

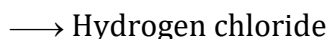
NCERT QUESTIONS WITH SOLUTIONS

1. Why should a magnesium ribbon be cleaned before it is burnt in air?

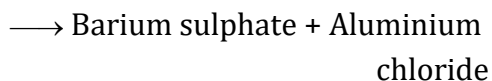
Ans. Magnesium is an extremely reactive metal. When stored, it reacts with oxygen to form a layer of magnesium oxide on its surface. This layer of magnesium oxide is quite stable and prevents further reaction of magnesium with oxygen. The magnesium ribbon is cleaned by sand paper for removing this layer so that the underlying metal can be exposed to air.

2. Write the balanced equation for the following chemical reactions.

(i) Hydrogen + Chlorine



(ii) Barium chloride + Aluminium sulphate



(iii) Sodium + Water $\longrightarrow$ Sodium hydroxide + Hydrogen

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

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

(iii) $2\text{Na}(\text{s}) + 2\text{H}_2\text{O}(\ell) \longrightarrow 2\text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$

3. 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.

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

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

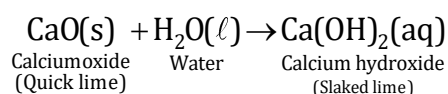
4. A solution of a substance 'X' is used for white washing.

(i) Name the substance 'X' and write its formula.

(ii) Write the reaction of the substance 'X' with water.

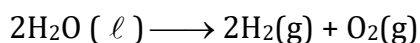
Ans. (i) The substance 'X' is calcium oxide. Its chemical formula is CaO. (Also known as quick lime)

(ii) Calcium oxide reacts vigorously with water to form calcium hydroxide (slaked lime).



5. Why is the amount of gas collected in one of the test tubes in active chemistry 7 double of the amount collected in the other? Name this gas.

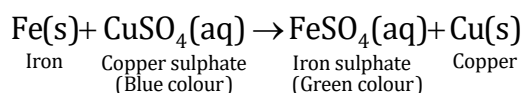
Ans. Water (H_2O) contains two parts of hydrogen and one part of oxygen. Therefore, the amount of hydrogen and oxygen produced during electrolysis of water is in a ratio of 2 : 1. During electrolysis, since hydrogen goes to one test tube and oxygen goes to another, the amount of gas collected in one of the test tubes is double of the amount collected in the other.



The amount of hydrogen gas collected would be double than that of oxygen gas.

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

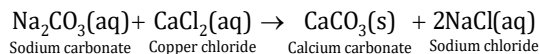
Ans. When an iron nail is placed in a copper sulphate solution, iron displaces copper from copper sulphate solution forming iron sulphate, which is green in colour.



Therefore, the blue colour of copper sulphate solution fades and green colour appears.

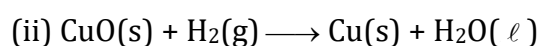
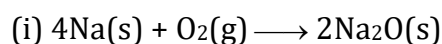
7. Give an example of a double displacement reaction other than the one given in Active chemistry 11.

Ans. Sodium carbonate reacts with calcium chloride to form calcium carbonate and sodium chloride.



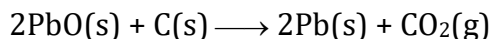
In this reaction, sodium carbonate and calcium chloride exchange their ions mutually to form two new compounds. Hence, it is a double displacement reaction.

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



Ans. (i) Sodium (Na) is oxidised as it gains oxygen and oxygen gets reduced.
 (ii) Copper oxide (CuO) is reduced to copper (Cu) while hydrogen (H₂) gets oxidised to water (H₂O).

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



- (1) Lead is getting reduced.
 (2) Carbon dioxide is getting oxidised.
 (3) Carbon is getting oxidised.
 (4) Lead oxide is getting reduced.
 (a) (1) and (2) (b) (1) and (3)
 (c) (1), (2) and (3) (d) All of these

Ans. (a) (1) and (2)

Carbon is getting oxidised into CO₂, while PbO is getting reduced into Pb.



The above reaction is an example of a

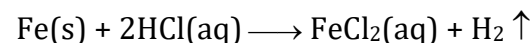
- (a) combination reaction.
 (b) double displacement reaction.
 (c) decomposition reaction.
 (d) displacement reaction.

Ans. (d) The given reaction is an example of a displacement reaction.

11. What happens when dilute hydrochloric acid is added to iron filings? 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.

Ans. (a) Hydrogen gas and iron chloride are produced. The reaction is as follows:



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

Ans. A reaction which has an equal number of atoms of each element on both sides of the chemical equation is called a balanced chemical equation.

The law of conservation of mass states that mass can neither be created nor be destroyed. Hence, in a chemical reaction, the total mass of reactants should be equal to the total mass of the products. It means that the total number of atoms of each element should be equal on both sides of a chemical equation. Hence, it is for this reason that chemical equations should be balanced.

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

(a) Hydrogen gas combines with nitrogen to form ammonia.

(b) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.

(c) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.

(d) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.

Ans. (a) $3\text{H}_2(\text{g}) + \text{N}_2(\text{g}) \longrightarrow 2\text{NH}_3(\text{g})$

(b) $2\text{H}_2\text{S}(\text{g}) + 3\text{O}_2(\text{g}) \longrightarrow 2\text{H}_2\text{O}(\ell) + 2\text{SO}_2(\text{g})$

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

(d) $2\text{K}(\text{s}) + 2\text{H}_2\text{O}(\ell) \longrightarrow 2\text{KOH}(\text{aq}) + \text{H}_2(\text{g})$

14. Balance the following chemical equations.

(a) $\text{HNO}_3 + \text{Ca}(\text{OH})_2 \longrightarrow \text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O}$

(b) $\text{NaOH} + \text{H}_2\text{SO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$

(c) $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl} + \text{NaNO}_3$

(d) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + \text{HCl}$

Ans. (a) $2\text{HNO}_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Ca}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$

(b) $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

(c) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$

(d) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$

15. 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

(c) Aluminium + Copper chloride
 $\longrightarrow$ Aluminium chloride + Copper

(d) Barium chloride + Potassium sulphate
 $\longrightarrow$ Barium sulphate + Potassium chloride

Ans. (a) $\text{Ca}(\text{OH})_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$

(b) $\text{Zn} + 2\text{AgNO}_3 \longrightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}$

(c) $2\text{Al} + 3\text{CuCl}_2 \longrightarrow 2\text{AlCl}_3 + 3\text{Cu}$

(d) $\text{BaCl}_2 + \text{K}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{KCl}$

16. 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)

(c) Hydrogen(g) + Chlorine(g) $\longrightarrow$ Hydrogen chloride(g)

(d) Magnesium(s) + Hydrochloric acid(aq) $\longrightarrow$ Magnesium chloride(aq) + Hydrogen(g)

Ans. (a) $2\text{KBr(aq)} + \text{BaI}_2\text{(aq)} \longrightarrow 2\text{KI(aq)} + \text{BaBr}_2\text{(s)}$; Double displacement reaction

(b) $\text{ZnCO}_3\text{(s)} \longrightarrow \text{ZnO(s)} + \text{CO}_2\text{(g)}$; Decomposition reaction

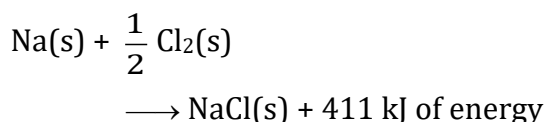
(c) $\text{H}_2\text{(g)} + \text{Cl}_2\text{(g)} \longrightarrow 2\text{HCl(g)}$; Combination reaction

(d) $\text{Mg(s)} + 2\text{HCl(aq)} \longrightarrow \text{MgCl}_2\text{(aq)} + \text{H}_2\text{(g)}$; Displacement reaction

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

Ans. Chemical reactions that release energy in the form of heat are called exothermic reactions.

