

Exercise :2 A

Page no: 23-24

1. (a) What: is a chemical reaction ?
 (b) State the conditions necessary for a chemical change or reaction.

Solution:

a) A chemical reaction is a process of breaking chemical bonds of the reactants(reacting substances) to form new bonds and substances(products).

b) Conditions necessary for a chemical change or reaction are

- Evolution of gas
- Change of colour
- Formation of precipitate
- Change of state

2. Define the following terms

- (a) Chemical change
 (b) Chemical bond
 (c) Effervescence
 (d) Precipitate

Solution:

a) Chemical change is defined as a permanent change in the composition of a substance which results in the formation of substance with different chemical compositions and properties.

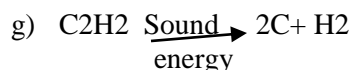
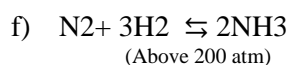
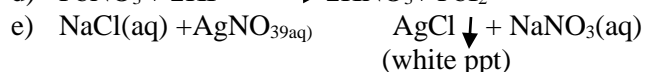
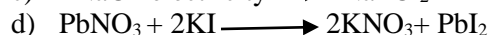
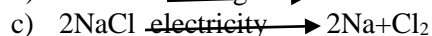
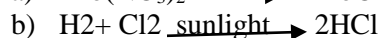
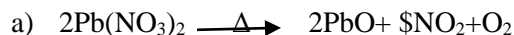
b) A chemical bond is a force which holds the atoms of a molecule in a compound

c) Effervescence is the formation of gas bubbles in a liquid by a chemical reaction.

d) Precipitate is the insoluble solid substance formed due to chemical reaction.

3. Give an example of a reaction where the following are involved

- (a) Heat (b) Light (c) Electricity (d) Close contact (e) Solution (f) Pressure (g) Catalyst

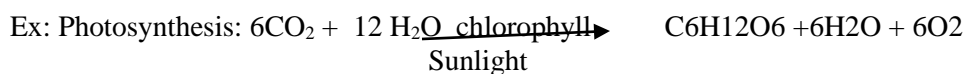
Solution:


4. Define :

(a) Photochemical reaction (b) Electrochemical reaction. Give one example in each case.

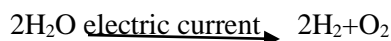
Solution:

a) Reaction that occurs with absorption of light is called as photochemical reaction



b) Reaction that occurs with absorption of electrical energy is called as electrochemical reaction .

Ex: Acidulated water breaks into hydrogen and oxygen



5. Give an example of each of the following chemical changes.

(a) A photochemical reaction involving

(i) silver salt (ii) water

(b) A reaction involving

(i) blue solution

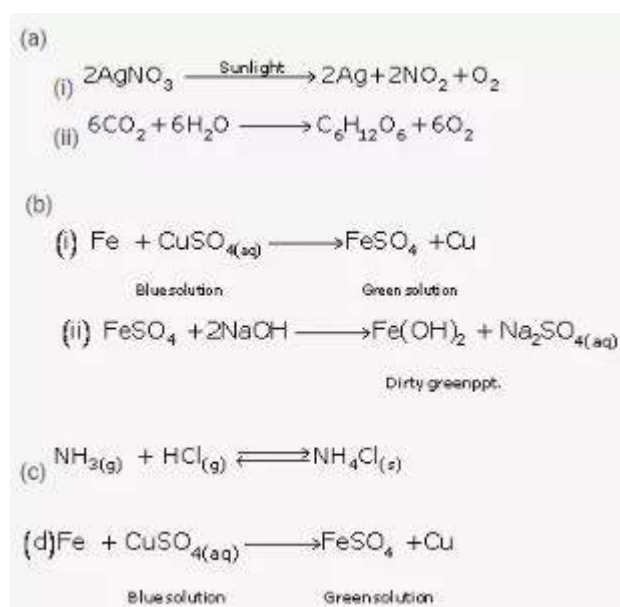
(ii) formation of dirty green precipitate

(c) Two gases combine to form a white solid.

(d) Two solids combine to form a liquid.

(e) A reaction where color change is noticed.

