CLASS 10

CBSE

PHYSICS WALLAH

15 SAMPLE QUESTION PAPERS

NEW PATTERN

As per Latest CBSE SQP (Dated 30 July 2025)

SCIENCE

With CBSE SQP, 2024 & 2025 Solved Papers

2026 EXAMINATION

Additional Features

- 13 Cheat Sheets (Mindmap)
- 14 Answering Templates
- 111 Most Probable Questions
- 3 SQPs with Marks Breakdown

Chapter-wise Weightage & Trend analysis

CBSE PAST 5 YEARS' PAPERS

SCIENCE										
CHAPTERS	2020		2022		2023		2024		2025	
	DL	ODL	DL	ODL	DL	ODL	DL	ODL	DL	ODL
Chemical Reactions and Equations	5	7	-	-	8	6	7	7	6	6
Acids, Bases and Salts	5	5	-	-	8	10	4	5	6	6
Metals and Non-metals	5	5	-	-	4	6	8	7	6	7
Carbon and its Compounds	5	7	5	5	7	6	6	6	6	6
Periodic Classification of Elements (*Rationalised*)	5	5	5	5	-	-	-	-	-	-
Life Processes	5	8	-	-	10	10	5	8	8	6
Control and Coordination	3	4	-	-	3	1	6	6	7	7
How do Organisms Reproduce?	7	5	6	7	6	5	6	10	7	7
Heredity and Evolution (*Some portion is Rationalised*)	8	6	7	6	6	6	6	1	4	5
Light – Reflection and Refraction	9	11	-	-	12	9	7	10	7	6
The Human Eye and the Colourful World (*Some portion is Rationalised*)	3	4	-	-	2	5	5	2	5	6
Electricity (*Some portion is Rationalised*)	7	8	6	6	11	8	7	8	6	7
Magnetic Effects of Electric Current (*Some portion is Rationalised*)	6	2	6	6	5	5	6	5	7	6
Sources of Energy (*Rationalised*)	1	4	-	-	-	-	-	-	-	-
Our Environment	4	3	5	5	5	5	4	5	5	5
Sustainable Management of Natural Resources (*Rationalised*)	2	1	-	-	-	-	-	-	-	-

**The marks allotment mentioned above is chapter-wise and includes internal choice questions as well. Therefore, the total might not match the Maximum Marks of the respective Previous Year Paper. Here, DL is Delhi, ODL is Outside Delhi.*

**For the year 2021, the exam was not conducted.*

Preparation Guide!

❖ Chapter-wise Weightage & Trend Analysis

Revise smartly with a clear understanding of chapter-wise marks distribution based on the last 5 years of CBSE board exams. Identify high-weightage chapters and focus your efforts strategically.

❖ Answering Templates

Master the art of writing scoring answers using pre-designed templates. Learn how to structure your responses as per CBSE's expectations—write precisely, score efficiently.

❖ Board-based FAQs

Get clear, concise answers to all your common questions about the CBSE board exams and the latest 2026 exam pattern. Scan the QR provided for more FAQs.

❖ CBSE 2026: Two Board Exams Scheme

Understand the new Two-Exam System introduced by CBSE—its purpose, key features, and how it changes your preparation strategy. Gain clarity on what it means for phase 1 and phase 2.

❖ OMR Mastery

Follow step-by-step guidance on correctly filling the OMR sheet. Learn the dos and don'ts to ensure accuracy and avoid common mistakes.

❖ Practice Pack: 12 SQPs

Start with easy level SQPs to build confidence and move to medium difficulty level SQPs for skill-building. Challenge yourself with hard sample papers for full-syllabus preparation and deeper insight.

❖ Solutions with Step-wise Marking Scheme

Get detailed, stepwise solutions for every question. Understand answer logic, avoid frequent errors, and learn the marking scheme through 3 SQPs with marks breakdown table.

❖ Recent CBSE Board Papers & SQPs

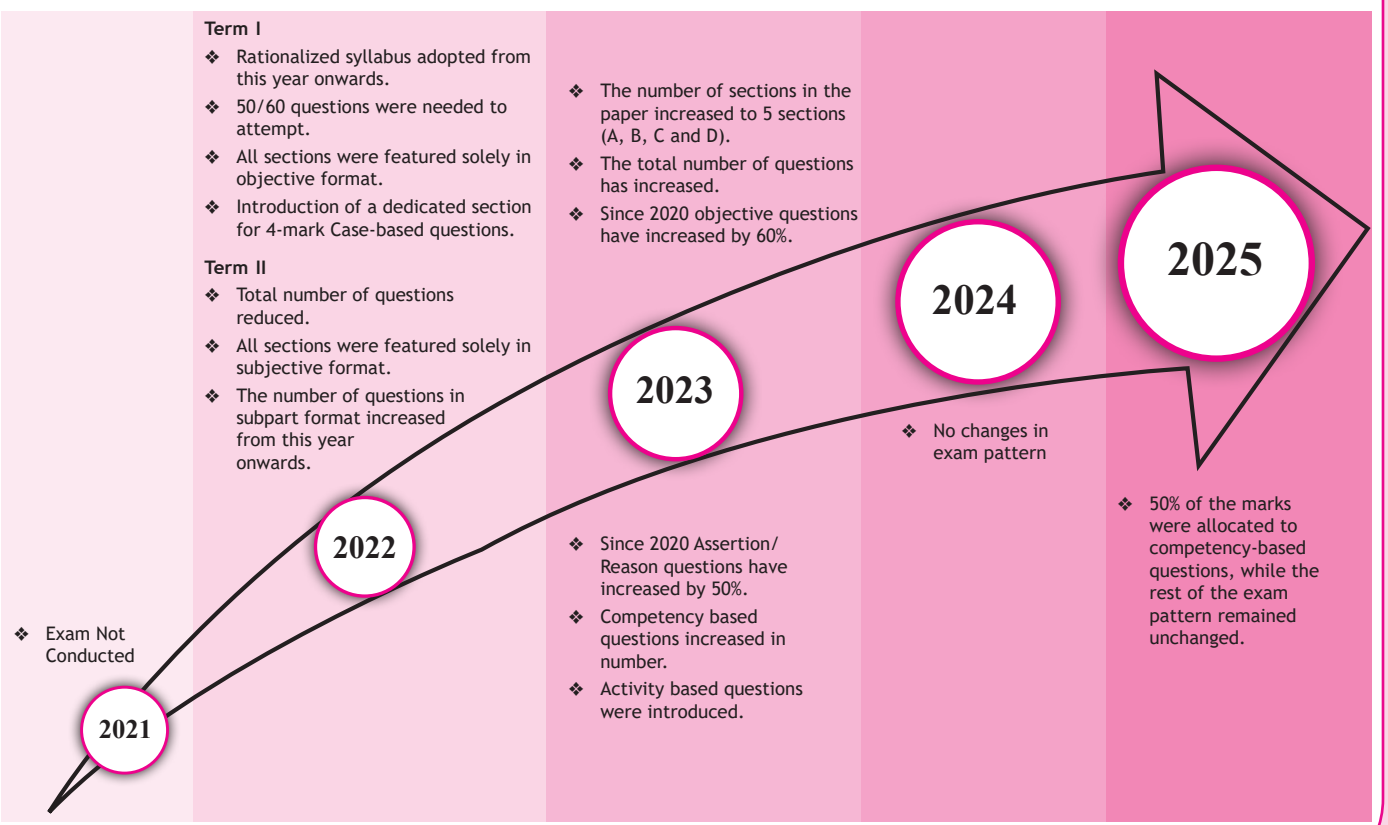
Practice with the latest Sample Question Paper (2025–26), along with 2024 and 2025 board papers. Understand evolving patterns, new question types, and updated evaluation trends.

Question Typology

YEAR	Objective Questions		Subjective Questions			
	MCQs	A/R	VSA	SA	LA	Case-Based type
2025	16	4	6	7	3	3
2024	16	4	6	7	3	3
2023	16	4	6	7	3	3
2022 (Term II)	-	-	7	6	-	2
2022 (Term I)	43	5	-	-	-	12
2021	Exam Not Conducted					

** Some paragraph-based MCQs and VSAs were asked in this year.*

Evolving Trends in CBSE Exam Patterns



CONTENTS

Scan for Latest Syllabus & Upcoming CBSE SQPs

IV. Explanations

V. CBSE Solved Papers

Frequently Asked Questions

Scan for More FAQs

1

Question: Has the paper pattern changed in CBSE SQP 2025-26 compared to 2025 Board Paper?

