

Q1 Why should a magnesium ribbon be cleaned before burning in air?

Q2 Give an example of a double displacement reaction other than the one given in activity 8.

Q3. Which of the statements about the reaction below are incorrect?



- | | |
|---------------------------------|---|
| (a) Lead is getting reduced. | (b) Carbon dioxide is getting oxidised. |
| (c) Carbon is getting oxidised. | (d) Lead oxide is getting reduced. |
| (i) (a) and (b) | (ii) (a) and (c) |
| (iii) (a), (b) and (c) | (iv) All |

Q4. $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

The above reaction is an example of a

- | | |
|-----------------------------|----------------------------------|
| (a) combination reaction | (b) double displacement reaction |
| (c) decomposition reaction. | (d) displacement reaction |

Q5. What happens when dilute hydrochloric acid is added to iron fillings? Tick the correct answer.

- | | |
|---|--|
| (a) Hydrogen gas and iron chloride are produced | (b) Chlorine gas and iron hydroxide are produced |
| (c) No reaction takes place. | (d) Iron salt and water are produced. |

Q6. In the refining of silver, the recovery of silver from silver nitrate solution involves displacement by copper metal. Write down the reaction involved.

Q7 Why do we apply paint on iron articles?

Q8. Balance the following chemical equations:

- | | |
|-----|--|
| (a) | $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl} + \text{NaNO}_3$ |
| (b) | $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + \text{HCl}$ |

Q9. Write the balanced chemical equations for the following reactions:

- | | |
|-----|---|
| (a) | Aluminium + Copper chloride $\longrightarrow$ Aluminium chloride + Copper |
| (b) | Barium chloride + potassium sulphate $\longrightarrow$ Barium sulphate + Potassium chloride |

Q10. Write the balanced chemical equation for the following and identify the type of reaction in each case:

- | | |
|-----|--|
| (a) | Potassium bromide (aq) + Barium iodide (aq) $\longrightarrow$ Potassium iodide (aq) + Barium bromide (s) |
| (b) | Zinc carbonate (s) $\longrightarrow$ Zinc oxide (s) + Carbon dioxide (g) |

Q11. Write the balanced chemical equation for the following and identify the type of reaction in each case:

- | | |
|-----|---|
| (a) | Hydrogen (g) + Chlorine (g) $\longrightarrow$ Hydrogen chloride (g) |
| (b) | Magnesium (s) + Hydrochloric acid (aq) $\longrightarrow$ Magnesium chloride (aq) + Hydrogen (g) |

Q12. A solution of a substance 'X' is used for white washing:

- | | |
|------|--|
| (i) | Name the substance 'X' and write its formula. |
| (ii) | Write the reaction of the substance 'X' named in (i) above with water. |

Q13. Why does the colour of copper sulphate solution change when an iron nail is dipped in it?

Q14. What does one mean by exothermic and endothermic reactions? Give examples.

Q15. Why is respiration considered an exothermic reaction? Explain.

Q16. Write the balanced chemical equations for the following reactions:

- (a) Calcium hydroxide + Carbon dioxide $\longrightarrow$ Calcium carbonate + Water
(b) Zinc + Silver nitrate $\longrightarrow$ Zinc nitrate + Silver

Q17. What do you mean by a precipitation reaction? Explain by giving examples.

Q18. A shiny brown coloured element 'X' on heating in air becomes black in colour. Name the element 'X' and the black coloured compound formed.

Q19. Identify the substances that are oxidised and the substances that are reduced in the following reactions:

- (i) $4\text{Na (s)} + \text{O}_2\text{(g)} \longrightarrow 2\text{Na}_2\text{O (s)}$ (ii) $\text{CuO (s)} + \text{H}_2\text{(g)} \longrightarrow \text{Cu (s)} + \text{H}_2\text{O (s)}$

Q20. Explain the following terms with one example each: (a) Corrosion, (b) Rancidity.

Q21. Why are decomposition reactions called the opposite of combination reactions? Write equations for these reactions.

Q22. Write a balanced chemical equation with state symbols for the following reactions:

- (i) Solution 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.

Q23. Translate the following statements into chemical equations and then balance them:

- (a) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.
(b) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.

Q24. Balance the following chemical equations:

- (a) $\text{HNO}_3 + \text{Ca(OH)}_2 \longrightarrow \text{Ca(NO}_3)_2 + \text{H}_2\text{O}$
(b) $\text{NaOH} + \text{H}_2\text{SO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$

Q25. What is a balanced chemical equation? Why should chemical equations be balanced?