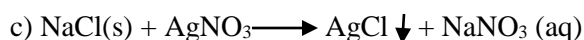
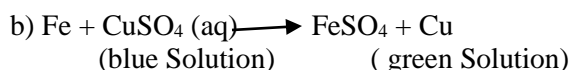
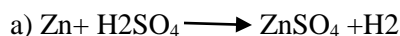
Solution:



6. Write the chemical reaction where the following changes observed.

- Gas is evolved
- Colour change is noticed
- Precipitate is formed
- Physical state is changed

Solution:



7. Give reason for the following :

- Silver nitrate solution is kept in coloured bottles.
- Molybdenum is used in the manufacture of ammonia.
- Blue solution of copper sulphate changes to green when a piece of iron is added to this solution.
- Colourless concentrated sulphuric acid in a test tube changes to blue on adding a small piece of copper to it.

Solution:

- Silver nitrate solution is kept in brown bottles in the laboratory because it decomposes in the presence of light.
- Molybdenum increases the efficiency of the catalyst iron used in the manufacture of ammonia.
- This is because the blue colour of the copper sulphate solution fades and eventually turns into light green due to the formation of ferrous sulphate.
- Colourless concentrated sulphuric acid in a test tube changes to blue on adding a small piece of copper to it because copper displaces hydrogen from sulphuric acid and forms blue colored copper sulphate.

Exercise :2 B

Page no: 29

1. Complete the following statements.

- a) The chemical change involving iron and hydrochloric acid illustrates a reaction.
 b) In the type of reaction called..... two compounds exchange their positive and negative radicals.
 c) A catalyst either or the rate of a chemical change but itself remains..... at the end of the reaction.
 (d) On heating, hydrated copper sulphate changes its colour from to

Solution:

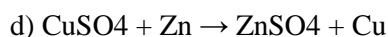
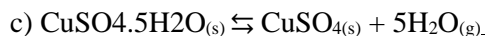
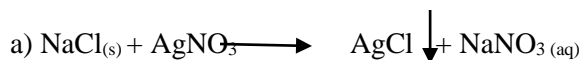
- a) The chemical change involving iron and hydrochloric acid illustrates a **Displacement** reaction.
 b) In the type of reaction called **double displacement** two compounds exchange their positive and negative radicals.
 c) A catalyst either **Accelerate** or **decelerates** the rate of a chemical change but itself remains **unaffected** at the end of the reaction.
 (d) On heating, hydrated copper sulphate changes its colour from **blue** to **white**.

2. When hydrogen burns in oxygen, water is formed; when electricity is passed through water, hydrogen and oxygen are given out. Name the type of chemical changes involved in the two cases.
Solution:

Answer is combination reaction

3. Explain, giving one example for each of the following chemical changes:

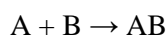
- (a) Double decomposition (b) Thermal dissociation
 (c) Reversible reaction (d) Displacement

Solution:

4. (a) What is synthesis ?

- (b) What kind of chemical reaction is synthesis? Support your answer by an example.

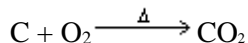
Solution:

a) A reaction in which two or more substances combine together to form a single substance is called a synthesis or combination reaction.



b) Synthesis is a combination reaction.

In the above reaction, substances A and B combine to give a molecule of a new substance, AB.
Carbon burns in oxygen to form a gaseous compound, carbon dioxide.



5. Decomposition brought about by heat is known as thermal decomposition. What is the difference between thermal dissociation and thermal decomposition.

Solution:

A decomposition reaction brought about by heat is known as thermal decomposition.

A simultaneous reversible decomposition reaction brought about only by heat is thermal dissociation.

- 6. (a) Define neutralization reaction with an example.
(b) Give a balanced equation for this reaction.
(c) Give three applications of neutralization reactions.**

Solution:

a) Neutralization reaction is a reaction between an acid and a base which results in the formation of salt and water.

Ex: $NaOH + HCl \rightarrow NaCl + H_2O$.

b) $NaOH + HCl \rightarrow NaCl + H_2O$ is a balanced equation

c) Applications of neutralization reactions are as follows

- When someone is stung by a bee, formic acid enters the skin and causes pain, which can be relieved by rubbing the spot with slaked lime or baking soda, both of which are bases.
- Acid which is accidentally spilled on to our clothes can be neutralised with ammonia solution.
- If soil is somewhat acidic and thus unfavourable for growing of certain crops, slaked lime is added to neutralise the excess acid.