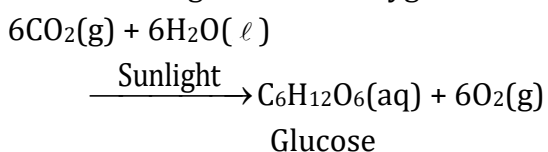
For example, Reaction of sodium and chlorine to yield common salt.



In other words, combination reactions are generally exothermic.

Reactions that absorb energy or require energy in order to proceed are called endothermic reactions.

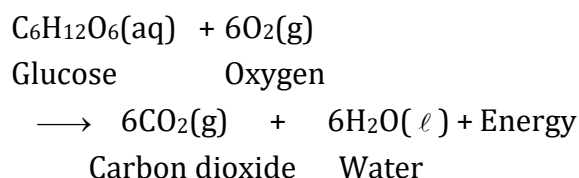
For example: In the process of photosynthesis, plants use the energy from the sun to convert carbon dioxide and water to glucose and oxygen.



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

Ans. Energy is required to support life. Energy in our body is obtained from the food we eat. During digestion, large molecules of food are broken down into simpler substances such as glucose. Glucose combines with oxygen in the cells and provides energy.

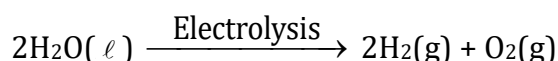
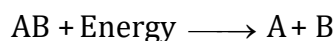
The special name of this combustion reaction is respiration. Since energy is released in the whole process, it is an exothermic process.



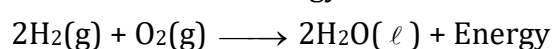
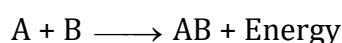
19. Why are decomposition reactions called the opposite of combination reactions? Write equations for these reactions.

Ans. Decomposition reactions are those in which a compound breaks down to form two or more substances. These reactions require a source of energy to proceed. Thus, they are the exact opposite of combination reactions in which two or more substances combine to give a new substance with the release of energy.

Decomposition reaction

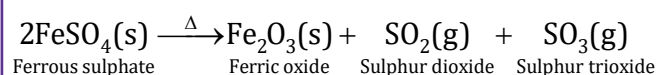


Combination reaction

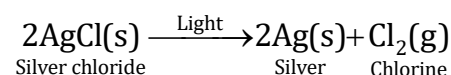


20. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity.

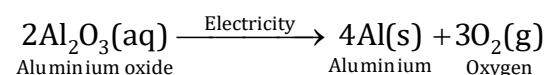
Ans. (a) Thermal decomposition



(b) Decomposition by light



(c) Decomposition by electricity



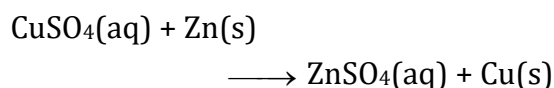
21. What is the difference between displacement and double displacement reactions? Write equations for these reactions.

Ans. In a displacement reaction, a more reactive element replaces a less reactive element from its compound. $A + BX \longrightarrow AX + B$; where A is more reactive than B
In a double displacement reaction, two atoms or a group of atoms interchange places to form new compounds.

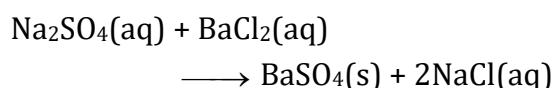


For example,

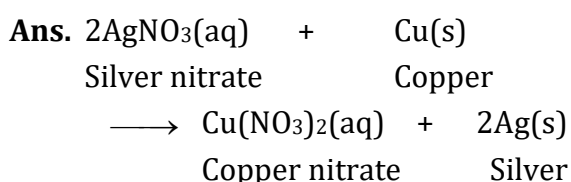
Displacement reaction-



Double displacement reaction-



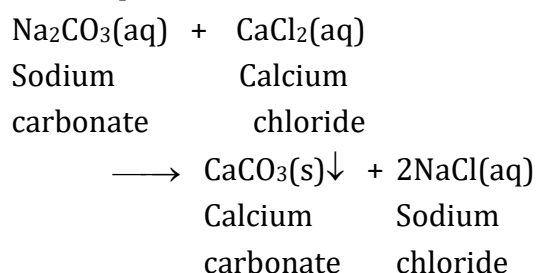
22. In the refining of silver, the recovery of silver from silver nitrate solution involves displacement by copper metal. Write down the reaction involved.



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

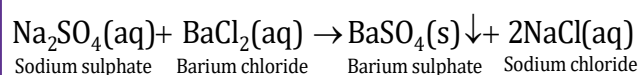
Ans. A reaction in which an insoluble solid (called precipitate) is formed is called a precipitation reaction.

For example,



In this reaction, calcium carbonate is obtained as a precipitate. Hence, it is a precipitation reaction.

Another example of precipitation reaction is.



In this reaction, barium sulphate is obtained as a precipitate.

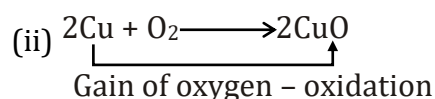
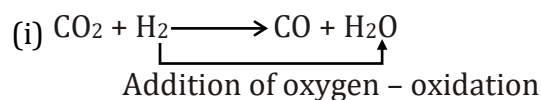
24. Explain the following in terms of gain or loss of oxygen with two examples of each.

(a) Oxidation

(b) Reduction

Ans. (a) Oxidation is the gain of oxygen.

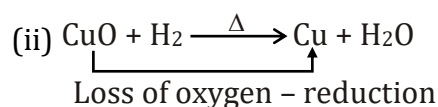
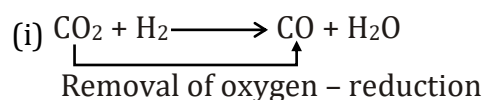
For example,



In equation (i), H_2 is oxidized to H_2O and in equation (ii), Cu is oxidised to CuO.

(b) Reduction is the loss of oxygen.

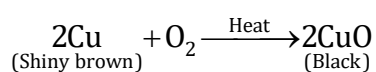
For example,



In equation (i), CO_2 is reduced to CO and in equation (ii), CuO is reduced to Cu.

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

Ans. 'X' is copper (Cu) and the black-coloured compound formed is copper oxide (CuO). The equation of the reaction involved on heating copper is given below.



26. Why do we apply paint on iron articles?

Ans. Iron articles are painted because it prevents them from rusting. When painted, the contact of iron articles with moisture and air is cut off. Hence, rusting is prevented. Their presence is essential for rusting to take place.

27. Oil and fat containing food items are flushed with nitrogen. Why?

Ans. Nitrogen is an inert gas and does not easily react with these substances. On the other hand, oxygen reacts with food substances and makes them rancid. Thus, bags used in packing food items are flushed with nitrogen gas to remove oxygen inside the pack. When oxygen is not present inside the pack, rancidity of oil and fat containing food items is prevented.

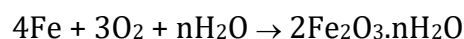
28. Explain the following terms with one example of each.

(a) Corrosion

(b) Rancidity

Ans. (a) Corrosion- Corrosion is defined as a process where materials, usually metals, deteriorate as a result of a chemical reaction with air, moisture, chemicals, etc.

For example, iron, in the presence of moisture, reacts with oxygen to form hydrated iron oxide.



Hydrated iron oxide

This hydrated iron oxide is rust.

(b) Rancidity - The process of oxidation of fats and oils that can be easily noticed by the change in taste and smell is known as rancidity.

