

**CBSE X 2025**

**Chapter and Topic-Wise  
Solved Papers  
2011-2024**

**Science**

 **Career  
Launcher**

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# Science

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# ▶ PREFACE

Class X Board Exams are a race against time. You must know how to manage time efficiently if you want to ace your exams. At Career Launcher, we understand the struggle of attempting such a crucial examination for the first time and the pressure that comes along with it. Which is why, our Chapter and Topic-Wise Solved Papers for Science have been designed to help you become acquainted with the exam pattern and hone your time management skills, both at the same time.

Exclusively designed for the students of CBSE Class X by highly experienced teachers, the book provides answers to all actual questions of Science Board Exams conducted from 2011 to 2024. The solutions have been prepared exactly in coherence with the latest marking pattern; after a careful evaluation of previous year trends of the questions asked in Class X Boards and actual solutions provided by CBSE.

The book follows a three-pronged approach to make your study more focused. The questions are arranged Chapter-wise so that you can begin your preparation with the areas that demand more attention. These are further segmented topic-wise and eventually the break-down is as per the marking scheme. This division will equip you with the ability to gauge which questions require more emphasis and answer accordingly. Apart from this, several value-based questions have also been included.

We hope the book provides the right exposure to Class X students so that you not only ace your Boards but mold a better future for yourself. And as always, Career Launcher's school team is behind you with its experienced gurus to help your career take wings.

Let's face the Boards with more confidence!

Wishing you all the best,

**Team CL**





## Blueprint & Marks Distribution

### Class 10<sup>th</sup> Science 2024-25 Analysis Unit Wise

Units	Name of Units	No of Periods	Marks Distribution
I	Chemical Substances-Nature and Behaviour	55	25
II	World of Living	50	25
III	Natural Phenomena	23	12
IV	Effects of Current	32	13
V	Natural Resources	20	05
	<b>Total</b>		<b>80</b>
	<b>Internal assessment</b>		<b>20</b>
	<b>Grand Total</b>	<b>180</b>	<b>100</b>



# Course Structure

**THEME: MATERIALS**

**(55 PERIODS)**

## Unit I: Chemical Substances - Nature and Behaviour

**Chemical reactions:** Chemical equation, Balanced chemical equation, Implications of a balanced chemical equation, Types of chemical reactions: Combination, Decomposition, Displacement, Double Displacement, Precipitation, Neutralization, Oxidation and Reduction.

**Acids, Bases and Salts:** Their definitions in terms of furnishing of  $H^+$  and  $OH^-$  ions, General properties, Examples and Uses, Concept of pH scale (Definition relating to logarithm not required), Importance of pH in everyday life; Preparation and uses of Sodium Hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.

**Metals and Nonmetals:** Properties of metals and non-metals; Reactivity series; Formation and properties of Ionic Compounds; Basic Metallurgical Processes; Corrosion and its prevention.

**Carbon compounds:** Covalent bonding in carbon compounds; Versatile nature of carbon; Homologous series; Nomenclature of carbon compounds containing functional groups (halogens, alcohol, ketones, aldehydes, alkanes and alkynes); difference between saturated hydrocarbons and unsaturated hydrocarbons; Chemical properties of carbon compounds (combustion, oxidation, addition and substitution reaction); Ethanol and Ethanoic acid (only properties and uses); Soaps and Detergents.

**THEME: THE WORLD OF THE LIVING**

**(50 PERIODS)**

## Unit II: World of Living

**Life processes:** 'Living Being'. Basic concept of nutrition, respiration, transport and excretion in plants and animals.

**Control and co-ordination in animals and plants:** Tropic movements in plants; Introduction of plant hormones; Control and co-ordination in animals: Nervous System; Voluntary, involuntary and reflex action; Chemical co-ordination: animal hormones.

**Reproduction:** Reproduction in animals and plants (asexual and sexual) reproductive health-need and methods of family planning. Safe sex vs HIV/AIDS. Child bearing and women's health.

**Heredity and Evolution:** Heredity; Mendel's contribution- Laws for inheritance of traits: Sex determination: brief introduction: (topics excluded - evolution; evolution and classification and evolution should not be equated with progress).

**THEME: NATURAL PHENOMENA**

**(23 PERIODS)**

**Unit III: Natural Phenomena**

Reflection of light by curved surfaces; Images formed by spherical mirrors, Centre of Curvature, Principal axis, Principal focus, Focal length, Mirror formula (Derivation not required), Magnification.

Refraction; Laws of Refraction, Refractive Index.

Refraction of light by Spherical Lens; Image formed by Spherical Lenses; Lens formula (Derivation not required); Magnification. Power of a lens.

Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses.

Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life. (excluding colour of the sun at sunrise and sunset).

**THEME: HOW THINGS WORK**

**(32 PERIODS)**

**Unit IV: Effects of Current**

Electric current, potential difference and electric current. Ohm's law; Resistance, Resistivity, Factors on which the resistance of a conductor depends. Series combination of resistors, parallel combination of resistors and its applications in daily life. Heating effect of electric current and its applications in daily life. Electric power, Interrelation between P, V, I and R.

**Magnetic effects of current :** Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid; Force on current carrying conductor, Fleming's Left Hand Rule, Electric Motor, Electromagnetic induction. Induced potential difference, Induced current. Fleming's Right Hand Rule, Electric Generator, Direct current. Alternating current : frequency of AC. Advantage of AC over DC. Domestic electric circuits.

**Unit V: Natural Resources**

**Our environment:** Eco-system, Environmental problems, Ozone depletion, Waste Production and their solutions. Biodegradable and Non-biodegradable substances.

**Note for the Teachers:**

1. The chapter Management of Natural Resources (NCERT Chapter 16) will not be assessed in the year-end examination. However, learners may be assigned to read this chapter and encouraged to prepare a brief write up to any concept of this chapter in their Portfolio. This may be for Internal Assessment and credit may be given Periodic Assessment/Portfolio).
2. The NCERT text books present information in boxes across the book. These help students to get conceptual clarity. However, the information in these boxes would not be assessed in the year-end examination.

# PRACTICALS

Practical should be conducted alongside the concepts taught in theory classes

## LIST OF EXPERIMENTS

1. A. Finding the pH of the following samples by using pH paper/universal indicator:

Unit-I

- (i) Dilute Hydrochloric Acid
  - (ii) Dilute NaOH solution
  - (iii) Dilute Ethanoic Acid solution
  - (iv) Lemon juice
  - (v) Water
  - (vi) Dilute Hydrogen Carbonate solution
- B. Studying the properties of acids and bases (HCl & NaOH) on the basis of their reaction with:

Unit-I

- a) Litmus solution (Blue/Red)
- b) Zinc metal
- c) Solid sodium carbonate

2. Performing and observing the following reactions and classifying them into:

Unit-I

- A. Combination reaction
- B. Decomposition reaction
- C. Displacement reaction
- D. Double displacement reaction
  - (i) Action of water on quicklime
  - (ii) Action of heat on ferrous sulphate crystals
  - (iii) Iron nails kept in copper sulphate solution
  - (iv) Reaction between sodium sulphate and barium chloride solutions

3. Observing the action of Zn, Fe, Cu and Al metals on the following salt solutions:

Unit-I

- (i)  $\text{ZnSO}_4(\text{aq})$
- (ii)  $\text{FeSO}_4(\text{aq})$
- (iii)  $\text{CuSO}_4(\text{aq})$
- (iv)  $\text{Al}_2(\text{SO}_4)_3(\text{aq})$

Arranging Zn, Fe, Cu and Al (metals) in the decreasing order of reactivity based on the above result.

