

Class 10 Science: Previous Year Questions, Chapter-wise

875 CBSE board exam questions, 2022–2026 · 13 chapters · sorted by question type

Each question shows its exam year and marks. A question repeated across paper sets appears once. Questions that need a figure from the original paper are left out. Questions only, no answers. Chapter headings link to free notes and MCQs for that chapter on studynos.co.in.

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1 Chemical Reactions and Equations

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MULTIPLE CHOICE AND ASSERTION-REASON (39)

Q1. CBSE 2026 · 1 mark The volume ratio of hydrogen and oxygen gases liberated during electrolysis of water is

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

Q2. CBSE 2026 · 1 mark $\text{C}_6\text{H}_{12}\text{O}_6(\text{aq}) + 6\text{O}_2(\text{g}) \rightarrow 6\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l})$. The above reaction is an example of -

- (a) Displacement Reaction (b) Endothermic Reaction
(c) Exothermic Reaction (d) Neutralisation Reaction

Q3. CBSE 2026 · 1 mark When lead nitrate is heated in a boiling tube, we observe:

- (a) brown fumes of O_2 gas (b) white fumes of NO_2 gas
(c) yellow fumes of lead oxide (d) brown fumes of NO_2 gas

Q4. CBSE 2026 · 1 mark Assertion (A): Reaction of quick lime with water is an exothermic reaction. Reason (R): A large amount of heat is evolved on the reaction of quick lime and water.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q5. CBSE 2026 · 1 mark Magnesium ribbon burns with a dazzling white flame and changes into a white powder. The powder is dissolved in water. Identify the chemical formula of the white powder and the correct change observed when the solution is tested with litmus paper.

- (a) MgO , turns blue litmus into red.
(b) MgO , turns red litmus blue.
(c) MgO_2 , turns red litmus blue.
(d) Mg_2O , turns blue litmus red.

Q6. CBSE 2026 · 1 mark Which of the following are combination reactions? (i) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$ (ii) $\text{MgO} + \text{H}_2\text{O} \rightarrow \text{Mg}(\text{OH})_2$ (iii) $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$ (iv) $\text{Zn} + \text{FeSO}_4 \rightarrow \text{ZnSO}_4 + \text{Fe}$

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

Q7. CBSE 2026 · 1 mark A metal carbonate reacts with a solution X which forms a salt, water and a gas Y. What are X and Y?

- (a) X – Sodium hydroxide, Y – Carbon dioxide
(b) X – Sodium hydroxide, Y – Hydrogen
(c) X – Hydrochloric acid, Y – Carbon dioxide
(d) X – Hydrochloric acid, Y – Hydrogen

Q8. CBSE 2026 · 1 mark When ferrous sulphate crystals are heated in a test tube, we observe that:

- (a) A colourless gas with no smell is evolved.
(b) A brown gas is evolved.
(c) The green colour of the salt fades and a gas with the smell of burning sulphur is evolved.
(d) The green colour of the salt fades and no gas is evolved.

Q9. CBSE 2026 · 1 mark Which of the following are decomposition reactions?

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

Q10. CBSE 2026 · 1 mark Which of the following is an example of a displacement reaction?

- (a) The combustion of natural gas
(b) The reaction of a reactive metal with dilute acid
(c) The electrolysis of water
(d) The reaction of quick lime with water

Q11. CBSE 2026 · 1 mark In the following equation $x\text{KI} + \text{H}_2\text{O}_2 \rightarrow \text{I}_2 + y\text{KOH}$, x and y respectively are:

- (a) 2, 2 (b) 1, 2 (c) 2, 1 (d) 1, 1



Q12. CBSE 2026 · 1 mark To a small amount of copper oxide in a beaker, when we add dilute hydrochloric acid slowly with stirring, the change in the colour of the solution is due to the formation of:

- (a) Copper(II) oxide, which is black in colour.
- (b) Copper(I) chloride, which is blue in colour.
- (c) Copper(II) chloride, which is blue-green in colour.
- (d) Copper(I) oxide, which is black in colour.

Q13. CBSE 2026 · 1 mark When zinc reacts with NaOH, the product formed is:

- (a) Na₂O (b) ZnO (c) Na₂ZnO₂ (d) Zn(OH)₂

Q14. CBSE 2025 · 1 mark Electrolysis of water is a decomposition reaction. The mass ratio (MH : M O) of hydrogen and oxygen gases liberated at the electrodes during electrolysis of water is :

- (a) 8 : 1 (b) 2 : 1 (c) 1 : 2 (d) 1 : 8

Q15. CBSE 2025 · 1 mark Assertion (A) : Decomposition reactions are generally endothermic reactions. Reason (R) : Decomposition of organic matter into compost is an exothermic process.

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

Q16. CBSE 2025 · 1 mark Reaction between two elements A and B, forms a compound C. A loses electrons and B gains electrons. Which one of the following properties will not be shown by compound C?

- (a) It has high melting point. (b) It is highly soluble in water.
- (c) It has weak electrostatic forces of attraction between its oppositely charged ions.
- (d) It conducts electricity in its molten state or aqueous solution.