For example, the taste and smell of butter changes when kept for long.

Rancidity can be avoided by

- (1) Storing food in airtight containers.
- (2) Storing food in refrigerators.
- (3) Adding antioxidants.
- (4) Storing food in an environment of nitrogen.

EXERCISE-01

- For each of the following reactions, determine what the products of each reaction will be? When you have predicted the products, balance the equation.
Assume all reactions take place in water.
(1) $\text{AgNO}_3 + \text{Na}_2\text{CO}_3 \rightarrow$
(2) $\text{Zn} + \text{H}_2\text{CO}_3 \rightarrow$
(3) $\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{H}_2\text{O} + \text{Cl}_2$
(4) $\text{FeSO}_4 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$
(5) $\text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbO} + \text{NO}_2 + \text{O}_2$
- The chemical formula of lead sulphate is
(1) Pb_2SO_4 (b) $\text{Pb}(\text{SO}_4)_2$
(3) PbSO_4 (4) $\text{Pb}_2(\text{SO}_4)_3$
- One of the following processes does not involve a chemical reaction. That is:
(1) Melting of candle wax when heated
(2) Burning of candle wax when heated
(3) Digestion of food in our stomach
(4) Ripening of banana
- The correct formula for ammonium sulphate is _____.
(1) NH_4SO_4 (2) $(\text{NH}_4)_2\text{SO}_4$
(3) $(\text{NH}_3)_2\text{SO}_4$ (4) $(\text{NH}_4)_2\text{S}$
- In the following equation $\text{Na}_2\text{CO}_3 + x \text{HCl} \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$, the value of x is
(1) 1 (2) 2
(3) 3 (4) 4
- Consider the reaction: $\text{Na(s)} + \text{O}_2(\text{g}) \rightarrow \text{Na}_2\text{O(s)}$. Number of sodium needed to balance the equation would be
(1) 1 (2) 2
(3) 3 (4) 4
- Consider the reaction: $\text{Al(s)} + \text{O}_2(\text{g}) \rightarrow \text{Al}_2\text{O}_3$. Number of Al(s) needed to balance the equation are
(1) 1 (2) 2
(3) 3 (4) 4
- It is necessary to balance a chemical equation in order to satisfy the law of
(1) Conservation of motion
(2) Conservation of momentum
(3) Conservation of energy
(4) Conservation of mass
- Physical changes are generally _____.
(1) temporary (2) permanent
(3) irreversible (4) endothermic
- The symbol H stands for _____ of hydrogen.
(1) one atom (2) one molecule
(3) one ion (4) two atoms
- Which is the correct symbol for manganese?
(1) M (2) Ma
(3) Mn (4) Mg
- The correct formula for nitrogen dioxide is _____.
(1) NO (2) N_2O
(3) NO_2 (4) N_2O_5
- Which of the following is an incorrect formula?
(1) NaCl_2 (2) BaSO_4
(3) H_2CO_3 (4) P_2O_5

- 13.** The correctly balanced equation for S is _____.
- (1) $2\text{FeS} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3 + 4\text{SO}_2$
 (2) $2\text{FeS} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3 + 4\text{SO}_2$
 (3) $4\text{FeS} + 4\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3 + 2\text{SO}_2$
 (4) $4\text{FeS} + 7\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3 + 4\text{SO}_2$
- 14.** Consider the reaction : $\text{S(s)} + \text{O}_2\text{(g)} \rightarrow \text{SO}_2$.
 The state of SO_2 in this reaction is
 (1) liquid (2) solid
 (3) gaseous (4) all of these
- 15.** Which of the following symbols is not a correct indication of the phase of a substance in a reaction?
 (1) (s) = solid (2) (g) = grams
 (3) (aq) = aqueous (4) (ℓ) = liquid
- 16.** The reaction $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$ is a
 (1) decomposition reaction
 (2) combination reaction
 (3) double displacement reaction
 (4) displacement reaction
- 17.** The reaction $\text{C} + \text{O}_2 \rightarrow \text{CO}_2 + \text{Heat}$, is a
 (1) combination reaction
 (2) oxidation reaction
 (3) exothermic reaction
 (4) all of these
- 18.** The electrolytic decomposition of water gives H_2 and O_2 in the ratio of
 (1) 1 : 2 by volume
 (2) 2 : 1 by volume
 (3) 8 : 1 by mass
 (4) 1 : 2 by mass
- 19.** When hydrated ferrous sulphate is heated strongly it undergoes decomposition to form ferric oxide as a main product accompanied by a change in colour from
 (1) blue to green.
 (2) green to blue.
 (3) green to brown.
 (4) green to yellow.
- 20.** Breaking of lead bromide into lead and bromine is an example of _____.
 (1) decomposition reaction
 (2) synthesis reaction
 (3) displacement reaction
 (4) neutralisation reaction
- 21.** Which of the following is not a decomposition reaction?
 (1) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
 (2) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
 (3) Digestion of food in the body
 (4) $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
- 22.** Which of the following is a decomposition reaction?
 (1) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
 (2) $\text{NH}_4\text{CNO} \rightarrow \text{H}_2\text{NCONH}_2$
 (3) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
 (4) $\text{H}_2 + \text{I}_2 \rightarrow 2\text{HI}$
- 23.** Conversion of CaCO_3 into CaO as per the following reaction is an example of
 $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
 (1) decomposition reaction
 (2) reduction reaction
 (3) oxidation reaction
 (4) none of these

- 24.** Which of the following is a displacement reaction?
- (1) $\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$
 (2) $\text{CaO} + 2\text{HCl} \longrightarrow \text{CaCl}_2 + \text{H}_2\text{O}$
 (3) $\text{Fe} + \text{CuSO}_4 \longrightarrow \text{FeSO}_4 + \text{Cu}$
 (4) $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$
- 25.** $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$
 This reaction is an example of
 (1) combination reaction
 (2) double displacement reaction
 (3) decomposition reaction
 (4) displacement reaction
- 26.** When iron nails are added to an aqueous solution of copper sulphate, a chemical change occurs. Which of the following is not true about this reaction?
 (1) Blue colour of the solution fades.
 (2) Iron nails become brownish in colour.
 (3) It is a displacement reaction.
 (4) Iron nails dissolve completely.
- 27.** In the reaction : $\text{BaCl}_2 + \text{ZnSO}_4 \rightarrow \text{ZnCl}_2 + \text{BaSO}_4$, the white precipitate seen is due to ____.
- (1) ZnCl_2 (2) BaSO_4
 (3) BaCl_2 (4) ZnSO_4
- 28.** Which of the following represents a double displacement reaction?
 (1) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
 (2) $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$
 (3) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl}(\downarrow) + \text{NaNO}_3$
 (4) $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
- 29.** Which of the following reaction is double displacement reaction?
 (1) $\text{FeCl}_3 + 3\text{NaOH} \longrightarrow \text{Fe}(\text{OH})_3 + 3\text{NaCl}$
 (2) $\text{Zn} + \text{H}_2\text{SO}_4 \longrightarrow \text{ZnSO}_4 + \text{H}_2$
 (3) $2\text{CO} + \text{O}_2 \longrightarrow 2\text{CO}_2$
 (4) $\text{N}_2 + \text{O}_2 \longrightarrow 2\text{NO}$
- 30.** Which of the following is a redox reaction?
 (1) $\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$
 (2) $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$
 (3) $\text{CaO} + 2\text{HCl} \longrightarrow \text{CaCl}_2 + \text{H}_2\text{O}$
 (4) $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$
- 31.** Which of the following statement is correct about the reaction?
 $2\text{PbO}(\text{s}) + \text{C}(\text{s}) \rightarrow 2\text{Pb}(\text{s}) + \text{CO}_2(\text{g})$
 (1) Lead is getting reduced
 (2) Carbon is getting reduced
 (3) Lead oxide is getting reduced
 (4) All of these
- 32.** $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$ which is correct about this reaction?
 (1) Mg is oxidized
 (2) Oxygen is oxidized
 (3) MgO is reduced
 (4) MgO is oxidized
- 33.** Corrosion of iron is known as
 (1) rusting (2) rancid
 (3) antioxidant (4) reduction
- 34.** Which of the following gases is used in the storage of fat and oil containing foods for a long time?
 (1) Carbon dioxide gas
 (2) Nitrogen gas
 (3) Oxygen gas
 (4) Neon gas