Answer: Yes. In 2025 Board Paper, questions from Biology, Chemistry, and Physics were intermixed throughout the paper, whereas in CBSE SQP 2025-26, the paper is divided into clear subject-wise sections:

Section A: Biology

Section B: Chemistry

Section C: Physics

2

Question: Are the total number of questions, total marks and duration the same in CBSE SQP 2025-26 and 2025 Board Paper?

Answer: Yes. Both consist of 39 questions, carry a total of 80 marks, and have a duration of 3 hours.

3

Question: Is the subject-wise marks distribution in the CBSE SQP 2025–26 the same as that of the 2025 Board Paper?

Answer: Yes, the subject-wise marks distribution in the CBSE SQP 2025–26 is the same as that of the 2025 Board Paper. The distribution of marks across the three Science subjects is as follows:

Biology: 30 marks

Chemistry: 25 marks

Physics: 25 marks

4

Question: Is there any change in the assessment scheme for the current academic session (2025–26)?

Answer: No. There is no change in the assessment scheme for 2025–26. It remains the same as that of the academic session 2024–25.

5

Question: Has the format of case-based questions changed in the CBSE SQP 2025-26 compared to 2025 Board Paper?

Answer: Yes. In CBSE SQP 2025-26, the format of case-based questions has been updated to include a combination of objective and descriptive questions. In contrast, the 2025 Board Paper featured only descriptive case-based questions. This change aligns with CBSE's focus on competency-based assessment and more diverse question formats.

6

Question: Do examiners deduct marks for exceeding the word limit and spelling mistakes, especially in the language papers?

Answer: No marks are deducted for exceeding the word limit. Marks for spelling mistakes and other errors are deducted in the Language Papers.

7

Question: Will questions be asked from the Board's sample paper?

Answer: Sample question papers help you know the design, pattern and types of questions. Questions in the examination may be from any part of the syllabus. So, prepare thoroughly from the entire syllabus

8

Question: How can we obtain a copy of the Answers Book of Class 10th exam?

Answer: Applicant may apply for obtaining photocopy of answer books by paying prescribed processing charges as per time frame set by the Board. For details please see our website www.cbse.nic.in at the time of declaration of results.

CBSE Board Exam 2026: Two-Exam Scheme Decoded

1. What is the major change in Class X Board exams from 2026?

Ans: Starting in 2026, CBSE will conduct two Board exams per year for Class X, one main examination and one for improvement, if desired. This aims to offer students more flexibility and reduce pressure.

2. Why are two Board exams being introduced?

Ans: This is in line with the National Education Policy (NEP) 2020, which emphasizes holistic assessment, focus on core competencies, and reducing rote memorization.

Two Board exams aim to eliminate the high-stress/high-stakes nature of a single final exam and provide students more opportunities to improve.

3. Can I appear for both exams in the same year?

Ans. Yes, you can appear in both exams within the same school year:

First Board Examination (Main Exam)

You must appear in the first Board Examination, as it is mandatory for all students.

Eligible categories:

- ❒ Fresh students of Class X
- ❒ Students in Compartment (2nd Chance)
- ❒ Students repeating the year (Essential Repeat)
- ❒ Students appearing for improvement of previous performance

Second Board Examination

You can appear in the second examination in the following cases:

- ❒ Improvement: For up to 3 subjects to improve your score.
- ❒ Compartment: If you were placed in Compartment in the first phase exam.
- ❒ Improvement + Compartment: You can appear for both in May.
- ❒ Improvement for the students passed by the replacement of the subject.

Note: You are not allowed to take the second examination if you didn't appear in at least 3 subjects during the first examination. In such cases, you'll fall under the "Essential Repeat" category and have to wait until the next year.

4. When will the exams be held?

Ans. First Phase Examination: 17 February to 6 March 2026

Second Phase Examination: 5 May to 20 May 2026

5. Is it mandatory to attempt the First Phase exam for all students?

Ans. Yes, it is mandatory to attempt the First Phase Exam for all Class X students. It will be treated as the main board examination.

INSTRUCTIONS FOR FILLING THE OMR SHEET

- Use a black or blue ballpoint pen to fill the OMR sheet. Pencils or gel pens are not allowed.
- Carefully read the instructions given on the OMR sheet before filling it out.
- While filling the name, leave a block between your first name, middle and last name.
- The student has to fill the following particulars in the answer sheet:

From Admit Card

1. Subject
2. Sub Code
3. Date of Examination
4. Candidate's Name
5. Father's Name
6. Roll No. (In digits)
7. Roll No. (In words)
8. Centre No.
9. School No.

From Question Paper

10. Set Number
11. Code Number

ADMIT CARD

CENTRAL BOARD OF SECONDARY EDUCATION, DELHI

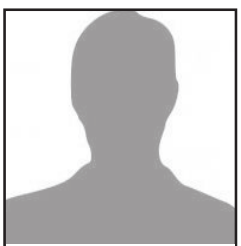
ADMIT CARD FOR SECONDARY EXAMINATION 2026

LATEST ENTRY IN EXAMINATION CENTRE 30 MIN BEFORE THE EXAM START 10 AM (IST)

Digital CBSE

Roll No. (6) **22122532** **Date of Birth** **26/02/2008** **School No.** (9) **65345** **Centre No.** (8) **8407**

Roll. No. (In words) (7) **TWO CRORE TWENTY ONE LAKH TWENTY TWO THOUSAND FIVE HUNDRED THIRTY TWO ONLY**



RAHUL KUMAR SINGH
11-04-2025

Examination	SECONDARY - CLASS: 10
Candidate's Name (4)	RAHUL KUMAR SINGH
Mother's Name	REKHA DEVI
Father/Guardian's Name (5)	OM PRAKASH SINGH
of School	**********
Exam Centre	**********
Category of PwD	Not Applicable
Admit Card ID	RR536521

SUB CODE (2)	SUBJECT NAME (1)	MEDIUM	DATE (3)
002	HINDI COURSE-A	...	21.02.2026
184	ENGLISH (LANGUAGE AND LITERATURE)	...	26.02.2026
086	SCIENCE	...	02.03.2026
087	SOCIAL SCIENCE	...	07.03.2026
041	MATHEMATICS STANDARD	...	11.03.2026

QUESTIONPAPER

Series WYXZ1/4

(10) **Set No. 2**

(11) Q.P. Code **2/4/2**

Roll No.

2	2	1	2	2	5	3	2

Candidates must write the Q.P. Code on the title page of the answer book.

Note: The details provided in the admit card are imaginary; if you found something resembling anyone's details, then it could be by chance.

केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली
सीनियर स्कूल सर्टिफिकेट परीक्षा (कक्षा बारहवीं)
परीक्षार्थी प्रवेश-पत्र के अनुसार भरे

CENTRAL BOARD OF SECONDARY EDUCATION, DELHI
Secondary School Examination (Class-X)
To be filled in by the candidate as per as per Admit Card
लिखे तथा संगत गोले को पूरे गहरे निशान से भरें।
Write and darken the appropriate circle as applicable.

क्रम संख्या
Serial No.