7. What do you understand by precipitation reaction? Explain with an example.

Solution:

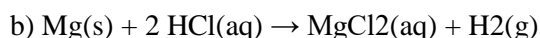
Precipitation is a reaction in which two compounds in liquid state react to form an insoluble salt as one of the products. This product is known as precipitate.

Ex: $AgNO_3(\text{aqueous}) + KCl(\text{aqueous}) \rightarrow AgCl(\text{precipitate}) + KNO_3(\text{aqueous})$

8. (a) What are double displacement reactions ? (b) Give an example of double displacement reaction, where a gas is evolved.

Solution:

a) Double displacement reactions are those in which two compounds in a solution reacts to form two new compounds by mutual exchange of radicals. This type of reaction is also known as double decomposition reaction.



9. (a) What is a decomposition reaction ?

(b) Decomposition reactions can occur by (i) heat (ii) electricity and (iii) sunlight.

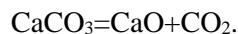
Give two balanced reactions for each.

Solution:

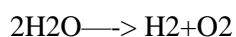
a) Reaction in which a compound splits into two or more simpler substances is called decomposition reaction.

b)

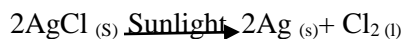
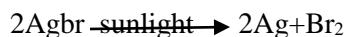
i) Heat



ii) Electricity



iii) Light



10. State the type of reactions each of the following represent and balance the ones that are not balanced.

- (a) $\text{Cl}_2 + 2\text{KBr} \rightarrow 2\text{KCl} + \text{Br}_2$
 (b) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
 (c) $2\text{HgO} \rightarrow 2\text{Hg} + \text{O}_2$
 (d) $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
 (e) $\text{PbO}_2 + \text{SO}_2 \rightarrow \text{PbSO}_4$
 (f) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
 (g) $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$
 (h) $\text{KNO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{HNO}_3 + \text{KHSO}_4$
 (i) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
 (j) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
 (k) $\text{NH}_4\text{Cl} \rightarrow \text{NH}_3 + \text{HCl}$
 (l) $\text{PbO} + 2\text{HNO}_3 \rightarrow \text{Pb}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$
 (m) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$

Solution:

- a) Displacement reaction
 b) Neutralisation reaction
 c) Decomposition reaction
 d) Displacement reaction
 e) Combination reaction
 f) Decomposition reaction
 g) Decomposition reaction
 h) Double decomposition reaction
 i) Displacement reaction
 j) Decomposition reaction
 k) Decomposition reaction
 l) Neutralisation reaction
 m) Double decomposition reaction

11. Match the following

a. $\text{Zn}(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{H}_2(\text{g})$	i) Photochemical decomposition
b. $2\text{AgCl}(\text{s}) \xrightarrow{\text{sunlight}} 2\text{Ag}(\text{s}) + \text{Cl}_2(\text{g})$	ii) Thermal decomposition
c. $2\text{KCl} \xrightarrow{\text{electricity}} 2\text{K} + \text{Cl}_2$	iii) Displacement reaction
d. $2\text{Hg}(\text{s}) \xrightarrow{\Delta} 2\text{HgS} + \text{O}_2$	iv) Electrolytic decomposition

Solution:

a. $\text{Zn}(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{H}_2(\text{g})$	iii) Displacement reaction
b. $2\text{AgCl}(\text{s}) \xrightarrow{\text{sunlight}} 2\text{Ag}(\text{s}) + \text{Cl}_2(\text{g})$	i) Photochemical decomposition
c. $2\text{KCl} \xrightarrow{\text{electricity}} 2\text{K} + \text{Cl}_2$	iv) Electrolytic decomposition
d. $2\text{Hg}(\text{s}) \xrightarrow{\Delta} 2\text{HgS} + \text{O}_2$	ii) Thermal decomposition

12. Multiple choice:

a. Which of the following is not a characteristic of a chemical change?