4. Studying the dependence of potential difference ( $V$ ) across a resistor on the current ( $I$ ) passing through it and determine its resistance. Also plotting a graph between  $V$  and  $I$ . Unit-IV
5. Determination of the equivalent resistance of two resistors when connected in series and parallel. Unit-IV
6. Preparing a temporary mount of a leaf peel to show stomata. Unit- II
7. Experimentally show that carbon dioxide is given out during respiration. Unit-II
8. Study of the following properties of acetic acid (ethanoic acid): Unit- I
  - (i) Odour
  - (ii) solubility in water
  - (iii) effect on litmus
  - (iv) reaction with Sodium Hydrogen Carbonate
9. Study of the comparative cleaning capacity of a sample of soap in soft and hard water. Unit- I
10. Determination of the focal length of: Unit-III
  - (i) Concave mirror
  - (ii) Convex lensby obtaining the image of a distant object.
11. Tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence. Measure the angle of incidence, angle of refraction, angle of emergence and interpret the result. Unit - III
12. Studying (a) binary fission in Amoeba, and (b) budding in yeast and Hydra with the help of prepared slides. Unit-II
13. Tracing the path of the rays of light through a glass prism. Unit-III
14. Identification of the different parts of an embryo of a dicot seed (Pea, gram or red kidney bean). Unit-II





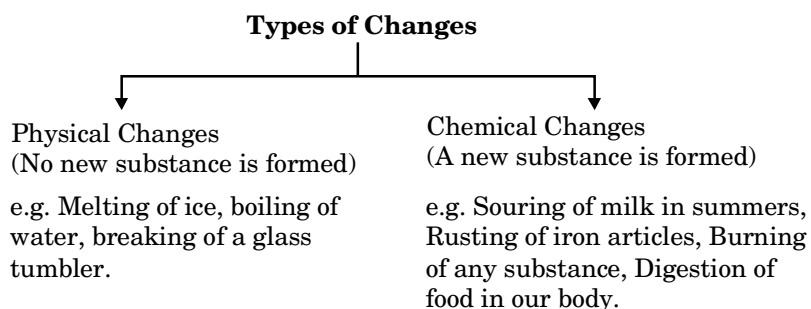
# Chemical Reaction and Equations

## Topic 1: Chemical Reactions & Equations

### Summary

**Knowing your Chapter at Glance:**

- Universe is recognised by two major changes:- chemical changes and physical changes.



- **Chemical reaction** is the process of breaking and making of bonds between different atoms to produce new substances.

## Examples

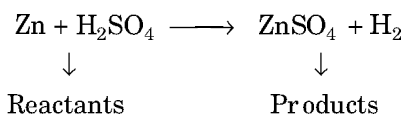
Rutherford observed the deflection of alpha particles after passing through metal sheet and proposed his atomic model

## Digestion of food

The burning of magnesium in air to form magnesium oxide

The two main components of the chemical reaction are **Reactants** which are the substances that take part in a chemical reaction.

**Product(s)** that are formed as a result of chemical reaction between the reactants.



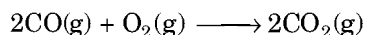
A chemical reaction is accompanied by the following chemical change that is observed as:

- Change in state
- Change in colour
- Evolution of gas
- Change in temperature
- Formation of precipitate
- Chemical equation is the representation of chemical reactions in the form of formulae.

While writing a chemical reaction the following steps must be employed

- The symbols and formulae of the reacting substances are written on the LHS with a plus sign(+) between them.
- The symbols and the formulae of the product formed are written on the RHS with a plus sign(+) between them.
- The LHS and RHS are connected by an arrow sign( $\rightarrow$ ).
- To make the equation more informative, states of the reactants and the products are also mentioned.

## Example

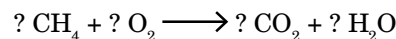


- Balanced equation is the one which has same number of atoms of each element on the LHS and RHS of the equation.

Balancing is done in accordance with the **law of conservation of mass** which states that “the total mass of the elements present in the products of the chemical reaction is equal to the total mass of the elements present in the reactants.

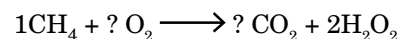
## CHAPTER 1 : Chemical Reaction and Equations

Example of Balancing a Chemical Equation (? means coefficient missing)

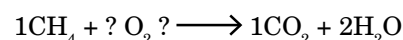


- Identify the elements in the equation: C, H, O
- Identify the net charge: no net charge, which makes this one easy!
- H is found in  $\text{CH}_4$  and  $\text{H}_2\text{O}$ , so it's a good starting element.

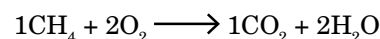
You have 4 'H' in  $\text{CH}_4$  yet only 2 'H' in  $\text{H}_2\text{O}$ , so you need to double the coefficient of  $\text{H}_2\text{O}$  to balance H.



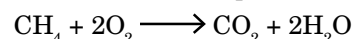
- Looking at carbon, you can see that  $\text{CH}_4$  and  $\text{CO}_2$  must have the same coefficient.



- Finally, determine the 'O' coefficient. You can see you need to double the  $\text{O}_2$  coefficient in order to get 4 'O' seen on the product side of the reaction.



So the final balanced equation would be written:



# PREVIOUS YEARS' EXAMINATION QUESTIONS

## TOPIC 1

### ▣ 1 Mark Questions

1. Which one is a chemical change – rusting of iron or melting of iron? [TERM 1, 2011]
2. Why do silver articles become black after some time when exposed to air? [TERM 1, 2011]
3. The aqueous solutions of copper sulphate and zinc sulphate appear
  - (a) Blue and green respectively
  - (b) Green and colourless respectively
  - (c) Blue and brown respectively
  - (d) Blue and colourless respectively
 [TERM 1, 2012]
4. When crystals of  $\text{FeSO}_4$  are strongly heated the residue obtained is
  - (a) reddish brown in colour.
  - (b) blue in colour.
  - (c) green in colour.
  - (d) colourless.
 [TERM 1, 2013]

5. A student took solid quicklime in a china dish and added a small amount of water to it. He would hear:  
 (a) A pop sound (b) A crackling sound  
 (c) A hissing sound (d) No sound at all  
 [TERM 1, 2015]
6. The chemical reaction between barium chloride and sodium sulphate is an example of  
 (a) combination reaction  
 (b) decomposition reaction  
 (c) displacement reaction  
 (d) double displacement reaction  
 [TERM 1, 2016]
7. Which gas is evolved in the reaction of Zinc metal and  $NaOH$   
 (a)  $Cl_2$  (b)  $H_2O$   
 (c)  $O_2$  (d)  $H_2$   
 [TERM 1, 2016]
8. Barium Sulphate is:  
 (a) White (b) Yellow  
 (c) Green (d) Red  
 [TERM 1, 2016]
9. When sodium sulphate solution and barium chloride solution are mixed together, the colour of precipitate formed is:  
 (a) Yellow (b) Green  
 (c) White (d) Red  
 [TERM 1, 2017]
10. While doing an experiment a student observed that the blue colour of the aqueous copper sulphate was changed to pale green by immersing a metal rod in it. The metal of the rod used by the student is:  
 (a) iron (b) zinc  
 (c) silver (d) aluminium  
 [TERM 1, 2017]
11. In which of the following, the identity of initial substance remains unchanged?  
 (a) Curdling of milk  
 (b) Formation of crystals by process of crystallisation  
 (c) Fermentation of grapes  
 (d) Digestion of food [2020]
12. It is important to balance the chemical equations to satisfy the law of conservation of mass. Which of the following statements of the law is incorrect?  
 (a) The total mass of the elements present in the reactants is equal to the total mass of the elements presents in the products.  
 (b) The number of atoms of each element remains the same, before and after a chemical reaction.  
 (c) The chemical composition of the reactants is the same before and after the reaction.  
 (d) Mass can neither be created nor can it be destroyed in a chemical reaction  
 [TERM 1, 2022]
13. To balance the following chemical equation the values of x and y should respectively be:  
 $2NaOH + xAl_2O_3 \rightarrow yNaAlO_2 + H_2O$   
 (a) 1, 4 (b) 1, 2  
 (c) 2, 4 (d) 2, 3 [2023]
- ### ▣ 2 Marks Questions
14. Reddish brown deposit observed on iron nails, when these are kept in aqueous solution of copper sulphate solution is that of  
 (a)  $Cu_2O$  (b)  $CuO$   
 (c)  $Cu$  (d)  $CuS$   
 [TERM 1, 2013, 2017]
15. Write chemical equations for the reactions taking place when  
 (i) Zinc sulphide is heated in air  
 (ii) Calcination of zinc carbonate is done.  
 [TERM 1, 2017]
16. "Respiration is an exothermic reaction." Justify this statement giving the chemical equation for the reaction involved. [TERM 1, 2017]
17. What is observed when a solution of sodium sulphate is added to a solution of barium chloride taken in a test tube? Write equation for the chemical reaction involved and name the type of reaction in this case. [TERM 1, 2018]
18. A student added few pieces of aluminium metal to two test tubes A and B containing aqueous solutions of iron sulphate and copper sulphate. In the second part of her experiment, she added iron metal to another test tubes C and D containing aqueous solutions of aluminium sulphate and copper sulphate.  
 In which test tube or test tubes will she observe color change? On the basis of this experiment, state which one is the most reactive metal and why?  
 [TERM 1, 2018]

### 3 Marks Questions

19. (a) Oil and fat containing food items are flushed with nitrogen while packing them why?  
(b) Why do we apply paint on iron articles?

