

Name of the student: *Date:*/...../.....

❖ **Chemical Equation:**

A **chemical equation** is the symbolic representation of a chemical reaction in the form of symbols and formulae, wherein the reactant entities are given on the left-hand side and the product entities on the right-hand side.

- The first chemical equation was diagrammed by **Jean Beguin** in 1615.
- An arrow (\rightarrow) or equals (=) sign is used between reactants and products.
- **Reactant** is a substance that takes part in and undergoes change during a reaction.
- **Product** is a substance that is the result of a chemical reaction or process.

1) represent the prior state of the reaction.

2) represent the resultant state of the reaction.

N.B: — Diatomic elements are pure elements that form molecules consisting of two atoms bonded together. There are **seven** diatomic elements.

Easy way to remember them—

Have = H_2

No = N_2

Fear = F_2

Of = O_2 [Here subscript 2 indicates their atoms number not valency]

Ice = I_2

Cold = Cl_2

Bear = Br_2

Q. Arrange the following entities to represent chemical equations:

1. $\text{H}_2, \text{O}_2, \text{H}_2\text{O}, \rightarrow$:

2. $\text{O}_2, \rightarrow, \text{C}, \text{CO}_2$:

3. $\text{Cl}_2, \rightarrow, \text{NaCl}, \text{Na}$:

4. $\text{Zn, ZnS} \longrightarrow \text{S}$:

5. $\text{H}_2, \text{H}_2\text{SO}_4, \text{Zn} \longrightarrow \text{ZnSO}_4$:

- The number of atoms before a chemical reaction must be equal to the number of atoms after chemical reaction.
- To balance the number of atoms of chemical reaction, the symbol or formulae must be multiplied by the required number and that number must be used before the symbol or formulae.

Q. Balance the following chemical equations:

1. $\text{H}_2 + \text{O}_2 \longrightarrow \text{H}_2\text{O}$:

2. $\text{Mn} + \text{O}_2 \longrightarrow \text{MnO}$:

3. $\text{Fe} + \text{O}_2 \longrightarrow \text{FeO}$:

4. $\text{Fe} + \text{O}_2 \longrightarrow \text{Fe}_2\text{O}_3$:

5. $\text{KClO}_3 \longrightarrow \text{KCl} + \text{O}_2$:

❖ Types of Chemical Reaction:

The basic types of chemical reactions are—

1. Addition or combination reaction: $\text{A} + \text{B} \longrightarrow \text{AB}$

2. Combustion reaction: $\text{A} + \text{O}_2 \longrightarrow \text{H}_2\text{O} + \text{CO}_2$

3. Decomposition reaction: $\text{AB} \longrightarrow \text{A} + \text{B}$

4. Substitution or displacement reaction: $\text{A} + \text{BC} \longrightarrow \text{AC} + \text{B}$

5. Double displacement reaction: $\text{XY} + \text{ZA} \longrightarrow \text{XZ} + \text{YA}$

6. Neutralization reaction: $\text{Acid} + \text{Base} \longrightarrow \text{Salt} + \text{Water}$

7. Precipitation reaction: $\text{A} + \text{Soluble salt B} \longrightarrow \text{Precipitate} + \text{soluble salt C}$

8. Redox reaction: $\text{X} \longrightarrow \text{X}^+ + \text{e}^-$; $\text{Y} + \text{e}^- \longrightarrow \text{Y}^-$; $\text{X} + \text{Y} \longrightarrow \text{XY}$

Q. Match Column-A with Column-B

Column-A	Column-B
a) Combination reaction	$\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
b) Combustion reaction	$\text{NaCl}(\text{aq}) + \text{AgNO}_3(\text{aq}) \rightarrow \text{AgCl}(\text{s})\downarrow + \text{NaNO}_3(\text{aq})$
c) Decomposition reaction	$\text{Na} + \text{Cl}_2 \rightarrow \text{NaCl}$
d) Displacement reaction	$\text{Fe} + \text{S} \rightarrow \text{FeS}$
e) Double displacement reaction	$\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
f) Neutralization reaction	$\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
g) Precipitation reaction	$\text{HBr} + \text{NaOH} \rightarrow \text{NaBr} + \text{H}_2\text{O}$
h) Redox reaction	$\text{C}_{10}\text{H}_8 + 12\text{O}_2 \rightarrow 10\text{CO}_2 + 4\text{H}_2\text{O}$