SAMPLE

विषय **Subject:** SCIENCE

विषय कोड **Subject Code:** 086

परीक्षा का दिन एवं तिथि
Day & Date of the Examination: MONDAY 02/03/2026

उत्तर देने का माध्यम
Medium of answering the paper: ENGLISH

प्रश्न पत्र के ऊपर लिखे कोड को दर्शाएं: **Write code No. as written on the top of the question paper**	**Code Number**	**Set Number**
	2/4/2	① ● ③ ④

अतिरिक्त उत्तर-पुस्तिका (ओं) की संख्या
No. of supplementary answer-book(s) used

विकलांग व्यक्ति: हाँ / नहीं
Person with Disabilities: Yes / No — NO

किसी शारीरिक अक्षमता से प्रभावित हो तो संबंधित वर्ग में ✓ का निशान लगाएं।

If physically challenged, tick the category

B	D	H	S	C	A

B = दृष्टिहीन, D = मूक व बधिर, H = शारीरिक रूप से विकलांग,
S = स्पास्टिक, C = डिस्लेक्सिक, A = ऑटिस्टिक

B = Visually Impaired, D = Hearing Impaired, H = Physically Challanged
S = Spastic, C = Dyslexic, A = Autistic

क्या लेखन - लिपिक उपलब्ध करवाया गया: हाँ / नहीं
Whether writer provided: Yes / No — NO

यदि दृष्टिहीन है तो उपयोग में लाए गये सोफ्टवेयर का नाम:
If Visually challenged, name of software used:

एक खाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि परीक्षार्थी का नाम 24 अक्षरों से अधिक है, तो केवल नाम के प्रथम 24 अक्षर ही लिखें।
Each letter be written in one box and one box be left blank between each part of the name. In case Candidate's Name exceeds 24 letters, write first 24 letters.

परीक्षार्थी का नाम बड़े अक्षरों में **Candidate's Name in CAPITAL letters**

R	A	H	U	L		K	U	M	A	R		S	I	N	G	H										

अनुक्रमांक
Roll No.

2	2	1	2	2	5	3	2

As per Admit Card

विषय कोड **Sub. Code**

0	8	6

केन्द्र संख्या **Centre No.**

8	4	0	7

विषय **Subject:** SCIENCE

School No. as per admit card: विद्यालय संख्या जैसा प्रवेश पत्र में दिया गया है।

6	5	3	4	5

अनुक्रमांक (शब्दों में) **Roll No. (in words)** TWO Crore TWENTY ONE Lakhs TWENTY TWO Thousands FIVE HUNDRED THIRTY TWO ONLY

पिता/संरक्षक का नाम
Father's/Guardian's Name: OM PRAKASH SINGH

परीक्षार्थी के हस्ताक्षर **Signature of Candidate:** *(Candidate's signature in black/blue ballpoint pen)*

कार्यालय उपयोग के लिए
Space for office use

इस पृष्ठ पर परीक्षार्थी द्वारा भरे गए सम्पूर्ण विवरण की जांच कर ली गई है।
All the particulars filled in by the candidate on this page have been verified

सहायक अधीक्षक के हस्ताक्षर
Signature of Asstt. Supdt.

अधीक्षक की मोहर
Facsimile sstamp of the Centre supdt.

SELF ASSESSMENT SHEET

Self-assessment plays a crucial role in exam preparation and offers several advantages:

- **Enhanced Self-awareness:** Self-assessment sheets help students gain a deeper understanding of their strengths and weaknesses across various subjects. Specific feedback on their performance provides valuable insights into areas of excellence and those that require improvement.
- **Focused Study:** These sheets provide clear guidance to students on where to direct their efforts. Identifying which questions to review, reattempt, or practice allows for more efficient and purposeful study sessions.
- **Targeted Improvement:** By categorizing questions into different categories (e.g., Easy, Revise, Reattempt), students can concentrate on areas that require the most attention. This targeted approach can result in significant improvements in their comprehension and performance.
- **Motivation:** Self-assessment sheets serve as a source of motivation for students. Observing their progress and understanding the steps needed for improvement can boost their motivation to work harder and achieve better results.
- **Reduced Exam Anxiety:** Having a clear understanding of their preparation progress helps reduce exam-related anxiety. Students feel more confident when they know what aspects to focus on, leading to a calmer and more effective exam experience.
- **Time Management:** Self-assessment sheets aid students in managing their study time more effectively. They can allocate more time to areas requiring extensive revision or reattempt while spending less time on topics they have already mastered.

Self evaluation Instruction: After completing the test, evaluate it using the provided explanations. Use only a pencil to mark the evaluations (allowing for revisions and reattempts). Record the marks obtained in the Marks section and provide remarks in the Remarks column.

Remarks abbreviations:

- **Easy (E):** Use for questions that you should find straightforward, indicating a good understanding and correct answers.
- **Revise (R):** Assign to questions where your response contains minor errors or gaps in understanding, suggesting the need for topic review.
- **Reattempt (RA):** Use for questions with incorrect responses, significant misconceptions, or a lack of understanding. Students receiving this remark should revisit the topic thoroughly, seek additional help if necessary, and attempt similar questions to enhance their grasp of the concept.

	SQP 1		SQP 2		SQP 3		SQP 4		SQP 5		SQP 6		SQP 7	
S.No.	Marks	Remarks	Marks	Remarks	Marks	Remarks	Marks	Remarks	Marks	Remarks	Marks	Remarks	Marks	Remarks
Q.1														
Q.2														
Q.3														
Q.4														
Q.5														
Q.6														
Q.7														
Q.8														
Q.9														
Q.10														
Q.11														
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Q.25														
Q.26														
Q.27														
Q.28														
Q.29														
Q.30														
Q.31														
Q.32														
Q.33														
Q.34														
Q.35														
Q.36														
Q.37														
Q.38														
Q.39														
Total														

EXAM READY: ANSWERING TEMPLATES THAT SCORE

Multiple Choice Question Type

Q. The oxide which can react with HCl as well as KOH to give corresponding salt and water is

(*a*) CuO (*b*) Al_2O_3

(*c*) Na_2O (*d*) K_2O

Ans.

Question no.: ____

Answer: (Correct Ans Key)

- Evaluate each option systematically by understanding the key terms and concepts involved.
- After identifying the correct option, write only the corresponding correct answer key.
- There is no need to provide the justification or explanation for this.

Comparison Type

Q. How is the movement of leaves of a sensitive plant different from the downward movement of the roots?

Ans.

The table outlining the difference between _____ _____ and _____

Aspect	Leaves of Sensitive Plant	Downward Movement of Roots
Type of Movement	_____	Geotropism
Dependency	_____	_____
Mechanism	Facilitated by changes in water content within cells.	_____ _____ _____
Trigger	_____ _____	Environmental stimulus (gravity)

In comparison / differentiate / distinguishing type questions, start with a general statement introducing the comparison between the two types of movements. This sets the context and keeps the examiner aware of the focus of your answer.

Avoid paragraphs*: Use a tabular format to compare both types of movements.

Use **comparative language in pairs** to indicate that you're comparing two different things.

Each point should address a different aspect such as **type of movement, dependency, mechanism, and trigger**.

**Use a paragraph format if the comparison-type question awards fewer marks (like 2 marks) or if there are only one or two key differences to mention. You can use the following connecting phrases to make the comparison flow smoothly in a paragraph form: "In contrast", "While", "Unlike", "On the other hand", "Additionally", "However", "Whereas".*

CHAPTER-1
CHEMICAL REACTIONS AND EQUATIONS

Chemical Reactions And Equations

Chemical Equations

CBSE 2025, 2024, 2022 Term-I

- It is the representation of chemical reaction in symbols and it needs to be balanced.
  E.g.: $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$
- As per law of **conservation of mass**, 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.

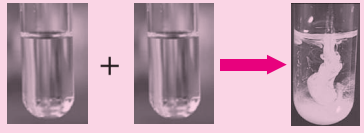
Represented as

Type of Change & Characteristics

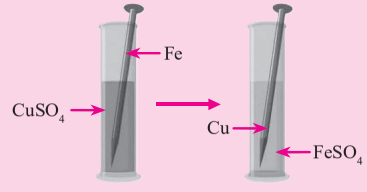
CBSE 2025

- **Chemical Change:** Reactants transform into products. Generally irreversible.
  E.g.: Curdling of milk
- **Physical Change:** No new substances are formed
  Generally reversible.
  E.g.: Melting of ice

- **Evolution of gas**
  E.g.: $CaCO_3(s) \xrightarrow{heat} CaO(s) + CO_2\uparrow(g)$
- **Change in temperature**
  E.g.: $CaO(s) + H_2O(s) \rightarrow Ca(OH)_2(aq.) + Heat$
- **Change in state**
  E.g.: $NH_3(g) + HCl(g) \rightleftharpoons NH_4Cl\downarrow(s)$
- **Formation of precipitate** **CBSE 2025**
  E.g.: $2KI(aq.) + Pb(NO_3)_2(aq.) \rightarrow 2KNO_3(aq.) + \underset{\text{(Yellow ppt)}}{PbI_2\downarrow(s)}$



- **Change in colour**
  E.g.: $\underset{\text{(Blue)}}{CuSO_4(aq.)} + Fe(s) \rightarrow \underset{\text{(Green)}}{FeSO_4(aq.)} + Cu(s)$



Effects of Oxidation

(a) Corrosion: Degradation of metals.
E.g.: Rusting of iron (Rust $Fe_2O_3 \cdot xH_2O$), Tarnishing of Ag.

