

**SAMPLE CONTENT**

**CBSE**



# COMPETENCY Based Questions

★ **SCIENCE** ★

**1280 Practice Questions**

CHAPTERWISE & SUBTOPICWISE FOR SECTION A & E

As per the latest circular and  
sample paper released by CBSE

## **TYPES OF QUESTIONS:**

- Multiple Choice Questions
- Assertion Reason Questions
- Case/source Based Questions

**Class X**

**Target** Publications<sup>®</sup> Pvt. Ltd.

# CBSE COMPETENCY Based Questions

**SCIENCE**

(SECTION A & E)

**Class X**

## Salient Features

- Written as per the Latest Syllabus
- Includes '1280' Questions for practice
- Subtopic-wise segregation of questions for efficient practice
- Extensive coverage of **Multiple Choice Questions, Assertion-Reason and Case/Source Based Questions**
- Covers selective Textual Exercise Questions and Exemplar Questions
- Quick Review of each chapter to facilitate quick revision
- Important inclusions: Connections and Caution
- Contains detailed Solutions to difficult MCQs and Assertion & Reason type of questions
- Includes Selective Solved Questions from Previous Years' Board Papers updated upto year 2023
- Includes selective solved questions from SQP (2022-23 and 2023-24), Practice Questions and Handbook (2022-23) released by CBSE
- 6 Self-Assessment Tests (Solutions can be accessed through QR code)

Printed at: **Print to Print**, Mumbai

## PREFACE

Competency Based Assessment is recently adopted by CBSE from National Education Policy 2020 for Board Examination of Class X. Target's "**CBSE Competency Based Questions Science Class X**" is a complete, thorough, critically analysed and extensively drafted book to cater to Competency Based Assessment for sections A and E of the Question paper for the Board Examination.

Since Competency Focused Questions in the form of MCQs/Case Based Questions, Source-based Integrated Questions, or any other type constitute **50%** (40 out of 80 marks) of the weightage of the board question paper, we wanted to create the book that would specifically strengthen competency of students for the two sections consisting of MCQs, Assertion-Reason, and Case/Source Based Questions.

This book aims to provide comprehensive and thorough preparation material of MCQs, Assertion-Reason and Case/Source Based Questions to excel in the exam.

The flow of subtopics within the chapter is purposely kept aligned with the latest NCERT textbook to foster a sense of familiarity in the students. Complete coverage of topics in this book would prove to be a strong source of foundational practise for Class X Board Examination.

The **Subtopic-wise** segregation for each chapter of this book helps the students practice questions smoothly and at their own pace.

Each chapter begins with **Synopsis** to offer crisp revision to students in efficient form of pointers, tables, charts, etc., followed by **Quick Review**.

The question types **Multiple Choice Questions, Assertion- Reason and Case/Source based Questions** have been specially created and compiled keeping following objectives in mind: to help students revise concepts as well as to prepare them to solve complex questions that require strenuous effort and understanding of multiple-concepts. The assortment of questions also encompasses questions based on real life situations and application based questions and promotes higher order thinking in students.

To aid students, solutions are provided for questions wherever deemed necessary. Certain solutions are supplied with the feature, '**Explanation for Better Understanding**' to improve the comprehensive understanding of the concept by students. '**Caution**' is added to make students watchful against commonly made mistakes. Also, '**Connections**' are furnished to enable students to perceive the interlinking of concepts covered in different chapters and prepare them for possible coalition questions.

**Self-Assessment Tests** (solutions provided in PDF format via QR codes) placed at the end of the book allow students to gauge their preparedness for each chapter.

We hope that the book builds up necessary knowledge and skillset in the students required to crack **Multiple Choice Questions, Assertion-Reason and Case/Source based Questions** and boosts their confidence required to succeed in the examination.

Publisher

**Edition:** Second

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

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*A book affects eternity; one can never tell where its influence stops.*

## Disclaimer

This reference book is transformative work based on Science Textbook for class X, Rationalised 2023-24 published by the National Council of Educational Research and Training (NCERT) and NCERT Exemplar: 2018 published by the National Council of Educational Research and Training (NCERT). We the publishers are making this reference book which constitutes as fair use of textual contents which are transformed by adding and elaborating, with a view to simplify the same to enable the students to understand, memorize and reproduce the same in examinations.

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# COURSE STRUCTURE 2023 - 24

## CLASS X (Annual Examination)

Marks: 80

Unit No.	Unit	Marks
I	Chemical Substances-Nature and Behaviour	25
II	World of Living	25
III	Natural Phenomena	12
IV	Effects of Current	13
V	Natural Resources	05
	<b>Total</b>	<b>80</b>
	<b>Internal Assessment</b>	<b>20</b>
	<b>Grand Total</b>	<b>100</b>

**Theme: Materials**

**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, endothermic exothermic reactions, oxidation and reduction.

**Acids, bases and salts:** Their definitions in terms of furnishing of  $H^+$  and  $OH^-$  ions, General properties, examples and uses, neutralization, 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 hydro carbons 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**

**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

### 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

### 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, Direct current. Alternating current: frequency of AC. Advantage of AC over DC. Domestic electric circuits.

## Theme: Natural Resources

### Unit V: Natural Resources

**Our environment:** Eco-system, Environmental problems, Ozone depletion, waste production and their solutions. Biodegradable and non-biodegradable substances.

#### Note:

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

- Finding the pH of the following samples by using pH paper/universal indicator: **Unit-I**
    - Dilute Hydrochloric Acid
    - Dilute NaOH solution
    - Dilute Ethanoic Acid solution
    - Lemon juice
    - Water
    - Dilute Hydrogen Carbonate solution
  - Studying the properties of acids and bases (HCl & NaOH) on the basis of their reaction with: **Unit-I**
    - Litmus solution (Blue/Red)
    - Zinc metal
    - Solid sodium carbonate
- Performing and observing the following reactions and classifying them into: **Unit-I**
  - Combination reaction
  - Decomposition reaction
  - Displacement reaction
  - Double displacement reaction
  - Action of water on quick lime.
  - Action of heat on ferrous sulphate crystals.
  - Iron nails kept in copper sulphate solution
  - 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**  
a.  $\text{ZnSO}_{4(\text{aq})}$       b.  $\text{FeSO}_{4(\text{aq})}$       c.  $\text{CuSO}_{4(\text{aq})}$       d.  $\text{Al}_2(\text{SO}_4)_{3(\text{aq})}$   
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 lens  
by 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**

## Assessment Areas (Theory) 2023-24

Assessment Areas (2023 - 24)		
Theory -Total Max. Marks: 80		
No.	Typology of Questions	Total
1	<b>Demonstrate Knowledge and Understanding:</b> State, name, list, identify, define, suggest, describe, outline, summarize, etc.	46%
2	<b>Application of Knowledge Concept:</b> Calculate, illustrate, show, adapt, explain, distinguish, etc.	22%
3	<b>Formulate, Analyze, Evaluate and Create:</b> Interpret, analyze, compare, contrast, examine, evaluate, discuss, construct, etc.	32%
	<b>Total</b>	<b>100%</b>

**Note:**

- Typology of Questions: Very Short Answers (VSA) including objective type questions, Assertion – Reasoning type questions, Short Answers (SA), Long Answers (LA), Source-based, Case-based, Passage-based, Integrated assessment questions.
- An internal choice of approximately 33% would be provided.

