

CLASS 10-  
SCIENCE  
CHAPTER 1  
CHEMICAL  
REACTIONS AND  
EQUATIONS

PART 3  
NCERT  
INTEXT AND  
BACK  
EXERCISE  
SOLUTIONS

# INTEXT QUESTIONS PAGE 6

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



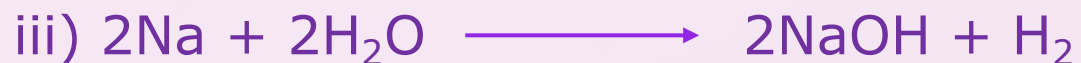
Magnesium metal reacts with atmospheric oxygen to form magnesium oxide (MgO) layer when kept in air for a long time. This layer does not allow magnesium to burn, so it is cleaned with sand paper before burning.

Q2) Write the balanced equation for the following chemical reactions.

i) Hydrogen + Chlorine  $\rightarrow$  Hydrogen chloride

ii) Barium chloride + Aluminium sulphate  $\rightarrow$  Barium sulphate + Aluminium chloride

iii) Sodium + Water  $\rightarrow$  Sodium hydroxide + Hydrogen

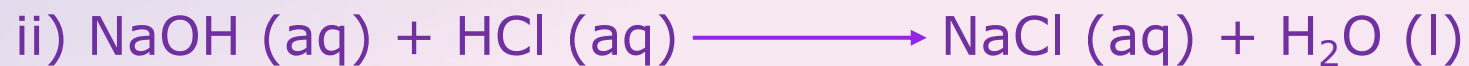
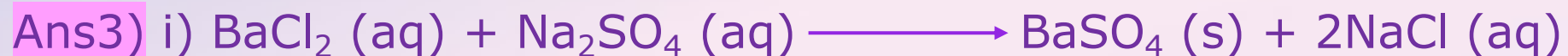


# INTEXT QUESTIONS PAGE 6 (cont...)

Q3) 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.



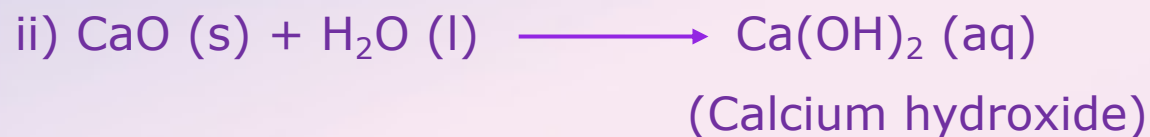
# INTEXT QUESTIONS PAGE 10

Q1) A solution of a substance 'X' is used for whitewashing.

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

(ii) Write the reaction of the substance 'X' named in (i) above with water.

Ans1) i) The substance 'X' which is used in whitewashing is quick lime or calcium oxide and its formula is CaO.



Q2) Why is the amount of gas collected in one of the test tubes in Activity 1.7 double of the amount collected in the other? Name this gas.

Ans2) In Activity 1.7, water is electrolysed to give H<sub>2</sub> gas at one electrode and O<sub>2</sub> gas at other electrode.



Thus two molecules of water on electrolysis give two molecules of hydrogen gas and one molecule of oxygen gas or in other words the amount of hydrogen gas collected would be double than that of oxygen gas.

# INTEXT QUESTIONS PAGE 13

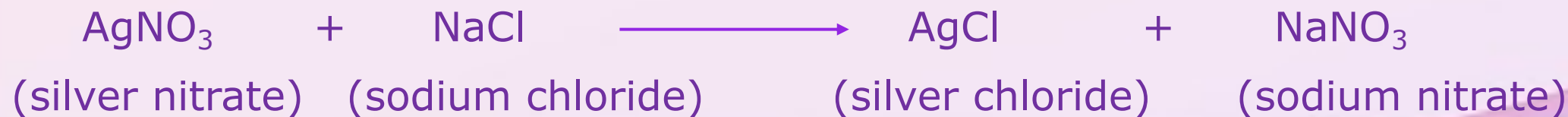
Q1) Why does the colour of copper sulphate solution change when an iron nail is dipped in it?