35. The main cause of rancidity in foods is

- (1) bacteria
- (2) proteins
- (3) antioxidants
- (4) oxidation of the fatty acid molecule

Fill in the blanks

1. Formation of nitric oxide from nitrogen and oxygen is a _____ reaction.
2. Reaction in which energy is absorbed is known as _____ reaction.
3. The reaction in which heat is given out along with products is known as _____ reaction.
4. Digestion of food in our body is an example of _____ reaction.
5. The reaction $\text{CaCO}_3 \xrightarrow{\text{Heat}} \text{CaO} + \text{CO}_2$ is a _____ reaction.
6. The reaction in which oxygen is added to the substance is called _____ reaction.
7. Reaction in which hydrogen is added to a substance is called _____ reaction.
8. The potato chips manufacturers use _____ gas to fill the chips bags to prevent the chips from getting oxidised.

9. When calcium carbonate is heated, it decomposes to give _____ and _____.

10. Rancidity of food is a _____ change.

True or False

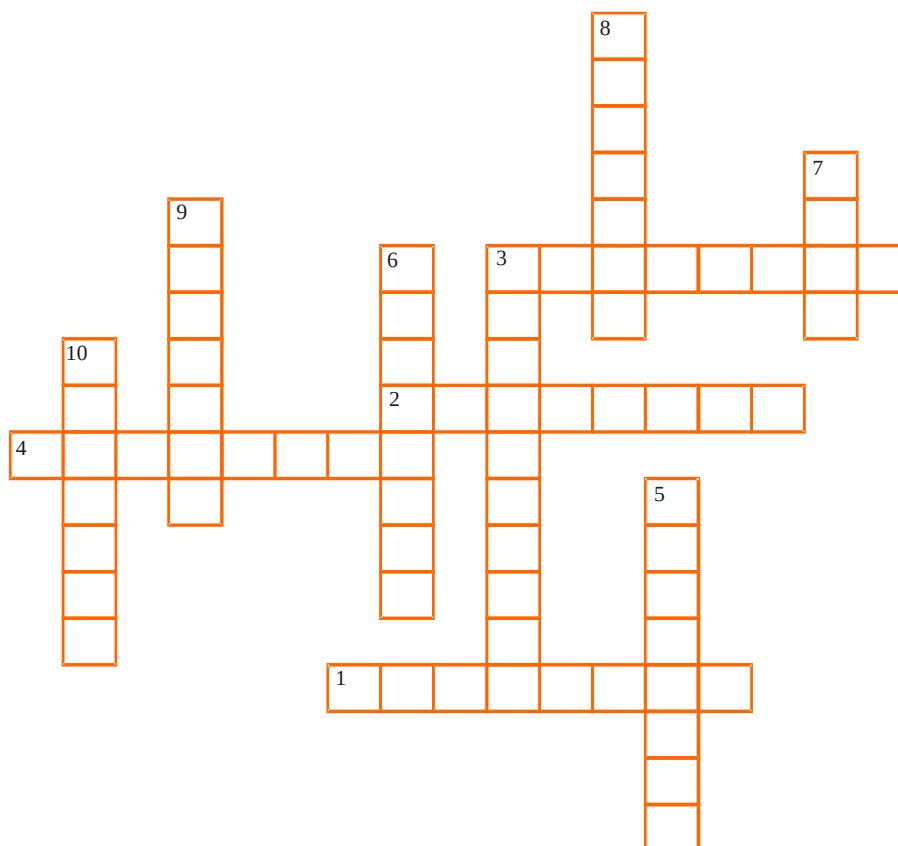
1. Rusting of iron is a physical change.
2. In general, combination reactions are exothermic.
3. A physical change is usually reversible.
4. When a magnesium ribbon burns brilliantly in air, a physical change takes place.
5. $3\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$ is a balanced reaction.
6. Ammonium chloride dissolves in water with the absorption of heat. This is an exothermic reaction.
7. At least one of the products or reactants must be a solid.
8. Iron nail becomes brownish in copper sulphate solution.
9. Precipitate is an insoluble substance formed during reaction.
10. If a substance gains oxygen during reaction, it is said to be reduced.

1. Match the column

	Column-A		Column-B
	Types of chemical reaction		Chemical equation
(A)	Combination	(i)	$\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
(B)	Oxidation & reduction reaction	(ii)	$2\text{H}_2\text{O} \xrightarrow{\text{Electricity}} 2\text{H}_2 + \text{O}_2$
(C)	Decomposition reaction	(iii)	$\text{CaO} + \text{CO}_2 \rightarrow \text{CaCO}_3$
(D)	Displacement reaction	(iv)	$\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
(E)	Double displacement reaction	(v)	$\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4(\downarrow) + 2\text{NaCl}$

Crossword puzzle

Complete the puzzle using the clues about chemical reactions shown below.

**Across**

1. The negatively charged particle of an atom.
2. An outside agent that affects the speed or occurrence of a reaction.
3. An expression in which symbols and formulae represent a chemical reaction.
4. A substance that take part in a chemical reaction.

Down

3. Reaction in which energy is liberated.
5. A substance made up of two or more elements chemically combined.
6. A chemical process where two substances interact to form a new substance.
7. The smallest unit of an element.
8. The centre of an atom that contains protons and neutrons.
9. A new substance produced by a chemical reaction.
10. A substance made up of one kind of atom; it cannot be broken down, into simpler substances.

ANSWER KEY

1. (1) $2\text{AgNO}_3 + \text{Na}_2\text{CO}_3 \rightarrow \text{Ag}_2\text{CO}_3 + 2\text{NaNO}_3$
 (2) $\text{Zn} + \text{H}_2\text{CO}_3 \rightarrow \text{ZnCO}_3 + \text{H}_2$
 (3) $\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
 (4) $2\text{FeSO}_4 \longrightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$
 (5) $2\text{Pb}(\text{NO}_3)_2 \longrightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$

Multiple choice questions

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	1	1	3	3	1	3	1	2	2	4	4	4	4	3	2
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	2	4	2	3	1	4	3	1	3	4	4	2	3	1	2
Question	31	32	33	34	35										
Answer	3	1	1	2	4										

Fill in the blanks

- | | | |
|------------------|------------------|----------------------------|
| 1. combination | 2. endothermic | 3. exothermic |
| 4. decomposition | 5. decomposition | 6. oxidation |
| 7. reduction | 8. nitrogen | 9. CaO and CO ₂ |
| 10. chemical | | |