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- Note:**
- \* mark represents *Textual question.*
  - ⌘ mark represents *NCERT Exemplar question.*

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## Content and Concepts

1.0 Introduction

1.1 Chemical equations

1.2 Types of chemical reactions

1.3 Oxidation reactions in everyday life

## Synopsis

## 1.0 Introduction

Whenever a chemical change occurs, it is said that a chemical reaction has taken place. Following observations help to determine whether a chemical reaction has taken place:

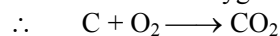
- change in state
- change in colour
- evolution of a gas
- change in temperature

## 1.1 Chemical equations

- Chemical equation:** Chemical change can be represented by the help of equation with the use of chemical symbols of elements/ compounds.

**Eg:** Carbon reacts with oxygen to form carbon dioxide.

Carbon + oxygen  $\longrightarrow$  carbon dioxide



- Balancing of chemical change:** The concept of balancing a chemical reaction is based on "Law of conservation of mass": That is, the total mass of the elements present in the products of a chemical reaction has to be equal to the total mass of the elements present in the reactants. i.e. The number of each element on both the sides of reaction arrow must be equal.

**Unbalanced equation:**  $\text{A} + \text{B} \longrightarrow \text{A}_2\text{B}_3$

**Balanced equation:**  $2\text{A} + 3\text{B} \longrightarrow \text{A}_2\text{B}_3$

- Conditions for reactions and physical state/s:** The symbol (g) is used with  $\text{H}_2\text{O}$  to indicate that in this reaction water is used in the form of steam. Conditions such as physical state, temperature, pressure, catalyst etc. can mentioned on above or below the arrow in chemical equation.

**Eg:**  $\text{CO}_{(g)} + 2\text{H}_{2(g)} \xrightarrow{340 \text{ atm}} \text{CH}_3\text{OH}_{(l)}$

## 1.2 Types of chemical reactions

- Combination reaction:** Two or more reactants combine to give a single product  
 $\text{A} + \text{B} \longrightarrow \text{AB}$

- Decomposition reaction:** Single reactant breaks down to form two or more simpler products.  
 $\text{AB} \longrightarrow \text{A} + \text{B}$

i. **Thermal decomposition:** Decomposition occurs by thermal energy.

ii. **Electrical decomposition:** Decomposition occurs by electrical energy.

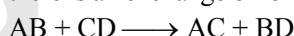
iii. **Photochemical decomposition:** Decomposition occurs by light.

- Displacement reaction:** In this reaction, more reactive element displaces less reactive element from its compound.



C is more reactive than B.

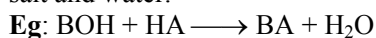
- Double displacement reaction:** In this reaction, there is an exchange of ions between the reactants.



- Precipitation reaction:** The reaction which involves formation of precipitate (insoluble substance) is known as precipitation reaction.



- Neutralization reaction:** The reaction in which an acid and a base react with each other to give salt and water.



Base      Acid      Salt      water

- Endothermic reactions:** Reactions in which energy is absorbed are called endothermic reactions.

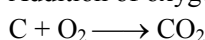


- Exothermic reactions:** Reactions accompanied by evolution of heat are called exothermic reactions.



- Oxidation reaction:**

Addition of oxygen/ removal of hydrogen.

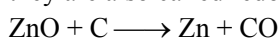


- Reduction reaction:**

Addition of hydrogen / removal of oxygen

$\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$ ; reduction of Cu from (CuO to Cu)

- Redox reaction:** Oxidation and reduction reactions always occur simultaneously. Hence, they are also called redox reactions.





### 1.3 Oxidation reactions in everyday life

- Corrosion:**

Metals get attacked by substances around it such as moisture, acids, etc. Metal is said to 'corrode' due to this attack and the process is called corrosion.

Many metals like iron, silver, copper, etc. get corroded. However, corrosion of iron is a serious problem as enormous amount of money is spent every year to replace damaged iron.

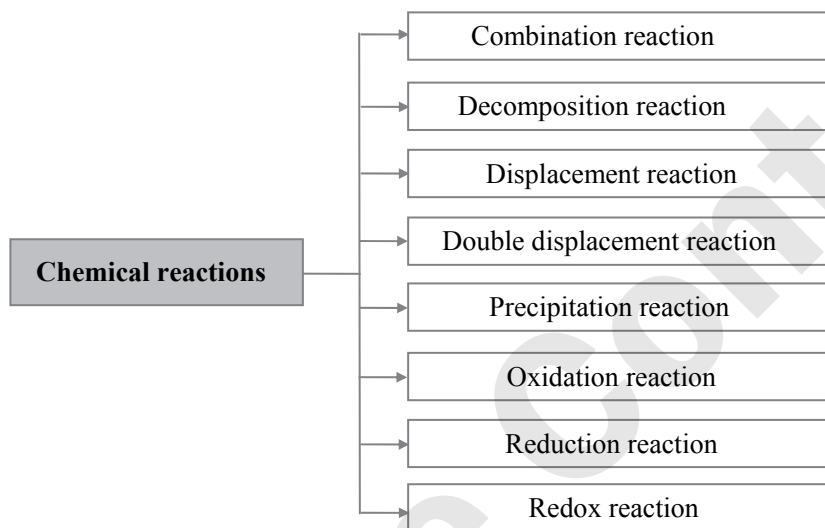
- Rancidity:**

Rancidification is a process in which substance containing fats and oils gets oxidised and their odour or taste becomes disagreeable, when kept for long time. Following methods can prevent rancidification of foods:

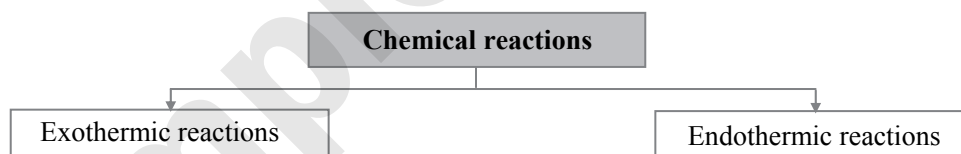
- Addition of antioxidants to food
- Use of nitrogen gas
- Use of airtight containers.

#### Quick Review

#### Classification of chemical reactions based on chemical change



#### Classification of chemical reactions based on energy change



#### Summary of chemical reactions of this chapter:

Reaction	Combination/ Decomposition/ Displacement/Double displacement	Oxidation/ Reduction/ Redox	Endothermic / Exothermic	Additional information
$2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$	Combination	Oxidation/ Redox	Exothermic	Burns with dazzling white flame.
$\text{Zn} + \text{H}_2\text{SO}_4 \longrightarrow \text{ZnSO}_4 + \text{H}_2$	Displacement			
$\text{C} + \text{O}_2 \longrightarrow \text{CO}_2$	Combination	Oxidation/ Redox		
$3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$	Displacement	Redox		
$\text{CO}_{(g)} + 2\text{H}_{2(g)} \longrightarrow \text{CH}_3\text{OH}_{(l)}$	Combination		Exothermic	
$6\text{CO}_2 + 6\text{H}_2\text{O} \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$			Endothermic	
$\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{heat}$	Combination		Exothermic	
$\text{Ca}(\text{OH})_2 + \text{CO}_2 \longrightarrow \text{CaCO}_3 + \text{H}_2\text{O}$			Exothermic	$\text{CaCO}_3$ is used for whitewashing walls.
$2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$	Combination		Exothermic	
$\text{CH}_4 + 2\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$		Redox	Endothermic	