[TERM 1, 2011]

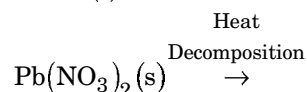
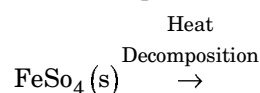
20. A solution of a substance 'X' is used for white washing.

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

- (iii) Write the balanced equation for the following chemical reaction.

[TERM 1, 2013, 2015]

21. Complete the following reactions and write the balanced equations:



[TERM 1, 2014]

22. Write balanced chemical equations for the following chemical reactions

- (a) Hydrogen + Chlorine  $\rightarrow$  Hydrogen Chloride  
(b) Lead + Copper Chloride  $\rightarrow$  Lead Chloride + Copper  
(c) Zinc Oxide + Carbon  $\rightarrow$  Zinc + Carbon Monoxide

[TERM 1, 2016]

23. The color of copper sulphate solution changes when an iron nail is dipped in it. State the giving chemical equation for the reaction involved. Write the name of reaction involved.

[TERM 1, 2017]

24. (a) Identify the substance oxidized, substance reduced, oxidizing agent and reducing agent in the following reaction:  $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$

- (b) Packets of potato chips are flushed with nitrogen gas, why?

[TERM 1, 2017]

### 5 Marks Questions

25. Write balanced chemical equation for the reactions taking place when

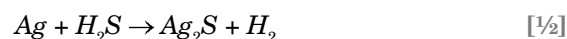
- (a) Zinc carbonate is calcinated.  
(b) Zinc sulphide is roasted.  
(c) Zinc oxide is reduced to Zinc.  
(d) Cinnabar is heated in the air.  
(e) Manganese dioxide is heated with Aluminium Powder



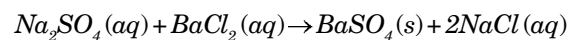
### Solutions

1. Rusting of iron is a chemical change. In a chemical change the reactants react together to form a new product and it is not a reversible change i.e. we cannot get back the reactants from the product. That is why rusting of iron is said to be a chemical change because the pure iron metal cannot be extracted from the rusted iron. [1]

2. When silver articles are exposed to air it becomes black after some time because the silver metal reacts with hydrogen sulphide present in the atmosphere that leads to the formation of silver sulphide ( $\text{Ag}_2\text{S}$ ) because of which they appear dull and black. This is a kind of corrosion of silver metal. [ $\frac{1}{2}$ ]



3. Any reaction that produces a precipitate can be called a precipitation reaction. For example, a white precipitate is formed when aqueous solution of barium chloride is reacted with an aqueous solution of sodium sulphate. The chemical reaction can be represented as: [ $\frac{1}{2}$ ]



The white precipitate of  $\text{BaSO}_4$  is formed by the reaction of  $\text{SO}_4^{2-}$  and  $\text{Ba}^{2+}$ . The other product formed is sodium chloride which remains in the solution. Such reactions in which there is an exchange of ions between the reactants are called double displacement reactions. [ $\frac{1}{2}$ ]

Hence, option (d) is correct.

4. The aqueous solutions of copper sulphate and zinc sulphate appear blue and colourless respectively. [1]

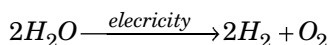
5. In the given reaction, Lead oxide (undergoing reduction) loses oxygen hence it is getting reduced and carbon (undergoing oxidation) gains oxygen hence, it is getting oxidized. [1]

Therefore, statement (i) and (ii) are incorrect.

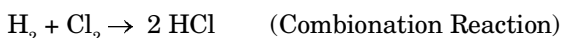
Hence, the correct answer is option A.

6. In the decomposition reaction one substance decomposes into two or more substances whereas in a combination reaction two or more substances are combined to form a new substance. Therefore, decomposition reactions and combination reactions are basically the opposite of each other. [1]

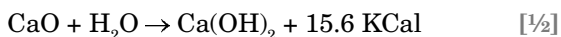
Examples:



(Decomposition Reaction)



7. A student took solid quicklime in a china dish and added a small amount of water to it. As it is an exothermic reaction he would hear a steady hissing sound till the chemical reaction completes [½]

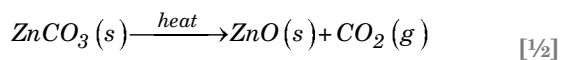


8.  $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$  [½]

Above reaction shows the chemical reaction between barium chloride and sodium sulphate, which is essentially a double displacement reaction (as there is exchange of ions between reactants). [½]

Hence the correct option is option (d).

9. Barium Sulphate is white in colour. Hence, the correct option is (a). [1]
10. When zinc carbonate is heated in absence of air, it releases carbon dioxide gas and forms Zinc oxide. [½]



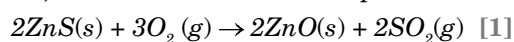
11. (b) Formation of crystals by process of crystallisation. [1]
12. (c) The chemical composition of the reactants is the same before and after the reaction.

During a chemical reaction, new atoms or molecules of reactants collide to form new bonds and break old bonds the reacting atoms rearrange themselves to form the product. As a result, the chemical composition of the reactants gets modified after the reaction. Hence, this is the incorrect statement. [1]

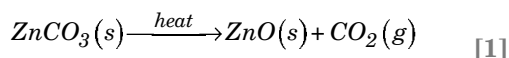
13. (b) The values of x and y should be 1 and 2 respectively in order to get a balanced chemical equation. [1]

14. When iron rod is immersed in copper sulphate solution, a green colour solution of ferrous sulphate ( $FeSO_4$ ) and copper ( $Cu$ ) is obtained due to displacement reaction [2]

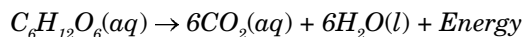
15. (i) When zinc sulphide is heated in presence of air, it forms zinc oxide and sulphur dioxide.



- (ii) When zinc carbonate is calcinated, it forms zinc oxide and carbon dioxide gas.

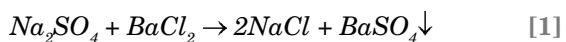


16. During respiration, the carbohydrates are broken down to form glucose. This glucose combines with oxygen in our cells to form carbon dioxide and water along with the production of energy (heat). [1]



Respiration is termed as exothermic process since energy is released during the process. [1]

17. This is a double displacement reaction. A white precipitate of barium sulphate is formed, when sodium sulphate is added to a solution of barium chloride. This precipitate is insoluble in water. Sodium chloride is also formed which is dissolved in water. [1]



18. In test tube A, aluminium is added to aqueous solution of iron sulphate where green color of iron sulphate disappears. [½]

In test tube B, aluminium is added to aqueous solution of copper sulphate where blue color of copper sulphate disappears and brown colored particles of copper settles at the bottom. [½]

In test tube C, Iron is added to aluminium sulphate solution where iron cannot displace aluminium being less reactive so the solution remains colorless. [½]

In test tube D, iron is added to copper sulphate solution where blue color of copper sulphate changes to light green color. [½]

Color change is observed in test tube A, B and D.