Prevention:
- Galvanisation
- Painting, oiling, etc.

(b) Rancidity: Oxidation of foods containing oils and fats, causing smell and taste change.

Prevention:
- Flushing of Nitrogen gas
- Refrigeration

Types

- **Combination reaction:** When 2 or more reactants combine to form single product **CBSE 2024, 2020**
  E.g.: $2Na(s) + Cl_2(g) \rightarrow 2NaCl(s)$
- **Decomposition reaction:** Single reactant breaks down into 2 or more products. It is of following types: **CBSE 2025, 2020**

  1. Thermal Decomposition, by heat **CBSE 2024, 2023, 2022 Term-I**

  $2Pb(NO_3)_2(s) \xrightarrow{heat} 2PbO(s) + \underset{\text{(Reddish-brown)}}{4NO_2\uparrow(g)} + O_2\uparrow(g)$

  2. Photo Decomposition, by light
  $2AgBr(s) \xrightarrow{hv} 2Ag(s) + Br_2\uparrow(g)$

  3. Electrolytic decomposition by electricity **CBSE 2024**
  $2H_2O(l) \xrightarrow{\text{Electrolysis}} 2H_2\uparrow(g) + O_2\uparrow(g)$
- **Single displacement reaction:** More reactive element displaces less reactive elements from its salt solution. **CBSE 2025, 2023, 2022 Term-I**
  $Fe(s) + CuSO_4(aq.) \rightarrow FeSO_4(aq.) + Cu(s)$
- **Double displacement reaction:** Exchange of ion takes place between reactants. **CBSE 2025, 2022 Term-I, 2020**
  $Na_2SO_4(aq.) + BaCl_2(aq.) \rightarrow 2NaCl(aq.) + BaSO_4(s)$
- **Exothermic Reaction:** Reaction in which heat is released. **CBSE 2024, 2022 Term-I, 2020**
  $\underset{\text{(Glucose)}}{C_6H_{12}O_6(aq.)} + 6O_2(aq.) \rightarrow 6CO_2(aq.) + 6H_2O(l) + \text{energy}$
- **Endothermic Reaction:** Reaction in which heat is absorbed.
  $6CO_2 + 6H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2\uparrow$ **CBSE 2023**
- **Redox Reactions** **CBSE 2022 Term-I**
  - **Oxidation:** (a) Addition of O_2 (b) Removal of H_2
  - **Reduction:** (a) Addition of H_2 (b) Removal of O_2
  - **Oxidising agent**: Agent which oxidises others and itself gets reduced.
  - **Reducing agent**: Agent which reduces others and itself gets oxidised. **CBSE 2025, 2023**

  E.g.:
  $\underset{\text{(Black)}}{CuO(s)} + H_2(g) \xrightarrow{heat} Cu(s) + \underset{\text{(Brown)}}{H_2O(l)}$
  Oxidation → H_2
  Reduction → CuO
  Oxidising agent → CuO
  Reducing agent → H_2

Cheat Sheet

To Access One Shot Revision Video **Scan This QR Code**

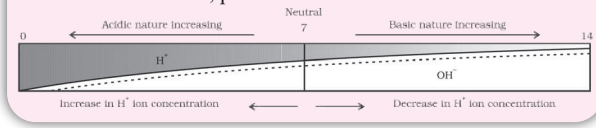
CHAPTER-2
ACIDS, BASES AND SALTS

Cheat Sheet

Acids, Bases and Salts

pH SCALE
CBSE 2024, 2022 Term-I

- $pH = -\log[H^+]$
- The values on the pH scale range from 0 to 14.
- For acidic solutions, pH < 7
- For neutral solutions, pH = 7
- For basic solutions, pH > 7



Synthetic Indicators
- Methyl orange (Natural colour → orange)
  Acid → Red colour,
  Base → Yellow colour

CBSE 2022 Term-I, 2020

- Phenolphthalein (Natural colour → colourless)
  Acid → Colourless,
  Base → Pink colour

Natural Indicators
- Turmeric

Turmeric

Acid → Yellow colour,
Base → Red colour

- Red Cabbage

Red Cabbage

Acid → Red colour,
Base → Green colour

- Litmus paper CBSE 2022 Term-I

Acid →Turns blue litmus red
Base → Turns red litmus blue

Type

Type

Type

Classification

Strong Bases	Weak Bases
Produce more OH^- ions in aqueous solutions	Produce less OH^- ions in aqueous solutions
E.g. → NaOH	E.g. → NH_4OH

Physical Properties
CBSE 2022 Term-I

- Bitter in taste
- Aqueous solution conducts electricity
- Soapy in touch
- Bases that are soluble in water : Alkali

Note: All alkalis are bases but all bases are not alkali.

Chemical Properties
- Base + Metal → Salt + $H_2\uparrow$ CBSE 2020
- Base + Non-metal oxide → Salt + H_2O

Properties

Olfactory indicators
(based on odour/smell)

Onion

Vanilla extract

Clove oil

Physical Properties
- Sour in taste
- Aqueous solution conducts electricity
- Corrosive in nature

Chemical Properties
- Metal + Acid →
  Metal salt + $H_2\uparrow$ (burns with a pop sound)
- Metal Carbonate + Acid →
  Metal salt + $CO_2\uparrow + H_2O$
  (turns lime water milky)

CBSE 2023, 2022 Term-I

- Metal Hydrogen Carbonate + Acid →
  Metal Salt + $CO_2\uparrow + H_2O$
- Neutralisation: Acid + Base → Salt + Water
- Metal oxide + Acid → Salt + H_2O

Properties

Sources

Classification

CBSE 2022 Term-I

Natural source	Acid	Natural source	Acid
Vinegar	Acetic acid	Sour milk (Curd)	Lactic acid
Orange	Citric acid	Lemon	Citric acid
Tamarind	Tartaric acid	Ant sting	Methanoic acid
Tomato	Oxalic acid	Nettle sting	Methanoic acid

Strong Acids	Weak Acids
Produce more H^+ ions in aqueous solutions	Produce less H^+ ions in aqueous solutions
E.g. → HCl, HNO_3, H_2SO_4	E.g. → Citric acid

To Access One Shot Revision Video Scan This QR Code

111 MOST PROBABLE QUESTIONS (ANALYZED & SELECTED FROM PYQs)

To Access Detailed Explanations
Scan This QR Code

Note: *Questions in this section are selected based on repetitive themes and concepts from past examinations, though patterns and typologies may vary.*

1. Chemical Reactions and Equations

1. $MnO_2 + xHCl \rightarrow MnCl_2 + yH_2O + zCl_2$

In order to balance the above chemical equation, the values of x, y and z respectively are: ***(1 M)*** **(2024, 2023)**

(a) 6, 2, 2 (b) 4, 1, 2

(c) 4, 2, 1 (d) 2, 2, 1

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

$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

(i) HCl is oxidized to Cl_2

(ii) MnO_2 is reduced to $MnCl_2$

(iii) $MnCl_2$ acts as an oxidizing agent

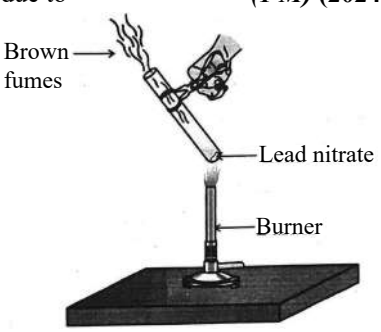
(iv) HCl acts as an oxidizing agent

(1 M) **(2024, 2023, 2022, 2016)**

(a) (ii), (iii) and (iv) (b) (i), (ii) and (iii)

(c) (i) and (ii) only (d) (iii) and (iv) only

3. The emission of brown fumes in the given experimental set-up is due to ***(1 M)*** **(2024, 2023, 2022)**



(a) thermal decomposition of lead nitrate which produces brown fumes of nitrogen dioxide.