$C_6H_{12}O_6(aq) + 6O_2(aq) \longrightarrow 6CO_2(aq) + 6H_2O(l) + \text{energy}$	Decomposition	Oxidation/ Redox	Exothermic	
$2FeSO_4(s) \xrightarrow{\text{Heat}} Fe_2O_3(s) + SO_2(g) + SO_3(g)$	Decomposition		Endothermic	Green to white
$CaCO_3(s) \xrightarrow{\text{Heat}} CaO(s) + CO_2(g)$	Decomposition (Thermal decomposition)		Endothermic	CaO is used for manufacture of cement
$2Pb(NO_3)_2(s) \xrightarrow{\text{Heat}} 2PbO(s) + 4NO_2(g) + O_2(g)$	Decomposition		Endothermic	
$2AgCl(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Cl_2(g)$	Decomposition (Photochemical decomposition)		Endothermic	Use: Black and white photography
$2AgBr(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Br_2(g)$	Decomposition (Photochemical decomposition)		Endothermic	White to grey colour change. Use: In black and white photography.
$Fe(s) + CuSO_4(aq) \longrightarrow FeSO_4(aq) + Cu(s)$	Displacement			Reddish brown coating of copper on iron surface.
$Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$	Displacement			
$Pb(s) + CuCl_2(aq) \longrightarrow PbCl_2(aq) + Cu(s)$	Displacement			
$Na_2SO_4(aq) + BaCl_2(aq) \longrightarrow BaSO_4(s) + 2NaCl(aq)$	Double displacement (precipitation)			Barium sulphate is formed as white precipitate.
$2Cu + O_2 \xrightarrow{\text{Heat}} 2CuO$	Combination	Oxidation/ Redox	Endothermic	The surface of copper powder becomes black.
$CuO + H_2 \xrightarrow{\text{Heat}} Cu + H_2O$	Displacement	Redox	Endothermic	
$ZnO + C \longrightarrow Zn + CO$	Displacement	Redox		
$MnO_2 + 4HCl \longrightarrow MnCl_2 + 2H_2O + Cl_2$		Redox		

### Competency Based Questions

#### 1.0 Introduction

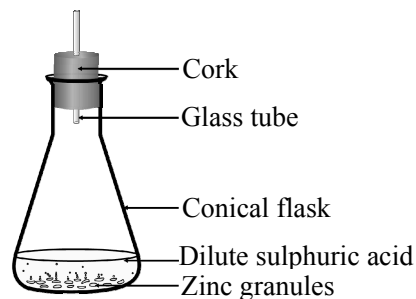
##### Multiple Choice Questions

- Which of the following is a chemical change?  
(A) Melting of ice  
(B) Digestion of food  
(C) Evaporation of water  
(D) Dissolution of salt in water
- Which of the following is not a physical change?  
(A) Boiling of water to give water vapour  
(B) Melting of ice to give water  
(C) Dissolution of salt in water  
(D) Combustion of Liquefied Petroleum Gas (LPG)
- Which of the following statements is/are CORRECT regarding physical change?  
Statement I : Change in the appearance

Statement II: Change in physical state

Statement III: Change in smell

- (A) Only statement I (B) Only statement II  
(C) Statements I and II (D) Only statement III
- Which gas is evolved in the given experiment setup?



- (A) Hydrogen (B) Oxygen  
(C) Hydrogen sulphide (D) Sulphur dioxide



### 1.1 Chemical equations

#### Multiple Choice Questions

- Write the CORRECT balanced chemical equation with the help of given statement.  
"Hydrogen chloride is formed by the direct combination of hydrogen gas and chlorine gas"  
(A)  $\text{HCl} \longrightarrow \text{H}_2 + \text{Cl}_2$   
(B)  $2\text{HCl} \longrightarrow \text{H}_2 + \text{Cl}_2$   
(C)  $\text{H}_2 + \text{Cl}_2 \longrightarrow \text{HCl}$   
(D)  $\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$
  - Which of the following is a balanced chemical equation?  
(A)  $3\text{Fe} + \text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$   
(B)  $4\text{Al} + 3\text{O}_2 \longrightarrow 2\text{Al}_2\text{O}_3$   
(C)  $\text{CO} + \text{H}_2 \longrightarrow \text{CH}_3\text{OH}$   
(D)  $\text{P}_4\text{O}_{10} + \text{H}_2\text{O} \longrightarrow 4\text{H}_3\text{PO}_4$
  - In a balanced equation given below, find x, y and z.  
 $x\text{PbO} + y\text{C} \longrightarrow z\text{Pb} + \text{CO}_2$   
(A)  $x = 2, y = 2, z = 2$   
(B)  $x = 2, y = 1, z = 2$   
(C)  $x = 1, y = 1, z = 1$   
(D)  $x = 1, y = 2, z = 1$
  - When a student opens the bottle of soft drink, the carbonic acid ( $\text{H}_2\text{CO}_3$ ) breaks down into water and gaseous carbon dioxide releases with a sound of fizz. Balanced reaction can be represented by \_\_\_\_\_.  
(A)  $\text{H}_2\text{CO}_3 \longrightarrow \text{H}_2\text{O} + \text{CO}_2$   
(B)  $\text{CO}_2 + 2\text{H}_2\text{O} \longrightarrow \text{H}_2\text{CO}_3$   
(C)  $\text{H}_2\text{CO}_3 \longrightarrow \text{H}_2\text{O} + 2\text{CO}_2$   
(D)  $\text{CO}_2 + 2\text{H}_2\text{O} \longrightarrow \text{H}_2\text{CO}_3$
  - When solid barium hydroxide and solid ammonium chloride are mixed in the test tube in a ratio of 2:1 by weight at room temperature then \_\_\_\_\_.  
(A) reaction proceeds with rise in temperature  
(B) reaction proceeds with fall in temperature  
(C) no reaction takes place  
(D) no reaction takes place unless heating is done
- ⌘6. Which of the following processes involve chemical reaction?  
(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 presence of air at high temperature.

- ⌘7. In which of the following chemical equations, the abbreviations represent the correct states of the reactants and products involved at reaction temperature?

- (A)  $2\text{H}_{2(l)} + \text{O}_{2(l)} \longrightarrow 2\text{H}_2\text{O}_{(g)}$   
(B)  $2\text{H}_{2(g)} + \text{O}_{2(l)} \longrightarrow 2\text{H}_2\text{O}_{(l)}$   
(C)  $2\text{H}_{2(g)} + \text{O}_{2(g)} \longrightarrow 2\text{H}_2\text{O}_{(l)}$   
(D)  $2\text{H}_{2(g)} + \text{O}_{2(g)} \longrightarrow 2\text{H}_2\text{O}_{(g)}$

8. The following reactions are carried out in open vessels.

- (P)  $2\text{Cu}_{(s)} + \text{O}_{2(g)} \xrightarrow{\text{Heat}} 2\text{CuO}_{(s)}$   
(Q)  $\text{Zn}_{(s)} + \text{CuSO}_{4(aq)} \longrightarrow \text{ZnSO}_{4(aq)} + \text{Cu}_{(s)}$   
(R)  $2\text{FeSO}_{4(s)} \xrightarrow{\text{Heat}} \text{Fe}_2\text{O}_{3(s)} + \text{SO}_{2(g)} + \text{SO}_3(g)$

Which of the following CORRECTLY shows if the weight of the reaction vessel and contents increases, decreases or remains the same after the reaction as compared to before the reaction?