Q26. Translate the following statements into chemical equations and then balance them:

- (a) Hydrogen gas combines with nitrogen to form ammonia.
(b) Hydrogen sulphide a gas burns in air to give water and sulphur dioxide.

Q27. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity.

Q28. What is the difference between displacement and double displacement reactions? Write equations for these reactions.

Q29. Write the balanced equation for the following chemical reactions:

- (i) Hydrogen + Chlorine $\longrightarrow$ Hydrogen chloride
(ii) Barium chloride + Aluminium sulphate $\longrightarrow$ Barium sulphate + Aluminium chloride
(iii) Sodium + Water $\longrightarrow$ Sodium hydroxide + Hydrogen.

Q30. Why is the amount of gas collected in one of the test tubes in Activity 5 double of the amount collected in the other? Name this gas.

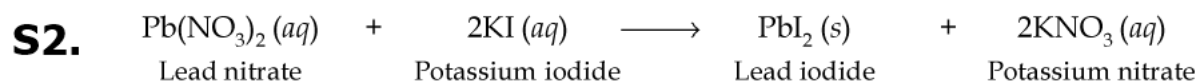
Q31. Explain the following in terms of gain or loss of oxygen with two examples each:

(a) Oxidation

(b) Reduction

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S1. This is done to remove the layers of magnesium oxide and magnesium carbonate from the surface of magnesium ribbon. These layers are formed as a result of reaction with atmospheric oxygen and carbon dioxide. Magnesium ribbon is cleaned by rubbing with sand-paper after which magnesium ribbon burns smoothly.

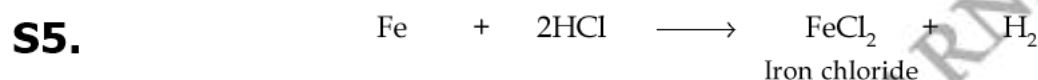


When we mix aqueous solutions of lead nitrate, $\text{Pb}(\text{NO}_3)_2$ and potassium iodide, KI we obtain a precipitate of lead iodide and a solution of potassium nitrate. In this reaction, the cations, Pb^{2+} and K^+ exchange their anions, NO_3^- and I^- to give the new substances PbI_2 and KNO_3 .

- S3.** (a) Lead is getting reduced is incorrect answer.
(b) Carbon dioxide is getting oxidised is incorrect answer.
(c) Carbon is getting oxidised is correct answer.
(d) Lead oxide is getting reduced is correct answer

As statement (a) and (b) are incorrect, answer (i) is correct.

S4. This is an example of displacement reaction because Fe in Fe_2O_3 has been displaced by Al. Thus, the correct answer is (d).

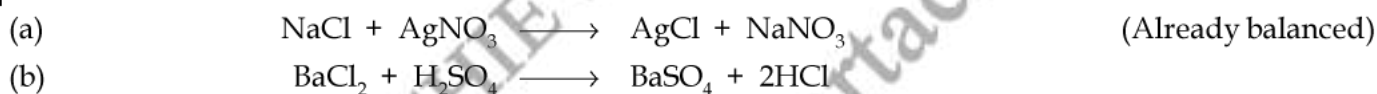


Thus, answer (a) is correct.

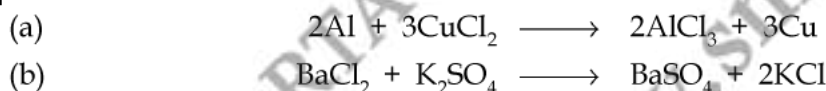


S7. We apply paint on iron articles to prevent rusting (corrosion). Iron articles do not come into contact with atmospheric oxygen and moisture and thus rusting is prevented.

S8. Balanced chemical equations are given as under:



S9. Balanced chemical equations for the reactions are given as under:

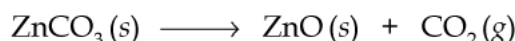


S10. (a) **Balanced equation:**



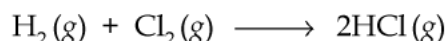
This is an example of **double displacement reaction** because the cations K^+ and Ba^{2+} have exchanged their anions, Br^- and I^- .

(b) **Balanced equation:**



This is an example of **decomposition reaction**.

S11.(a) **Balanced equation:**



This is an example of **Combination reaction**.