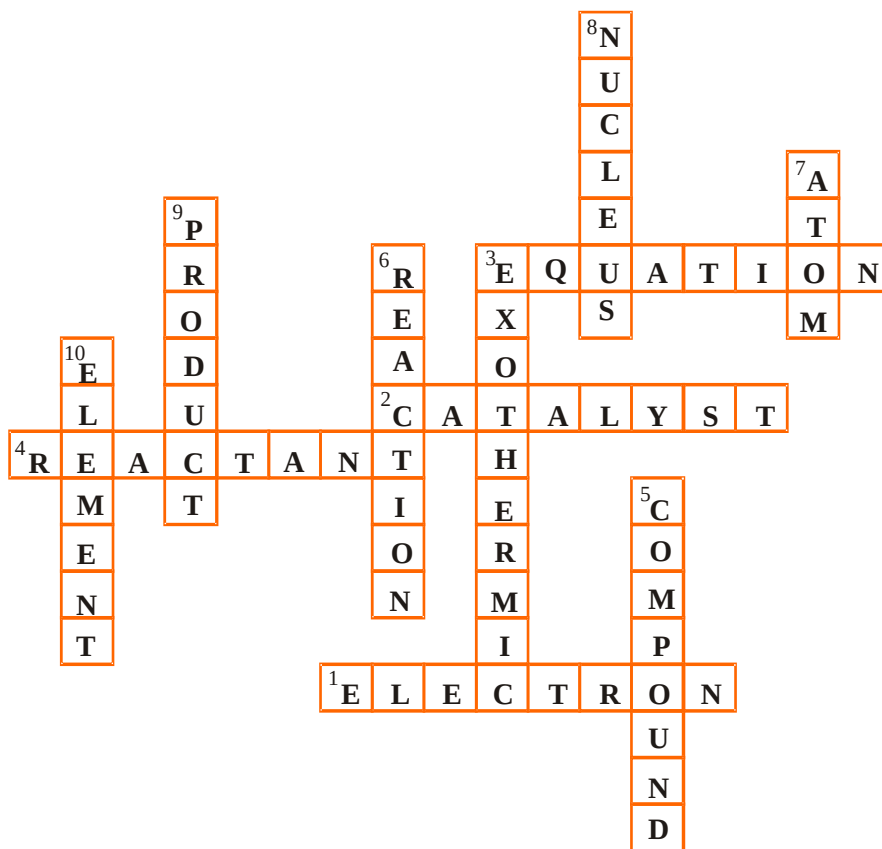
True or False

- | | | | | |
|----------|----------|---------|----------|-----------|
| 1. False | 2. True | 3. True | 4. False | 5. False |
| 6. False | 7. False | 8. True | 9. True | 10. False |

Match the column

(A) → (iii), (iv) ; (B) → (i), (ii), (iv) ; (C) → (ii) ; (D) → (i) ; (E) → (v)

Crossword puzzle



EXERCISE-02

Very short answer type questions

- Which one is a chemical change: rusting of iron or melting of iron?
- On what basis is balancing of a chemical equation done?
- What happens chemically when quick lime is added to water?
- Define a combination reaction. Give one example of an exothermic combination reaction.
- Give one type of decomposition reaction.
- Give an example of photochemical reaction.
- What will happen if silver bromide is kept in sunlight for some time?
- What happens when a strip of zinc is dipped in a copper sulphate solution?
- Is copper more reactive than iron? Give a reaction in support of your answer.
- In which type of reaction does the exchange of ions take place?
- What is meant by endothermic and exothermic reactions?
- What is a redox reaction?
- Identify the type of reaction in the following:
(i) $\text{Fe} + \text{CuSO}_4(\text{aq}) \longrightarrow \text{FeSO}_4(\text{aq}) + \text{Cu}(\text{s})$
(ii) $2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$
- What is corrosion?
- Define the term rancidity.

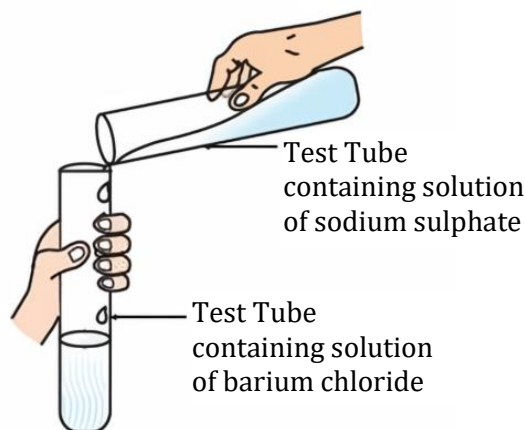
Short answer type questions

- Which among the following are physical or chemical changes?
(a) Evaporation of petrol
(b) Burning of Liquefied Petroleum Gas (LPG)
(c) Heating of an iron rod to red hot.
(d) Curdling of milk
(e) Sublimation of solid ammonium chloride
- Balance the following chemical equations and identify the type of chemical reaction.
(a) $\text{Mg}(\text{s}) + \text{Cl}_2(\text{g}) \rightarrow \text{MgCl}_2(\text{s})$
(b) $\text{HgO}(\text{s}) \xrightarrow{\text{Heat}} \text{Hg}(\ell) + \text{O}_2(\text{g})$
(c) $\text{Na}(\text{s}) + \text{S}_8(\text{s}) \xrightarrow{\text{Fuse}} \text{Na}_2\text{S}(\text{s})$
(d) $\text{H}_2\text{O}_2(\ell) \xrightarrow{\text{UV}} \text{H}_2\text{O}(\ell) + \text{O}_2(\text{g})$
- Ferrous sulphate decomposes with the evolution of a gas having a characteristic odour of burning sulphur. Write the chemical reaction involved and identify the type of reaction.
- Translate the following reaction into the language of chemistry and then balance it. When ferric oxide is heated with aluminium, it gives aluminium oxide and iron.
- What are decomposition reactions? Give one example each of
(a) Thermal decomposition reaction
(b) Electrolytic decomposition
(c) Photolytic decomposition

6. Draw a labelled schematic diagram to show the electrolysis of water. Why is the amount of gas collected in one of the test tubes in this activity is double of the amount collected in the other?
7. What do you mean by a precipitation reaction?
8. The following reactions are observed to occur
 (i) $\text{CuSO}_4 + \text{Fe} \rightarrow \text{FeSO}_4 + \text{Cu}$
 (ii) $\text{FeSO}_4 + \text{Zn} \rightarrow \text{ZnSO}_4 + \text{Fe}$
 (iii) $2\text{AgNO}_3 + \text{Cu} \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$
 Arrange Cu, Fe, Ag and Zn in order of their reactivity.
9. A solution of potassium chloride when mixed with silver nitrate solution, an insoluble white substance is formed. Write the chemical reaction involved and also mention the type of the chemical reaction?
10. What happens when iron nail is put inside copper sulphate solution? Write the reactions with observations.
11. Define oxidation and reduction. In the following reactions, identify which one is reduced and which one is oxidized?
 $\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
12. What do you mean by a precipitation reaction?
13. Give two examples from everyday life situations where redox reactions are taking place.
14. Identify the substances oxidized and reduced in the following reaction.
 $\text{ZnO} + \text{C} \longrightarrow \text{Zn} + \text{CO}$
15. What type of chemical reaction takes place when
 (i) Magnesium wire is burnt in air.
 (ii) Electric current passed through water.
 (iii) Limestone is heated.
 (iv) Digestion of food occurs in the body.
 (v) Ammonia and hydrogen chloride gases are mixed.
 (vi) Sulphuric acid is added into barium chloride solution.
- Long answer type questions**
1. A magnesium ribbon is burnt in oxygen to give a white compound X accompanied by emission of light. If the burning ribbon is now placed in an atmosphere of nitrogen, it continues to burn and forms a compound Y.
 (a) Write the chemical formulae of X and Y.
 (b) Write a balanced chemical equation, when X is dissolved in water.
2. On heating blue coloured powder of copper (II) nitrate in a boiling tube, copper oxide (black), oxygen gas and a brown gas X is formed.
 (a) Write a balanced chemical equation of the reaction.
 (b) Identify the brown gas X evolved.
 (c) Identify the type of reaction.
 (d) What could be the pH range of aqueous solution of the gas X?

