

1. Tick (✓) the best answer

a. In which medium do sodium chloride and silver nitrate react with each other?

→ iv. **Aqueous solution** ✓

b. What kind of reaction occurs between sodium chloride and silver nitrate solutions?

→ iii. **Displacement** (double displacement actually) ✓

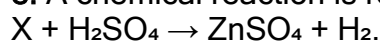
c. When sodium metal is dropped into chlorine gas, common salt is formed. Which equation represents this?

→ iii. **$2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$** ✓

d. Which of the following is an example of decomposition reaction?

→ i. **$\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$** ✓

e. A chemical reaction is represented as:



X = ?

→ ii. **Zn** ✓

2. Answer these questions in one sentence

a. A piece of iron left in open area turns brown after some days. What kind of change is this?

→ It is a **chemical change** called **rusting of iron**.

b. What is neutralization reaction?

→ A reaction between an **acid and a base** to form **salt and water** is called neutralization reaction.

c. What kind of chemical reaction is affected by pressure?

→ **Gaseous reactions** are affected by pressure.

d. Give an example of synthesis reaction.



e. Give an example of a negative catalyst.

→ **Glycerine** acts as a negative catalyst in the decomposition of hydrogen peroxide.

f. An equation is given: $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$. What kind of chemical reaction is it? Why?

→ It is a **decomposition reaction** because a single compound (KClO_3) breaks down into simpler substances (KCl and O_2).

g. Define single displacement reaction.

→ A reaction in which a **more reactive element displaces a less reactive element** from its compound is called a single displacement reaction.

h. Write an example of double displacement reaction.

→ $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{NaNO}_3 + \text{AgCl} \downarrow$.

3. Give reasons

a. The rate of reaction becomes faster if a bulk solid is finely powdered.

→ Because **powdering increases the surface area**, so more particles are exposed to react at the same time, which increases reaction rate.

b. Acid-base reaction is called neutralization reaction.

→ Because in this reaction, **the effect of acid and base is neutralized**, producing **salt and water**.

c. **Heating increases the rate of chemical reaction**

→ Heating increases the **kinetic energy** of the particles, causing them to move faster. This leads to **more frequent and more energetic collisions**, so more particles can overcome the **activation energy**, increasing the reaction rate.

d. **Hydrogen peroxide is not stored in a transparent bottle**

→ Hydrogen peroxide **decomposes on exposure to light** into water and oxygen. A transparent bottle allows light to pass through, so it is stored in a **dark or opaque bottle** to prevent decomposition.

Write down difference between:

Acid and base

Acid	Base
An acid tastes sour.	A base tastes bitter or slippery.
An acid has a pH less than 7.	A base has a pH greater than 7.
An acid turns blue litmus paper red.	A base turns red litmus paper blue.
An acid produces H^+ ions in water.	A base produces OH^- ions in water.
An example of an acid is hydrochloric acid (HCl).	An example of a base is sodium hydroxide (NaOH).

Combination and decomposition reaction

Combination (Synthesis)

In a combination reaction, two or more substances combine to form a single product.

An example of a combination reaction is $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$.

Decomposition

In a decomposition reaction, one compound breaks down into two or more simpler substances.

An example of a decomposition reaction is $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$.

Single and double displacement reaction

Single Displacement

In a single displacement reaction, one element displaces another element from its compound.

An example of a single displacement reaction is $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$.

Double Displacement

In a double displacement reaction, two ions exchange their partners between two compounds.

An example of a double displacement reaction is $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl}\downarrow + \text{NaNO}_3$.

a. Define skeleton and balanced chemical equations with examples

Skeleton equation: A chemical equation showing reactants and products with their formulas but not balanced.

Example: $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$

Balanced equation: A chemical equation with coefficients added so that the number of atoms of each element is the same on both sides.

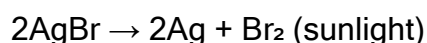
Example: $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

b. Why is it necessary to balance a chemical reaction?

To obey the **Law of Conservation of Mass** – the number of atoms of each element must be the same on both sides of the equation.