Option	Reaction P	Reaction Q	Reaction R
A	decreases	remains the same	increases
B	remains the same	increases	decreases
C	increases	decreases	increases
D	increases	remains the same	decreases

[CBSE Practice Questions 2022-23]

- (A) A (B) B (C) C (D) D

#### Assertion & Reason

For question numbers 9 and 10, two statements are given - one labelled Assertion (A) and the other labelled Reason (R). Select the correct answers to these questions from the codes (A), (B), (C) and (D) as given below:

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of the Assertion (A).  
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).  
(C) Assertion (A) is true, but Reason (R) is false.  
(D) Assertion (A) is false, but Reason (R) is true.
9. **Assertion (A):** The given reaction is balanced chemical reaction.  
 $\text{CH}_{4(g)} + 2\text{O}_{2(g)} \longrightarrow \text{CO}_{2(g)} + 2\text{H}_2\text{O}_{(g)}$   
**Reason (R):** All the reactants and products are in the same physical state i.e. gaseous state.
10. **Assertion (A):** In dissociation of 28 g of A, the summation of masses of products formed must be 28 g.  
**Reason (R):** This is in accordance to law of conservation of mass.



## 1.2 Types of chemical reactions

## Multiple Choice Questions

- In the combination reactions, \_\_\_\_\_ or more reactants combine to form \_\_\_\_\_ product(s).  
(A) 1,2 (B) 2,1  
(C) 1,1 (D) 2,2
- During digestion process, carbohydrates are broken down to form glucose which combines with \_\_\_\_\_ in the cells and provide energy.  
(A) hydrogen (B) oxygen  
(C) carbon (D) water
- Which of the following are combination reactions?  
(i)  $2\text{KClO}_3 \xrightarrow{\text{Heat}} 2\text{KCl} + 3\text{O}_2$   
(ii)  $\text{MgO} + \text{H}_2\text{O} \longrightarrow \text{Mg}(\text{OH})_2$   
(iii)  $4\text{Al} + 3\text{O}_2 \longrightarrow 2\text{Al}_2\text{O}_3$   
(iv)  $\text{Zn} + \text{FeSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Fe}$   
(A) (i) and (iii) (B) (iii) and (iv)  
(C) (ii) and (iv) (D) (ii) and (iii)
- Marble contains \_\_\_\_\_.  
(A) calcium hydroxide  
(B) calcium chloride  
(C) calcium carbonate  
(D) calcium oxide
- Which among the following statement(s) is (are) true? Exposure of silver chloride to sunlight for a long duration turns it grey due to  
(i) the formation of silver by decomposition of silver chloride  
(ii) sublimation of silver chloride  
(iii) decomposition of chlorine gas from silver chloride  
(iv) oxidation of silver chloride  
(A) (i) only (B) (i) and (iii)  
(C) (ii) and (iii) (D) (iv) only
- A chemist carries out electrolysis of water experiment in his laboratory. Which of the following figure correctly shows the volume of the gases collected in the two test tubes?

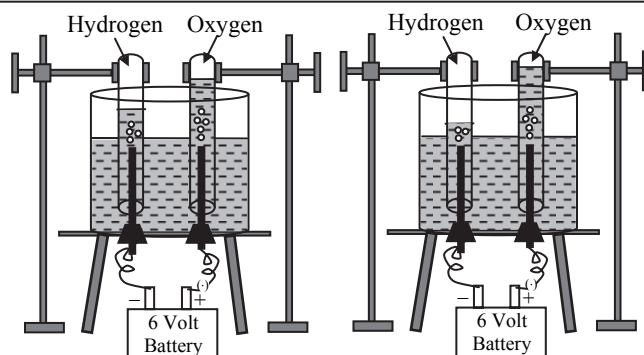
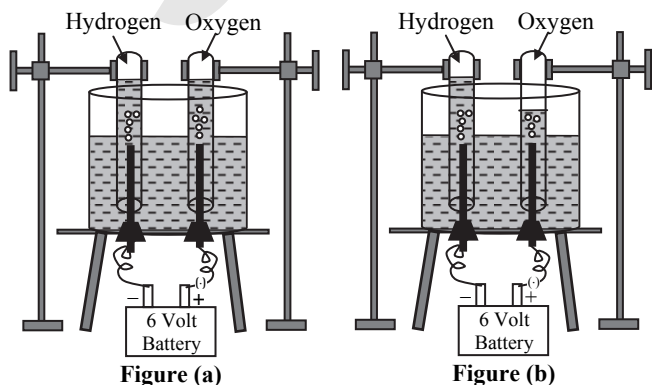


Figure (c)

Figure (d)

- Figure (a)
  - Figure (b)
  - Figure (c)
  - Figure (d)
- 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
  - A solution of slaked lime produced by the reaction between \_\_\_\_\_ and \_\_\_\_\_ is used for the whitewashing of wall.  
(A) quick lime, oxygen  
(B) quick lime, water  
(C) carbon, oxygen  
(D) carbon, water
  - Quick lime is formed by heating \_\_\_\_\_.  
(A) limestone (B) slaked lime  
(C) calcium (D) sodium carbonate
  - Calcium oxide reacts vigorously with water to produce slaked lime?  
 $\text{CaO}_{(s)} + \text{H}_2\text{O}_{(l)} \longrightarrow \text{Ca}(\text{OH})_{2(aq)}$   
This reaction can be classified as \_\_\_\_\_.  
**[CBSE 2020]**  
(i) combination (ii) exothermic  
(iii) endothermic (iv) oxidation  
(A) (i) and (iii) (B) (iii) and (iv)  
(C) (i), (iii) and (iv) (D) (i) and (ii)
  - Which of the following are exothermic processes?  
(i) Reaction of water with quick lime  
(ii) Dilution of an acid  
(iii) Evaporation of water  
(iv) Sublimation of camphor (crystals)  
(A) (i) and (ii) (B) (ii) and (iii)  
(C) (i) and (iv) (D) (iii) and (iv)
  - Three beakers labelled as A, B and C each containing 25 ml of water was taken. A small amount of NaOH, anhydrous  $\text{CuSO}_4$  and NaCl were added to the beakers A, B and C respectively. It was observed that there was an increase in the temperature of the solutions contained in beakers A and B, whereas in case of beaker C, the temperature of the solution falls. Which one of the following statement(s) is (are) correct?