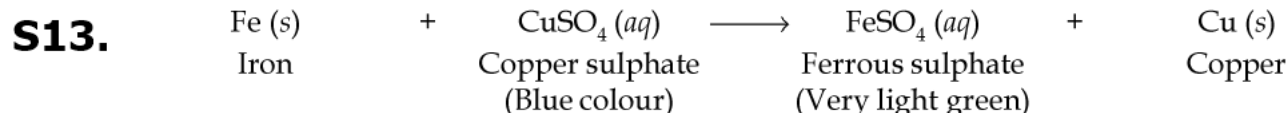
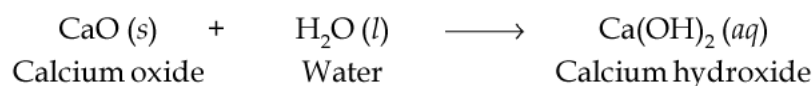
(b) **Balanced equation:**



This is an example of **displacement reaction** because H in HCl has been displaced by Mg.

S12.(i) Substance 'X' used for white washing is calcium oxide (or quick lime). Its formula is CaO.

(ii) Calcium oxide reacts with water as under:



S14. A reaction in which energy is released in the form of heat or light is called exothermic reaction.

Examples of exothermic reactions are:

(i) Burning of methane gas



(ii) Reaction of Al with ferric oxide



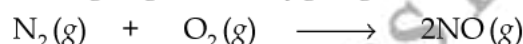
A reaction in which energy is absorbed from the surroundings and cooling is produced is called endothermic reaction.

Examples of endothermic reactions are:

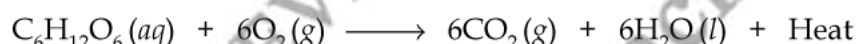
(i) Decomposition of lime



(ii) Combination of nitrogen gas and oxygen gas

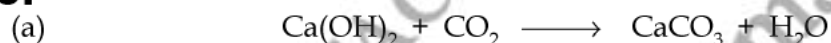


S15. During respiration, we inhale oxygen from the atmosphere which reacts with glucose in our body to produce carbon dioxide and water



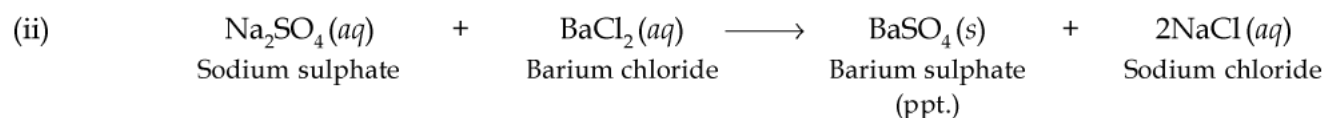
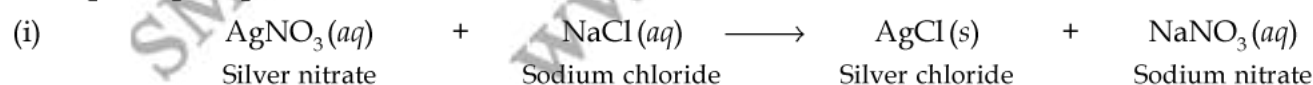
Heat is liberated in this process, hence respiration is considered an exothermic reaction.

S16. Balanced chemical equations for the reactions are given as under:

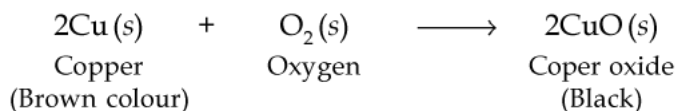


S17. A chemical reaction in which a precipitate (insoluble substances) is formed is called a precipitation reaction.

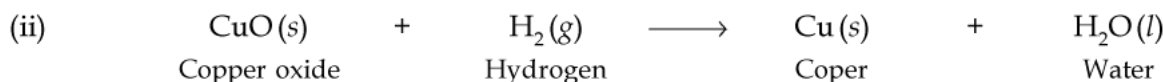
Example of precipitation reactions:



S18. The brown coloured element 'X' is copper. On heating in air it forms copper oxide which is black in colour.



In this reaction, sodium is oxidised because it combines with oxygen to form sodium oxide. Oxygen is reduced because it is converted into sodium oxide.



In this reaction, CuO is reduced because it loses oxygen. H₂ is oxidised because it combines with the oxygen of CuO to form water.

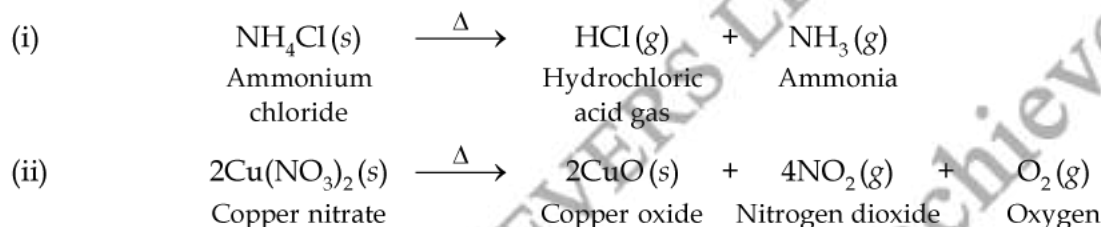
S20(a) Corrosion: Metals are attacked by atmospheric oxygen, carbon dioxide and moisture and are converted into metal oxides and carbonates. This phenomenon is called corrosion. In the case of iron, corrosion is called rusting.

