

CBSE Class 10 Science Chapter 1 Chemical Reactions and Equations (2 Mark Questions)

1. During the rusting of iron, which of the following statements is INCORRECT? (a) Iron loses electrons. (b) Oxygen gains electrons. (c) Iron oxide is formed. (d) The reaction is exothermic.

Answer:

The correct answer is: (b) Oxygen gains electrons.

Explanation:

During the rusting of iron, the process involves the reaction of iron with oxygen and water to form iron oxide (rust). The correct statements are:

(a) Iron loses electrons: This is correct. In the rusting process, iron undergoes oxidation, losing electrons.

(b) Oxygen gains electrons: This statement is incorrect. Oxygen does not gain electrons; instead, it accepts electrons in the reduction half-reaction.

(c) Iron oxide is formed: This is correct. The rust formed is essentially iron oxide, which is a compound of iron and oxygen.

(d) The reaction is exothermic: This is correct. The rusting of iron is an exothermic process, meaning it releases energy.

2. Balance the following chemical equation and state the type of reaction: $\text{CaCO}_3 + \text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$

Answer: $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ (Double displacement reaction). In this case, calcium carbonate (CaCO_3) reacts with hydrochloric acid (HCl) to produce calcium chloride (CaCl_2), carbon dioxide (CO_2), and water (H_2O).

3. What happens when zinc sulphate solution is added to barium chloride solution? Identify the precipitate formed and type of reaction.

Answer: White precipitate of barium sulphate forms. It is a double displacement reaction.

When zinc sulfate solution (ZnSO_4) is added to barium chloride solution (BaCl_2), a precipitation reaction occurs. The balanced chemical equation for the reaction is:



In this reaction, zinc sulfate reacts with barium chloride to produce zinc chloride (ZnCl_2) and barium sulfate (BaSO_4). The barium sulfate formed is insoluble in water.

and appears as a white precipitate. So, the precipitate formed is BaSO₄, and the type of reaction is a double displacement reaction with the formation of a precipitate.

4. Differentiate between combustion and decomposition reactions using examples from everyday life.

Answer:

Combustion	Decomposition
Combines with oxygen, releases heat and light.	Breaks down one compound into simpler substances, often requiring external energy.
e.g., burning wood	e.g., thermal decomposition of calcium carbonate

5. Write the chemical equation for the reaction between magnesium metal and dilute hydrochloric acid. Identify the gas evolved and its characteristic property.

Answer: $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ (Hydrogen gas; burns with a popping sound)

6. Explain the concept of coefficients in a balanced chemical equation.

Answer: Coefficients represent the number of molecules or atoms of each reactant and product involved in the reaction, ensuring the law of conservation of mass.

7. Distinguish between physical and chemical changes, providing two examples for each.

Answer:

Physical Change	Chemical Change
Change in state	Formation of new substance
E.g. ice melting, dissolving sugar in water.	E.g. burning paper, curdling of milk

8. Why are chemical reactions represented by equations? What information can be obtained from a balanced equation?

Answer: Equations use symbols to represent reactants, products, and their proportions, providing a concise and informative way to understand the reaction. We can determine relative amounts of reactants and products, type of reaction, and element/compound conservation.

9. Identify the oxidizing agent and reducing agent in the reaction: $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$

Answer: Oxidizing agent: The oxidizing agent is the substance that gets reduced by accepting electron. E.g. O₂ (gains electrons)

Reducing agent: The reducing agent is the substance that gets oxidized by losing electrons. E.g. Mg (loses electrons)

10. **Explain the role of a catalyst in a chemical reaction, using an example.**

Answer: A catalyst lowers the activation energy of a reaction, allowing it to proceed more quickly without being consumed in the process (e.g., platinum catalyst in car exhaust catalytic converters).