- (i) In beakers A and B, exothermic process has occurred.  
 (ii) In beakers A and B, endothermic process has occurred.  
 (iii) In beaker C, exothermic process has occurred.  
 (iv) In beaker C, endothermic process has occurred.  
 (A) (i) only (B) (ii) only  
 (C) (i) and (iv) (D) (ii) and (iii)
- ⌘13. Solid calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form its solution called lime water. Which among the following is (are) true about slaking of lime and the solution formed?  
 (i) It is an endothermic reaction.  
 (ii) It is an exothermic reaction.  
 (iii) The pH of the resulting solution will be more than seven.  
 (iv) The pH of the resulting solution will be less than seven.  
 (A) (i) and (ii) (B) (ii) and (iii)  
 (C) (i) and (iv) (D) (iii) and (iv)
- ⌘14. Which of the following is(are) an endothermic process(es)?  
 (i) Dilution of sulphuric acid  
 (ii) Sublimation of dry ice  
 (iii) Condensation of water vapours  
 (iv) Evaporation of water  
 (A) (i) and (iii) (B) (ii) only  
 (C) (iii) only (D) (ii) and (iv)
- ⌘15. The following reaction is used for the preparation of oxygen gas in the laboratory
- $$2\text{KClO}_3(\text{s}) \xrightarrow[\text{catalyst}]{\text{Heat}} 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$$
- 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.
- \*16.  $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$   
 The above reaction is an example of a \_\_\_\_\_.  
 (A) combination reaction  
 (B) double displacement reaction  
 (C) decomposition reaction  
 (D) displacement reaction
17. If metal X is more reactive than metal Z and metal Y is more reactive than metal Z but less reactive than metal X. Which of the following statements is CORRECT?  
 (A) Z can displace X from its salt in aqueous solution but cannot displace Y from its salt in aqueous solution.  
 (B) Z can displace Y from its salt in aqueous solution but cannot displace Z from its salt in aqueous solution.  
 (C) Z can displace X as well as Y from their respective salts in aqueous solution.  
 (D) Z cannot displace either X or Y from their salts in aqueous solution.
18. Which of the following element(s) can replace copper from its salt solution?  
 (A) Zinc (B) Lead  
 (C) Iron (D) All of these
19. The CORRECT general representation for the displacement reaction is \_\_\_\_\_.  
 (A)  $\text{A} + \text{B} \longrightarrow \text{AB}$   
 (B)  $\text{AB} \longrightarrow \text{A} + \text{B}$   
 (C)  $\text{AB} + \text{CD} \longrightarrow \text{AC} + \text{BD}$   
 (D)  $\text{AB} + \text{C} \longrightarrow \text{AC} + \text{B}$
- \*20. What happens when dilute hydrochloric acid is added to iron fillings? Choose the correct answer.  
 (A) Hydrogen gas and iron chloride are produced.  
 (B) Chlorine gas and iron hydroxide are produced.  
 (C) No reaction takes place.  
 (D) Iron salt and water are produced.
21. When a magnesium ribbon is added to copper sulphate solution, a displacement reaction occurs. Which of the following represents the chemical equation for this reaction?  
 (A)  $\text{Mg} + \text{CuSO}_4 \longrightarrow \text{MgS} + \text{CuO}$   
 (B)  $\text{Mg} + \text{CuSO}_4 \longrightarrow \text{MgSO}_4 + \text{CuO}$   
 (C)  $\text{Mg} + \text{CuSO}_4 \longrightarrow \text{MgO} + \text{CuS}$   
 (D)  $\text{Mg} + \text{CuSO}_4 \longrightarrow \text{MgSO}_4 + \text{Cu}$
22.  $\text{KBr}_{(\text{aq})} + \text{AgNO}_3(\text{aq}) \longrightarrow \text{KNO}_3(\text{aq}) + \text{AgBr}_{(\text{s})}$   
 The above reaction is an example of \_\_\_\_\_.  
 (A) displacement reaction  
 (B) decomposition reaction  
 (C) combination reaction  
 (D) double displacement reaction
23. In a double displacement reaction such as reaction between sodium sulphate solution and barium chloride solution, \_\_\_\_\_.  
 (i) exchange of atoms take place  
 (ii) exchange of ions takes place  
 (iii) a precipitate is formed

[CBSE 2020]



- (iv) an insoluble salt is produced  
 (A) (ii) and (iv) (B) (i) and (iii)  
 (C) (ii) only (D) (ii), (iii) and (iv)

24. On mixing aqueous solutions of silver nitrate and sodium chloride, a white precipitate is obtained. This reaction can be categorized as \_\_\_\_\_ reaction.

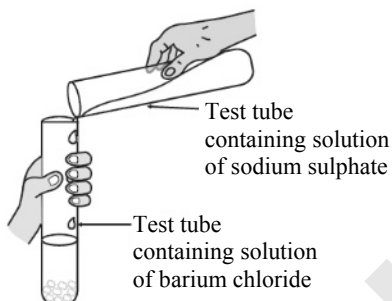
- (A) decomposition  
 (B) combination  
 (C) double displacement  
 (D) displacement

25. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and sulphuric acid formed remains in the solution. The reaction is an example of \_\_\_\_\_.

[CBSE 2020]

- (A) combination reaction  
 (B) double displacement reaction  
 (C) decomposition reaction  
 (D) displacement reaction

26.



When aqueous sodium sulphate is added to barium chloride solution, an insoluble precipitate is formed. Which of the following ions are involved in the formation of this precipitate?

- (A)  $\text{Ba}^{2+}$  and  $\text{Cl}^-$  (B)  $\text{Na}^+$  and  $\text{Cl}^-$   
 (C)  $\text{Ba}^{2+}$  and  $\text{SO}_4^{2-}$  (D)  $\text{Na}^+$  and  $\text{SO}_4^{2-}$

27. Which among the following is (are) double displacement reaction(s)?

- (i)  $\text{Pb} + \text{CuCl}_2 \longrightarrow \text{PbCl}_2 + \text{Cu}$   
 (ii)  $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$   
 (iii)  $\text{C} + \text{O}_2 \longrightarrow \text{CO}_2$   
 (iv)  $\text{CH}_4 + 2\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$   
 (A) (i) and (iv) (B) (ii) only  
 (C) (i) and (ii) (D) (iii) and (iv)

28. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?

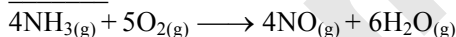
- (i) Displacement reaction  
 (ii) Precipitation reaction  
 (iii) Combination reaction  
 (iv) Double displacement reaction

- (A) (i) only (B) (ii) only  
 (C) (iv) only (D) (ii) and (iv)

29. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?

- (A) Lead sulphate (insoluble)  
 (B) Lead acetate  
 (C) Ammonium nitrate  
 (D) Potassium sulphate

30. The following reaction is an example of a \_\_\_\_\_.



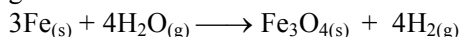
- (i) displacement reaction  
 (ii) combination reaction  
 (iii) redox reaction  
 (iv) neutralisation reaction  
 (A) (i) and (iv) (B) (ii) and (iii)  
 (C) (i) and (iii) (D) (iii) and (iv)

31. Which among the following are both redox and displacement reactions?

- (i)  $\text{CuO} + \text{H}_2 \xrightarrow{\text{Heat}} \text{Cu} + \text{H}_2\text{O}$   
 (ii)  $\text{MgH}_2 \longrightarrow \text{Mg} + \text{H}_2$   
 (iii)  $2\text{Cu} + \text{O}_2 \xrightarrow{\text{Heat}} 2\text{CuO}$   
 (iv)  $\text{ZnO} + \text{C} \longrightarrow \text{Zn} + \text{CO}$

- (A) (i), (ii) and (iii)  
 (B) (i), (iii) and (iv)  
 (C) (ii) and (iii)  
 (D) (i) and (iv)

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



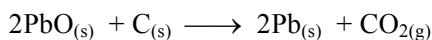
- (i) Iron metal is getting oxidised.  
 (ii) Water is getting reduced.  
 (iii) Water is acting as a reducing agent.  
 (iv) Water is acting as an oxidising agent.  
 (A) (i), (ii) and (iii) (B) (iii) and (iv)  
 (C) (i), (ii) and (iv) (D) (ii) and (iv)

33. A dilute ferrous sulphate solution was gradually added to the beaker containing acidified potassium permanganate solution. The light purple colour of the solution faded and finally disappeared. Which of the following is the correct explanation for the observation?