(b) thermal decomposition of lead nitrate which produces brown fumes of lead oxide.

(c) oxidation of lead nitrate forming lead oxide and nitrogen dioxide.

(d) oxidation of lead nitrate forming lead oxide and oxygen.

4. **Assertion (A):** Reaction of Quicklime with water is an exothermic reaction.

Reason (R): Quicklime reacts vigorously with water releasing a large amount of heat.

(1 M) **(2024, 2023, 2020)**

5. While studying the double displacement reaction, the solutions of barium chloride and sodium sulphate are mixed together.

(i) What do you observe as soon as the two solutions are mixed together?

(ii) What will happen in the above observation made by you after ten minutes?

(2 M) **(2022, 2020 , 2019, 2016)**

6. (i) While electrolysing water before passing the current some drops of an acid are added. Why? Name the gases liberated at cathode and anode. Write the relationship between the volume of gas collected at anode and the volume of gas collected at cathode.

(ii) What is observed when silver chloride is exposed to sunlight? Give the type of reaction involved.

(3 M) **(2024, 2023)**

7. 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. ***(3 M)*** **(2024, 2020, 2019, 2018)**

8. Select (i) combination reaction, (ii) decomposition reaction and (iii) displacement reaction from the following chemical equations: ***(3 M)*** **(2023, 2022, 2019, 2015)**

(i) $ZnCO_3(s) \rightarrow ZnO(s) + CO_2(g)$

(ii) $Pb(s) + CuCl_2(aq) \rightarrow PbCl_2(aq) + Cu(s)$

(iii) $NaBr(aq) + AgNO_3(aq) \rightarrow AgBr(s) + NaNO_3(aq)$

(iv) $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$

(v) $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$

(vi) $3H_2(g) + N_2(g) \rightarrow 2NH_3(g)$

(vii) $CaCO_3(s) \xrightarrow{Heat} CaO(s) + CO_2(g)$

Roll No. | | | | | | | | |

Q.P. Code 01

Candidates must write the Q.P. Code on the title page of the answer book.

SAMPLE QUESTION PAPER-I

SCIENCE

Time allowed : 3 hours | Maximum Marks : 80

GENERAL INSTRUCTIONS:

Read the following instructions very carefully and strictly follow them :

*(i) This question paper comprises **39** questions divided into **three sections: Section A – Biology (Q.1–16), Section B – Chemistry (Q.17–29),** and **Section C – Physics (Q.30–39)**.*

*(ii) All questions are **compulsory**. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*

*(iii) **Multiple Choice Questions** (Q.1–9, Q.17–24, Q.30–32) carry **1 mark each**.*

*(iv) **Very Short Answer Type Questions** (Q.10–12, Q.25, Q.33–34) carry **2 marks each**. Answers to these questions should be in the range of **30** to **50** words.*

*(v) **Short Answer Type Questions** (Q.13–14, Q.26–27, Q.35–37) carry **3 marks each**. Answers to these questions should be in the range of **50** to **80** words.*

*(vi) **Source-based/Case-based Questions** (Q.15, Q.28, Q.38) carry **4 marks** each with sub-parts.*

*(vii) **Long Answer Type Questions** (Q.16, Q.29, Q.39) carry **5 marks each**. Answers to these questions should be in the range of **80** to **120** words.*

SECTION - A

1. Filtration unit of kidney is **1**

(*a*) Ureter (*b*) Urethra (*c*) Neuron (*d*) Nephron

2. During contraction, what prevents the backflow of blood inside the heart? **1**

(*a*) Valves in heart (*b*) Thick muscular walls of ventricles

(*c*) Thin walls of atria (*d*) Thick walls of atria

3. Identify the parts of the brain included in the hindbrain: **1**

(*a*) Cerebellum, medulla, pons (*b*) Cerebellum, hypothalamus, pons

(*c*) Medulla, cerebrum, pons (*d*) Medulla, hypothalamus, pons

4. Anita is studying the germination process in angiospermic flowers for her biology exam. Her teacher, Mr. Sharma, shows her several diagrams depicting different pathways of pollen tube growth and asks her to identify the correct one.
Which of the following shows the correct pathway of germination in the angiospermic flower? 1

(*a*) 

(*b*) 

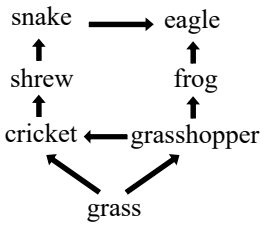
(*c*) 

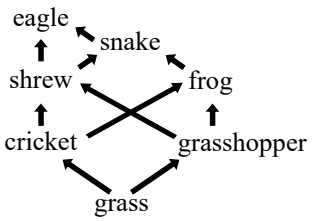
(*d*) 

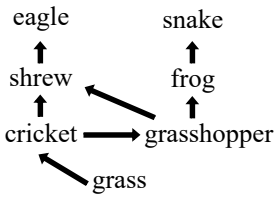
5. In his experiments, Mendel crossed tall pea plants with dwarf pea plants. The pea plants produced in F_1 generation were: **1**

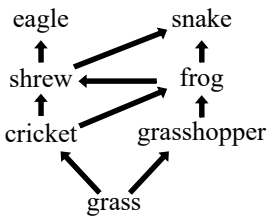
(*a*) All of them were tall
(*b*) All of them were of medium height
(*c*) Both tall and dwarf
(*d*) All of them were dwarf

6. In a classroom, a biology teacher explained food webs in ecosystems and drew four different food webs on the board as given in the question. She then asked Neha to select the food web that most accurately represents a natural ecosystem. Which of the following food webs is most likely to exist in nature? **1**

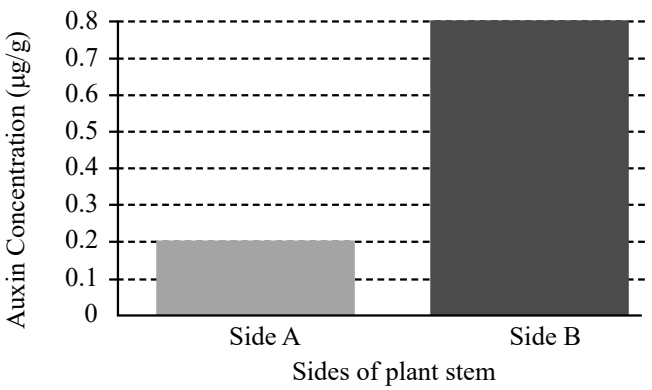
(*a*)


(*b*)


(*c*)


(*d*)


7. A study records the concentration of auxin in different sides of a plant stem. The auxin concentrations are represented in the graph below: **1**



Based on the graph, what is the likely outcome of this auxin distribution on the plant's growth?

(*a*) The plant will grow uniformly
(*b*) The plant will bend towards Side A
(*c*) The plant will bend towards Side B
(*d*) The plant will stop growing

The following two questions consist of two statements – **Assertion** (A) and **Reason** (R). Answer these questions by selecting the appropriate option given below:

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

8. **Assertion (A):** Ozone layer is getting depleted at upper atmosphere which is a cause of concern.
Reason (R): CFC reacts with ozone and breaks it. **1**

9. **Assertion (A):** Hybrid is formed by cross between two organisms that are different in one or more than one traits.
Reason (R): Mendel crossed two plants differing in one trait to obtain F_1 plants which is monohybrid cross. **1**

SAMPLE QUESTION PAPER-I

(Explanations)

Marking Scheme (Ques 1-9) *10 Min*

- Each question carries 1 mark.

1. (*d*) Nephron filters blood in the kidney and therefore is called the filtration unit of kidney.