Green coating on copper and black coating on silver are examples of corrosion. Corrosion reduces the strength of the metal. Thus, it causes damage to car bodies, bridges, railings, ships, etc. Corrosion can be prevented by applying paints on metal articles.

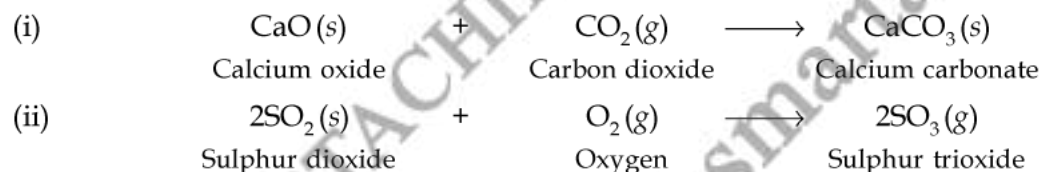
(b) **Rancidity:** Oil and fat containing articles when kept for some time in the open, start giving bad smell and taste. We say that these articles have gone rancid. This phenomenon of reaction of atmospheric oxygen with oils and fats is called rancidity. Rancidity can be prevented by flushing oil and fat containing articles with nitrogen. As a simple measure, oils and fats, and foods containing oils and fats are kept in airtight containers.

S21. In a decomposition reaction, a single substance breaks down into two or more substances while in a combination reaction, two or more substances react to produce one substance. Therefore, decomposition reactions are called the opposite of combination reactions.

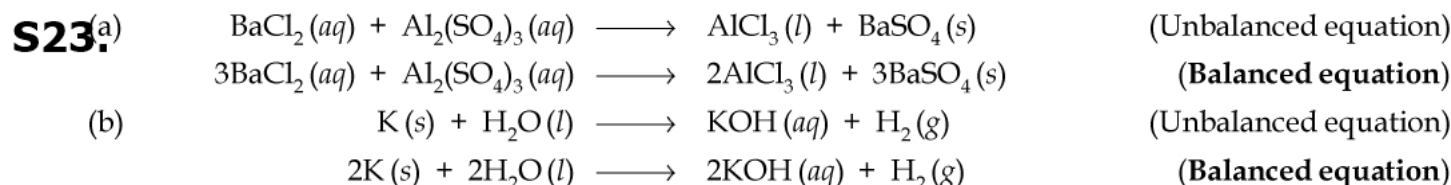
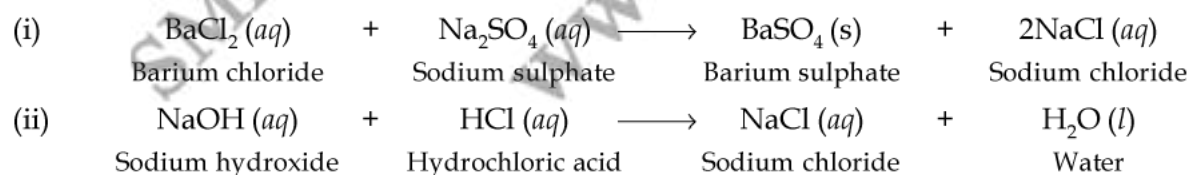
Example of decomposition reactions:



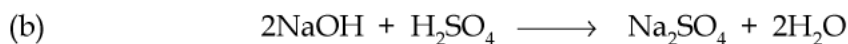
Example of combination reactions:



S22. Balanced equations in symbols and formulae with state symbols for the above reactions are given as under:



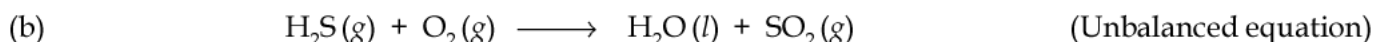
S24. Balanced chemical equations are given as under:



S25. An equation in which the number of atoms of each element are equal on the reactant side and product side is called balanced equation. For example,



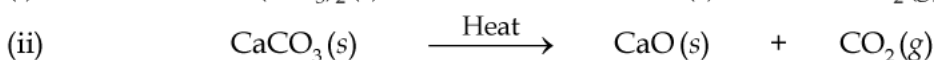
Chemical equations should be balanced because only a balanced equation tells us the relative quantities of different reactants and products involved in the reaction.