- i. It is irreversible.
- ii. No net energy change is involved.
- iii. New substance is formed.
- iv. Involves absorption or liberation of energy.

b. A reaction of a type: $AB + CD \rightarrow AD + CB$, involves

- i. No chemical change
- ii. Decomposition of AB and CD
- iii. Exchange of ions of AB and CD
- iv. Combination of AB and CD

c. The reaction $BaCl_2(aq) + H_2SO_4(aq) \rightarrow BaSO_4(s) + 2HCl(aq)$ is

- i. Displacement reaction
- ii. Neutralisation reaction
- iii. Decomposition reaction
- iv. Double displacement reaction

d. Thermal decomposition of sodium carbonate will produce

- i. Carbon dioxide
- ii. Oxygen
- iii. Sodium hydroxide
- iv. No other product

Solution:

- a) ii. No net energy change is involved.
- b) iii. Exchange of ions of AB and CD
- c) iv. Double displacement reaction
- d) i. Carbon dioxide

Exercise :2 C

Page no: 32

1. What is a chemical change? Give two examples of chemical change?**Solution:**

A permanent change in which the chemical composition of a substance is changed and a new substance is formed is called as chemical change.

Examples:

Iodine and phosphorus react explosively when brought into close contact.

Plants produce glucose from carbon dioxide and water in presence of sunlight.

2. Why energy is involved in a chemical change?**Solution:**

Energy is involved in a chemical change because of formation and breakdown of bonds. In exothermic reactions energy is released and in endothermic reactions energy is taken in.

3. What do you understand by 'chemical reaction'?**Solution:**

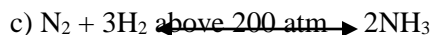
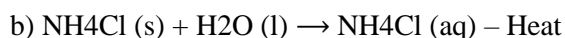
A chemical reaction is a permanent change in which process of chemical bond breakage takes place along with formation of new bonds. A chemical change occurs when particles collide with each other when they are in close contact or else with the help of energy.

4. Give an example of a reaction where the following are involved

(a) Evolution of heat

(b) Absorption of heat

(c) High pressure is required

Solution:

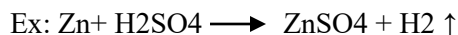
5. State the main characteristics of chemical reactions. Give at least one example in each case

Solution:

Main characteristics of chemical reactions are as follows

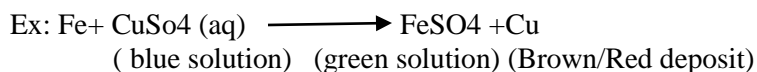
1. Evolution of gas

In certain chemical reactions one of the products will be gas



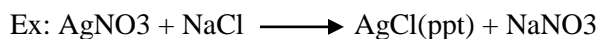
2. Change of Color

Some chemical reactions are characterized by change in color



3. Formation of precipitate

Few chemical reactions give out insoluble solid substance called as precipitates.



4. Change of State

In many chemical reaction change of state is observed. Solid might turn to liquids and gases. Liquids and gases lead to formation of solids.



6. Give an example of each of the following chemical changes.

(a) A reaction involving

(i) Change of state

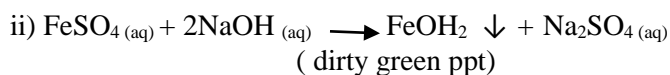
(ii) formation of precipitate

(b) An exothermic and an endothermic reaction involving carbon as one of the reactants.

(c) A reaction where colour change is noticed.

Solution:

a)



b)

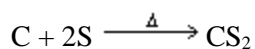
Exothermic reaction:

When carbon burns in oxygen to form carbon dioxide, a lot of heat is produced.

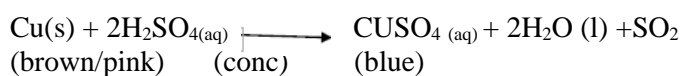


Endothermic reaction:

When carbon is heated with sulphur at high temperature, liquid carbon disulphide is formed.



c)



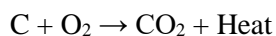
7. Define exothermic and endothermic changes. Give two examples in each case.

Solution:

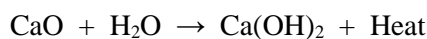
A reaction in which heat is given out is called as **exothermic reactions**, in exothermic reactions energy is released.

Examples:

When carbon burns in oxygen to form carbon dioxide, a lot of heat is produced.



Water added to quick lime (calcium oxide), slaked lime (calcium hydroxide) is produced with a lot of heat energy.



A reaction in which heat is absorbed is called **endothermic reaction**. In endothermic reactions energy is utilized.