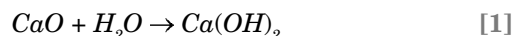
Aluminium metal is the most reactive as it does not get displaced. It lies above all other metals in the reactivity series.

19. (a) Nitrogen acts as an antioxidant and it prevents the food material from being oxidised. It is an inert gas and does not react easily with the oil and fat present in the food substances. [1½]

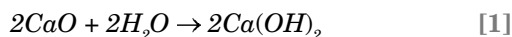
- (b) Paint is applied on the iron articles to prevent them from rusting. Paints prevent iron from coming in contact with moisture and air. [1½]

20. (i) The substance 'X' is calcium oxide which is also known as Quick lime. The formula of calcium oxide is. [1]

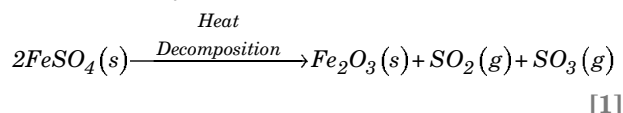
- (ii) Calcium oxide after reacting with water gives calcium hydroxide or Slaked lime.



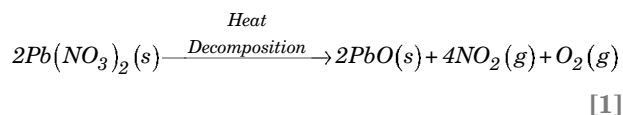
(iii) Following is the balanced equation of the above chemical reaction:



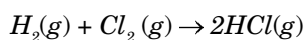
21. Ferrous sulphate crystals ( $FeSO_4 \cdot 7H_2O$ ) lose water when heated and the colour of the crystals changes. It then decomposes to ferric oxide ( $Fe_2O_3$ ), sulphur dioxide ( $SO_2$ ) and sulphur trioxide ( $SO_3$ ). Ferric oxide is a solid, while ( $SO_2$ ) and ( $SO_3$ ) are gases.



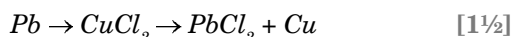
Lead nitrate decomposes to form solid Lead oxide ( $PbO$ ) and Nitrogen dioxide ( $NO_2$ ) and oxygen ( $O_2$ ).



22. (a) Hydrogen + Chlorine  $\rightarrow$  Hydrogen Chloride



Lead + Copper Chloride  $\rightarrow$  Lead Chloride + Copper



- (b) Zinc Oxide + Carbon  $\rightarrow$  Zinc + Carbon Monoxide



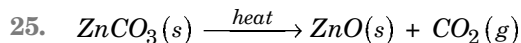
23. The color of copper sulphate solution changes when an iron nail is dipped in it. This happens because iron is more reactive than copper and therefore it displaces copper from the copper sulphate solution. Therefore the change in color is from blue to green. [1½]

The reaction involved is:

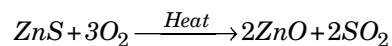


This is a displacement reaction.

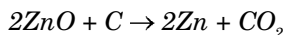
24. (a) In the given reaction,  
 $ZnO + C \rightarrow Zn + CO$   
 Substance oxidized:- C  
 Substance reduced:- ZnO  
 Oxidizing agent:- ZnO  
 Reducing agent:- C [1½]
- (b) The packet of the potato chips is filled with nitrogen gas to prevent it from oxidizing. As nitrogen gas is very stable and unreactive so it prevents the chips from rancidity. [1½]



When zinc carbonate is calcinated, it gives zinc oxide and carbon dioxide. [1]

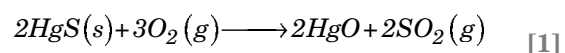


Zinc sulphide, when roasted in presence of air, gives zinc oxide and sulphur dioxide. [1]

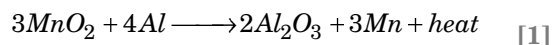


When zinc oxide is reacted with carbon, it is reduced to zinc with evolution of carbon dioxide gas. [1]

Cinnabar is the common name for Mercury sulfide ( $HgS$ ). When cinnabar is heated in the air, following reaction takes place



Manganese dioxide when heated with aluminium powder gives following reaction.



## MULTIPLE CHOICE QUESTIONS

- Which of the following is not a physical change?
  - Boiling of water to give water vapour
  - Melting of ice to give water
  - Dissolution of salt in water
  - Combustion of Liquefied petroleum Gas (LPG)
- The following reaction is an example of a
  $4NH_3(g) + 5O_2(g) \longrightarrow 4NO(g) + 6H_2O(g)$ 
  - Displacement reaction
  - Redox reaction
  - both a and b
  - None of the above
- Which of the following statements about the given reaction are correct?
  $3Fe(s) + 4H_2O(g) \longrightarrow Fe_3O_4(s) + 4H_2(g)$ 
  - Iron metal is getting oxidized
  - Water is getting reduced
  - Water is acting as reducing agent
  - Water is acting as oxidizing agent
  - a, b and d
- Which of the following are exothermic processes?
  - Reaction of water with quick lime
  - Dilution of an acid
  - Evaporation of water
  - Sublimation of camphor (crystals)
  - both a and b

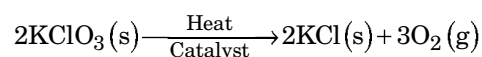
5. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is

(a) 1 : 1                      (b) 2 : 1  
(c) 4 : 1                      (d) 1 : 2

6. Which of the following gases can be used for storage of fresh sample of an oil for a long time?

(a) Carbon dioxide or oxygen  
(b) Nitrogen or oxygen  
(c) Carbon dioxide or helium  
(d) Helium or nitrogen

7. The following reaction is used for the preparation of oxygen gas in the laboratory

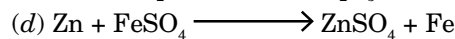
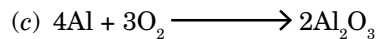


Which of the following statement(s) is/are correct about the reaction?

- (a) It is a decomposition reaction and endothermic in nature  
(b) It is a combination reaction  
(c) It is a decomposition reaction and accompanied by release of heat.  
(d) It is a photochemical decomposition reaction and exothermic in nature
8. Which one of the following process involve chemical reactions?
- (a) Storing of oxygen gas under pressure in a gas cylinder  
(b) Liquefaction of air  
(c) Keeping petrol in a china dish in the open  
(d) Heating copper wire in the presence of air at higher temperature
9. In which of the following chemical equations, the abbreviations represent the correct states of the reactants and products involved at reaction temperature?
- (a)  $2\text{H}_2(\text{l}) + \text{O}_2(\text{l}) \rightarrow 2\text{H}_2\text{O}(\text{g})$   
(b)  $2\text{H}_2(\text{g}) + \text{O}_2(\text{l}) \rightarrow 2\text{H}_2\text{O}(\text{g})$   
(c)  $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{l})$   
(d)  $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$

10. Which of the following are combination reactions?

(a)  $2\text{KClO}_3 \xrightarrow{\text{Heat}} 2\text{KCl} + 3\text{O}_2$   
(b)  $\text{MgO} + \text{H}_2\text{O} \longrightarrow \text{Mg}(\text{OH})_2$



(e) Both b and c

### Answer Key

1. (d)    2. (c)    3. (e)    4. (e)    5. (b)  
6. (d)    7. (a)    8. (d)    9. (c)    10. (e)



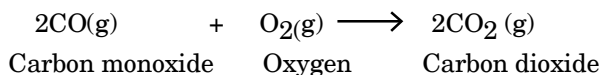
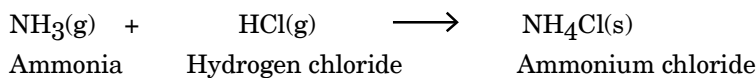
### Solutions