Q17. CBSE 2025 · 1 mark The correct balanced chemical equation showing exothermic reaction in which natural gas burns in air is:

- (a) $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
- (b) $\text{CH}_4 + 2\text{O}_2 \rightarrow 2\text{CO}_2 + 2\text{H}_2\text{O} + \text{Energy}$
- (c) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
- (d) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{Energy}$

Q18. CBSE 2025 · 1 mark In the electrolysis of water, the mass ratio of hydrogen and oxygen gases liberated at the electrodes is:

- (a) 1 : 2 (b) 1 : 4 (c) 1 : 8 (d) 1 : 16

Q19. CBSE 2025 · 1 mark Consider the following chemical equation: $p \text{ Al} + q \text{ H}_2\text{O} \rightarrow r \text{ Al}_2\text{O}_3 + s \text{ H}_2$. 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

Q20. CBSE 2025 · 1 mark From the following, select a process in which combination reaction occurs:

- (a) Black and white photography
- (b) Burning of carbon (coal) (c) Burning of methane
- (d) Refining of copper

Q21. CBSE 2025 · 1 mark Select exothermic processes from the following: (i) Dilution of acid (ii) Burning of natural gas (iii) Evaporation of water (iv) Electrolysis of water

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

Q22. CBSE 2025 · 1 mark Assertion (A): Decomposition of vegetable matter into compost is an exothermic reaction. Reason (R): Decomposition reactions need energy to break down the reactants.

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

Q23. CBSE 2025 · 1 mark Select from the following decomposition reactions in which the source of energy for decomposition is heat: (i) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ (ii) $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ (iii) $2\text{AgBr} \rightarrow 2\text{Ag} + \text{Br}_2$ (iv) $2\text{FeSO}_4 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$

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

Q24. CBSE 2024 · 1 mark $\text{Zn} + 2\text{CH}_3\text{COOH} \rightarrow (\text{CH}_3\text{COO})_2\text{Zn} + \text{H}_2$. The above reaction is a:

- (a) Decomposition reaction (b) Displacement reaction
- (c) Double displacement reaction (d) Combination reaction

Q25. CBSE 2024 · 1 mark A chemical reaction in which exchange of ions occurs between the reactants, is known as:

- (a) Endothermic Reaction (b) Exothermic Reaction
- (c) Double Displacement Reaction
- (d) Displacement Reaction

Q26. CBSE 2024 · 1 mark To balance the following chemical equation, the values of the coefficients x, y and z must be respectively: $x \text{ Zn}(\text{NO}_3)_2 \rightarrow y \text{ ZnO} + z \text{ NO}_2 + \text{O}_2$

- (a) 4, 2, 2 (b) 4, 4, 2 (c) 2, 2, 4 (d) 2, 4, 2

Q27. CBSE 2024 · 1 mark Which of the following is a redox reaction, but not a combination reaction?

- (a) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$ (b) $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$
- (c) $2 \text{Mg} + \text{O}_2 \rightarrow 2 \text{MgO}$ (d) $\text{Fe}_2\text{O}_3 + 3 \text{CO} \rightarrow 2 \text{Fe} + 3 \text{CO}_2$

Q28. CBSE 2024 · 1 mark Which of the following is not a thermal decomposition reaction?

- (a) $2 \text{FeSO}_4 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$
- (b) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ (c) $2 \text{AgCl} \rightarrow 2 \text{Ag} + \text{Cl}_2$
- (d) $\text{Pb}(\text{NO}_3)_2 \rightarrow 2 \text{PbO} + 4 \text{NO}_2 + \text{O}_2$

Q29. CBSE 2024 · 1 mark Consider the following chemical equations: $p \text{ MnO}_2 + q \text{ Al} \rightarrow r \text{ Mn} + s \text{ Al}_2\text{O}_3$. To balance this chemical equation the values of the coefficients p, q, r and s must be respectively:

- (a) 3, 2, 3, 4 (b) 4, 3, 4, 2 (c) 3, 4, 3, 2 (d) 4, 2, 4, 3

Q30. CBSE 2023 · 1 mark Which of the following is an example of endothermic process?

- (a) Formation of slaked lime
- (b) Decomposition of vegetable matter into compost
- (c) Dissolution of ammonium chloride in water
- (d) Digestion of food in our body



Q31. CBSE 2023 · 1 mark In order to balance the following chemical equation, the values of the coefficients x and y respectively are: x $\text{Pb}(\text{NO}_3)_2 \rightarrow 2 \text{PbO} + y \text{NO}_2 + \text{O}_2$

- (a) 2, 4 (b) 2, 2 (c) 2, 3 (d) 4, 2

Q32. CBSE 2023 · 1 mark During electrolysis of water, if the volumes of oxygen and hydrogen evolved at the electrodes are VO and VH respectively, then VO/VH is

- (a) 4 (b) 2 (c) 21 (d) 41

Q33. CBSE 2023 · 1 mark In order to balance the following chemical equation, the values of the coefficients x and y respectively are: x $\text{Pb}(\text{NO}_3)_2 \xrightarrow{\text{Heat}} 2 \text{PbO} + y \text{NO}_2 + \text{O}_2$

- (a) 2, 4 (b) 2, 2 (c) 2, 3 (d) 4, 2

Q34. CBSE 2023 · 1 mark A metal ribbon 'X' burns in oxygen with a dazzling white flame forming a white ash 'Y'. The correct description of X, Y and the type of reaction is:

- (a) X = Ca ; Y = CaO ; Type of reaction = Decomposition
(b) X = Mg ; Y = MgO ; Type of reaction = Combination
(c) X = Al ; Y = Al_2O_3 ; Type of reaction = Thermal decomposition
(d) X = Zn ; Y = ZnO ; Type of reaction = Endothermic

Q35. CBSE 2023 · 1 mark When aqueous solutions of potassium iodide and lead nitrate are mixed, an insoluble substance separates out. The chemical equation for the reaction involved is:

- (a) $\text{KI} + \text{PbNO}_3 \rightarrow \text{PbI} + \text{KNO}_3$
(b) $2\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbI}_2 + 2\text{KNO}_3$
(c) $\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbI} + \text{KNO}_3$
(d) $\text{KI} + \text{PbNO}_3 \rightarrow \text{PbI}_2 + \text{KNO}_3$

Q36. CBSE 2023 · 1 mark Assertion (A): Reaction of Quicklime with water is an exothermic reaction. Reason (R): Quicklime reacts vigorously with water releasing a large amount of heat.

