

## 10<sup>th</sup> Chemical Reaction and Equation questions with solution 05

### 1. Q. Write the balanced equation for the following chemical reactions.

(i) Hydrogen + Chlorine  $\rightarrow$  Hydrogen Chloride

(ii) Barium chloride + Aluminum sulphate  $\rightarrow$  Barium sulphate + Aluminum chloride

(iii) Sodium + Water Sodium hydroxide + Hydrogen

Ans: (i)  $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow 2\text{HCl}(\text{g})$

(ii)  $3\text{BaCl}_2(\text{aq}) + \text{Al}_2(\text{SO}_4)_3(\text{aq}) \rightarrow 2\text{BaSO}_4(\text{s}) + 2\text{AlCl}_3(\text{aq})$

(iii)  $2\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$ .

### 2. Q. Write a balanced chemical equation with state symbols for the following reactions.

(I) Solutions of barium chloride and sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.

(ii) Sodium hydroxide solution (in water) reacts with hydrochloric acid solution (in water) to produce sodium chloride solution and water.

Answer:

(i)  $\text{BaCl}_2(\text{aq}) + \text{Na}_2\text{SO}_4(\text{aq}) \rightarrow \text{BaSO}_4(\text{s}) + 2\text{NaCl}(\text{aq})$

(ii)  $\text{NaOH}(\text{aq}) + \text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l})$

### 3. Q. What is combination reaction?

Answer: A reaction in which a single product is formed from two or more reactants is known as a combination reaction. For example:

$\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{Ca}(\text{OH})_2(\text{aq})$  ;

$\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$  ;

$2\text{H}_2(\text{g}) + \text{O}_2 \rightarrow \text{H}_2\text{O}(\text{l})$

### 4. Q. What happens when water is added to a small amount of calcium oxide (quick lime) in a beaker?

Answer: Calcium oxide reacts vigorously with water and produces slaked lime (calcium hydroxide) releasing a large amount of heat. Therefore the temperature of the beaker rises and it makes the beaker warm.

$\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{Ca}(\text{OH})_2(\text{aq}) + \text{Heat}$

### 5. Q. Why does a solution of slaked lime [Calcium hydroxide] is used for white washing walls.

Answer: Calcium hydroxide reacts slowly with the carbon dioxide in air to form a thin layer of calcium carbonate on the walls after two to three days of white washing and gives a shiny finish to the walls.

$\text{Ca}(\text{OH})_2(\text{aq}) + \text{CO}_2(\text{g}) \rightarrow \text{CaCO}_3(\text{s}) + \text{H}_2\text{O}(\text{l})$

### 6. Q. What does you mean by exothermic and endothermic reactions? Give examples?

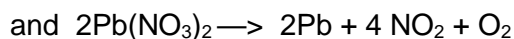
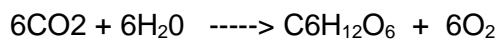
Answer: Reactions in which heat is released along with the formation of products are called exothermic chemical reactions.

Examples – Combustion reactions e.g.  $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{Heat}$

Thermite reactions e.g.  $2\text{Al} + \text{Fe}_2\text{O}_3 \rightarrow 2\text{Fe} + \text{Al}_2\text{O}_3 + \text{Heat}$

Remember that combinations are generally exothermic in nature. The decomposition of organic matters into compost is an example of exothermic reaction. Endothermic reactions: The reactions in which energy is absorbed are called endothermic reactions.

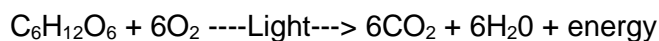
Examples



### 7. Q. Why respiration is called an exothermic process?

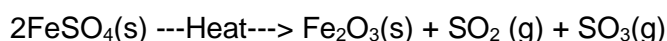
Ans: During respiration glucose combines with oxygen and release energy in our body. Since, Energy is released during the process of respiration; it is considered an exothermic reaction.

For example,



### 8. Q. What happen when crystals of ferrous sulphate heated over the flame of a burner or spirit lamp in a dry boiling tube?

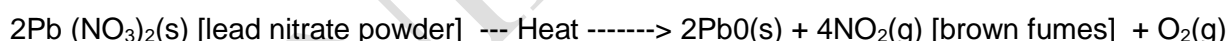
Ans: Ferrous sulphate, crystals ( $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ ) lose water on heating and the green colour of the crystals gets changed, Ferrous sulphate decomposes to ferric oxide, sulphur dioxide and sulphur trioxide.