Examples:

When ammonium chloride (NH_4Cl) is dissolved in water, an endothermic reaction takes place. The salt dissociates into ammonium (NH_4^+) and chloride (Cl^-) ions. The chemical equation can be written as follows: $\text{NH}_4\text{Cl (s)} + \text{H}_2\text{O (l)} \rightarrow \text{NH}_4\text{Cl (aq)} - \text{Heat}$

Ammonium nitrate (NH_4NO_3), an important component in instant cold packs, dissociates into the ammonium cation (NH_4^+) and the nitrate anion (NO_3^-) when dissolved in water. These ions go on to form ammonium hydroxide (NH_4OH) and nitric acid (HNO_3) respectively (by reacting with the OH^- and H^+ ions in water). This reaction is endothermic in nature since it cools the surroundings by absorbing heat from it.

8. State the effects of endothermic and exothermic reactions on the surroundings.
Solution:

Exothermic reactions releases heat into the surroundings causes increase in temperature of its surroundings.

Endothermic reactions absorbs heat resulting in cooling down of its surroundings.

9. Define:

(a) **Photochemical reaction**

(b) **Electrochemical reaction**

Give one example in each case

Solution:

a) Reaction in which absorption of light takes places is known as photochemical reaction.

Ex: Photosynthesis- $6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow[\text{Sunlight}]{\text{chlorophyll}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

b) Reaction in which there is absorption of electrical energy is called as electrochemical reaction.

Ex: Fused potassium chloride, on passing current through it, breaks into charged particles (ions) of potassium chloride.

$\text{KCl} \xrightarrow{\text{electric current}} \text{K}^+ + \text{Cl}^-$

10. Complete and balance the following reactions:

(a) $\text{NaCl}_{(\text{aq})} + \text{AgNO}_{3(\text{aq})} \rightarrow$

(b) $\text{Pb}(\text{NO}_3)_2 + \text{KI} \rightarrow$

(c) $\text{CuCO}_3 \xrightarrow{\Delta} \rightarrow$

(d) $\text{Pb}(\text{NO}_3)_2 \xrightarrow{\Delta} \rightarrow$

(e) $\text{NH}_3 + \text{O}_2 \xrightarrow{\text{Pt}} \rightarrow$

Solution:

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

(b) $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow 2\text{KNO}_3 + \text{PbI}_2$

(c) $\text{CuCO}_3 \xrightarrow{\Delta} \rightarrow \text{CuO}_{(\text{s})} + \text{CO}_{2(\text{g})}$

(d) $2\text{Pb}(\text{NO}_3)_2 \xrightarrow{\Delta} \rightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$

(e) $4\text{NH}_3 + 5\text{O}_2 \xrightarrow{\text{Pt}} \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$

11. What do you observe? When

- a) Lead nitrate is heated.
- b) Silver chloride is exposed to sunlight.
- c) Hydrogen peroxide is exposed to sunlight.
- d) H_2S gas is passed through copper sulphate solution.
- e) Barium chloride is added to sodium sulphate solution
- f) Water is added to the quick lime.
- g) Sodium chloride solution is added to silver nitrate solution.

Solution:

- a) On heating Lead nitrate it decomposes to give a yellow residue of Lead oxide and brown Nitrogen dioxide with evolution of Oxygen gas.
- b) Exposure of Silver chloride to sunlight leads to thermal decomposition of silver chloride which results in silver chloride break down into silver and chloride.
- c) Hydrogen peroxide breaks down to form water and oxygen gas along with heat energy.
- d) When hydrogen sulphide is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained, and sulphuric acid is formed which remains in the solution.
- e) Barium sulphate precipitate is formed when Barium chloride is added to sodium sulphate solution
- f) Slaked lime, i.e. calcium hydroxide is produced when Water is added to the quick lime.
- g) When sodium chloride is added to the silver nitrate solution, a white curdy precipitate of silver chloride is formed.

12. Name

- (a) a carbonate which do not decompose on heating.
- (b) a nitrate which produces oxygen as the only gas.
- (c) a compound which produces carbon dioxide on heating
- (d) a nitrate which produces brown gas on heating.

Solution:

- a) Sodium carbonate
- b) Sodium nitrate
- c) Zinc carbonate
- d) Lead nitrate