Ans1) When an iron nail is dipped in copper sulphate solution then iron displaces copper from copper sulphate solution because iron is more reactive than copper. The colour of copper sulphate fades due to the formation of light green coloured solution of iron sulphate.



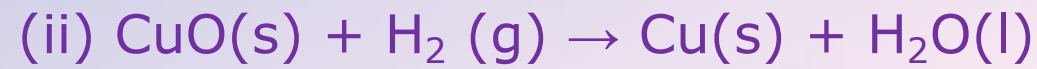
Q2) Give an example of a double displacement reaction other than the one given in Activity 1.10.

Ans2) Reaction between silver nitrate and sodium chloride is an example of double displacement reaction as there is an exchange of ions between the reactants.



# INTEXT QUESTIONS PAGE 13 (cont...)

Q3) Identify the substances that are oxidised and the substances that are reduced in the following reactions.



Ans3) i) Sodium (Na) is oxidised as it gains oxygen and oxygen ( $\text{O}_2$ ) is reduced.

ii) Copper Oxide (CuO) is reduced to copper as it loses oxygen and hydrogen ( $\text{H}_2$ ) is oxidised as it gains oxygen.

# NCERT BACK EXERCISE SOLUTIONS

Q1) 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

Ans1) i) (a) and (b)



The above reaction is an example of a

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

Ans2) d) Displacement reaction.

# NCERT BACK EXERCISE SOLUTIONS

Q3) What happens when dilute hydrochloric acid is added to iron fillings? Tick the correct answer.

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

Ans3) a) Hydrogen gas and iron chloride are produced.

Q4) What is a balanced chemical equation? Why should chemical equations be balanced?

Ans4) Balanced chemical equation is an equation in which number of atoms of various elements are equal on both sides of the equation i.e. on the reactant side as well as on the product side.

The equation should be balanced so that it follows the law of conservation of mass. According to this law, the total mass of all the elements in the products should be equal to the total mass of the elements in the reactants of a chemical reaction. In other words, the number of atoms of each element in the products must be equal to the number of atoms of these elements in the reactants.



# NCERT BACK EXERCISE SOLUTIONS

Q5) 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.

Ans5) a)  $\text{H}_2 (\text{g}) + \text{N}_2 (\text{g}) \longrightarrow \text{NH}_3 (\text{g})$

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

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

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

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

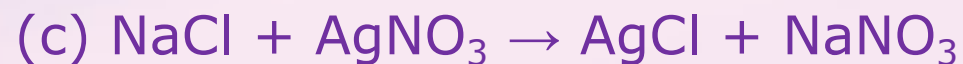
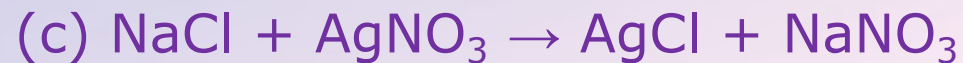
$3\text{BaCl}_2 (\text{aq}) + \text{Al}_2(\text{SO}_4)_3 (\text{aq}) \longrightarrow 2\text{AlCl}_3 (\text{aq}) + 3\text{BaSO}_4 (\text{s})$  (balanced)

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

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

# NCERT BACK EXERCISE SOLUTIONS

Q6) Balance the following chemical equations.



# NCERT BACK EXERCISE SOLUTIONS

Q7) Write the balanced chemical equations for the following reactions.

(a) Calcium hydroxide + Carbon dioxide → Calcium carbonate + Water

(b) Zinc + Silver nitrate → Zinc nitrate + Silver

(c) Aluminium + Copper chloride → Aluminium chloride + Copper

(d) Barium chloride + Potassium sulphate → Barium sulphate + Potassium chloride

Ans7) a)  $\text{Ca(OH)}_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$  (balanced)

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

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

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

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

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

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

# NCERT BACK EXERCISE SOLUTIONS

Q8) Write the balanced chemical equation for the following and identify the type of reaction in each case.