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

Q37. CBSE 2023 · 1 mark The balanced chemical equation showing reaction between quicklime and water is:

- (a) $2 \text{CaO} + \text{H}_2\text{O} \rightarrow 2 \text{CaOH} + \text{H}_2 + \text{Heat}$
(b) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2 + \text{Heat}$
(c) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{Heat}$
(d) $2 \text{CaO} + 3 \text{H}_2\text{O} \rightarrow 2 \text{Ca}(\text{OH})_3 + \text{O}_2 + \text{Heat}$

Q38. CBSE 2023 · 1 mark Study the following chemical reaction: $2 \text{Na} (\text{s}) + 2 \text{H}_2\text{O} (\text{l}) \rightarrow 2 \text{NaOH} (\text{aq}) + \text{H}_2 (\text{g})$. The reducing agent in this reaction is:

- (a) Na (b) H_2O (c) NaOH (d) H_2

Q39. CBSE 2023 · 1 mark Assertion (A): In the following reaction $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$, ZnO undergoes reduction. Reason (R): Carbon is a reducing agent that reduces ZnO to Zn.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

VERY SHORT ANSWER (20)

Q40. CBSE 2026 · 3 marks What happens when (i) lead (II) nitrate is heated? (ii) iron (II) sulphate is heated? (iii) silver chloride is exposed to sunlight? Write balanced chemical equations of the reactions involved in support of your answer.

Q41. CBSE 2026 · 2 marks (a) Why should chemical equations be balanced? (b) Name the oxidising and reducing agent in the following equation: $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$

Q42. CBSE 2026 · 2 marks Write balanced equations for the reactions of the following: (a) Iron with steam (b) Calcium with water

Q43. CBSE 2026 · 3 marks Define the following terms: (a) Corrosion (b) Rancidity (c) Double displacement reaction

Q44. CBSE 2026 · 3 marks Give reasons: (i) Potato chips manufacturers fill the packet of chips with nitrogen gas. (ii) Respiration is an exothermic reaction. (iii) Silver chloride is stored in dark coloured bottles.

Q45. CBSE 2026 · 3 marks Define the following terms: (i) Corrosion (ii) Rancidity (iii) Exothermic reaction

Q46. CBSE 2025 · 2 marks What happens when: (a) Lead nitrate is thermally decomposed, (b) Natural gas burns in oxygen (or air)? (write balanced chemical equation)

Q47. CBSE 2025 · 2 marks Translate the following statements into chemical equations and then balance them: (a) Nitric acid reacts with calcium hydroxide to form calcium nitrate and water. (b) Sodium chloride reacts with silver nitrate to form silver chloride and sodium nitrate.

Q48. CBSE 2025 · 2 marks (a) In common practice silver is recovered from silver nitrate solution by the use of copper metal. Name the type of reaction that takes place in this process and give the chemical equation of the reaction involved. (b) Name the method used for refining silver.

Q49. CBSE 2025 · 2 marks Balance the following chemical equations: (a) $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 + \text{H}_2\text{O}$ (photosynthesis) (b) $\text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbO} + \text{NO}_2 + \text{O}_2$ (heat)

Q50. CBSE 2025 · 2 marks (a) List the possible sources of energy required in decomposition reactions. Illustrate any one with a suitable example. OR (b) What is observed when hydrated ferrous sulphate crystals are heated in a dry boiling tube? Give balanced chemical equation(s) of the reaction(s) that occur(s).



Q51. CBSE 2025 · 2 marks Translate the following statements into balanced chemical equations: (a) Aluminium reacts with copper chloride to form aluminium chloride and copper. (b) Zinc reacts with sodium hydroxide to give sodium zincate and hydrogen gas.

Q52. CBSE 2024 · 2 marks (a) 1 gram of solid sodium chloride was taken in a clean and dry test tube and concentrated sulphuric acid was added to it. (i) Name the gas evolved in the reaction. (ii) What will be observed when this gas is tested with (I) dry, and (II) wet blue litmus paper? Write your conclusion about the nature (acidic/basic) of this gas.

Q53. CBSE 2024 · 2 marks A spatula full of sodium carbonate is taken in a test tube and 2 mL of dilute ethanoic acid is added to it. (a) Write a chemical equation for the reaction. (b) Suggest a method of testing the gas liberated in the reaction.

Q54. CBSE 2024 · 2 marks (a) Copper powder is taken in a china dish and heated over a burner. Name the product formed and state its colour. Write the chemical equation for the reaction involved.

Q55. CBSE 2023 · 2 marks What is observed when aqueous solutions of potassium iodide and lead nitrate are mixed together? Name the type of reaction and write the chemical equation for the reaction that occurs.

Q56. CBSE 2023 · 2 marks A student took a small amount of copper oxide in a conical flask and added dilute hydrochloric acid to it with constant stirring. He observed a change in colour of the solution. (i) Write the name of the compound formed and its colour. (ii) Write a balanced chemical equation for the reaction involved.