- A physical change involves only change in physical state whereas a chemical change results the formation of new substances. Boiling of water, melting of ice and dissolution of salt are physical changes as no new products are formed. [1]
- A Redox reaction is combination of oxidation (removal of hydrogen) and reduction (addition of hydrogen). Displacement reaction involves displacement of some part of a compound with other atom like H atoms of  $\text{NH}_2$  are displaced by oxygen. [1]
- Addition of oxygen to Fe is an oxidation process whereas lose of oxygen from  $\text{H}_2\text{O}$  to  $\text{H}_2$  is a reduction step since water is source of oxygen therefore it acts as oxidizing agent. [1]
- Energy is released in exothermic reactions in the form of heat. [1]
- The balance chemical equation for electrolysis of water is;  
 $2\text{H}_2\text{O}(\text{l}) \xrightarrow{\text{Electric Current}} 2\text{H}_2(\text{g}) + \text{O}_2(\text{g})$  [1]
- Inert gases like Helium and Nitrogen can be used for storage of food items as they prevent the oxidation of food items. [1]
- Decomposition reaction can be defined as the reaction which involves decomposition of one compound to more than one substance. Endothermic reactions require heat energy to form products [1]
- Chemical changes involve formation of new compounds from one of more substances. Reaction of copper wire with oxygen forms copper oxide. [1]
- At standard conditions, hydrogen and oxygen exist in gaseous state whereas water in liquid state. [1]
- Combination reactions form a new product with the combination of more than one reactant molecules. [1]

## Topic 2: Types of Chemical Reactions, Corrosion and Rancidity

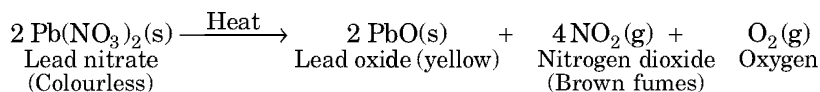
The chemical reactions are of the following types-

- In combination reactions, two or more than two elements combine to give one single product.



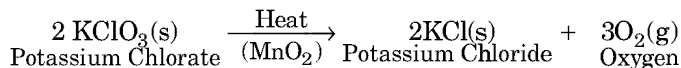
This reaction is a combination reaction, as ammonia and hydrogen chloride combine together to form ammonium chloride as a single product.

- Decomposition is splitting of a compound into two or more simpler products.

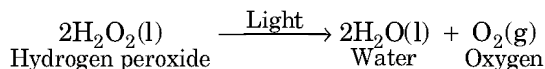


Decomposition reaction can be accomplished by supplying energy in the form of heat, electricity or light.

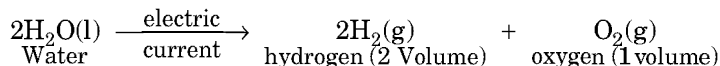
- Thermal decomposition** reaction is the one where energy is supplied as heat.



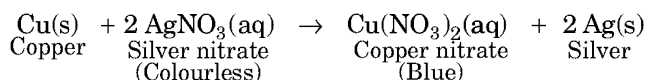
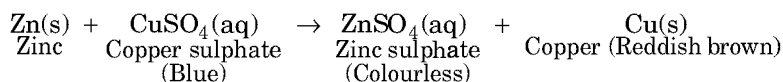
- Photo decomposition** reaction is the one where energy is supplied as light.



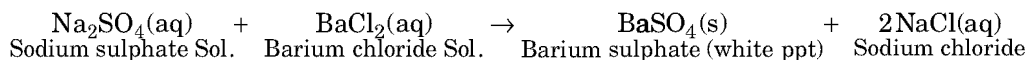
- Electrolytic decomposition** reaction is the one where energy is supplied as electricity.



- In **displacement reaction**, the more reactive metal displaces the less reactive metal from a compound.



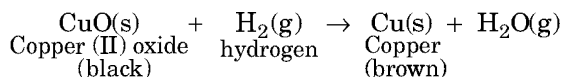
- The reactions in which the different atoms or group of atoms are displaced by other atoms or group of atoms, i.e two compounds exchange their ions and one of the products formed is insoluble are said to be **double displacement reactions**.



- Redox reactions**

In the term 'redox', 'red' stands for reduction and 'ox' stands for oxidation.

Thus the reactions in which oxidation and reduction take place simultaneously are called Redox reactions, i.e. in redox reactions one substance is oxidized and other is reduced.





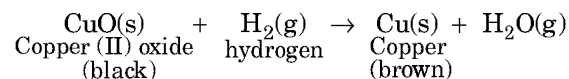
## IMPORTANT TERMS IN REDOX REACTION

**Oxidation:** Reaction that involves the gain of oxygen or loss of hydrogen.

**Reduction:** Reaction that shows the loss of oxygen or gain of hydrogen.

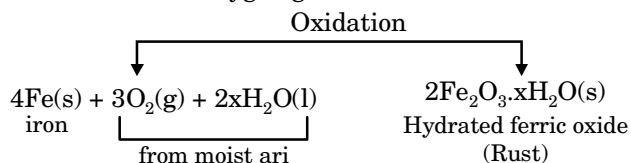
**Oxidising agent:** It is a substance which itself gets reduced but oxidizes the other substance.

**Reducing agent:** It is a substance which itself gets oxidized but reduces the other substance.



In the above equation CuO is undergoing reduction and H<sub>2</sub> is undergoing oxidation. Hence CuO acts as oxidising agent and H<sub>2</sub> acts as reducing agent.

- **Corrosion:** The surface of the reactive metals are attacked by air, water and the other substances around it, and corrodes while the process is called corrosion. It is a redox reaction where metal gets oxidised to metal oxide and oxygen gets reduced to oxide ions.



This reaction is called corrosion of iron or rusting.

## Prevention of rusting

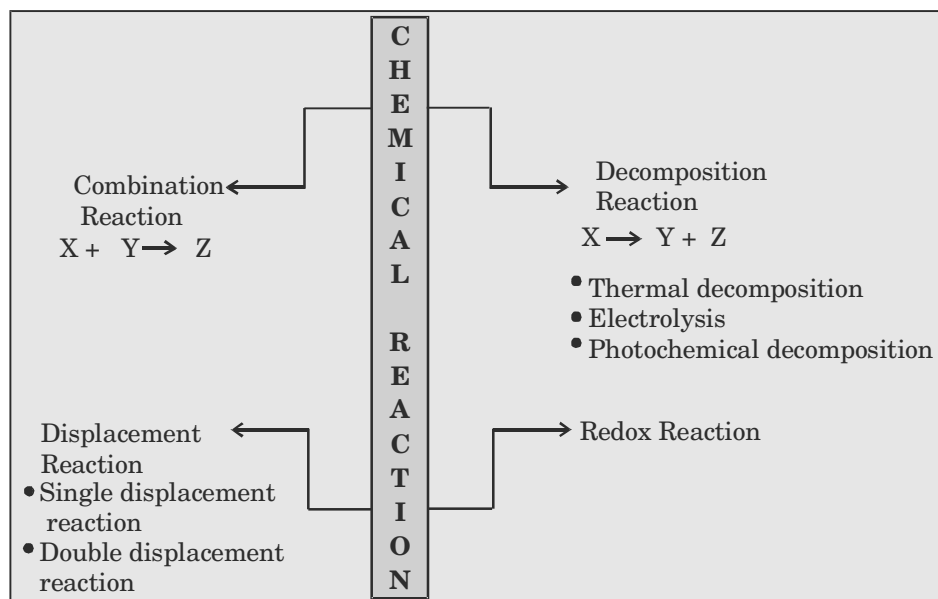
- By painting
- By lubricating it with oil or grease
- By galvanising (coating with active metals like zinc)
- By alloying
- **Rancidity:** Oils and fats when get oxidized on exposure to air results in the production of foul odour and taste in them.

## Methods to prevent Rancidity

Packing of food materials in air tight containers flushed with inert gases like nitrogen.

Refrigeration of cooked food at low temperature.