- (A)  $\text{KMnO}_4$  is an oxidising agent, it oxidises  $\text{FeSO}_4$ .  
 (B)  $\text{FeSO}_4$  acts as an oxidising agent and oxidises  $\text{KMnO}_4$ .  
 (C) The colour disappears due to dilution; no reaction is involved.  
 (D)  $\text{KMnO}_4$  is an unstable compound and decomposes in presence of  $\text{FeSO}_4$  to a colourless compound.

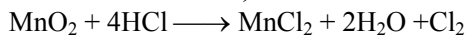


- \*34. Which of the statements about the reaction below are incorrect?



- (i) Lead is getting reduced.  
 (ii) Carbon dioxide is getting oxidised.  
 (iii) Carbon is getting oxidised.  
 (iv) Lead oxide is getting reduced.  
 (A) i and ii (B) i and iii  
 (C) i, ii and iii (D) all

35. In the redox reaction,



[CBSE SQP 2022-23]

- (A)  $\text{MnO}_2$  is reduced to  $\text{MnCl}_2$  &  $\text{HCl}$  is oxidized to  $\text{H}_2\text{O}$   
 (B)  $\text{MnO}_2$  is reduced to  $\text{MnCl}_2$  &  $\text{HCl}$  is oxidized to  $\text{Cl}_2$   
 (C)  $\text{MnO}_2$  is oxidized to  $\text{MnCl}_2$  &  $\text{HCl}$  is reduced to  $\text{Cl}_2$   
 (D)  $\text{MnO}_2$  is oxidized to  $\text{MnCl}_2$  &  $\text{HCl}$  is reduced to  $\text{H}_2\text{O}$

#### Assertion & Reason

For question numbers 36 to 42, two statements are given - one labelled Assertion (A) and the other labelled Reason (R). Select the correct answers to these questions from the codes (A), (B), (C) and (D) as given below:

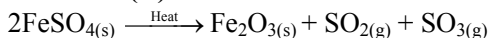
- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of the Assertion (A).  
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).  
 (C) Assertion (A) is true, but Reason (R) is false.  
 (D) Assertion (A) is false, but Reason (R) is true.

36. **Assertion (A):** A whitewashed wall develops a coating of calcium carbonate after a few days.

**Reason (R):** Calcium oxide on the wall reacts slowly with carbon dioxide in the air.

[CBSE Practice Questions 2022-23]

37. **Assertion (A):**



This is an example of decomposition reaction.

**Reason (R):** In a decomposition reaction, a single reactant breaks down to give two or more simpler products.

38. **Assertion (A):** Silver salts are used in black and white photography.

**Reason (R):** Silver salts do not decompose in the presence of light. [CBSE 2021-22]

39. **Assertion (A):** Respiration is an exothermic process.

**Reason (R):** Reactions in which energy is absorbed are known as endothermic reactions.

40. **Assertion (A):** Rusting of iron is endothermic in nature.

**Reason (R):** As the reaction is slow, the release of heat is barely evident.

[CBSE SQP 2023-24]

41. **Assertion (A):** Dilute  $\text{HNO}_3$  cannot be stored in copper container.

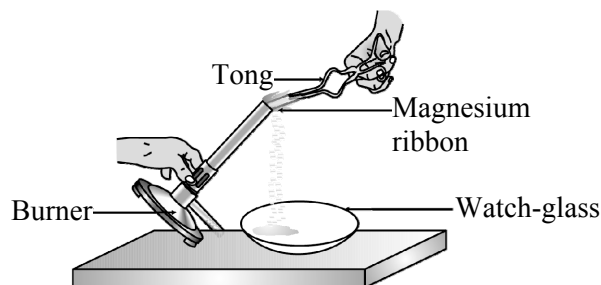
**Reason (R):** Copper reacts with dilute  $\text{HNO}_3$  and form copper nitrate, nitrogen monoxide gas and water.

42. **Assertion (A):** When barium chloride is added to sodium sulphate solution, a white precipitate of barium sulphate is formed.

**Reason (R):** The type of reaction involved is displacement reaction, since precipitate is formed during the reaction.

#### Case/ Source Based Questions

43. Maya carried out an experiment in which magnesium ribbon is burnt in air. Observe the diagrammatic representation of the experiment and answer questions based on it.



- Write an observation of the reaction.
- Write the balanced chemical equation for the reaction taking place when magnesium ribbon is burnt in air.
- What is a combination reaction? Can the reaction occurring in this experiment carried out by Maya be classified as a combination reaction? Justify your answer.

OR

- When is a substance said to be oxidised? Is magnesium being oxidised or reduced in this reaction?



44. Read the following paragraph and answer questions based on it.

Marble is a type of rock that is composed of calcium carbonate. It is used to construct a variety of structures, from hand-held sculptures to massive pillars and buildings.



Decomposition of calcium carbonate to calcium oxide and carbon dioxide on heating is an important decomposition reaction used in various industries.

- What is the chemical formula of calcium carbonate?
- Write chemical reaction showing decomposition of calcium carbonate.
- What is a decomposition reaction? Romal states that 'All decomposition reactions are endothermic reactions.' Do you agree with Romal's statement? Justify your answer by giving proper reason.

OR

- Write one equation each for decomposition reactions where energy is supplied in the form of light and electricity.
45. A student performed following experiment to study the reaction between zinc and copper sulphate. A zinc plate was put into an aqueous solution of copper sulphate kept in a glass container. It was found that blue colour of the solution fades with the passing time. After few days, when zinc plate was taken out of the solution, a number of holes were observed on it.

- Write a balanced chemical equation of the reaction involved.
- Identify the type of reaction.
- In which of the following case, a chemical reaction will occur? Justify your choice.

Beaker A	Zinc + Silver nitrate $\longrightarrow$
Beaker B	Silver + Copper sulphate $\longrightarrow$

OR

- What will happen if lead plate is kept immersed in a solution of copper sulphate? Explain with chemical reaction.

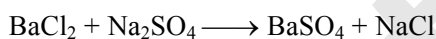
46. Read the following passage and answer questions based on it.

When solution of barium chloride is added to a solution of sodium sulphate, they react to give insoluble barium sulphate and the solution of sodium chloride.

The word-equation for the reaction is:

Barium chloride + Sodium sulphate  
 $\longrightarrow$  Barium sulphate + Sodium chloride

The unbalanced equation for the reaction is:



To equalise number of Na atoms, coefficient '2' is written in front of 'NaCl' as '2NaCl'.

Thus, the balanced equation is:



The numbers of atoms of elements on both sides of the equation are equal.

- Explain why this reaction is called a double displacement reaction.
- Give an example of a double displacement reaction other than the one between barium chloride and sodium sulphate solution.
- Why should chemical equation be balanced?

OR

- Write the balanced chemical equations for the following reactions:
  - Sodium + Water  $\longrightarrow$  Sodium hydroxide + Hydrogen
  - Calcium hydroxide + Carbon dioxide  $\longrightarrow$  Calcium carbonate + Water

### 1.3 Oxidation reactions in everyday life

#### Multiple Choice Questions

- Which of the following is not an example of corrosion?
  - Black coating on silver
  - Green coating on copper
  - Bad smell of butter
  - Rusting of iron
- Which of the following gases can be used for storage of fresh sample of oil for a long time?
  - Carbon dioxide or oxygen
  - Nitrogen or oxygen
  - Carbon dioxide or helium
  - Helium or nitrogen





### Assertion & Reason

For question numbers 3 and 4, two statements are given - one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below:

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of the Assertion (A).  
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

- (C) Assertion (A) is true, but Reason (R) is false.  
 (D) Assertion (A) is false, but Reason (R) is true.