Q57. CBSE 2023 · 2 marks (A) A student took a small amount of copper oxide in a conical flask and added dilute hydrochloric acid to it with constant stirring. He observed a change in colour of the solution. (i) Write the name of the compound formed and its colour. (ii) Write a balanced chemical equation for the reaction involved. OR (B) The industrial process used for the manufacture of caustic soda involves electrolysis of an aqueous solution of compound 'X'. In this process, two gases 'Y' and 'Z' are liberated. 'Y' is liberated at cathode and 'Z', which is liberated at anode, on treatment with dry slaked lime forms a compound 'B'. Name X, Y, Z and B.

Q58. CBSE 2023 · 2 marks When X is heated to 373 K, it releases water molecules and converts to Y. To keep Y stable, certain steps are taken. (i) Identify X and Y. (ii) How can X be reobtained from Y?

Q59. CBSE 2023 · 2 marks (a) X is heated to 373 K and it loses water molecules to become Y. Y is kept in the right position. (i) Identify X and Y (ii) How can X be reobtained from Y?

SHORT ANSWER (16)

Q60. CBSE 2026 · 3 marks Account for the following: (a) White silver chloride turns grey when exposed to sunlight. (b) Lead (II) nitrate on heating releases brown fumes. (c) Bags of oil and fat containing food items are flushed with nitrogen gas.

Q61. CBSE 2026 · 3 marks Answer the following: (a) Identify the substance oxidized and the substance reduced in the following reaction: $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$ (b) What type of reaction occurs when Lead (II) nitrate solution is mixed with potassium iodide solution? (c) Why is silver chloride stored in dark coloured bottles?

Q62. CBSE 2026 · 3 marks Answer the following: (a) Write two observations when green coloured crystals of ferrous sulphate are heated in a boiling tube. (b) Why brown coloured copper powder turns black on heating? (c) What happens when limestone is heated strongly?

Q63. CBSE 2026 · 2 marks What happens when (i) Calcium carbonate is heated? (ii) Silver bromide is exposed to sunlight? (iii) Lead is added to copper (II) chloride solution? Write balanced chemical equations of the reactions involved in support of your answer.

Q64. CBSE 2026 · 3 marks What happens when (i) potassium iodide solution is added to lead (II) nitrate solution? (ii) zinc is added to copper (II) chloride solution? (iii) hydrogen gas is passed over hot copper (II) oxide? Write balanced chemical equations of the reactions involved in support of your answer.

Q65. CBSE 2026 · 3 marks Seema took a small amount of copper powder in a china dish and heated it. What changes will she observe on heating? When H_2 gas is passed over this heated substance, what visible changes will be seen in it? Give the chemical equations of the reactions involved, along with the names and colours of the products in each case.

Q66. CBSE 2026 · 3 marks 2 g of green coloured crystals of ferrous sulphate are heated in a dry boiling tube. Name the type of chemical reaction taking place. Write the balanced chemical equation for the reaction. Is this an exothermic or an endothermic reaction?

Q67. CBSE 2025 · 3 marks (a) (i) Define the term decomposition reaction. Write one chemical equation each for decomposition reaction where energy is supplied in the form of heat, light or electricity. (ii) Decomposition of vegetable matter into compost is considered an exothermic reaction. Why? OR (b) Why are decomposition reactions called the opposite of combination reactions? Write one chemical equation each for these two types of reactions mentioning the name of the reactant(s) and the product(s) involved in the reactions.

Q68. CBSE 2025 · 3 marks Define a displacement reaction. Name a displacement reaction which is highly exothermic and has its use in joining railway tracks. Explain the process with a balanced chemical equation of the reaction that occurs.

Q69. CBSE 2024 · 3 marks A small amount of copper oxide was taken in a beaker and dilute hydrochloric acid was added with continuous stirring of the solution. Name the compound formed and state the colour of its solution. Write balanced chemical equation for the reaction that occurs. Based on the reaction, state the nature (acidic/basic) of copper oxide.



Q70. CBSE 2024 · 3 marks Answer the following questions in the context of electrolysis of water: (a) Why is this reaction/process called a decomposition reaction? (b) Giving reason state whether this reaction is exothermic or endothermic. (c) Name the gases collected at the anode and cathode. (d) What is the mass ratio of the gases collected at the anode and cathode?

Q71. CBSE 2023 · 3 marks Silver chloride kept in a china dish turns grey in sunlight. (a) Write the colour of silver chloride when it was kept in the china dish. (b) Name the type of chemical reaction taking place and write the chemical equation for the reaction. (c) State one use of the reaction. Name one more chemical which can be used for the same purpose.

Q72. CBSE 2023 · 3 marks Write down the balanced chemical equations for the following reactions and identify the type of reaction in each case. (a) Nitrogen gas is treated with hydrogen gas to form ammonia gas. (b) Lead nitrate is heated strongly to form lead monoxide, nitrogen dioxide and oxygen. (c) A copper wire is dipped in silver nitrate solution and a shining deposit of silver is produced.

Q73. CBSE 2023 · 3 marks (a) Define oxidation. (b) Identify the oxidising agent in the following reactions and balance the chemical equations : (i) $\text{Pb3O4} + \text{HCl} \rightarrow \text{PbCl2} + \text{Cl2} + \text{H2O}$ (ii) $\text{MnO2} + \text{Al} \rightarrow \text{Mn} + \text{Al2O3}$

Q74. CBSE 2023 · 3 marks (i) While electrolysis of 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.

Q75. CBSE 2023 · 3 marks (a) Define a double displacement reaction. (b) Write the chemical equation of a double displacement reaction which is also a (i) Neutralization reaction and (ii) Precipitation reaction. Give justification for your answer.