2. (*a*) Valves within the heart act as one-way gates. They open to allow blood flow during contraction and close to prevent backflow, ensuring efficient circulation and maintaining proper blood flow direction.

3. (*a*) The hindbrain includes the cerebellum, medulla oblongata, and pons.

4. (*a*) Diagram (*a*) is correct as it shows the pollen tube growing through the style to the ovary for fertilization. Only one pollen tube enter the embryo sac and carries male gamete to the egg in the ovary.

5. (*a*) Tall character is dominant over dwarf (recessive trait) hence in F_1 generation all plants were tall in Mendel's experiments.

6. (*b*) Image B represents the correct food web of the ecosystem because it accurately sequences the flow of predators and prey, and shows interconnected relationships where one prey has multiple predators, reflecting natural environmental dynamics.

7. (*b*) Auxin accumulates on the shaded side of the plant (Side B), promoting cell elongation. This differential growth causes the plant to bend towards the side with less auxin concentration (Side A). This mechanism helps the plant to grow towards light, enhancing photosynthesis efficiency.

8. (*a*) In the stratosphere ozone layer is present, which protects us from harmful ultraviolet (UV) radiations coming from the Sun.
When CFC reacts with ozone it breaks the molecule of ozone leading to the depletion of this layer and exposing us to harmful radiations.

9. (*b*) Hybrid is the offspring which have the quality of both the parental generation. One trait should be different for the monohybrid cross.
The reason is true, but it is not the explanation of assertion, because it is written that Mendel did a monohybrid cross, but the reason of getting hybrid is not mentioned which is recombination.

10. **Marking Scheme** *4 Min*

- (a) Concerned gland name in the case of patient 1. ***(½ M)***
- (b) Concerned gland name in the case of patient 2. ***(½ M)***
- Function of concerned gland for patient 2. ***(1 M)***

(*a*) The gland concerned in the case of patient 1 seems to be the thyroid gland.

(*b*) The gland concerned in the case of patient 2 might be the adrenal gland.
One of its functions includes secreting adrenaline, which prepares the body for a 'fight or flight' response by increasing the heart rate and supplying more oxygen to muscles.

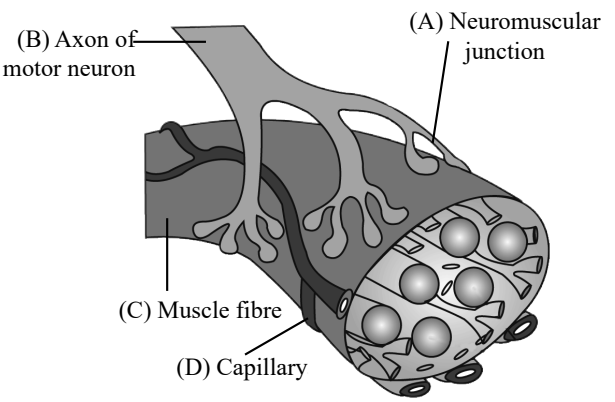
Key Takeaways

From this question, students will understand the specific roles of endocrine glands and will be able to recognize the connection between symptoms and gland functions, ensuring accurate answers in similar questions.

11. **Marking Scheme** *2 Min*

- Identifying the figure ***(1 M)***
- Labeling each part correctly ***(1 M)***

(A) The figure is showing the neuromuscular junction.



OR

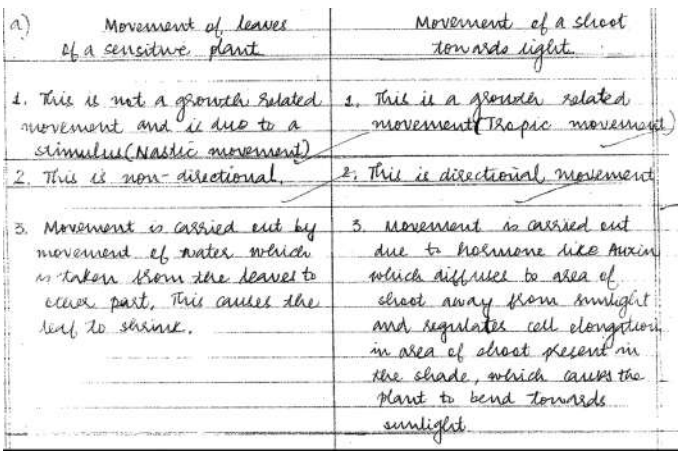
Marking Scheme — 2 Min

- Mention the differences *(1+1 M)*

(B)

Leaves of a sensitive plant	Shoot towards light
Immediate response to touch and no growth is involved in this movement	Slow-growth movement and dependent on light and is caused by elongation of cells on the shaded side of the shoot.
Movement is due to changes in the amount of water in the cells, causing them to swell or shrink	Movement is due to directional growth of the plant part towards the environmental stimulus (light)

Topper's Explanation **(CBSE, 2023)**



12. **Marking Scheme** — 3 Min

- Describe the activity *(1 M)*
- Name two agents involved in this activity *(1 M)*

The butterflies were engaged in pollination which involves transfer of pollen grains from the anther (male reproductive structure) to the stigma (female reproductive structure) of a flower.

Apart from butterflies, water and wind are common abiotic agents facilitating this process.

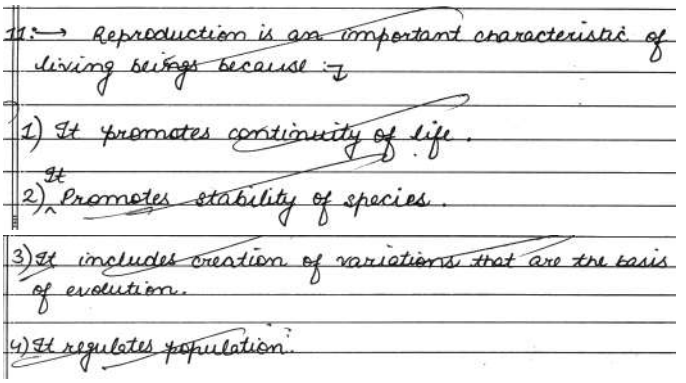
13. **Marking Scheme** — 4 Min

- Three reasons supporting reproduction's importance. *(1+ 1+ 1 M)*

Reproduction is one of the most important characteristics of living beings. Here are three reasons in support of the statement:

1. Continuation of species: Reproduction ensures the continuation of various species on Earth. In the absence of reproduction, species will not be able to exist for a long time and may soon get extinct.
2. Genetic variation: Reproduction allows for genetic variations, within a species by introducing new combinations of genes through sexual reproduction, mutation and genetic recombination.
3. Evolution: Variations produced during reproduction are the basis of evolution. Over time, genetic variations and natural selection lead to the emergence of new species.

Topper's Explanation **(CBSE 2017)**



Mistakes 101 : What not to do!

Students might provide insufficient or vague reasons for why reproduction is important, lacking specific details or examples.

14. **Marking Scheme** — 5 Min

(a) Identification of the biodegradable and non-biodegradable item *(½ + ½ M)*
Reasoning for each choice *(½ + ½ M)*

(b) Importance of managing biodegradable waste *(½ M)*
Importance of managing non-biodegradable waste *(½ M)*

(*a*) The apple core is biodegradable because it is an organic material and can naturally decompose over time, returning nutrients to the soil.

The plastic wrapper is non-biodegradable because plastics are inert materials and take hundreds of years to break down. Thus, it can harm the environment if not properly disposed of.

