Chapter- Chemical Reactions And Equations

* **Chemical Reaction :-**
Chemical reactions are the processes in which new substances with new properties are formed.

* **Chemical Equations:-**
The method of representing a chemical reaction with the help of symbols and formulae of the substances involved in it is known as a chemical equation.

* **Types of Chemical Reactions :-**

① **Combination Reactions :-** $(A + B \rightarrow AB)$
Those reactions in which two or more substances combine to form a single substance, are called combination Reactions.

Example:

① $2Mg + O_2 \xrightarrow{\text{combination}} 2MgO$ (Magnesium oxide)

② $2H_2 + O_2 \xrightarrow{\text{combination}} 2H_2O$ (water)

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② **Decomposition Reactions :-** $(AB \longrightarrow A + B)$
Those reactions in which a compound splits up into two or more simpler substances are known as Decomposition Reactions.

Example:

① By Heat :-
$CaCO_3 \xrightarrow{\text{Heat}} CaO + CO_2$
(Limestone) (calcium oxide) (carbon dioxide)

② By Current :-
$2NaCl \xrightarrow[\text{Current}]{\text{Electricity}} 2Na + Cl_2$
(sodium chloride) (sodium) (chlorine gas)

This process is known as Electrolysis.

③ By Light: (Sunlight) Sun

$$2AgCl \xrightarrow{Light} 2Ag + Cl_2$$

(Silver chloride) (Silver) (Chlorine gas)

③ Displacement Reactions :- ($A + BC \rightarrow AC + B$)

Those reactions in which one element takes the place of another element in a compound, are known as Displacement Reactions.

Example:

High Reactive

① $CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$

(Copper sulphate) (zinc) (zinc sulphate) (copper)

④ Double - Displacement Reactions :- ($AB + CD \longrightarrow AD + CB$)

Those reactions in which two compounds react by an exchange of ions to form two new compounds are called Double Displacement Reactions.

Example:

① $AgNO_3 + NaCl \longrightarrow AgCl + NaNO_3$

(silver nitrate) (sodium chloride) (Silver chloride) (sodium nitrate)

⑤ Oxidation And Reduction Reactions :-

Oxidation :-

① The addition of oxygen to a substance is called oxidation.
② The removal of hydrogen from a substance is also called oxidation.

Reduction :-

① The addition of hydrogen to a substance is called reduction.
② The removal of oxygen from a substance is called reduction.

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Redox :- (Reduction + Oxidation)

The oxidation and reduction reactions are also called Redox Reactions.

Example:

Removal of oxygen : Reduction

$$CuO + H_2 \xrightarrow{Heat} Cu + H_2O$$

Addition of oxygen : oxidation

* **Effects of Oxidation Reactions:-**

① **Corrosion:-** 2018

Corrosion is the process in which metals are eaten up gradually by the action of air, moisture or a chemical on their surfaces. Corrosion is caused mainly by the oxidation of metals by the oxygen of air. Rusting of iron metal is the most common form of corrosion.

Example:

$$\underset{\text{(Iron)}}{4Fe} + \underset{\text{(oxygen)}}{3O_2} + \underset{\text{(water)}}{2xH_2O} \longrightarrow \underset{\text{Hydrated iron (III) oxide (Rust)}}{2Fe_2O_3 \cdot xH_2O}$$

* Gold and silver metal never be corrode.

② **Rancidity:-**

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It can be prevented by the following ways:-

① Rancidity of food can be prevented by adding anti-oxidants to foods containing fats and oils.

② Rancidity can be prevented by packaging fat and oil containing foods in nitrogen gas.

③ Rancidity can be retarded by keeping food in a refrigerator.

④ Rancidity can be retarded by storing food in air-tight containers.

⑤ Rancidity can be retarded by storing foods away from light.

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Exothermic Reaction - The reaction in which heat is evolved (produce) is known as exothermic rxn.

$$C + O_2 \longrightarrow CO_2 + Heat$$

Endothermic Reaction - The reaction in which heat is absorbed is known as Endothermic rxn.

$$CaCO_3 \xrightarrow{Heat} CaO + CO_2$$

S → -2

Reactivity Series

Most reactive ←

K
Na
Ca
Mg
Al
C
Zn
Fe
Sn
Pb
H
Cu
Hg
Au
Pt → Least Reactive

Reactivity decreases