### Chapter in Brief:



# PREVIOUS YEARS' EXAMINATION QUESTIONS

## TOPIC 2

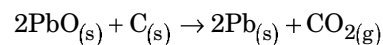
### 1 Mark Questions

1. Rahul adds aqueous solution of barium chloride to an aqueous solution of sodium sulphate. He would observe that

- (a) a pungent smelling gas is evolved.  
 (b) the colour of the solution turns red.  
 (c) a yellow precipitate is formed after sometime.  
 (d) a white precipitate is formed almost immediately [TERM 1, 2011]

2. Define the term rancidity. [TERM 1, 2014]

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



- (i) Lead is getting reduced.  
 (ii) Carbon dioxide is getting oxidized.  
 (iii) Carbon is getting oxidized.  
 (iv) Lead oxide is getting reduced.

- (a) (i) and (ii)  
 (b) (i) and (iii)  
 (c) (i), (ii) and (iii)  
 (d) All [TERM 1, 2014]

4. Why decomposition reactions are called the opposite of combination reactions?

[TERM 1, 2015]

5. What happens when  $\text{ZnCO}_3$  is heated in the absence of air? Give the relevant equation.

[TERM 1, 2017]

6. A student took Sodium Sulphate solution in a test tube and added barium Chloride solution to it. He observed that an insoluble substance has formed. The colour and molecular formula of the insoluble substance is :

- (a) Grey,  $\text{Ba}_2\text{SO}_4$   
 (b) Yellow,  $\text{Ba}(\text{SO}_4)_2$   
 (c) White,  $\text{BaSO}_4$   
 (d) Pink,  $\text{BaSO}_4$

[TERM 1, 2022]

7. Which of the following statements about the reaction given below are correct?



- (i) HCl is oxidized to  $\text{Cl}_2$   
 (ii)  $\text{MnO}_2$  is reduced to  $\text{MnCl}_2$   
 (iii)  $\text{MnCl}_2$  acts as an oxidizing agent  
 (iv) HCl acts as an oxidizing agent

- (a) (ii), (iii) and (iv)  
 (b) (i), (ii) and (iii)  
 (c) (i) and (ii) only  
 (d) (iii) and (iv) only [TERM 1, 2022]

8. Which one of the following reactions is categorised as thermal decomposition reaction?

- (a)  $2\text{H}_2\text{O}(l) \rightarrow 2\text{H}_2(g) + \text{O}_2(g)$   
 (b)  $2\text{AgBr}(s) \rightarrow 2\text{Ag}(s) + \text{Br}_2(g)$   
 (c)  $2\text{AgCl}(s) \rightarrow 2\text{Ag}(s) + \text{Cl}_2(g)$   
 (d)  $\text{CaCO}_3(s) \rightarrow \text{CaO}(s) + \text{CO}_2(g)$

[TERM 1, 2022]

9. The pair(s) which will show displacement reaction is/are

- (i) NaCl solution and copper metal  
 (ii)  $\text{AgNO}_3$  solution and copper metal  
 (iii)  $\text{Al}_2(\text{SO}_4)_3$  Solution and magnesium metal  
 (iv)  $\text{ZnSO}_4$  solution and iron metal

- (a) (ii) only  
 (b) (ii) and (iii)  
 (c) (iii) and (iv)  
 (d) (i) and (ii)

[TERM 1, 2022]

10. Consists of two statements – Assertion (A) and Reason (R). Answer the questions selecting the appropriate option given below :

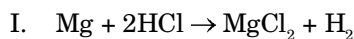
**Assertion (A) :** Burning of Natural gas is an endothermic process.

**Reason (R) :** Methane gas combines with oxygen to produce carbon dioxide and water.

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).  
 (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).  
 (c) (A) is true, but (R) is false.  
 (d) (A) is false, but (R) is true.

[TERM 1, 2022]

11. Consider the following chemical equation I and II



The correct statement about these equations is –

- (a) 'I' is a displacement reaction and 'II' is a decomposition reaction.  
 (b) 'I' is a displacement reaction and 'II' is double displacement reaction.  
 (c) Both 'I' and 'II' are displacement reactions.  
 (d) Both 'I' and 'II' are double-displacement reactions. [2023]

### ▣ 2 Marks Questions

12. When an iron nail rubbed with sand paper is dipped in copper sulphate solution, we observe that copper gets deposited

- (a) first on the lower part of the nail and proceeds to the upper part.  
 (b) first on the upper part of the nail and proceeds to the lower part.  
 (c) on the entire surface of the nail.  
 (d) on the nail in small patches

[TERM 1, 2011]

13. Give an example each for thermal decomposition and photo chemical decomposition reactions. Write relevant balanced chemical equations also. [TERM 1, 2011]

14. Burning of candle is accompanied by both physical and chemical change. Mention the observations which help to deduce that both physical and chemical changes are taking place.

[TERM 1, 2014]

15. 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? [TERM 1, 2015]

16. Write observation with reaction for the following: Granulated zinc reacts with dil. sulphuric acid.

[TERM 1, 2017]

17. A metal nitrate 'A' on heating gives a metal oxide along with evolution of a brown coloured gas 'B' and a colourless gas, which helps in burning. Aqueous solution of 'A' when reacted with potassium iodide forms a yellow precipitate.

- (a) Identify 'A' and 'B'  
 (b) Name the types of both the reactions involved in the above statement. [2023]

### ▣ 3 Marks Questions

18. (a) What happens when a strip of lead metal is placed in a solution of copper chloride?

Write the balanced chemical equation for the reaction along with the colour changes observed during the reaction.

- (b) What are precipitation reactions? Give one example of precipitation reaction

[TERM 1, 2015]

19. Explain why:

- (a) Digestion of food is a decomposition reaction.  
 (b) All decomposition reactions are endothermic reactions.  
 (c) A popping sound is produced when a burning candle is brought near mouth of a test tube used in electrolysis of water.

[TERM 1, 2015]

20. Describe the use of aluminium as reducing agent for reduction of metal oxides. Give the equations involved. [TERM 1, 2015]

21. 2 ml of sodium hydroxide solution is added to a few pieces of granulated zinc metal taken in a test tube. When the contents are warmed, a gas evolves which is bubbled through a soap solution before testing. Write the equation of the chemical reaction involved and the test to detect the gas. Name the gas which will be evolved when the same metal reacts with dilute solution of a strong acid. [TERM 1, 2018]

22. Decomposition reactions require energy either in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity. [TERM 1, 2018]

23. 2 g of silver chloride is taken in a china dish and the china dish is placed in sunlight for some time. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction.

OR

Identify the type of reactions taking place in each of the following cases and write the balanced chemical equation for the reactions:

- (a) Zinc reacts with silver nitrate to produce zinc nitrate and silver.  
 (b) Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide. [2019]

24. Mention with reason the colour changes observed when :
- silver chloride is exposed to sunlight.
  - copper powder is strongly heated in the presence of oxygen.
  - a piece of zinc is dropped in copper sulphate solution. [2020]
25. A reddish brown metal used in electrical wires when powdered and heated strongly turn black. When hydrogen gas is passed over this black substance, it regains its original colour. Based on this information answer the following questions –
- Name the metal and the black substance formed. [2023]
  - Write balanced chemical equations for the two reactions involved in the above information. [2023]

### ▣ 5 Marks Questions

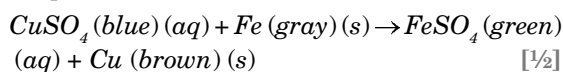
26. (a) Name and describe giving chemical equation of the process used for producing sodium hydroxide. Why is this process so named?
- (b) Give one use of each of any two products obtained in this process.

[TERM 1, 2016]



## Solutions

1. The following will be the reaction when an iron nail rubbed with sand paper is dipped in copper sulphate solution:



When a piece of more reactive metal is immersed in an aqueous salt solution of a less reactive metal, a displacement reaction takes place, in which the less reactive metal precipitates out in its original solid form and the more reactive metal forms the aqueous salt solution. Hence, the copper being less reactive than iron deposits on the entire surface of iron nail because complete surface of iron is exposed simultaneously into the solution for reaction. [1/2]

Hence, option (c) is correct.