LONG ANSWER (4)

Q76. CBSE 2025 · 5 marks (b) When dry crystals of ferrous sulphate were heated in a dry boiling tube, some tiny water droplets were observed in the tube after some time. (i) State the source of these water droplets. (ii) Write the colour change observed during heating. (iii) Write the balanced chemical equation of the reaction that occurs during heating. (iv) How many water molecules are attached per formula unit of ferrous sulphate crystal? (v) Write the molecular formula of crystalline form of (I) copper sulphate, and (II) sodium carbonate.

Q77. CBSE 2025 · 5 marks (a) (i) On adding dilute HCl to a test tube containing sodium carbonate, an effervescence is observed. Explain the observation giving chemical equation for the reaction. How is the gas released tested in a school laboratory? (ii) What happens when excess carbon dioxide passes through lime water? Write chemical equations to explain your answer.

Q78. CBSE 2024 · 5 marks (a) What is a chemical reaction? Describe one activity each to show that a chemical change has occurred in which (i) change of colour, and (ii) change in temperature has taken place.

Q79. CBSE 2024 · 5 marks When lead nitrate is heated strongly in a boiling tube, two gases are liberated and a solid residue is left behind in the test tube. (i) Name the type of chemical reaction and define it. (ii) Write the name and formula of the coloured gas liberated. (iii) Write the balanced chemical equation for the reaction. (iv) Name the residue left in the test tube and state the method of testing its nature (acidic/basic).

CASE-BASED (1)

CASE STUDY · CBSE 2024

(1) $\text{CaO} + \text{H2O} \rightarrow \text{Ca(OH)2}$ (2) $\text{Pb(NO3)2} \rightarrow \text{PbO} + \text{NO2} + \text{O2}$ (3) $\text{CuSO4} + \text{Fe} \rightarrow \text{FeSO4} + \text{Cu}$ (4) $\text{Na2SO4} + \text{BaCl2} \rightarrow \text{BaSO4} + \text{NaCl}$

Q80. CBSE 2024 · 1 mark Consider the unbalanced chemical equations of the chemical reactions listed below. (i) Select combination reaction from the reactions listed above. Is this reaction endothermic or exothermic?

2 Acids, Bases and Salts

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (46)

Q1. CBSE 2026 · 1 mark An aqueous solution turns red litmus blue. Excess addition of which of the following solution would reverse the change?

- (a) Sodium hydroxide (b) Hydrochloric acid
(c) Baking soda (d) Slaked lime

Q2. CBSE 2026 · 1 mark While washing dirty clothes by soap, micelles are formed. Select the correct statement about micelles.

- (a) The hydrophobic tail of the soap molecule is in the interior of the cluster, whereas hydrophilic end is on the surface of the cluster.
(b) The hydrophobic tail is on the surface of the cluster, whereas hydrophilic end is in the interior of cluster.
(c) Both hydrophobic tail and hydrophilic end are in the interior of the cluster.
(d) Both hydrophobic tail and hydrophilic end are on the surface of the cluster.



Q3. CBSE 2026 · 1 mark How will you protect yourself from the heat generated while diluting a concentrated acid?

- (a) By adding acid to water with constant stirring.
- (b) By adding water to acid with constant stirring.
- (c) By adding water to acid followed by base.
- (d) By adding base to acid with constant stirring.

Q4. CBSE 2026 · 1 mark The volume ratio of hydrogen and oxygen gases liberated during electrolysis of water is

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

Q5. CBSE 2026 · 1 mark Which one of the following chemicals is used in soda-acid fire-extinguishers?

- (a) Sodium carbonate (b) Sodium hydrogen carbonate
- (c) Sodium hydroxide (d) Sodium acetate

Q6. CBSE 2026 · 1 mark Four solutions, namely fructose, ethanol, hydrochloric acid and sodium hydroxide filled in four separate beakers are connected one by one in an electric circuit with a bulb. The solutions in which the bulb will glow when current is passed are:

- (a) ethanol and hydrochloric acid (b) fructose and ethanol
- (c) fructose and sodium hydroxide
- (d) hydrochloric acid and sodium hydroxide

Q7. CBSE 2026 · 1 mark Study the following table and select the correct option : Salt | Acid used | Base used | Nature of Salt

- (a) NaCl | HCl | NaOH | Basic
- (b) Na₂CO₃ | H₂CO₃ | NaOH | Neutral
- (c) Na₂SO₄ | H₂SO₄ | NaOH | Acidic
- (d) CH₃COONa | CH₃COOH | NaOH | Basic

Q8. CBSE 2026 · 1 mark The pH of the gastric juices released during digestion is:

- (a) Less than 7 (b) More than 7 (c) Equal to 7
- (d) Equal to 0

Q9. CBSE 2026 · 1 mark Baking powder is a mixture of:

- (a) Sodium carbonate + Acetic acid
- (b) Sodium carbonate + Tartaric acid
- (c) Sodium hydrogen carbonate + Tartaric acid
- (d) Sodium hydrogen carbonate + Acetic acid

Q10. CBSE 2026 · 1 mark A metal carbonate reacts with a solution X which forms a salt, water and a gas Y. What are X and Y?

- (a) X – Sodium hydroxide, Y – Carbon dioxide
- (b) X – Sodium hydroxide, Y – Hydrogen
- (c) X – Hydrochloric acid, Y – Carbon dioxide
- (d) X – Hydrochloric acid, Y – Hydrogen

Q11. CBSE 2026 · 1 mark Tamarind is a natural source of which acid?