(a) Potassium bromide(aq) + Barium iodide(aq) → Potassium iodide(aq) + Barium bromide(s)

(b) Zinc carbonate(s) → Zinc oxide(s) + Carbon dioxide(g)

(c) Hydrogen(g) + Chlorine(g) → Hydrogen chloride(g)

(d) Magnesium(s) + Hydrochloric acid(aq) → Magnesium chloride(aq) + Hydrogen(g)

Ans8) a)  $\text{KBr (aq)} + \text{BaI}_2 \text{ (aq)} \longrightarrow \text{KI (aq)} + \text{BaBr}_2 \text{ (s)}$

$2\text{KBr (aq)} + \text{BaI}_2 \text{ (aq)} \longrightarrow 2\text{KI (aq)} + \text{BaBr}_2 \text{ (s)}$  (balanced)

This is a double displacement and also a precipitation reaction.

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

This is a decomposition reaction

c)  $\text{H}_2 \text{ (g)} + \text{Cl}_2 \text{ (g)} \longrightarrow \text{HCl (g)}$

$\text{H}_2 \text{ (g)} + \text{Cl}_2 \text{ (g)} \longrightarrow 2\text{HCl (g)}$  (balanced)

This is a combination reaction.

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

$\text{Mg (s)} + 2\text{HCl (aq)} \longrightarrow \text{MgCl}_2 \text{ (aq)} + \text{H}_2 \text{ (g)}$  (balanced)

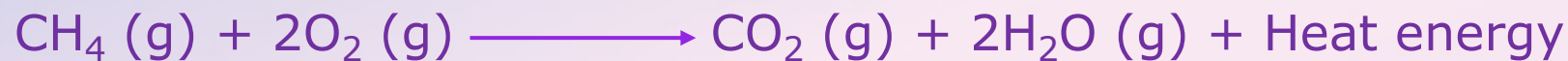
This is a displacement reaction.

# NCERT BACK EXERCISE SOLUTIONS

Q9) What does one mean by exothermic and endothermic reactions? Give examples.

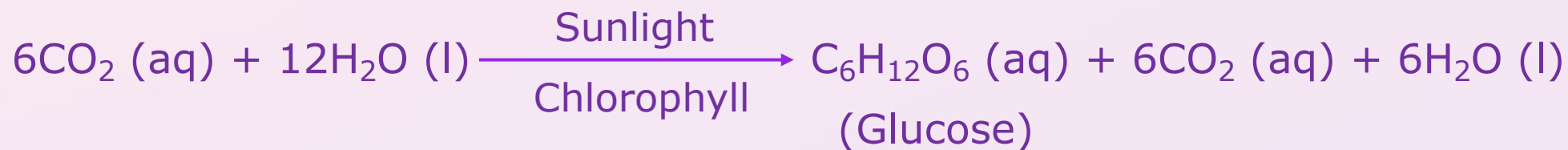
**Ans9)** Exothermic Reactions - Reactions in which heat is given out along with the products are called exothermic reaction.

Example- Burning of natural gas



Endothermic Reactions - Reactions in which energy is absorbed either in the form of heat, light or electricity are known as endothermic reactions.

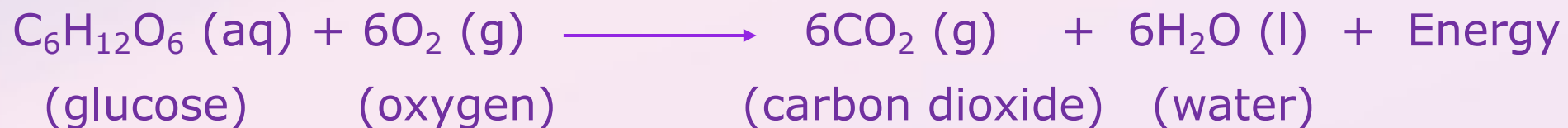
Example- Photosynthesis



# NCERT BACK EXERCISE SOLUTIONS

Q10) Why is respiration considered an exothermic reaction? Explain.