3. What are rules for balancing a chemical equation? Explain with suitable example.
4. What is combination reaction? Explain with suitable examples.
5. When CaO is added to water taken in a beaker, rise in temperature is observed. However, when $\text{Ba}(\text{OH})_2$ is mixed with NH_4Cl , a fall in temperature is observed. Why?
6. What are the differences between displacement and double displacement reactions? Explain with suitable example.
7. What happens when a piece of
 - (a) Iron metal is added to copper sulphate solution?
 - (b) Aluminium metal is added to dilute hydrochloric acid?
 - (c) Silver metal is added to copper sulphate solution?
 Also, write the balanced chemical equation if the reaction occurs.
8. On adding a drop of barium chloride solution to an aqueous solution of sodium sulphite, white precipitate is obtained.
 - (a) Write a balanced chemical equation of the reaction involved.
 - (b) What other name can be given to this precipitation reaction?
 - (c) On adding dilute hydrochloric acid to the reaction mixture, white precipitate disappears. Why?

9. (a) Observe the given figure and answer the following questions.



- (i) Write the complete balanced chemical equation for the above reaction.
- (ii) What is the type of reaction involved?
- (iii) Is there any precipitate formed?
- (iv) If any precipitate is formed then write the colour of the precipitate.
- (b) When a water insoluble substance 'X' is added to dilute hydrochloric acid, a colourless and odourless gas is evolved. When this gas is passed through lime water, it turns milky. The compound X is regained. Write the chemical formula of 'X' and the chemical equations involved.
10. What is oxidation and reduction? Taking suitable examples, explain the oxidation and reduction always take place together.

Exercise-01 Solutions

Multiple choice questions

1. Option (1)

Physical changes are that which can be generally converted back into their original position so they are temporary.

2. Option (1)

H stands for an atom of hydrogen.

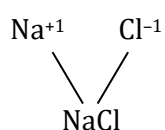
3. Option (3)

Correct symbol for manganese is Mn.

4. Option (3)

Nitrogen dioxide NO_2 (di means two).

5. Option (1)



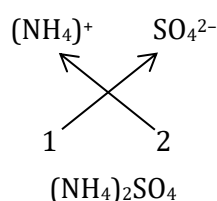
6. Option (3)

PbSO_4 – Lead sulphate.

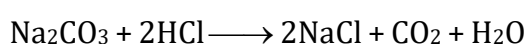
7. Option (1)

Melting of wax is a physical change.

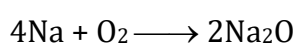
8. Option (2)



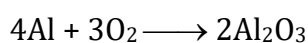
9. Option (2)



10. Option (4)



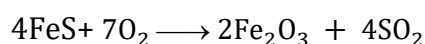
11. Option (4)



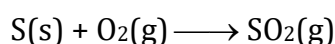
12. Option (4)

To satisfy the law of conservation of mass.

13. Option (4)



14. Option (3)



15. Option (2)

'g' represents gaseous state of a substance.

16. Option (2)

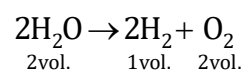
The reactions in which two or more substances combine to form a single new substance are called combination reaction.

$\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$ is a combination reaction.

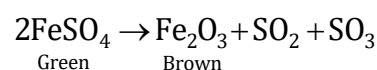
17. Option (4)

$\text{C} + \text{O}_2 \longrightarrow \text{CO}_2$ is a combination reaction as well as oxidation reaction which produces heat.

18. Option (2)



19. Option (3)



20. Option (1)

The reaction in which a single compound breaks up into two or more simpler substances is known as decomposition reaction.

$2\text{PbBr}_2 \longrightarrow 2\text{Pb} + 2\text{Br}_2$ is a decomposition reaction.

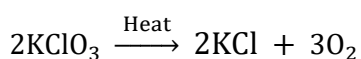
21. Option (4)

The reactions in which two or more substances combine to form a single new substance are called combination reaction. It is not a decomposition reaction.

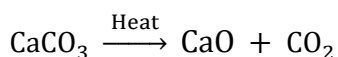
$\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$ is a combination reaction.

22. Option (3)

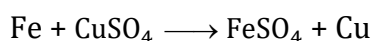
The reaction in which a single compound breaks up into two or more simpler substances is known as decomposition reaction.

**23. Option (1)**

The reaction in which a single compound breaks up into two or more simpler substances is known as decomposition reaction

**24. Option (3)**

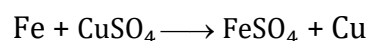
A reaction in which a more reactive element displaces a less reactive element from its compounds is called displacement reaction. Iron is more reactive than Cu so it can displace the Cu from its compound.

**25. Option (4)**

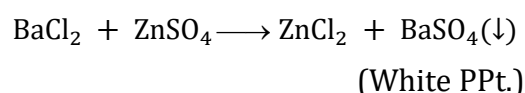
A reaction in which a more reactive element displaces a less reactive element from its compounds is called displacement reaction. It is also an example of displacement reaction.

26. Option (4)

Iron displaces copper from copper sulphate solution forming iron (II) sulphate in the solution, which has a light green colour. Hence, blue colour of copper sulphate solution fades. The displaced copper is deposited on the iron nail giving it a brownish colour.

**27. Option (2)**

Barium chloride solution reacts with zinc sulphate solution to form a white precipitate of barium sulphate along with zinc chloride in the solution.

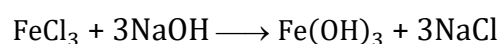
**28. Option (3)**

Those reactions in which two different atoms or groups of atoms are exchanged called double displacement reactions.

$\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl}(\downarrow) + \text{NaNO}_3$ it is an example of double displacement reaction.

29. Option (1)

Those reactions in which two different atoms or groups of atoms are exchanged are called double displacement reactions.

**30. Option (2)**

CuO is getting reduced while H_2 is getting oxidized.

31. Option (3)

Substance which gives oxygen or gains hydrogen (reduced) is called an oxidising agent whereas substance which gives hydrogen or gains oxygen (oxidised) is called a reducing agent.

32. Option (1)

Substance which gives oxygen or gains hydrogen (reduced) is called an oxidising agent whereas substance which gives hydrogen or gains oxygen (oxidised) is called a reducing agent.

33. Option (1)

Corrosion of iron is known as rusting.

34. Option (2)

Nitrogen gas is used in the storage of fat and oil containing foods for a long time.

35. Option (4)

The oxidation of oils or fats in food, resulting into bad taste and bad smell is called rancidity.

True or false**1. False**

In a chemical change one or more substances change into new substances. So rusting of iron is a chemical change.

2. True

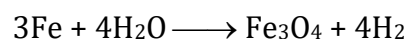
Combination reactions produce heat, so they are usually exothermic in nature.

3. True

Physical changes are usually reversible.

4. False

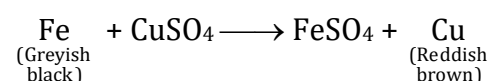
Combustion of a magnesium metal is a chemical change.

5. False**6. False**

Dissolution of NH_4Cl in water is an endothermic reaction.

7. False

Products or reactants can be in any physical state.

8. True**9. True**

Precipitate is an insoluble substance formed during reaction.

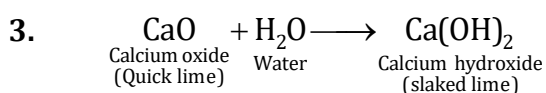
10. False

If a substance gains oxygen during reaction, it is said to be oxidized.

