

## Points to Remember

### Balanced chemical equation

A balanced chemical equation is the simplified representation of a chemical reaction, which describes the chemical composition, physical state of the reactants and the products, and the reaction conditions.

### Classification based on the nature of rearrangement of atoms

#### Combination / synthesis / composition reaction

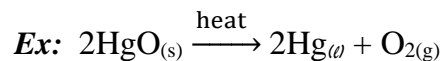
It is a reaction in which two or more reactants combine to form a compound.

1. Element + Element  $\rightarrow$  Compound **Ex:**  $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow 2\text{HCl}(\text{g})$
2. Compound + Element  $\rightarrow$  Compound **Ex:**  $\text{PCl}_3(\text{l}) + \text{Cl}_2(\text{g}) \rightarrow \text{PCl}_5(\text{s})$
3. Compound + Compound  $\rightarrow$  Compound. **Ex:**  $\text{SiO}_2(\text{s}) + \text{CaO}(\text{s}) \rightarrow \text{CaSiO}_3(\text{s})$

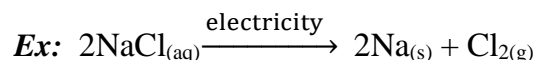
#### Decomposition reactions

It is the reaction in which a single compound splits into two or more simpler substances under suitable conditions.

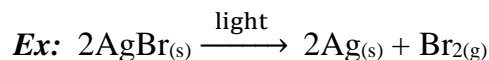
**Thermal decomposition / Thermolysis :** Reactant is decomposed by heat.



**Electrolytic decomposition :** Reactant is decomposed by electrical energy.

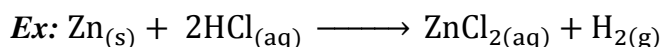


**Photo decomposition/photolysis :** Reactant is decomposed by light energy.



#### Single displacement Reactions

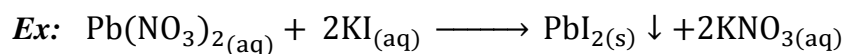
It is the reaction between an element and a compound, where one of the elements of the compound-reactant is replaced by the element-reactant to form a new compound and an element.



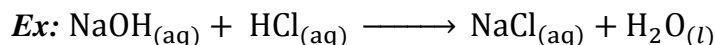
#### Double displacement reactions / Metathesis

Two compounds react by interchanging their ions.

**Precipitation reaction :** Aqueous solution of two compounds react to form an insoluble compound and a soluble compound.

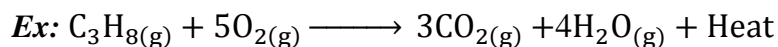


**Neutralisation reaction:** Acid react with the base to form a salt and water.



#### Combustion reaction

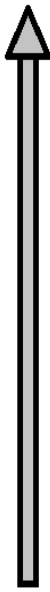
It is a reaction in which the reactant rapidly combines with oxygen to form one or more oxides and energy (heat).



### Classification based on the direction of the reaction

<b>Reversible reaction</b>	<p>It is a reaction in which the products can be converted back to the reactants.</p> <p style="text-align: center;"><i>Ex:</i> <math>\text{PCl}_5(g) \rightleftharpoons \text{PCl}_3(g) + \text{Cl}_2(g)</math></p> <p><i>Types :</i> 1) Forward reaction 2) Backward reaction</p>
<b>Irreversible reaction</b>	<p>The reaction that cannot be reversed is called irreversible reaction.</p> <p><i>i.e.</i> They take place only in the forward direction.</p> <p style="text-align: center;"><i>Ex :</i> <math>\text{C}_{(s)} + \text{O}_{2(g)} \longrightarrow \text{CO}_{2(g)} + \text{Heat}</math></p>
<b>Rate of a reaction</b>	<p>Rate of a reaction is the change in the amount or concentration of any one of the reactants or products per unit time.</p> <p><b>* Influencing factors:</b> Nature of the reactant, Concentration of the reactant, Temperature, Pressure, Catalyst, Surface area of the reactant.</p>
<b>Catalyst</b>	<p>A catalyst is a substance, which increases the reaction rate without being consumed in the reaction.</p>
<b>Ionic product of water</b>	<p>The product of the concentration of the hydronium ion and the hydroxyl ion is called '<i>ionic product of water</i>'. Its denoted as '<math>K_W</math>'. Its unit <math>\text{mol}^2\text{dm}^{-6}</math>.</p> <p style="text-align: center;"><math>K_W = [\text{H}_3\text{O}^+][\text{OH}^-]</math>(or) <math>K_W = [\text{H}^+][\text{OH}^-]</math></p>
<b>pH</b>	<p>pH is the negative logarithm of the hydrogen ion concentration. <math>\text{pH} = -\log_{10}[\text{H}^+]</math></p> <p style="text-align: center;"><math>\text{pH} &lt; 7 \Rightarrow \text{Acid}</math>    <math>\text{pH} &gt; 7 \Rightarrow \text{Base}</math>    <math>\text{pH} = 7 \Rightarrow \text{Neutral}</math></p>

### Activity series of some elements

<p>Potassium (K)</p> <p>Sodium (Na)</p> <p>Lithium (Li)</p> <p>Calcium (Ca)</p> <p>Magnesium (Mg)</p> <p>Aluminium (Al)</p> <p>Zinc (Zn)</p> <p>Iron (Fe)</p> <p>Lead (Pb)</p> <p>Hydrogen (H) non-metal</p> <p>Copper (Cu)</p> <p>Silver (Ag)</p> <p>Gold (Au)</p> <p>Platinum (Pt)</p>	 <p style="text-align: right; margin-top: 0;"><b>Most reactive</b></p> <p style="text-align: left; margin-bottom: 0;"><b>Least reactive</b></p>
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