Ans10) For the survival of life, we require energy. We obtain this energy from the food we eat. The food molecules through the process of digestion, are broken down into a simpler molecule like glucose. These substances come in contact with the oxygen present in our body cells to form carbon-dioxide and water along with a certain amount of energy (respiration process). Since the energy is in the form of heat (that maintains our body temperature), the respiration is considered to be an exothermic reaction. The reaction taking place is-

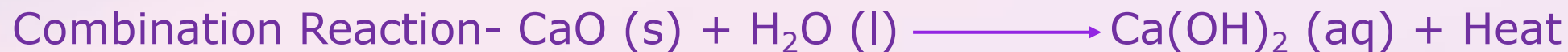
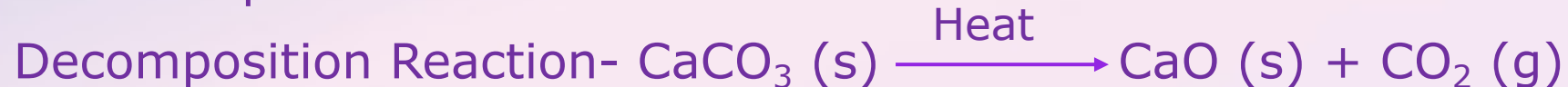


# NCERT BACK EXERCISE SOLUTIONS

Q11) Why are decomposition reactions called the opposite of combination reactions? Write equations for these reactions.

Ans11) 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.

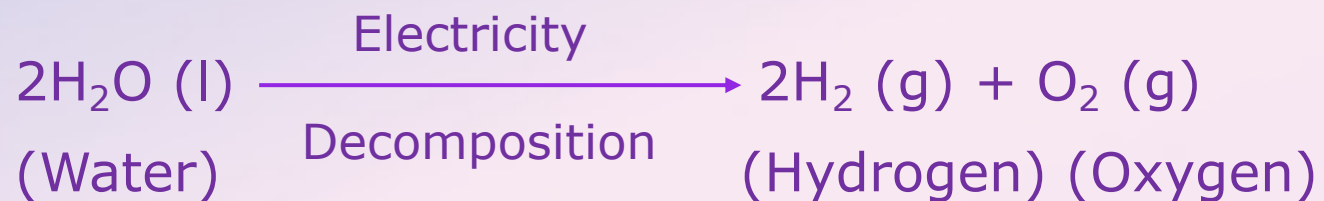
For example-



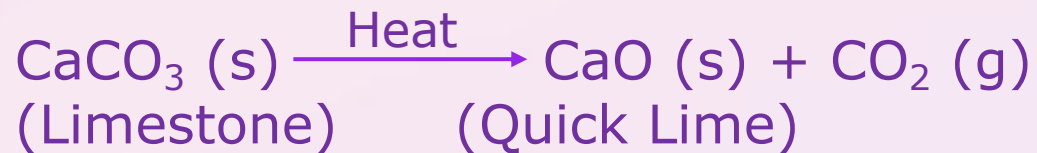
# NCERT BACK EXERCISE SOLUTIONS

Q12) Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity.

Ans12) i) Electricity- Water decomposes into hydrogen gas and oxygen gas by passing electricity through it.



ii) Heat- Decomposition of calcium carbonate (limestone) to calcium oxide (quick lime) and carbon dioxide is carried out by heating.



iii) Light- Decomposition of silver bromide into silver metal and bromine gas in presence of sunlight (light).



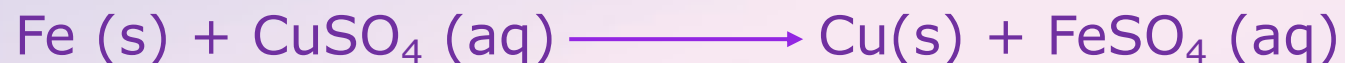


# NCERT BACK EXERCISE SOLUTIONS

Q13) What is the difference between displacement and double displacement reactions? Write equations for these reactions.

Ans13) In displacement reaction, a more reactive metal displaces a less reactive metal from its solution.

For example-



This is a displacement reaction where iron displaces copper from copper sulphate solution to form iron sulphate solution.

In double displacement reaction, two reactants in their aqueous solution react by exchanging their ions.

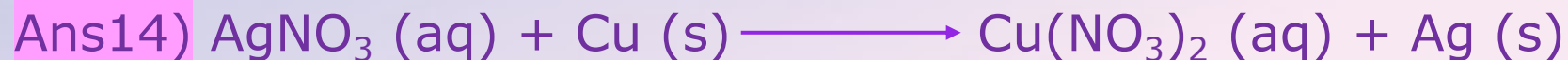
For example-



This is a double displacement reaction where silver nitrate and sodium chloride exchange  $\text{Cl}^-$  and  $\text{NO}_3^-$  ions between them.

