BHAGIRATHI BAL SHIKSHA SADAN SEC SCHOOL

CLASS- X

Sub — Science

Topic - Chemical Reactions and Equations (Chemistry)

1. **Chemical Reaction:—** The process in which two or more than two reactants give rise to one or more products of different chemical properties, is called chemical reaction. e.g - $2H_2 + O_2 \longrightarrow 2H_2O$.

Characteristics of a chemical reaction:— A chemical reaction is characterised with the help of any of the following observations :—

(a) Evolution of a gas.
(b) Change in temperature.
(c) formation of a precipitate.
(d) Change in colour.
(e) Change of state.

2. **Chemical Equation:—** A chemical equation is the symbolic representation of a chemical reaction in the form of symbols and formulae, wherein the reactants are given on the left hand side and the Products are given on right hand side. The first chemical equation was diagrammed by Jean Beguin in 1615. They are of two types :—

(i) **Balanced chemical Equation:—** A balanced chemical equation has an equal number of atoms of different elements in the reactant & and Products. e.g :- $N_2 + 3H_2 \longrightarrow 2NH_3$

(ii) Unbalanced chemical Equation:— An unbalanced chemical equation has an unequal number of atoms of one or more elements in the reactants and Products. e.g- $H_2 + Cl_2 \longrightarrow HCl$.

CHEMICAL-EQUATIONS

- **Writing**: Short-hand method to represent a chemical reaction
- **BALANCING**: Equal number of atoms of different elements in reactants and products

3. Balancing of a chemical Equation:— The process of equating the number of atoms of each element on both the sides of a chemical equation is called the "balancing of a chemical equation".

STEPWISE BALANCING (HIT and Trial)

STEP-1:- We write a chemical equation and draw boxes around each formula.

$$\boxed{Fe} + \boxed{H_2O} \longrightarrow \boxed{Fe_3O_4} + \boxed{H_2}$$

We donot change any thing inside the box.

STEP-2:- We count the number of atoms of each element of both the sides of chemical equation

Element		No. of atoms at reactant side	No. of atoms at Product side
1	Fe	1	3
2.	H	2	2
3.	O	1	4

STEP-3 :— We equalise the number of atoms of element which has maximum number by Putting in front of it.

$$Fe + 4H_2O \rightarrow Fe_3O_4 + H_2$$

STEP-4 :— We try to equalise all the atoms of elements on reactants and Products side by adding coefficient in front of it.

$$3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$$

Now we see that all the atoms of elements are equal on both sides.

STEP-5 :— We write the Physical states of reactants and products

$$3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$$

Solid state = (s)
Liquid state = (l)
Gaseous state = (g)
Aqueous state = (aq)

STEP-6 :— We also write necessary conditions of temperature, Pressure, Catalyst on arrow above or below.

Assignment to do

1. Note it down in your remaing Register of class IX neatly and lear it by heart.
2. Balance the following Chemical equations as given rules.

(i) $HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + H_2O$
(ii) $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$
(iii) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$
(iv) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + HCl$
(v) $CH_4 + O_2 \rightarrow CO_2 + H_2O$
(vi) $H_2S + Cl_2 \rightarrow HCl + S$