- (a) Acetic acid (b) Tartaric acid (c) Oxalic acid
- (d) Citric acid

Q12. CBSE 2026 · 1 mark Rain water is called 'acid rain' when its:

- (a) pH falls below 7.2. (b) pH falls below 14.
- (c) pH is above 7. (d) pH falls below 5.6.

Q13. CBSE 2026 · 1 mark Tomato is a natural source of which acid?

- (a) Acetic acid (b) Tartaric acid (c) Oxalic acid
- (d) Citric acid

Q14. CBSE 2026 · 1 mark Which of the following compounds is used for removing permanent hardness of water?

- (a) Bleaching powder (b) Washing soda (c) Baking soda
- (d) Caustic soda

Q15. CBSE 2026 · 1 mark To a small amount of copper oxide in a beaker, when we add dilute hydrochloric acid slowly with stirring, the change in the colour of the solution is due to the formation of:

- (a) Copper(II) oxide, which is black in colour.
- (b) Copper(I) chloride, which is blue in colour.
- (c) Copper(II) chloride, which is blue-green in colour.
- (d) Copper(I) oxide, which is black in colour.

Q16. CBSE 2026 · 1 mark When zinc reacts with NaOH, the product formed is:

- (a) Na₂O (b) ZnO (c) Na₂ZnO₂ (d) Zn(OH)₂

Q17. CBSE 2025 · 1 mark Consider the following reactions: (i) Dilute hydrochloric acid reacts with sodium hydroxide. (ii) Magnesium oxide reacts with dilute hydrochloric acid. (iii) Carbon dioxide reacts with sodium hydroxide. It is found that in each case :

- (a) Salt and water is formed. (b) Neutral salts are formed.
- (c) Hydrogen gas is formed. (d) Acidic salts are formed.

Q18. CBSE 2025 · 1 mark In one formula unit of salt 'X', seven molecules of water of crystallisation are present. The salt 'X' is:

- (a) CuSO₄ (b) Na₂CO₃ (c) FeSO₄ (d) CaSO₄

Q19. CBSE 2025 · 1 mark Reaction between two elements A and B, forms a compound C. A loses electrons and B gains electrons. Which one of the following properties will not be shown by compound C?

- (a) It has high melting point. (b) It is highly soluble in water.
- (c) It has weak electrostatic forces of attraction between its oppositely charged ions.
- (d) It conducts electricity in its molten state or aqueous solution.

Q20. CBSE 2025 · 1 mark Tooth enamel is made up of calcium hydroxyapatite (a crystalline form of calcium phosphate). This chemical starts corroding in the mouth when the pH is:

- (a) 7 (b) 5 (c) 10 (d) 14

Q21. CBSE 2025 · 1 mark The body of human beings works within the pH range of:

- (a) 61 to 68 (b) 65 to 73 (c) 70 to 78 (d) 75 to 81

Q22. CBSE 2025 · 1 mark In the electrolysis of water, the mass ratio of hydrogen and oxygen gases liberated at the electrodes is:

- (a) 1 : 2 (b) 1 : 4 (c) 1 : 8 (d) 1 : 16

Q23. CBSE 2025 · 1 mark Which of the given option represents a family of salts?

- (a) NaCl, Na₂SO₄, CaSO₄ (b) K₂SO₄, Na₂SO₄, CaSO₄
- (c) NaNO₃, CaCO₃, Na₂CO₃ (d) MgSO₄, CuSO₄, MgCl₂



Q24. CBSE 2025 · 1 mark Oxides of aluminium and zinc are:

- (a) Acidic (b) Amphoteric (c) Basic (d) Neutral

Q25. CBSE 2024 · 1 mark An aqueous solution of a salt turns blue litmus to red. The salt could be the one obtained by the reaction of:

- (a) HNO_3 and NaOH (b) H_2SO_4 and KOH
(c) CH_3COOH and NaOH (d) HCl and NH_4OH

Q26. CBSE 2024 · 1 mark The acid produced in our stomach during digestion and the base used to neutralise the excess acid during indigestion respectively are:

- (a) HCl , $\text{Mg}(\text{OH})_2$ (b) HCl , $\text{Ca}(\text{OH})_2$
(c) Amino acids, $\text{Ca}(\text{OH})_2$ (d) Lactic acid, $\text{Mg}(\text{OH})_2$

Q27. CBSE 2024 · 1 mark Four solutions, namely glucose, alcohol, hydrochloric acid and sulphuric acid filled in four separate beakers are connected one by one in an electric circuit with a bulb. The solutions in which the bulb will glow when current is passed are:

- (a) Glucose and alcohol (b) Alcohol and hydrochloric acid
(c) Glucose and sulphuric acid
(d) Hydrochloric acid and sulphuric acid

Q28. CBSE 2024 · 1 mark The salt present in tooth enamel is:

- (a) Calcium phosphate (b) Magnesium phosphate
(c) Sodium phosphate (d) Aluminium phosphate

Q29. CBSE 2024 · 1 mark An aqueous solution of sodium chloride is prepared in distilled water. The pH of this solution is:

- (a) 6 (b) 8 (c) 7 (d) 3

Q30. CBSE 2024 · 1 mark An aqueous solution of a dye appears pink due to phenolphthalein. When another aqueous solution is added to this pink solution, the mixture appears colourless. Now when a few drops of this colourless solution are added to the colourless mixture, the mixture again turns pink. The respective changes in the nature of the solution are from:

- (a) acidic $\rightarrow$ basic $\rightarrow$ basic (b) basic $\rightarrow$ acidic $\rightarrow$ acidic
(c) acidic $\rightarrow$ basic $\rightarrow$ acidic (d) basic $\rightarrow$ acidic $\rightarrow$ basic

Q31. CBSE 2024 · 1 mark The pH of an aqueous solution of a salt is 9. The types of acid and base from which this salt is formed are:

- (a) weak acid and weak base (b) weak acid and strong base
(c) strong acid and weak base
(d) strong acid and strong base

Q32. CBSE 2024 · 1 mark A colourless gas G is produced when eggshells are treated with a solution S. The gas G turns lime water milky. S and G respectively are:

- (a) H_2SO_4 and SO_2 (b) HCl and SO_2 (c) NaCl and CO_2
(d) HCl and CO_2

Q33. CBSE 2024 · 1 mark Assertion (A): Silver oxide is an amphoteric oxide. Reason (R): Metal oxides which react with both acids as well as bases are called amphoteric oxides.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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 and Reason (R) is false.
(d) Assertion (A) is false and Reason (R) is true.

Q34. CBSE 2023 · 1 mark Assertion (A): Sodium oxide is an amphoteric oxide. Reason (R): Metal oxides which react with both acids as well as bases are known as amphoteric oxides.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q35. CBSE 2023 · 1 mark In the given experimental set-up, if the experiment is carried out separately with each of the following solutions the cases in which the bulb will glow is/are: (i) Dilute hydrochloric acid (ii) Dilute sulphuric acid (iii) Glucose solution (iv) Alcohol

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

Q36. CBSE 2023 · 1 mark Which of the following gives the correct increasing order of acidic strength?

- (a) Sodium chloride < Acetic acid < Hydrochloric acid
(b) Sodium chloride < Hydrochloric acid < Acetic acid
(c) Acetic acid < Sodium chloride < Hydrochloric acid
(d) Hydrochloric acid < Sodium chloride < Acetic acid

Q37. CBSE 2023 · 1 mark Select the correct option(s) in the following table : Option | Natural Sources | Acid present (i) Tamarind | Tartaric acid (ii) Tomato | Acetic acid (iii) Ant sting | Oxalic acid (iv) Nettle sting | Methanoic acid

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

Q38. CBSE 2023 · 1 mark Select the correct option from the following : Salt | Parent acid | Parent base | Nature of salt (a) Sodium acetate | CH_3COOH | NaOH | Neutral (b) Sodium carbonate | H_2CO_3 | NaOH | Basic (c) Sodium chloride | HCl | NaOH | Acidic (d) Sodium nitrate | HNO_3 | NaOH | Acidic

- (a) (a) (b) (b) (c) (c) (d) (d)

Q39. CBSE 2023 · 1 mark The name of the salt used to remove permanent hardness of water is:

- (a) Sodium hydrogen carbonate (NaHCO_3)
(b) Sodium chloride (NaCl)
(c) Sodium carbonate decahydrate ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$)
(d) Calcium sulphate hemihydrate ($\text{CaSO}_4 \cdot 1/2\text{H}_2\text{O}$)



Q40. CBSE 2023 · 1 mark Sodium hydroxide is termed an alkali while Ferric hydroxide is not because:

- (a) Sodium hydroxide is a strong base, while Ferric hydroxide is a weak base.
- (b) Sodium hydroxide is a base which is soluble in water while Ferric hydroxide is also a base but it is not soluble in water.
- (c) Sodium hydroxide is a strong base while Ferric hydroxide is a strong acid.
- (d) Sodium hydroxide and Ferric hydroxide both are strong base but the solubility of Sodium hydroxide in water is comparatively higher than that of Ferric hydroxide.

Q41. CBSE 2023 · 1 mark Acid present in tomato is:

- (a) Methanoic acid (b) Acetic acid (c) Lactic acid
- (d) Oxalic acid

Q42. CBSE 2023 · 1 mark When Sodium bicarbonate reacts with dilute hydrochloric acid, the gas evolved is:

- (a) Hydrogen; it gives pop sound with burning match stick.
- (b) Hydrogen; it turns lime water milky.
- (c) Carbon dioxide; it turns lime water milky.
- (d) Carbon dioxide; it blows off a burning match stick with a pop sound.

Q43. CBSE 2023 · 1 mark Select a pair of olfactory indicators from the following:

- (a) Clove oil and vanilla essence (b) Onion and turmeric
- (c) Clove oil and litmus solution
- (d) Vanilla and methyl orange

Q44. CBSE 2023 · 1 mark Fresh milk has a pH of 6. To delay its curdling, a chemical substance is added to it, which is:

- (a) Sodium carbonate (b) Baking powder
- (c) Sodium hydroxide (Caustic soda)
- (d) Baking soda (Sodium hydrogen carbonate)

Q45. CBSE 2023 · 1 mark Which of the following statements is true for an amphoteric oxide?

- (a) It reacts only with acid and does not form water.
- (b) It reacts with acid as well as base to form salt and hydrogen gas.
- (c) It reacts with both acid as well as base to form salt and water.
- (d) It reacts only with base and does not form water.

Q46. CBSE 2023 · 1 mark Hydronium ions are formed by the reaction between:

- (a) Sodium hydroxide and water
- (b) Calcium chloride and water
- (c) Hydrogen chloride gas and water (d) Ethanol and water

VERY SHORT ANSWER (15)

Q47. CBSE 2026 · 1 mark (a) A compound 'A' is used in soda-lime fire-extinguisher and decomposes on heating to form compound 'B'. Compound 'B' is used for removing permanent hardness of water. Identify 'A' and 'B'.