# NCERT BACK EXERCISE SOLUTIONS

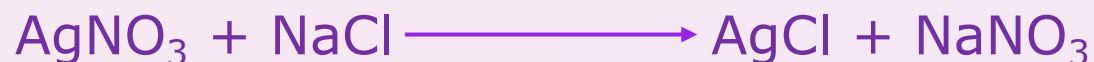
Q14) In the refining of silver, the recovery of silver from silver nitrate solution involved displacement by copper metal. Write down the reaction involved.



Q15) What do you mean by a precipitation reaction? Explain by giving examples.

Ans15) A precipitation reaction is a chemical reaction in which an insoluble solid or salt (called precipitate) is formed when two solutions containing soluble salts are combined together.

For example-



# NCERT BACK EXERCISE SOLUTIONS

Q16) Explain the following in terms of gain or loss of oxygen with two examples each.

(a) Oxidation

(b) Reduction

**Ans16)**a) Oxidation Reaction- It is a chemical reaction in which gain of oxygen or loss of hydrogen takes place.

For Example-



Here, magnesium is oxidised to become magnesium oxide.



Here, copper is oxidised to become copper oxide.

b) Reduction Reaction- It is a chemical reaction in which loss of oxygen or gain of hydrogen takes place.

For example-



Here, copper oxide is reduced to copper.



Here, zinc oxide is reduced to zinc.

# NCERT BACK EXERCISE SOLUTIONS

Q17) A shiny brown coloured element 'X' on heating in air becomes black in colour. Name the element 'X' and the black coloured compound formed.

Ans17) The shiny brown coloured element is the copper metal (Cu). When the metal is heated in air, it reacts with atmospheric oxygen to form copper oxide. Hence, the black coloured compound formed is copper oxide.



Q18) Why do we apply paint on iron articles?

Ans18) Iron articles are painted to prevent them from rusting. When left unpainted, the metal surface comes in contact with the atmospheric oxygen and in the presence of moisture, it forms Iron (III) oxide. But if painted the surface does not come in contact with moisture and air thus prevents rusting.

# NCERT BACK EXERCISE SOLUTIONS

Q19) Oil and fat containing food items are flushed with nitrogen. Why?

Ans19) The main purpose of flushing nitrogen into food packets that contain oil and fat items is to prevent rancidity which occurs when the oil or fat reacts with the oxygen letting out an unpleasant smell and taste. Therefore, by flushing nitrogen, an unreactive surrounding is created thus preventing rancidity.

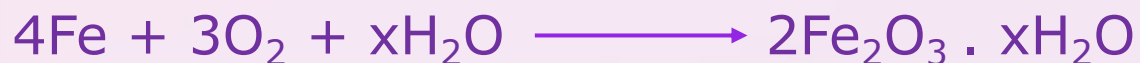
Q20) Explain the following terms with one example each.

(a) Corrosion

(b) Rancidity

Ans20)a) Corrosion- Corrosion is a natural process, which converts a refined metal to a more stable form, such as its oxide, hydroxide or sulphide. It is the gradual destruction of materials (usually metals) by chemical or electrochemical reaction with their environment.

Example- When iron is exposed to moist air for a long period of time, its surface acquires a coating of a brown, flaky substance called rust. Rust is mainly hydrated iron(III) oxide.



Hydrated Iron (III) Oxide (Rust)

# NCERT BACK EXERCISE SOLUTIONS

Ans20)b) Rancidity- Rancidity is the process of slow oxidation of oil and fat present in the food materials resulting in the production of foul odour and taste in them.

Examples-

- i) When a chips pack is exposed to atmospheric air, it results in a change in taste and odour.
- ii) When butter is kept open for a long time, then its smell and taste gets changed.

An illustration of an open book with a light gray cover and a bright pink spine. The pages are white and feature the words "THANK YOU" in a large, purple, sans-serif font. A thin purple horizontal line is positioned directly beneath the text, spanning across both the left and right pages. The book is shown from a slightly elevated perspective, with the pages curving slightly at the edges.

THANK YOU