3. **Assertion (A):** Foodstuffs become rancid when kept for a long time.  
**Reason (R):** Antioxidant is used to prevent rancidity of foodstuffs.  
 4. **Assertion (A):** Chips manufacturers usually flush bags of chips with nitrogen gas.  
**Reason (R):** This process prevents the chips from getting oxidised.

### Answer key and Solutions

#### 1.0 Introduction

1. (B)    2. (D)  
 3. (B)    4. (A)

#### 1.1 Chemical equations

1. (D)  
 2. (B)  
 In option B, number of atoms of Al and O are same on both the sides of the reaction.  
 3. (B)  
 The balanced equation is  

$$2 \text{PbO} + 1 \text{C} \longrightarrow 2 \text{Pb} + \text{CO}_2$$
  
 4. (A)  
 5. (B)  
 Mixing of solid barium hydroxide  $[\text{Ba}(\text{OH})_2]$  and solid ammonium chloride  $[\text{NH}_4\text{Cl}]$  in a ratio of 2 : 1 by weight at room temperature in a test tube sets an endothermic reaction and it proceeds by absorbing energy from the surrounding. Thus, there is a fall in temperature and especially the bottom of the test tube becomes cold.  
 6. (D)    7. (C)  
 8. (D)  
 As the reactions are carried in open vessels, gaseous reactants and gaseous products will not contribute to the weight of the reaction vessel and contents.  
 In reaction P, since one of the reactant is a gas, the weight of the reaction vessel and contents increases after the reaction.  
 In reaction Q, since the reactants and the products are in solid and aqueous state, the weight of the reaction vessel and contents remains the same after the reaction.  
 In reaction R, since two products are gases, the weight of the reaction vessel and contents decreases after the reaction.

9. (B)  
 The equation is balanced because the number of atoms of each element is same on each side of reaction arrow.

10. (A)

#### 1.2 Types of chemical reactions

1. (B)    2. (B)  
 3. (D)  
 The reaction in which two or more reactants combine to form a single product is called combination reaction. Amongst given options, only in option (ii) and (iii), a single product is formed. Thus, these represent combination reactions.  
 4. (C)  
 Marble contains calcium carbonate  $(\text{CaCO}_3)$ .  
 5. (A)  
 6. (C)  
 During electrolysis of water, the ratio of volume of hydrogen and oxygen formed is 2:1.  
 7. (B)  
 During electrolysis of water, hydrogen and oxygen gases are formed in the mole ratio 2 : 1.  

$$2\text{H}_2\text{O}_{(l)} \xrightarrow{\text{Electrolysis}} 2\text{H}_{2(g)} + \text{O}_{2(g)}$$

Water	Hydrogen	Oxygen
	2	1

  
 8. (B)  

$$\text{CaO}_{(s)} + \text{H}_2\text{O}_{(l)} \longrightarrow \text{Ca}(\text{OH})_{2(aq)} + \text{Heat}$$

Quick lime	water	Slaked lime
------------	-------	-------------

  
 9. (A)  

$$\text{CaCO}_{3(s)} + \text{heat} \longrightarrow \text{CaO}_{(s)} + \text{CO}_{2(g)}$$

Limestone	Quick lime
-----------	------------

  
 10. (D)



11. (A)  
When water reacts with quick lime, calcium hydroxide is formed along with release of heat. Thus, it is an exothermic reaction.  
The process of diluting a concentrated acid is a highly exothermic process.  
Evaporation of water and sublimation of camphor are examples of endothermic reactions.
12. (C)
13. (B)  
Slaking of lime is accompanied by liberation of heat, hence it is an exothermic reaction.  
Calcium hydroxide is an alkali and its aqueous solution (i.e., lime water) turns red litmus blue. Thus, the pH of the solution will be more than seven.

**Connections**

In Chapter 2, you will study how a litmus paper is used to distinguish between acid and base.

14. (D)    15. (A)
16. (D)
17. (D)  
From the given information, the order of reactivity is  $X > Y > Z$ . Z is the least reactive, therefore Z cannot displace either X metal or Y metal.
18. (D)

**Connections**

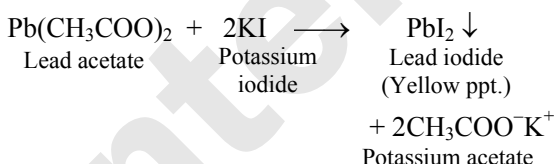
In Chapter 3, you will study on reactivity series of metals. Based on it, you will be able to predict whether the metal will react with the salt solution of another metal.

19. (D)    20. (A)
21. (D)    22. (D)
23. (D)    24. (C)
25. (B)  
 $\text{CuSO}_4 + \text{H}_2\text{S} \longrightarrow \text{H}_2\text{SO}_4 + \text{CuS}$
26. (C)  
On addition of sodium sulphate ( $\text{Na}_2\text{SO}_4$ ) to barium chloride ( $\text{BaCl}_2$ ) solution, white precipitate of barium sulphate ( $\text{BaSO}_4$ ) is formed.
27. (B)
28. (D)  
 $\text{BaCl}_2 + (\text{NH}_4)_2\text{SO}_4 \longrightarrow \text{BaSO}_4 \downarrow + 2\text{NH}_4\text{Cl}$   
Barium chloride      Ammonium sulphate      Barium sulphate (White ppt.)      Ammonium chloride

In the given reaction, there is exchange of ions between the reactants, thus it is a double displacement reaction.

Also, white precipitate of barium sulphate is formed as a product, thus it is also an example of precipitation reaction.

29. (B)  
In order to obtain yellow precipitate of lead iodide, the salt that needs to be used (instead of lead nitrate) should also contain lead. Thus, option (C) and (D) are ruled out. Lead sulphate being an insoluble salt cannot be used for the given activity. Thus, lead acetate which is a soluble salt in water can be used in the given activity.



30. (C)  
The given reaction is a displacement reaction as hydrogen (H) in  $\text{NH}_3$  is displaced by oxygen (O). It is also an example of redox reaction as oxidation and reduction reactions occur simultaneously.
31. (D)
32. (C)  
In the given reaction, there is addition of oxygen to iron metal and it is oxidised. Also, there is removal of hydrogen from the water and thus, water is reduced. A substance which causes oxidation of other chemical species in a chemical reaction and itself undergoes reduction is known as an oxidising agent. Thus, in given reaction, water is acting as an oxidising agent.
33. (A)  
Potassium permanganate ( $\text{KMnO}_4$ ) in presence of dil.  $\text{H}_2\text{SO}_4$ , i.e., in acidic medium acts as strong oxidising agent. In acidic medium,  $\text{KMnO}_4$  oxidises ferrous sulphate to ferric sulphate.
- $$\begin{array}{ccc} 2\text{KMnO}_4 + 8\text{H}_2\text{SO}_4 + 10\text{FeSO}_4 & & \\ \text{Potassium permanganate} & \text{Sulphuric acid} & \text{Ferrous sulphate} \\ & & \\ \longrightarrow & \text{K}_2\text{SO}_4 + 5\text{Fe}_2(\text{SO}_4)_3 + 2\text{MnSO}_4 + 8\text{H}_2\text{O} & \\ & \text{Potassium sulphate} & \text{Ferric sulphate} \quad \text{Manganese sulphate} \quad \text{Water} \end{array}$$
34. (A)    35. (B)





36. (C)  
A solution of slaked lime (calcium hydroxide) is used for whitewashing walls. Calcium hydroxide reacts slowly with the carbon dioxide in air to form a thin layer of calcium carbonate on the walls.