Exercise-02 Solutions

Very short answer type questions

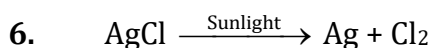
1. A chemical change in which one or more substances change into new substances, so rusting of iron is chemical change.
2. According to the law of conservation of mass, the total, mass of products must be equal to the total mass of the reactants. That's why a balancing of a chemical equation is done.



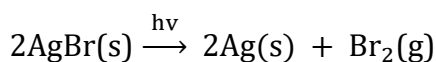
4. When two or more substances react together to form a single product, reaction is called combination reaction.



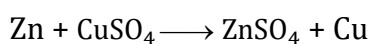
5. $\text{CaCO}_3 \xrightarrow{\Delta} \text{CaO} + \text{CO}_2$ [Thermal decomposition]



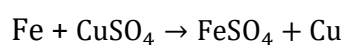
7. Silver bromide decomposes into grey silver and bromine in the presence of light



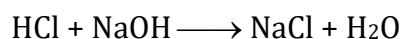
8. Zinc displaces copper from copper sulphate solution forming zinc(II) sulphate in the solution, which is colourless. Hence blue colour of copper sulphate solution fades. The displaced copper is deposited on the zinc strip giving it a brownish colour.



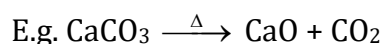
9. No, iron is more reactive than copper. A reaction in which a more reactive element displaces a less reactive element from its compounds is called displacement reaction. Iron can displace copper from copper sulphate solution forming iron(II) sulphate in the solution, so copper is less reactive than iron.



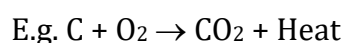
10. In double displacement reaction, exchange of ions takes place.



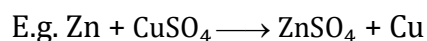
11. The reaction which occurs by absorbing heat energy is called endothermic reaction.



The reaction which occurs by releasing heat energy is called exothermic reaction.



12. A chemical reaction in which both oxidation and reduction take place simultaneously, is known as redox reaction.



13. (i) Displacement reaction

(ii) Combination reaction

14. The chemical or electrochemical reaction between a material, usually a metal, and its environment that produces a deterioration of the material and its properties is called corrosion.

15. The oxidation of oils or fats, resulting into a bad taste and bad smell is called rancidity.

Short answer type questions

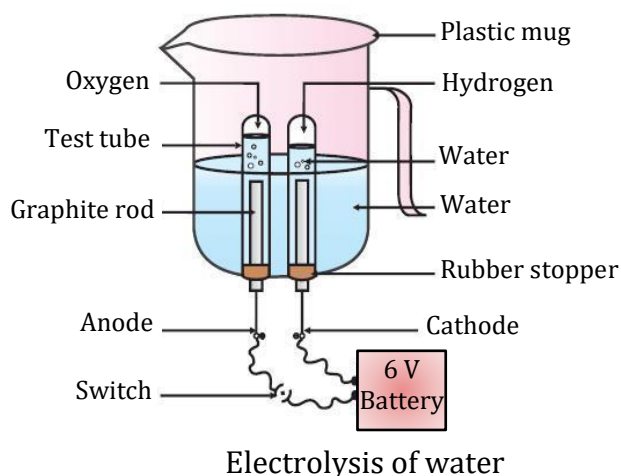
- (a), (c), (e) are physical changes and (b), (d) are chemical changes.
- (a) $\text{Mg(s)} + \text{Cl}_2\text{(g)} \longrightarrow \text{MgCl}_2\text{(s)}$;
Combination reaction

(b) $2\text{HgO (s)} \xrightarrow{\text{heat}} 2\text{Hg(l)} + \text{O}_2\text{(g)}$;
Decomposition reaction

(c) $16\text{Na(s)} + \text{S}_8\text{(s)} \xrightarrow{\text{Fuse}} 8\text{Na}_2\text{S(s)}$;
Combination reaction

(d) $2\text{H}_2\text{O}_2\text{(l)} \xrightarrow{\text{Uv}} 2\text{H}_2\text{O(l)} + \text{O}_2\text{(g)}$;
Decomposition reaction
- $\text{FeSO}_4 \cdot 7\text{H}_2\text{O} \longrightarrow \text{FeSO}_4 + 7\text{H}_2\text{O}$
 $2\text{FeSO}_4 \longrightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$
 (Decomposition reaction)

It is observed that green coloured ferrous sulphate crystals on heating first changes colour by losing water to form FeSO_4 , which on further heating decomposes to leave behind a reddish-brown residue along with evolution of sulphur dioxide and sulphur trioxide gases.
- $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$; Redox reaction, Single displacement reaction
- When a single substance breaks into two or more simpler substances by the action of some form of energy, reaction is called decomposition reaction
 - $\text{CaCO}_3 \xrightarrow{\Delta} \text{CaO} + \text{CO}_2$
 - $\text{H}_2\text{O} \xrightarrow{\text{electricity}} \text{H}_2 + \text{O}_2$
 - $\text{AgCl} \xrightarrow{\text{sunlight}} \text{Ag} + \text{Cl}_2$
- Acidified water undergoes electrolysis producing H_2 and O_2 gases in the ratio of 2:1 by volume, because water compound has double atoms of hydrogen than oxygen.



- $\text{BaCl}_2\text{(aq)} + \text{Na}_2\text{SO}_4\text{(aq)} \longrightarrow \text{BaSO}_4\text{(s)} \downarrow + 2\text{NaCl(aq)}$
 (white ppt)

The above reaction is a double displacement reaction as well as precipitation reaction.

In the above reaction, an insoluble compound i.e. BaSO_4 is formed because of double displacement reaction. This type of double displacement reaction where precipitate formation takes place is called as precipitation reaction.
- (i) $\text{CuSO}_4 + \text{Fe} \longrightarrow \text{FeSO}_4 + \text{Cu}$
 $[\text{Fe} > \text{Cu}]$

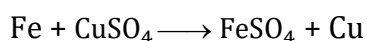
(ii) $\text{FeSO}_4 + \text{Zn} \longrightarrow \text{ZnSO}_4 + \text{Fe}$
 $[\text{Zn} > \text{Fe}]$

(iii) $2\text{AgNO}_3 + \text{Cu} \longrightarrow \text{Cu(NO}_3)_2 + 2\text{Ag}$
 $[\text{Cu} > \text{Ag}]$

So, order of reactivity is $\text{Ag} < \text{Cu} < \text{Fe} < \text{Zn}$.
- $\text{KCl(aq)} + \text{AgNO}_3\text{(aq)} \longrightarrow \text{AgCl(s)} + \text{KNO}_3\text{(aq)}$

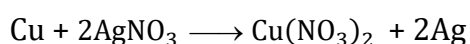
Double displacement reaction or precipitation reaction.

10. Iron displaces copper from copper sulphate solution forming iron(II) sulphate in the solution, which has a light green colour. Hence blue colour of copper sulphate solution fades. The displaced copper is deposited on the iron nail giving it a brownish colour.



11. The reaction which involves addition of oxygen or removal of hydrogen from a substance is called oxidation reaction. The reaction which involves addition of hydrogen or removal of oxygen from a substance is called reduction reaction. MnO_2 is reduced; and HCl is oxidised.

12. Copper displaces silver from silver nitrate solution to form copper nitrate in the solution, which has a blue colour. Hence silver nitrate solution become blue in colour after some time, when copper turnings are added to it. The displaced silver is deposited on the copper turnings giving it a silvery grey colour.