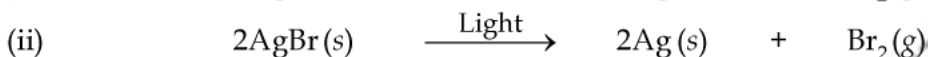
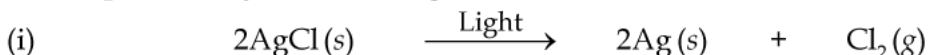
(from air)



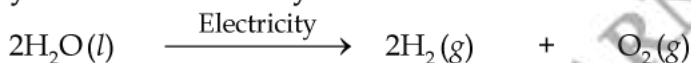
S27. Decomposition by the use of heat:



Decomposition by the use of light:



Decomposition by the use of electricity:



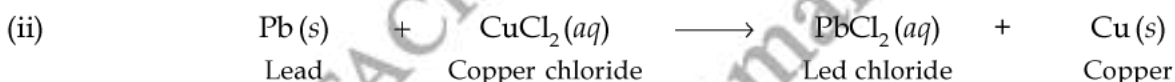
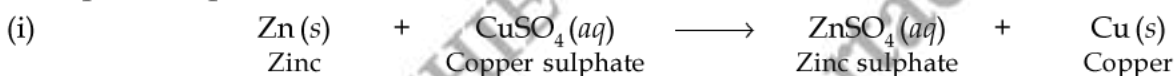
S28. In displacement reaction, displacement of one element by another element takes place. A general displacement may be written as:



In double displacement reactions, exchange of ions takes place. A general double displacement reaction may be represented as:

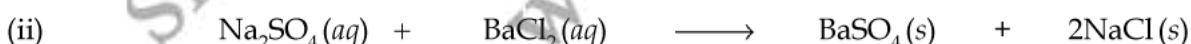
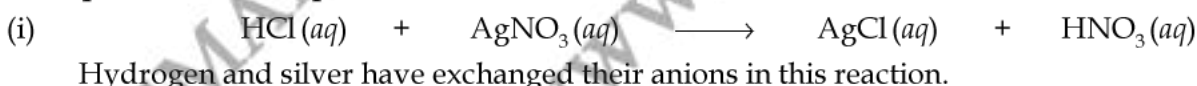


Example of displacement reactions:



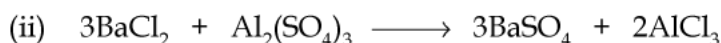
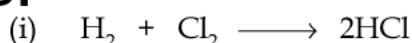
Lead has displaced copper in this reaction.

Example of double displacement reactions:



Sodium and barium have exchanged their anions in this reaction.

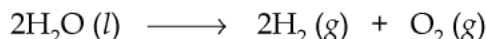
S29. Balanced equation in the symbolic form are given as under:



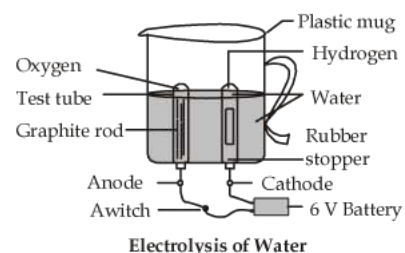
S30. In Activity 5, **electrolysis of water** is carried out. Electric current is passed through water acidulated with sulphuric acid.

The gas collected over the cathode is hydrogen and the gas collected over anode is oxygen. The volume of gas collected over cathode *i.e.*, H₂ gas is double the volume of gas collected over anode *i.e.*, O₂ gas.

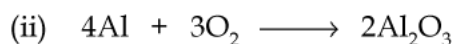
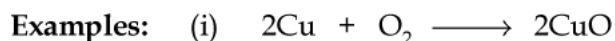
This can be explained with the help of the chemical reaction that takes place.



Volume of the gas is proportional to the number of molecules of the gas as indicated in the balanced equation. There are two molecules of hydrogen and one molecule of oxygen in the balanced equation. Hence, hydrogen collected has twice the volume of oxygen collected.



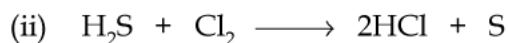
S31(a) **Oxidation:** Addition of oxygen or removal of hydrogen in a reaction is called **oxidation**.



(b) **Reduction:** Addition of hydrogen or removal of oxygen in a reaction is called reduction.



Oxygen has been removed from CuO in the above reaction.



Hydrogen has been added to Cl₂ in the above reaction.