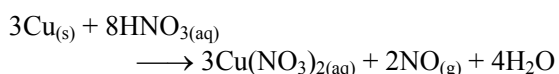
37. (A)  
In the given reaction, a single reactant on heating gave three different products, hence it is a decomposition reaction.

38. (C)

39. (B)  
Respiration is an exothermic process because energy is released in the form of heat during respiration.

40. (D)

41. (A)  
Copper reacts with dilute  $\text{HNO}_3$  and form copper nitrate, nitrogen monoxide gas and water.

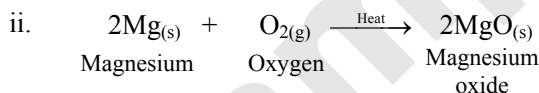


42. (C)

The white precipitate of  $\text{BaSO}_4$  is formed by the reaction of  $\text{SO}_4^{2-}$  and  $\text{Ba}^{2+}$  ions. Such reactions in which there is exchange of ions between the reactants are called double displacement reactions. Since, one of the products formed is in the form of precipitate, it can be called as precipitation reaction.

43.

i. Observation: Magnesium ribbon burns with brilliant white light.



iii. A reaction in which two or more reactants combine to form a single product is called combination reaction.

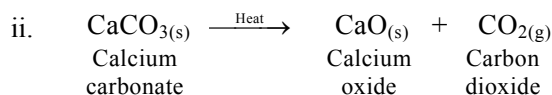
Yes, the reaction occurring when magnesium ribbon is burnt in air is a combination reaction as two reactants (magnesium and oxygen) combine to form a single product (magnesium oxide).

OR

iii. If a substance gains oxygen or loses hydrogen during a reaction, it is said to be oxidised. In this reaction, magnesium gains oxygen to form magnesium oxide and hence, magnesium is oxidised.

44.

i. The chemical formula of calcium carbonate is  $\text{CaCO}_3$ .



iii. Decomposition reaction is a reaction in which single reactant breaks down to form two or more simpler products.

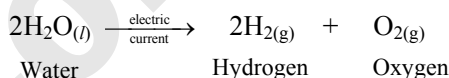
Yes, Decomposition reactions require energy (either in the form of heat, light or electricity) for breaking down the reactants. Hence, all decomposition reactions are endothermic.

OR

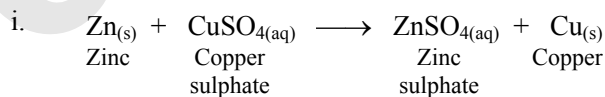
iii. Decomposition reaction that requires energy in the form of light:



Decomposition reaction that requires energy in the form of electricity:



45.



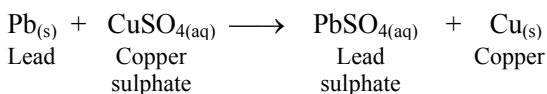
ii. It is a displacement reaction.

iii. A chemical reaction will occur in beaker A. Zinc is more reactive than silver. Hence, zinc will displace silver from silver nitrate solution forming zinc nitrate and silver.

In beaker B, there will be no chemical reaction as silver is less reactive than copper.

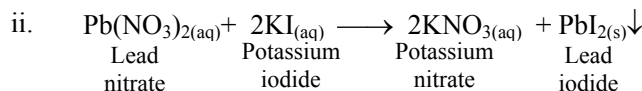
OR

iii. Lead is more reactive than copper. Hence, lead will displace copper from copper sulphate solution forming lead sulphate and copper.



46.

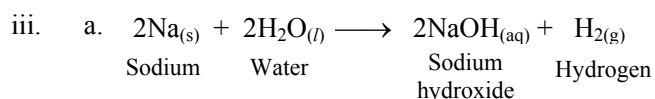
i. The given reaction is called a double displacement reaction as there is exchange of ions between the reactants.



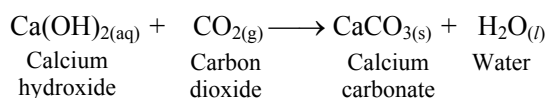


- iii. The number of atoms of each element on both sides of the chemical equation should be equal because as per law of conservation of mass, mass can neither be created nor be destroyed. Total mass of the elements present in the products of a chemical reaction has to be equal to the total mass of the elements present in reactants. Thus, a chemical equation should always be balanced.

OR



b.



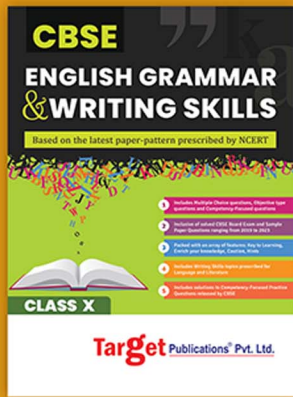
### 1.3 Oxidation reactions in everyday life

1. (C)
2. (D)  
To prevent rancidification of foods containing fats and oils, the packed food is surrounded by unreactive gas like (helium, nitrogen, etc.). The inert atmosphere thus created prevents oxidation of fats and oils.
3. (B)  
When foodstuffs are kept for a long time, they become rancid due to oxidation. Antioxidants prevent oxidation of foodstuffs and hence, they are added to prevent them from becoming rancid.
4. (A)

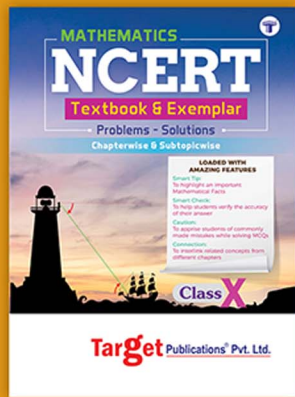
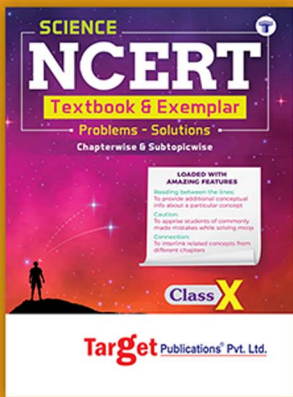


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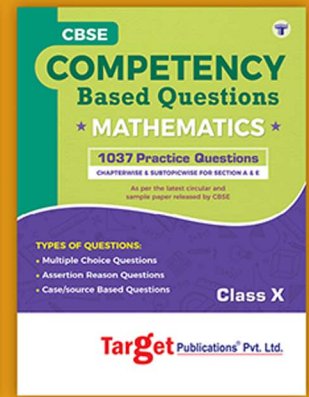
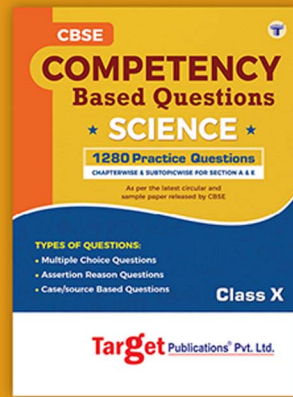
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