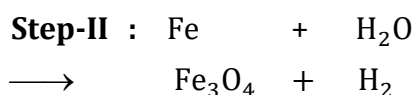


13. Combustion, photosynthesis, respiration etc are the examples of everyday redox reaction.
14. ZnO – reduced substance
 C – oxidized substance.
15. (i) Combination reaction
 (ii) Decomposition reaction
 (iii) Decomposition reaction
 (iv) Decomposition reaction
 (v) Combination reaction
 (vi) Double displacement (precipitation) reaction

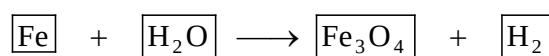
Long answer type questions

1. (a) $\text{X} = \text{MgO}$, $\text{Y} = \text{Mg}_3\text{N}_2$
 (b) $\text{MgO} + \text{H}_2\text{O} \longrightarrow \text{Mg}(\text{OH})_2$
2. (a)
- $$2\text{Cu}(\text{NO}_3)_2 \xrightarrow{\Delta} 2\text{CuO} + 4\text{NO}_2 + \text{O}_2$$
- copper nitrate (blue) copper oxide (black) nitrogen dioxide (brown fumes)
- (b) NO_2 = Brown gas
 (c) Thermal decomposition reaction
 (d) It is acidic in nature so, pH range will be between 0 – 7
3. Steam is passed over red hot iron to form Iron (II, III) oxide and hydrogen in presence of air.

Step-I : Iron + Steam $\longrightarrow$ Iron (II, III) Oxide + Hydrogen



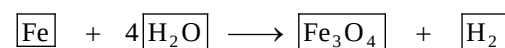
Step-III :



Element	Number of atoms in L.H.S.	Number of atoms in R.H.S.
Fe	1	3
H	2	2
O	1	4

Step-IV : Formula selected is Fe_3O_4 to start balancing oxygen,

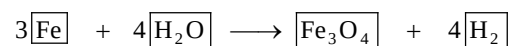
(i) To balance O-atoms, multiply H_2O in LHS by 4.



(ii) Now balance Fe atoms.

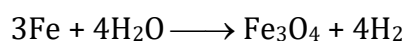


(iii) Balance H atoms.

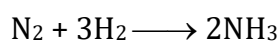
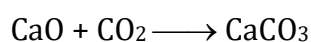
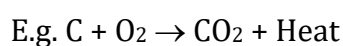


Note: Mixture of ferrous oxide (FeO) and ferric oxide (Fe₂O₃) is also known as magnetic oxide of iron.

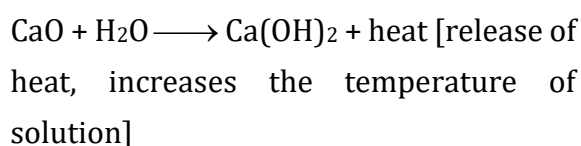
Step-V : On checking the number of all elements, we found that equation is balanced now.



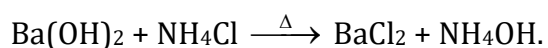
4. When two or more substances react together to form a single product, reaction is called combination reaction.



5. Because chemical reaction between CaO and water is an exothermic reaction.



The chemical reaction between Ba(OH)₂ and NH₄Cl is an endothermic reaction.

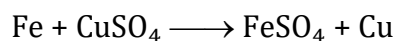


It absorbs heat from the solution and temperature decreases.

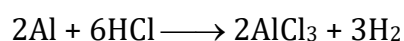
Single displacement reaction	Double displacement reaction
In single displacement reaction, a more reactive element replaces a less reactive element from its compound.	In double displacement reaction, two reactants exchange ions to form two new compounds.

In this reaction, there is change in colour generally and no precipitate formation takes place.	In this reaction, precipitate formation takes place.
It is also a redox reaction.	It can't be a redox reaction.
Ex: $\text{CuSO}_4 + \text{Fe} \rightarrow \text{FeSO}_4 + \text{Cu}$	Ex: $\text{Ba(OH)}_2 + \text{NH}_4\text{Cl} \longrightarrow \text{BaCl}_2 + \text{NH}_4\text{OH}$

7. (a) Iron displaces copper from copper sulphate solution forming iron(II) sulphate in the solution, which has a light green colour. Hence blue colour of copper sulphate solution fades. The displaced copper is deposited on the iron nail giving it a brownish colour.



- (b) When aluminium metal is added to dilute hydrochloric acid, hydrogen gas is liberated and salt is formed.

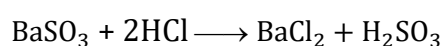


- (c) No reaction takes place.

8. (a) $\text{BaCl}_2 + \text{Na}_2\text{SO}_3 \rightarrow 2\text{NaCl} + \text{BaSO}_3 \downarrow$
(white precipitate)

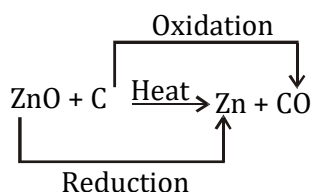
- (b) Double displacement reaction

- (c) On adding hydrochloric acid to the reaction mixture, white precipitate disappears because it reacts with barium sulphite and form barium chloride.

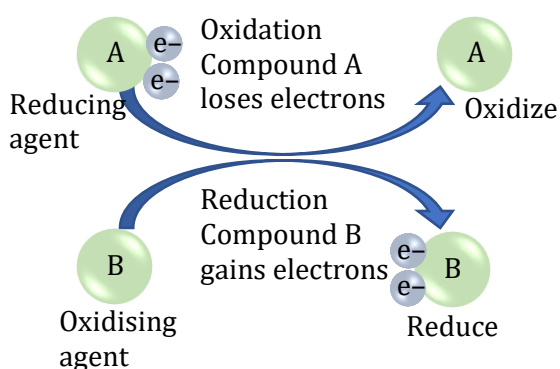


9. (a) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow 2\text{NaCl} + \text{BaSO}_4 \downarrow$
(white precipitate)
- (ii) Double displacement or precipitation reaction.
- (iii) Yes, there is a white precipitate of BaSO_4 formed.
- (iv) There is white precipitate of BaSO_4 formed.
- (b) Chemical formula of X- CaCO_3
- $$\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$$
- X (colourless gas)
- $$\text{CO}_2 + \text{Ca(OH)}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$$
- (lime water) (milky) (X)

10. The reaction which involves addition of oxygen or removal of hydrogen from a substance is called oxidation reaction. The reaction which involves addition of hydrogen or removal of oxygen from a substance is called reduction reaction
- Ex.:



ZnO : Oxidizing agent
 C : Reducing agent



Oxidation and reduction in term of electronic concept.

Aim

To study oxidation of copper to copper (II) oxide.

Materials required

China dish, copper powder, burner, tripod stand, wire gauze

Method

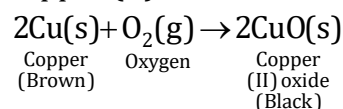
Heat a China dish containing about 1g copper powder.

Observation

It is observed that the brown copper powder gets coated with black copper (II) oxide.

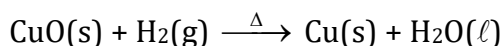
Conclusion

Copper (brown in colour) on heating combines with oxygen to form black copper (II) oxide.



Here, we can say that copper is being oxidised, as it is gaining oxygen.

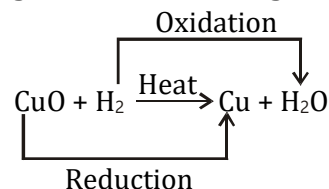
In the above activity, if hydrogen gas is passed over the product (CuO) then black coating on the surface becomes brown because reverse reaction takes place.



Here, we can say that copper oxide is being reduced, as it is losing oxygen and hydrogen is being oxidised, as it is gaining oxygen.

OR

One reactant (H_2) gets oxidised and other (CuO) gets reduced during this reaction.



Such reactions where both oxidation and reduction reactions take place are called oxidation- reduction reactions or redox reactions.