



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

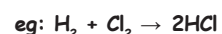
REDOX REACTION

TYPES OF REDOX REACTIONS

COMBINATION REACTION

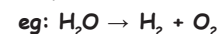
A redox reaction in the form
 $A + B \rightarrow C$

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



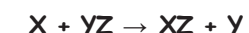
DECOMPOSITION REACTION

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



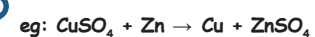
DISPLACEMENT REACTION

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



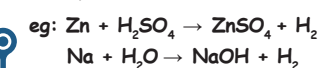
METAL DISPLACEMENT

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



NON-METAL DISPLACEMENT

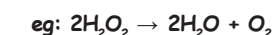
Non-metal in a compound can be displaced by a metal or a non-metal



DISPROPORTIONATION REACTIONS

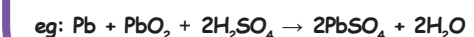
In a disproportionation reaction an element in one oxidation state is simultaneously oxidised and reduced.

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

POINTS TO REMEMBER

Carbon suboxide
 $O = \overset{+2}{C} = \overset{+2}{C} = O$

Fe_3O_4
 $FeO \cdot Fe_2O_3$
 $\overset{+2}{Fe}O \cdot \overset{+3}{Fe}_2O_3$

$CaOCl_2$
 $Ca(\overset{+1}{OCl})\overset{-1}{Cl}$

CrO_5
 $\begin{array}{c} \text{O} \\ \parallel \\ -O-Cr-O- \\ \parallel \quad \parallel \\ O \quad O \end{array}$
Oxidation state of Cr is +6

Tribromooctaoxide
 $O = \overset{+6}{Br} - \overset{+4}{Br} - \overset{+6}{Br} = O$

Tetrathionate ion
 $\begin{array}{c} O \\ \parallel \\ -O-S(=O)_2-S-S-S(=O)_2-O- \\ \parallel \\ O \end{array}$