2. The correct option is (a) reddish brown in colour. After heating strongly iron oxide is formed which is reddish-brown in colour. ( 1 mark question, so the reaction is not required). [1]

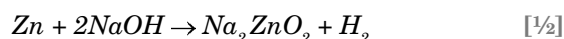
3. The correct option is (c)

When iron nails are kept in the copper sulphate solution which is blue in colour, the displacement reaction takes place and copper being less reactive than iron gets coated on iron nail.



4. Rancidity is defined as Oxidation of oils and fats present in the food item. It spoils the food materials that makes it difficult for consumption. Nitrogen act as an antioxidant that is added to foods containing fats and oil. [1]

5. Chemical reaction of Zinc metal and NaOH is



From above reaction we can see that  $\text{H}_2$  gas evolved in the reaction. [1/2]

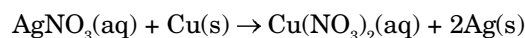
Hence (d) is the correct answer.

6. (c) On adding a solution of barium chloride to sodium sulphate solution, a white colour precipitate of barium sulphate is formed along with the formation of sodium chloride salt. [1]

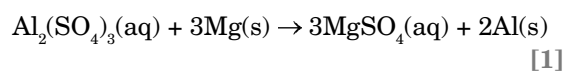
7. (c) In this reaction,  $\text{MnO}_2$  is losing oxygen to form  $\text{MnCl}_2$ , so manganese dioxide is being reduced to manganese dichloride. On the other hand, HCl is losing hydrogen to form  $\text{Cl}_2$ , so hydrochloric acid (HCl) is being oxidised to chlorine. Therefore, manganese dioxide is the oxidising agent while hydrochloric acid (HCl) is the reducing agent. [1]

8. (d) Decomposition of calcium carbonate is an example of thermal decomposition reaction because in this reaction, a single reactant decomposes into multiple products by the action of heat. [1]

9. (b) A displacement reaction is a chemical reaction in which a more reactive element displaces a less reactive element from its compound. Since, Cu is more reactive than Ag; it can displace Ag from its nitrate solution and show a displacement reaction.



Similarly, magnesium being more reactive than aluminium displaces it from its sulphate solution.



10. (d) Burning of natural gas is an exothermic process as heat is evolved in the process. Burning of methane gas leads to the production of carbon dioxide, water and heat. [1]

11. (b) In reaction I, magnesium, being more reactive than hydrogen, displaces it in a chloride molecule, resulting in a single displacement reaction.

In reaction II, both the ions from each of the reactants (NaOH and HCl) are displaced with another reactant. [1]

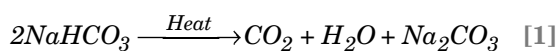
12. When sodium sulphate solution and barium chloride solution are mixed together, a white precipitate is formed due to the formation of barium sulphate and sodium chloride (Double displacement Reaction) [2]

13. Those reactions in which a chemical compound decomposes by the action of sunlight are called photo chemical decomposition reactions. For example, silver chloride in the presence of light decomposes to give silver and chlorine gas.



Thermal decomposition is a chemical decomposition caused by heat.

For example, when baking soda is heated, we get sodium carbonate along with carbon dioxide and water.



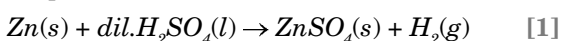
14. Physical change: When a candle burns, the wax melts. The state of wax changes from solid to liquid hence, it is a physical change. [1]

Chemical change: The wax near the wick is composed of carbon. When the wax burns its chemical composition changes and due to which carbon dioxide and water is released. A black residue called soot is also produced. This shows that a chemical change takes place while the candle is burning. [1]

15.  $\text{KCl}(\text{aq}) + \text{AgNO}_3(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{KNO}_3(\text{aq})$   
*Potassium Silver Silver Potassium*  
*chloride nitrate chloride nitrate*  
 (white ppt.)

It is a "Double displacement reaction" as well as a "Precipitation reaction" as AgCl forms a white precipitate. [1]

16. The gas produced in the reaction with a pop up sound is hydrogen. Zinc reacts with dilute sulphuric acid to produce hydrogen gas and zinc sulphate. [1]



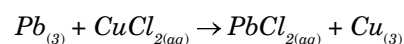
This is an example of displacement reaction.

17. (a) The metal nitrate (A) is Lead nitrate ( $\text{Pb}(\text{NO}_3)_2$ ). On heating it produces Nitrogen dioxide (B) which is brown in colour.

[ $\frac{1}{2} + \frac{1}{2}$ ]

- (b) The first reaction is a decomposition reaction and the second reaction is a double displacement reaction. [1]

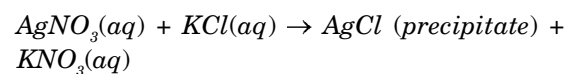
18. (a) Lead is more reactive than copper and therefore, it displaces it from its solution. When a strip of lead metal is placed in a solution of copper chloride, then lead chloride solution and copper metal are formed. The chemical reaction is given below:



The green colour of copper chloride fades to give a colourless solution. [1]

- (b) Precipitation reaction is a chemical reaction in which insoluble, known as a precipitate, is formed when 2 solutions containing soluble salts are combined. [1]

#### For example :



In the above reaction, Silver Chloride is formed as a precipitate. [1]

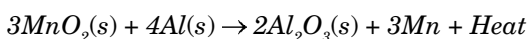
19. (a) Decomposition reaction is a type of chemical reaction in which single compound splits into two or more simpler substances. Digestion is process where large chunks of nutrient molecules break down into smaller molecules and provide energy to the body. Therefore, digestion of food involves decomposition reaction. [1]

- (b) All the decomposition reactions are endothermic reaction because decomposition requires energy. These reactions often involve an energy source in some form and it breaks apart the bonds of compounds. This energy can be either in the form of light, heat or electricity. [1]

- (c) Hydrogen gas is produced during the electrolysis of water. A popping sound is produced when a burning candle is brought near mouth of a test tube used in electrolysis of water because Hydrogen is a combustible gas and when it comes in contact of fire, it explodes with a popping sound [1]

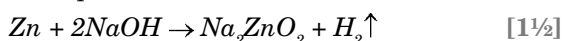
20. Carbon is used as a reducing agent for less reactive metals. For metal oxides of a comparatively more reactive metal than zinc, aluminium is used as a reducing agent. [1]

For example, aluminium powder is used as a reducing agent when we have to reduce manganese dioxide. [1]



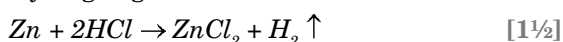
In this exothermic reaction, aluminium powder reduces the metal oxide to metal and itself gets oxidized to aluminium oxide. [1]

21. The equation of the chemical reaction is as follows:



The equation shows that hydrogen gas is liberated. It can be detected by putting a burning matchstick at the opening of a test tube. It is observed that there is a pop-sound and a blue colored flame.

When zinc reacts with dilute hydrochloric acid, hydrogen gas is evolved.



22. Thermal decomposition reaction where energy is supplied as heat.

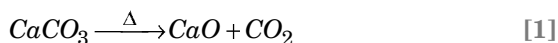
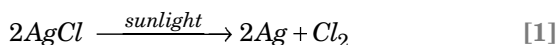
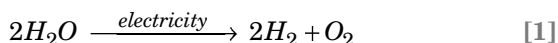


Photo decomposition reaction where energy is supplied as light.

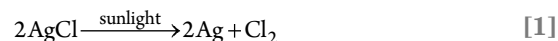


Electrolytic decomposition reaction where energy is supplied as electricity



23. When silver chloride is placed in sunlight for the sometime, it turns grey due to the decomposition of silver chloride into silver and chlorine. [1½]

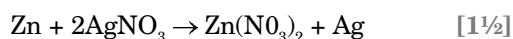
Balanced chemical equation:



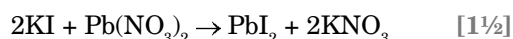
This is a type of Decomposition reaction. [½]

OR

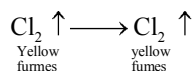
- (a) This is a type of displacement reaction.



