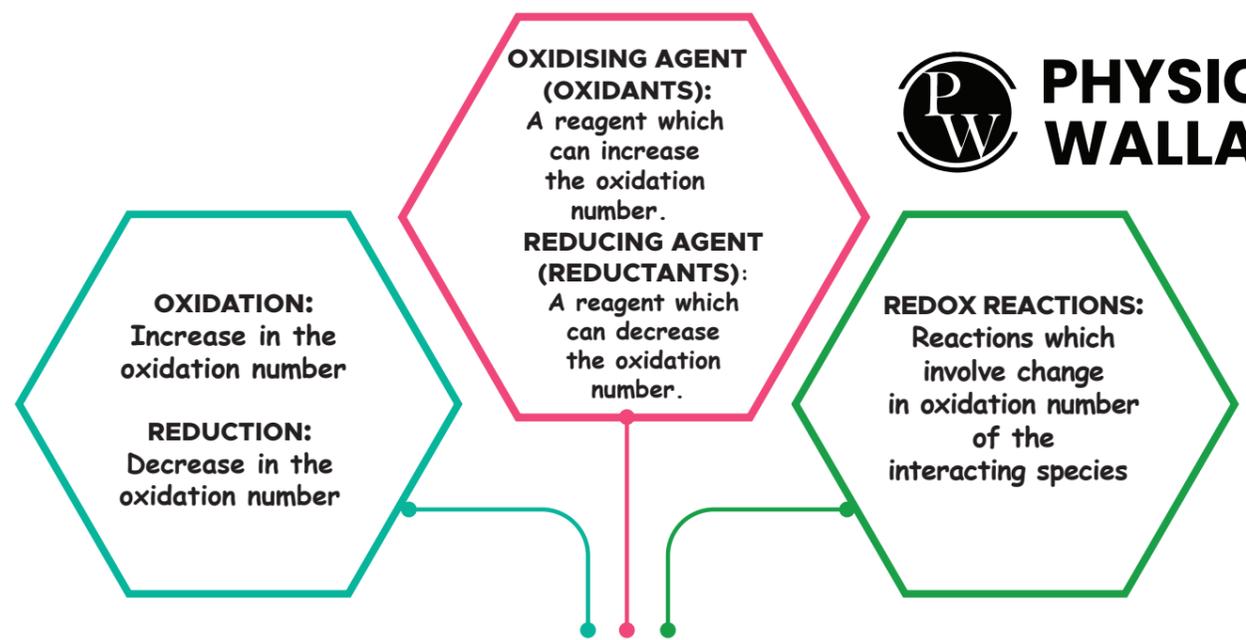
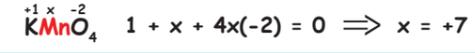


REDOX REACTIONS

OXIDATION NUMBER

RULES TO ASSIGN OXIDATION NUMBER

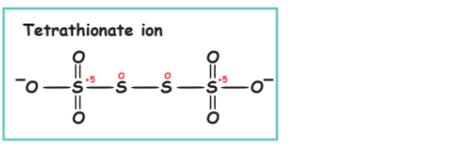
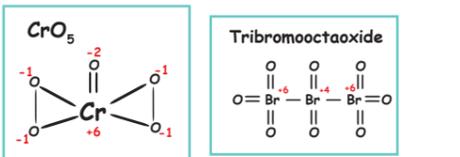
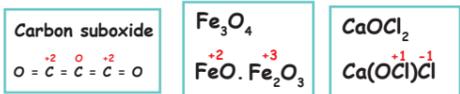
- 1) Oxidation number of an element in free elemental state or Uncombined state zero
- 2) In polyatomic ion, the algebraic sum of all the oxidation numbers of atoms of the ion must equal the charge on the ion
- 3) The oxidation number of oxygen in most of the compounds is -2
In peroxides -1
In superoxides -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.



REDOX REACTION

TYPES OF REDOX REACTIONS

POINTS TO REMEMBER



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.

eg: $H_2 + Cl_2 \rightarrow 2HCl$

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.

eg: $H_2O \rightarrow H_2 + O_2$

DISPLACEMENT REACTION

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

$X + YZ \rightarrow XZ + Y$

METAL DISPLACEMENT

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

eg: $CuSO_4 + Zn \rightarrow Cu + ZnSO_4$

NON-METAL DISPLACEMENT

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

eg: $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$
 $Na + H_2O \rightarrow NaOH + H_2$

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.

eg: $2H_2O_2 \rightarrow 2H_2O + O_2$

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

eg: $Pb + PbO_2 + 2H_2SO_4 \rightarrow 2PbSO_4 + 2H_2O$

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