CBSE Solved Paper 2025

Time allowed : 3 hours | Maximum Marks : 80

GENERAL INSTRUCTIONS:

Read the following instructions very carefully and strictly follow them:

*(i) This question paper comprises **39** questions. **All** questions are compulsory.*

*(ii) This question paper is divided into **FIVE** sections viz. Section **A, B, C, D** and **E**.*

*(iii) In Section **A** - question number **1** to **20** are Multiple Choice Questions (MCQs) carrying **1** mark each.*

*(iv) In Section **B** - question number **21** to **26** are Very Short Answer (VSA) type questions carrying **2** marks each. Answer to these questions should be in the range of **30** to **50** words.*

*(v) In Section **C** - question number **27** to **33** are Short Answer (SA) type questions carrying **3** marks each. Answer to these questions should be in the range of **50** to **80** words.*

*(vi) In Section **D** - question number **34** to **36** are Long Answer (LA) type questions carrying **5** marks each. Answer to these questions should be in the range of **80** to **120** words.*

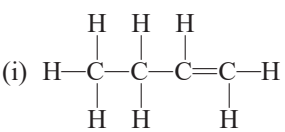
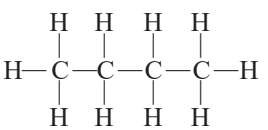
*(vii) In Section **E** - question number **37** to **39** are of 3 source-based/case-based units of assessment carrying **4** marks each with sub-parts.*

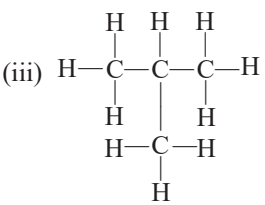
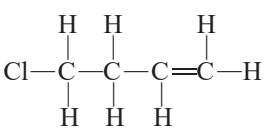
(viii) There is no overall choice. However, an internal choice has been provided in some Sections. Only one of the alternatives has to be attempted in such questions.

SECTION-A

Select and write the most appropriate option out of the four options given for each of the questions no. 1 to 20. There is no negative marking for incorrect response.

1. Given below are the structures of some hydrocarbons. Select the two structures which are related to each other from the given options: **(*An*) (*1 Mark*)**

(i)  (ii) 

(iii)  (iv) 

(*a*) (i) and (iv) (*b*) (ii) and (iv)

(*c*) (ii) and (iii) (*d*) (i) and (iii)

2. Choose the ***incorrect*** statement about the common reaction used in hydrogenation of vegetable oils. **(*Un*) (*1 Mark*)**

(*a*) It is an addition reaction.

(*b*) It takes place in the presence of nickel or palladium catalyst.

(*c*) The product contains only single bonds between carbon atoms.

(*d*) It is an addition reaction which occurs in the presence of an acid catalyst.

3. Consider the following chemical equation: **(*Ev*) (*1 Mark*)**

$p\,Al + q\,H_2O \rightarrow r\,Al_2O_3 + s\,H_2$

To balance this chemical equation, the values of 'p','q',r' and 's' must be respectively:

(*a*) 3,2,2,1 (*b*) 2,3,3,1 (*c*) 2,3,1,3 (*d*) 3,1,2,2

4. Study the following cases: **(*1 Mark*)**

(i) $CuSO_4 + Mg \rightarrow$

(ii) $FeSO_4 + Pb \rightarrow$

(iii) $CaSO_4 + Al \rightarrow$

(iv) $ZnSO_4 + Ca \rightarrow$

The case/cases in which new product (s) will form is/are: **(*Un*)**

(*a*) Only (i) (*b*) Only (iii)

(*c*) (i) and (iv) (*d*) (i), (ii) and (iv)

17. Assertion (A): In our actions of writing or talking, our nervous system communicates with the muscles.

Reason (R): Cranial nerves and spinal nerves form the peripheral nervous system. **(*Re*) (*1 Mark*)**

18. Assertion (A): Use of jute bags for shopping reduces pollution.

Reason (R): Jute is biodegradable and its bag may be reused as and when needed. **(*Un*) (*1 Mark*)**

19. Assertion (A): Hydrogen gas is not evolved when a metal reacts with nitric acid.

Reason (R): Nitric acid is a strong reducing agent and reduces the hydrogen produced in the reaction to water. **(*An*) (*1 Mark*)**

20. Assertion (A): Magnetic field lines around a bar magnet never intersect each other.

Reason (R): Magnetic field produced by a bar magnet is a quantity that has both magnitude and direction. **(*Un*) (*1 Mark*)**

SECTION-B

Questions no. 21 to 26 are Very Short Answer Type questions.

21. (A) List the possible sources of energy required in decomposition reactions. Illustrate any one with a suitable example. **(*Re*) (*2 Marks*)**

OR

(B) What is observed when hydrated ferrous sulphate crystals are heated in a dry boiling tube? Give balanced chemical equation (s) of the reactions(s) that occur (s). **(*Un*) (*2 Marks*)**

22. Giving reason, state the advantage of using baking powder over baking soda for the preparation of bread or cakes. **(*Un*) (*2 Marks*)**

23. State the main function of arteries. Why do they have thick and elastic walls? **(*Re, Un*) (*2 Marks*)**

24. (A) Explain how the proteins control the 'characteristics' in an organism with the help of an example of 'short height' trait in pea plant.

(B) Name the information source of making proteins in a cell. **(*Un, Re*) (*2 Marks*)**

25. (A) A student has difficulty in reading his textbooks but can read the blackboard clearly while sitting in the last row. Name the defect of vision the student is suffering from. List two reasons due to which this defect arises. Write the nature of the lenses required to correct this defect. **(*An*) (*2 Marks*)**

OR

(B) Draw a ray diagram to show the path of a ray of light falling obliquely on one of the refracting faces of a triangular glass prism and mark the angle of deviation on it. **(*Cr*) (*2 Marks*)**

26. A voltage source sends a current of 2 A to a resistor of 40 Ω connected across it for 5 minutes. Calculate the electrical energy supplied by the source. **(*Ev*) (*2 Marks*)**

SECTION-C

Questions no. 27 to 33 are Short Answer Type questions.

27. How is a double displacement reaction different from a displacement reaction? Explain giving example in the form of balanced chemical equations. **(*Re*) (*3 Marks*)**

28. (A) Common salt is an important raw material for various chemicals of daily use. State in brief the method of preparation of (i) Sodium hydroxide, and (ii) Sodium hydrogen carbonate from common salt. Write balanced chemical equations of the reactions that occur. **(*Ap*) (*3 Marks*)**

OR

(B) Design an experimental set-up to demonstrate that "Alcohol and glucose contain hydrogen but are not categorised as acids". Also give the reason to justify this fact. **(*An*) (*3 Marks*)**

29. (A) Enlist any two nitrogenous waste products removed from the blood of human kidney.

(B) Name the capillary cluster formed by the branch of renal artery in the Bowman's capsule.

(C) Depict in the form of a flow chart the path of the urine formed in each kidney until it is finally passed out through the urethra. **(*Re, Cr*) (*3 Marks*)**

30. A pure pea plant having round (R), yellow (Y) seeds is crossed with another pure pea plant having wrinkled (r), green (y) seeds. Subsequently F_1 progeny is self-pollinated to obtain F_2 progeny. **(*An*) (*3 Marks*)**

(A) What do the seeds of F_1 generation look like?

(B) Give the possible combinations of traits in seeds of F_2 generation. Also give their ratio.

(C) State the reason of obtaining seeds of new combination of traits in F_2 generation.

31. A person has to keep reading material much beyond 25 cm (say at 50 cm) from the eye for comfortable reading. Name the defect of vision he is suffering from. List two causes responsible for arising of this defect. Draw labelled diagram showing correction of this defect using eye-glasses. Are these glasses convergent or divergent of light? **(*Cr*) (*3 Marks*)**

32. (A) Draw a labelled diagram to show the pattern of magnetic field lines on a horizontal white board due to a straight current carrying conductor passing perpendicular through its centre. If the direction of current in the conductor is vertically downwards, mark the direction of (i) current, and (ii) magnetic field lines.

(B) State the right hand thumb rule and check whether the directions marked on the diagram are in accordance with this rule. **(*Cr*, *Re*) (*3 Marks*)**

33. (A) "In a food chain energy flow is unidirectional." Give two reasons for the given statement.

(B) If 10,000 J energy is available at the producer level, how much energy will be available to the secondary consumers ? Give reason to justify your answer.

(*Un, Ap*) (*3 Marks*)

SECTION-D

Questions no. 34 to 36 are Long Answer Type questions.

34. (A) (*i*) "In refraction of light through a rectangular glass slab, the emergent ray is always parallel to the direction of the incident ray". Why? Explain with the help of a ray diagram. What happens when a ray of light falls normally on one of the faces of a rectangular glass prism? Draw diagram.