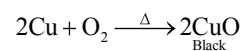
- (b) This is a type of precipitation reaction



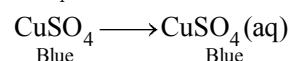
24. (i) White silver chloride turns grey in sunlight. This is due to the decomposition of silver chloride into silver and chlorine by light. [1]



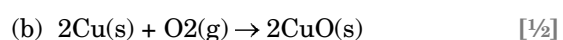
- (ii) The surface of copper powder becomes coated with black copper (II) oxide. This is because oxygen is added to copper and copper oxide is formed. [1]



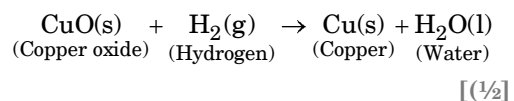
- (iii) Blue colour of copper sulphate solution changes to colourless. This is because zinc is more reactive than copper, so it displaces it from  $CuSO_4$ . [1]



25. (a) The brown coloured metal is copper and the black coloured compound formed is Copper oxide. [1 + 1]

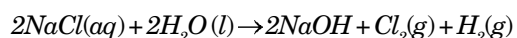


The chemical equation for the reaction can be written as :



26. (a) The process used to produce sodium chloride is known as Chloroalkali process. Chlorine and sodium hydroxide are used as commodity chemicals in the industries. These chemicals are produced by Chloroalkali process. When electricity is passed through an aqueous solution sodium chloride (called brine) it decomposes to form sodium hydroxide, chlorine gas and hydrogen gas.

The chemical equation for producing sodium hydroxide is [2]



The process is named as chlor-alkali because the term chlor-alkali refers to the two chemicals i.e. chlorine and an alkali which are produced simultaneously because of electrolysis of a saltwater. [2]

- (b) Sodium hydroxide (NaOH) is used to manufacture soaps and chlorine is used as an antiseptic and is used to make drinking water safe. [1]

## MULTIPLE CHOICE QUESTIONS

- What is order of reaction?
  - The sum of exponents of concentration
  - Product of exponents of concentration
  - The difference of exponents of concentration
  - None of the mentioned

2. What is  $(-dC/dt) = KCa^2$ ?
  - (a) Third order reaction
  - (b) First order reaction
  - (c) Second order reaction
  - (d) Fourth order reaction
3. In a chemical reaction, the rate of reaction is independent of the reactant concentration, What is it called?
  - (a) Zero order reaction
  - (b) First order reaction
  - (c) Second order reaction
  - (d) None of the mentioned
4. How many reaction take place in a simple reaction?
  - (a) Zero reaction
  - (b) One reaction
  - (c) Two reactions
  - (d) Simultaneous reactions
5. How many phases are there in Homogeneous reaction?
  - (a) Does not depend on phases
  - (b) Single phases
  - (c) Multiple phases
  - (d) Gaseous phases
6. What do you mean by Isothermal reactions?
  - (a) Constant pressure
  - (b) Constant energy
  - (c) Constant heat
  - (d) Constant temperature
7. What does 'n' denote in a rate of reaction?
  - (a) Number of phases
  - (b) Order of reaction
  - (c) Order of concentration
  - (d) None of the mentioned
8. How many products are formed in a parallel reaction?
  - (a) Zero products
  - (b) One product
  - (c) Many products
  - (d) Dependsonreaction
9. Dry corrosion is also called as \_\_\_\_\_
  - (a) Chemical corrosion
  - (b) Electrochemical corrosion
  - (c) Wet corrosion
  - (d) Oxidation corrosion
10. Anhydrous inorganic liquid metal surface in absence of moisture undergoes \_\_\_\_\_
  - (a) Wet corrosion
  - (b) Dry corrosion
  - (c) Galvanic corrosion
  - (d) Pitting corrosion
11. The rusting iron is the \_\_\_\_\_
  - (a) Oxidation corrosion
  - (b) Liquid metal corrosion
  - (c) Wet corrosion
  - (d) Corrosion by other gases
12. Chemical action of flowing liquid metal at high temperatures is \_\_\_\_\_
  - (a) Liquid metal corrosion
  - (b) Corrosion by other gases
  - (c) Oxidation corrosion
  - (d) Wet corrosion
13. Corrosion between the dissimilar metals is called as \_\_\_\_\_.
  - (a) Galvanic corrosion
  - (b) Dry corrosion
  - (c) Oxidation corrosion
  - (d) Concentration cell corrosion
14. Wet corrosion is also called as \_\_\_\_\_
  - (a) Chemical cell
  - (b) Electro chemical cell
  - (c) Oxidation reaction
  - (d) Liquid metal corrosion
15. Corrosion due to difference in water level is \_\_\_\_\_
  - (a) Soil corrosion
  - (b) Oxidation corrosion
  - (c) Pitting corrosion
  - (d) Water line corrosion

### Answer Key

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (a)  | 2. (c)  | 3. (a)  | 4. (b)  | 5. (b)  |
| 6. (d)  | 7. (b)  | 8. (c)  | 9. (a)  | 10. (b) |
| 11. (a) | 12. (a) | 13. (a) | 14. (b) | 15. (d) |



### Solutions

1. In a homogeneous reaction, the order of reaction is the sum of the exponents of concentration of reaction. [1]
2. In a chemical reaction the rate equation of the reaction is written in the following form:-  
 $(-dC/dt) = KCa^2$  [1]

3. In zero order reaction, the rate of reaction is independent of the reactant concentration where as in other reactions the rate of reaction depends on the reactant concentration. [1]
4. In a simple reaction, only one reaction is considered, therefore it is called simple. [1]
5. Homogeneous reaction is the reaction taking place in only one phases whereas heterogeneous has many phases. [1]
6. Isothermal is a reaction in which no change in temperature takes place i.e. both are at same temperature [1]
7. In a rate of reaction the order of reaction is denoted by 'n' in the rate equation. [1]
8. As in parallel reactions more than one products are formed due to separate reactions which happens simultaneously. In serious only one product is formed. [1]
9. Dry corrosion is also called as the chemical corrosion. The corrosion is divided into two types. They are dry corrosion and wet corrosion. [1]
10. Anhydrous inorganic liquid metal surface in absence of moisture undergoes the dry corrosion. Atmospheric gases also undergo the dry corrosion. [1]
11. The rusting of iron comes under the oxidation corrosion. Direct action oxygen at high or low temperatures will be on metals. [1]
12. Chemical action of flowing liquid metal at high temperature is called liquid metal corrosion.[1]
13. Corrosion between the dissimilar metals is called as the galvanic corrosion. Dry corrosion also called as the chemical corrosion. [1]
14. Wet corrosion is also called as the electro chemical corrosion. Corrosion due to the conducting liquid in contact with cathodic and anodic areas is called as wet corrosion. [1]

15. Corrosion due to the difference in water level is water line corrosion. Corrosion due to formation of varying concentrations of the aeration. [1]

## ASSERTION AND REASON

Each type consists of two statements namely Assertion (A) and Reason (R). For selecting the correct answer, use the following code :

- (a) Both Assertion and Reason are true and Reason is a correct explanation of Assertion.
- (b) Both Assertion and Reason are true and Reason is not a correct explanation of Assertion.
- (c) Assertion is true and Reason is false.
- (d) Assertion is false and Reason is true.

1. Assertion  $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$  is a balanced reaction.

Reason In balanced reaction number of atoms of each elements is the same on both sides of arrow.

The correct answer is a/b/c/d.

2. Assertion  $3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$  is not a balanced reaction.

In balanced reaction number of atoms of each element is the same on both sides of arrow.

The correct answer is a/b/c/d.

3. Assertion  $\text{Fe(s)} + \text{CuSO}_4(\text{aq}) \rightarrow \text{FeSO}_4(\text{aq}) + \text{Cu(s)}$  is a displacement reaction.

Reason A more reactive element displaces a less reactive element from the compound.

The correct answer is a/b/c/d.

4. Assertion Respiration is an exothermic reaction.

Reason In exothermic reaction heat is released along with formation of products.

The correct answer is a/b/c/d.

## Answer Key

1. (a)
2. (d)
3. (a)
4. (a)