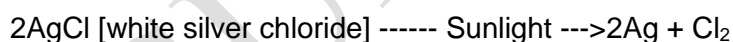
### 9.Q. What do you mean by a decomposition reaction?

Answer: A chemical reaction in which a single reactant breaks down to give simpler products. The decomposition reactions require energy either in the form of heat, light or electricity for breaking down the reactants. e.g.  $\text{CH}_4 \xrightarrow{\text{catalyst}} \text{C} + 2\text{H}_2(\text{g})$

Decomposition by heat or thermal energy: When a decomposition reaction is carried out by heating, it is called thermal decomposition reaction.



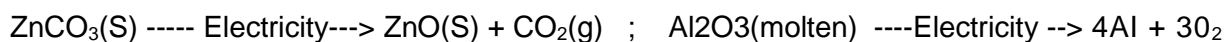
Decomposition by light or photolysis: When a decomposition reaction is carried out with sunlight, it is called photochemical decomposition reaction.



White silver chloride turns grey in sunlight due to the decomposition of silver chloride into silver and chlorine by light this is why this reaction is used in black and white photography Similarly,  $2\text{AgBr}(\text{s}) \xrightarrow{\text{Sunlight}} 2\text{Ag}(\text{s}) + \text{Br}_2(\text{g})$

Decomposition by electricity or electrolysis: When a decomposition reaction is carried out with electricity, it is called electrolysis reaction.  $2\text{H}_2\text{O} \xrightarrow{\text{Electricity}} 2\text{H}_2 + \text{O}_2$

Decomposition reaction use to extract metal from their ores [Metallurgic process]



**10. Q. What form of energy is causes decomposition reactions?**

Answer: The decomposition reactions require energy either in the form of heat, light or electricity.

**11. Q. Why is the amount of gas collected in one of the test tubes during electrolysis of water, double of the amount collected in the other? Name this gas.**

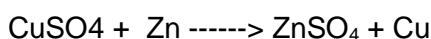
Ans: Water contains two parts of hydrogen and one part oxygen. Therefore, during the electrolysis of water the amount of hydrogen gas collected in one of the test tubes is double than that of the oxygen produced and collected in the other test tube.

**12. Q. What do you observe if you add ammonium chloride into barium hydroxide in a test tube?**

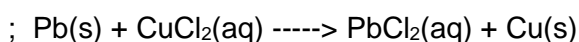
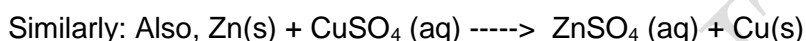
Answer: When you touch the bottom of the test tube with your palm you feel warmth. Hence, it is an exothermic or endothermic reaction.  $\text{Ba(OH)}_2 + 2\text{NH}_4\text{Cl} \rightarrow \text{BaCl}_2 + 2\text{NH}_4(\text{OH})$

**13.Q. What is the difference between the displacement and double displacement reactions? Write equations for these reactions.**

Answer: In displacement reaction, Less reactive element from its salt is displaced by a more reactive element like

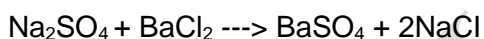


Here, Cu is displaced by Zn from CuSO<sub>4</sub> because Zn is more reactive.



Zinc and lead are more reactive elements than copper. They displace copper from its compounds

In double displacement reaction, exchange of ions takes place between two reactants to form new products,,



Here, the white precipitate of BaSO<sub>4</sub> is formed by the reaction of SO<sub>4</sub><sup>2-</sup> and Ba<sup>2+</sup>

**14. Q. In the refining of silver, the recovery of silver from silver nitrate solution involved displacement by copper metal. Write down the reaction involved.**

Ans: When copper is mixed in silver nitrate solution, it displaces the silver because copper is more reactive than silver.  $2\text{AgNO}_3 + \text{Cu} \rightarrow \text{Cu(NO}_3)_2 + 2\text{Ag}$

**15. Q. What do you mean by a precipitation reaction and Neutralization reaction? Explain by giving examples.**

Ans: The reactions in which a precipitate is formed are called precipitation reactions.

Examples:  $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$  [In this reaction, BaSO<sub>4</sub> is obtained as precipitate]



A substance which is insoluble in water is formed during precipitation reaction;

This insoluble substance formed is known as a precipitate Neutralization reaction: In this type of reaction an acid reacts with a base to form salt and water by exchange of ions,