(*ii*) An object is placed at a distance of 30 cm from the optical centre of a concave lens of focal length 20 cm. Use Lens formula to determine the position of the image formed in this case. **(*Cr*, *Ev*) (*5 Marks*)**

OR

(B) (*i*) A student wishes to study the image formation by a concave mirror using candle flame as object. State the type of the image formed by the mirror and mention the change in the image formed, if any, that he observes when the candle flame is gradually moved away from the pole of the mirror. Draw a ray diagram to show the image formation when the object distance is nearly equal to the radius of curvature of the mirror.

(*ii*) A convex mirror used for rear-view on an automobile has a focal length of 3.0 m. If a bus is located at 6.0 m from this mirror, use mirror formula to find the position of the image of the bus as seen in the mirror. **(*Cr*, *Ev*) (*5 Marks*)**

35. (A) (*i*) Consider the following metals:

K, Ca, Al, Cu, Ag, Fe

Select from the above metals, a metal which

I. does not react with oxygen even at high temperature.

II. reacts with oxygen at ordinary temperature and forms a protective oxide layer which prevents the metal from further oxidation.

III. catches fire when kept in the open.

IV. does not burn in oxygen but the hot metal is coated with a black coloured oxide layer.

(*ii*) What are amphoteric oxides? With the help of balanced chemical equations show that aluminium oxide is an amphoteric oxide.

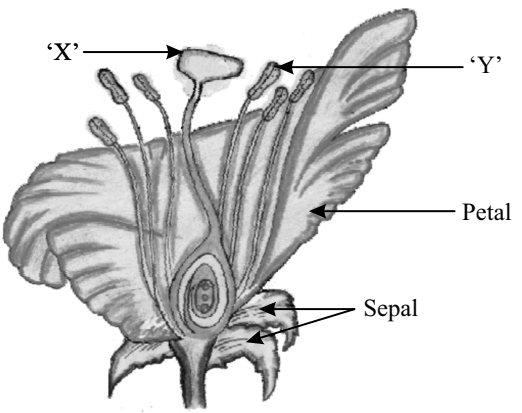
(*iii*) What are alkalis? Give one example. **(*Un*) (*5 Marks*)**

OR

(B) (*i*) With the help of balanced chemical equations state the process of extracting (I) mercury from its ore called cinnabar. and (II) copper from its sulphide ore.

(*ii*) Silver and copper articles slowly lose their shiny surfaces when exposed to air. Name the compounds formed on (I) silver articles, and (II) copper articles in the form of coating. **(*Un*) (*5 Marks*)**

36. (A) (*i*) Identify the parts 'X' and 'Y' in the figure given below:



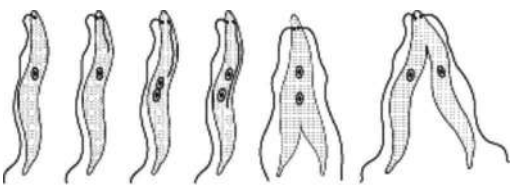
(*ii*) Name the yellowish coloured structures produced by the part labelled as 'Y'.

(*iii*) Write the name of the process by which these are transferred to the part labelled as 'X'.

(*iv*) Explain the process of seed formation in a flowering plant. **(*Re, Un*) (*5 Marks*)**

OR

(B) (*i*) Name the type of asexual mode of reproduction shown in the given figure.



(a) (b) (c) (d) (e) (f)

(*ii*) Identify the unicellular organism in the diagram.

(*iii*) List any two advantages of asexual reproduction over sexual reproduction.

(*iv*) Name and explain any one mode of asexual reproduction observed in *Hydra*.

(*Re, Un*) (*5 Marks*)

EXPLANATIONS

1. (*c*) (ii) and (iii) are isomers since they have the same molecular formula of C_4H_{10}. Hence, they both are related to each other. **(*1 Mark*) [NCERT, Ch-4, Pg. no. 65]**

2. (*d*) Hydrogenation of vegetable oils is an addition reaction that occurs using a nickel catalyst or palladium catalyst to give saturated hydrocarbons. **(*1 Mark*)**
[NCERT, Ch-4, Pg. no. 71]

3. (*c*) The complete balanced equation is:
$2Al + 3H_2O \rightarrow Al_2O_3 + 3H_2$
Hence, p = 2, q = 3, r = 1, s = 3 **(*1 Mark*)**
[NCERT, Ch-1, Pg. no. 3]

4. (*c*) According to reactivity series, only reactions i) and iv) will take place.
$CuSO_4 + Mg \rightarrow MgSO_4 + Cu$
$ZnSO_4 + Ca \rightarrow CaSO_4 + Zn$ **(*1 Mark*)**
[NCERT, Ch-3, Pg. no. 44, 45]

5. (*b*) Salts having the same positive or negative radicals are said to belong to a family. K_2SO_4, Na_2SO_4, and $CaSO_4$ belong to the family of sulphate salts. **(*1 Mark*)**
[NCERT, Ch-2, Pg. no. 28, 29]

6. (*d*) Fertilisation of egg and sperm occurs in the oviduct, embryo implants in the uterus, sperm enters through the vagina, and the placenta removes waste from the developing embryo's blood, ensuring proper nutrient and waste exchange. **(*1 Mark*)**
[NCERT, Ch-7, Pg. no. 124]

7. (*d*) The medulla in the hindbrain controls involuntary actions like salivation and vomiting, regulating essential reflexes for body function. **(*1 Mark*)**
[NCERT, Ch-6, Pg. no. 104]

8. (*b*) *Hibiscus* and Mustard are bisexual flowers, containing both stamens (male) and carpels (female), enabling self and cross-pollination. **(*1 Mark*)**
[NCERT, Ch-7, Pg. no. 120]

9. (*b*) Cytokinins promote cell division and are found in high concentrations in actively growing regions like fruits and seeds. **(*1 Mark*) [NCERT, Ch-6, Pg. no. 108]**

10. (*b*) *Amoeba* forms pseudopodia, a temporary finger-like extensions, to engulf food through phagocytosis, aiding movement and nutrition intake. **(*1 Mark*)**
[NCERT, Ch-5, Pg. no. 84]

11. (*c*) The resistance R of a wire is given by $R = \rho\frac{l}{A}$

When the wire is stretched to 3 times its original length ($3l$), the volume of the wire remains the same, so

$l \times A = (3l) \times A' \Rightarrow A' = \frac{A}{3}$

Thus, the new resistance R' becomes

$$R' = \rho\frac{3l}{A/3} = \rho\frac{3l \times 3}{A} = 9\rho\frac{l}{A} = 9R$$

(*1 Mark*) [NCERT, Ch-11, Pg. no. 178]

12. (*d*)

- Outside the magnet, magnetic field lines run from the north pole to the south pole.
- Inside the magnet, they run from the south pole to the north pole to form closed loops. **(*1 Mark*)**

[NCERT, Ch-12, Pg. no. 197]

13. (*a*) The absolute refractive index n of a medium is given by

$$n = \frac{c}{v}$$

For glass:

$$n_g = \frac{c}{v_g}$$

Substituting values:

$$\frac{3}{2} = \frac{c}{2\times10^8}$$

Solving for c:

$$c = \frac{3}{2}\times2\times10^8 = 3\times10^8 \text{ m/s}$$

For water

Using the same formula:

$$n_w = \frac{c}{v_w}$$

Substituting values:

$$\frac{4}{3} = \frac{3\times10^8}{v_w}$$

Solving for v_w:

$$v_w = \frac{3\times10^8}{4/3} = 3\times10^8 \times\frac{3}{4} = \frac{9}{4}\times10^8 \text{ m/s}$$

(*1 Mark*) [NCERT, Ch-9, Pg. no. 143]

14. (*c*) When a beam of white light passes through fine dust particles, the color that scatters the most is blue.
This phenomenon is called Rayleigh scattering, where shorter wavelengths of light scatter more readily, and blue light has the shortest wavelength in the visible spectrum.
(*1 Mark*) [NCERT, Ch-10, Pg. no. 169]

15. (*c*) While the direction of the current determines the polarity of the magnetic field (north or south pole), it does not affect the strength of the field inside the solenoid. **(*1 Mark*) [NCERT, Ch-12, Pg. no. 201]**

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