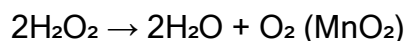
c. Example of a decomposition reaction caused by light:

Photodecomposition of silver bromide:

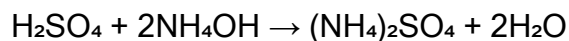


d. Example of a decomposition reaction enhanced by a catalyst:

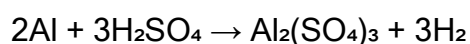
Decomposition of hydrogen peroxide using MnO_2 as catalyst:



e. Balanced chemical equation of sulphuric acid reacting with ammonium hydroxide:



f. Balanced reaction between aluminium and dilute sulphuric acid & type:



Type: Single displacement reaction, because aluminium displaces hydrogen from sulphuric acid.

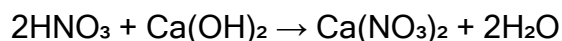
g. How does heat enhance reaction rate?

Heating increases the **kinetic energy** of particles, causing more frequent and energetic collisions, so more particles can overcome the **activation energy**, increasing the reaction rate.

h. Convert word equation to balanced formula:

Word: Nitric acid + calcium hydroxide \rightarrow calcium nitrate + water

Balanced formula:



i. Two ways to increase the rate of a slow reaction:

Increase the **temperature**.

Increase **concentration** (or surface area for solids) or use a **catalyst**.

j. Two characteristics of a catalyst:

Increases the reaction rate without being consumed.

Lowers the activation energy and remains chemically unchanged at the end.

k. Balanced equation using a positive catalyst:

Decomposition of potassium chlorate with MnO_2 :



l. Define positive catalyst with example:

A **positive catalyst** is a substance that **increases the rate of a reaction**.

Example: MnO_2 in decomposition of H_2O_2 : $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$ (MnO_2)

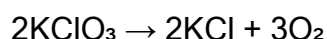
m. What happens when lead nitrate is heated?

Lead nitrate decomposes into lead oxide, nitrogen dioxide, and oxygen:

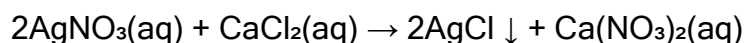


6. What happens when... (with balanced equations)

a. Potassium chlorate is heated:

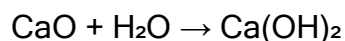


b. Silver nitrate solution + calcium chloride solution:



(AgCl is a white precipitate)

c. Calcium oxide reacts with water:

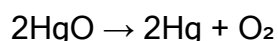


(Slaking of lime)

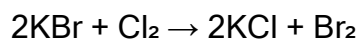
d. Iron reacts with oxygen:



e. Mercuric oxide is heated:

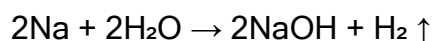


f. Potassium bromide + chlorine gas:



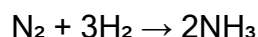
(Chlorine displaces bromine)

g. Sodium metal + water:

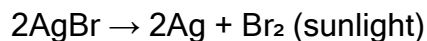


(Vigorous reaction; hydrogen may ignite)

h. Nitrogen + hydrogen (Haber process):

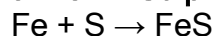


i. Silver bromide exposed to sunlight:



Write down the balanced chemical equations for the following reaction.

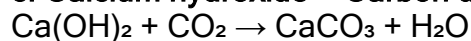
a. Iron + Sulphur \rightarrow Iron sulphide



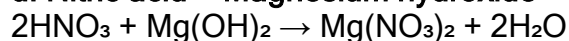
b. Copper carbonate \rightarrow Copper oxide + Carbon dioxide



c. Calcium hydroxide + Carbon dioxide \rightarrow Calcium carbonate + Water



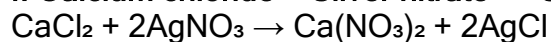
d. Nitric acid + Magnesium hydroxide \rightarrow Magnesium nitrate + Water



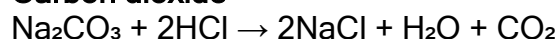
e. Calcium bicarbonate \rightarrow Calcium carbonate + Water + Carbon dioxide



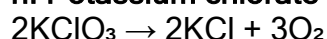
f. Calcium chloride + Silver nitrate \rightarrow Calcium nitrate + Silver chloride



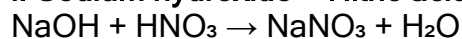
g. Sodium carbonate + Hydrochloric acid \rightarrow Sodium chloride + Water + Carbon dioxide



h. Potassium chlorate \rightarrow Potassium chloride + Oxygen



i. Sodium hydroxide + Nitric acid \rightarrow Sodium nitrate + Water



j. Lead nitrate + Potassium iodide \rightarrow Potassium nitrate + Lead iodide