Q48. CBSE 2026 · 2 marks Write the balanced chemical equation for the preparation of: (a) Sodium hydroxide by electrolysis of brine solution (b) Sodium carbonate

Q49. CBSE 2026 · 2 marks Define the following terms: (i) Olfactory indicator (ii) Water of crystallization

Q50. CBSE 2026 · 2 marks Write the preparation of Baking soda. How does it help in making cakes soft and spongy?

Q51. CBSE 2026 · 2 marks Comment on the following properties of ionic compounds and give reason in support of your answer: (i) Physical nature (ii) Melting and boiling points

Q52. CBSE 2026 · 2 marks Show the formation of NaCl by transfer of electrons. Why does solid NaCl not conduct electricity?

Q53. CBSE 2025 · 2 marks Translate the following statements into chemical equations and then balance them: (a) Nitric acid reacts with calcium hydroxide to form calcium nitrate and water. (b) Sodium chloride reacts with silver nitrate to form silver chloride and sodium nitrate.

Q54. CBSE 2025 · 2 marks (a) Write the formula of the ions which (i) acids, and (ii) bases generate in water solutions. (b) Dry HCl gas does not change the colour of dry litmus paper. Why?

Q55. CBSE 2024 · 2 marks (a) 1 gram of solid sodium chloride was taken in a clean and dry test tube and concentrated sulphuric acid was added to it. (i) Name the gas evolved in the reaction. (ii) What will be observed when this gas is tested with (I) dry, and (II) wet blue litmus paper? Write your conclusion about the nature (acidic/basic) of this gas.

Q56. CBSE 2024 · 2 marks A spatula full of sodium carbonate is taken in a test tube and 2 mL of dilute ethanoic acid is added to it. (a) Write a chemical equation for the reaction. (b) Suggest a method of testing the gas liberated in the reaction.

Q57. CBSE 2024 · 2 marks (b) Write chemical equation for the chemical reaction which occurs when the aqueous solutions of barium chloride and sodium sulphate react together. Write the symbols of the ions present in the compound precipitated in the reaction.

Q58. CBSE 2024 · 2 marks (a) When a compound is heated at 373 K, water molecules are lost and solid forms. Doctors use this for supporting fractured bones in the right position. (i) Identify the compound and the solid. (ii) How can we obtain the compound from the solid? OR (b) Two solutions X and Y give red and blue colour respectively with universal indicator. (i) In which solution is the hydrogen ion concentration more than the other? Justify your answer. (ii) If X and Y are mixed in proper amounts and the resultant mixture is tested with a universal indicator, it turns green. What is the nature of the salt formed? Justify your answer.

Q59. CBSE 2023 · 2 marks What is observed when aqueous solutions of potassium iodide and lead nitrate are mixed together? Name the type of reaction and write the chemical equation for the reaction that occurs.



Q60. CBSE 2023 · 2 marks The industrial process used for the manufacture of caustic soda involves electrolysis of an aqueous solution of compound 'X'. In this process, two gases 'Y' and 'Z' are liberated. 'Y' is liberated at cathode and 'Z', which is liberated at anode, on treatment with dry slaked lime forms a compound 'B'. Name X, Y, Z and B.

Q61. CBSE 2023 · 2 marks Two solutions M and N give Red and Blue colour respectively with a universal indicator. (i) In which solution will the hydrogen ion concentration be more? Justify your answer. (ii) If both M and N solutions are mixed and the resultant mixture is tested with a universal indicator, it turns green. What is the nature of the salt formed? Justify your answer.

SHORT ANSWER (16)

Q62. CBSE 2026 · 2 marks Write the balanced chemical equations involved in the preparation of (a) Bleaching powder (b) Baking soda

Q63. CBSE 2026 · 3 marks (A) (a) Give the chemical name and formula of Plaster of Paris. (b) Write the chemical equation of its preparation. (c) Give any two uses of it.

Q64. CBSE 2026 · 2 marks How is a universal indicator obtained? How is the wide range of pH of solution tested by it?

Q65. CBSE 2026 · 2 marks Show the formation of the following ionic compounds by transfer of electrons between the combining atoms: (i) Sodium oxide (Na_2O) (ii) Magnesium chloride (MgCl_2) [Given: Atomic number: Na = 11, Mg = 12, O = 8, Cl = 17]

Q66. CBSE 2026 · 3 marks (a) Give reasons: (i) For dilution of an acid, acid is added into water and not water into acid. (ii) Dry HCl gas does not turn blue litmus red whereas dilute hydrochloric acid does. (iii) Blue colour of Copper(II) sulphate crystals turns white on heating.

Q67. CBSE 2025 · 3 marks Write the electron-dot structures of (i) sodium, and (ii) oxygen. Using these structures, show the formation of sodium oxide. Mark the anion and cation present in this compound. (At. No. – Sodium = 11 and Oxygen = 8)

Q68. CBSE 2025 · 3 marks Two substances 'A' and 'B' are burnt in air separately. For 'A', ashes are collected and dissolved in water to get solution 'X', while for 'B', fumes produced are passed through water to get solution 'Y'. Both the solutions 'X' and 'Y' are then tested with pH paper. (a) If 'X' gives light blue colour and 'Y' gives orange colour to the pH paper, then write the nature and range of pH of 'X' and 'Y'. (b) Which one of the two – A and B, is a metal? Justify your answer.

Q69. CBSE 2025 · 3 marks (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. 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.

Q70. CBSE 2025 · 3 marks (a) Write the name and chemical formula of a sodium compound which is sometimes added for faster cooking. How is it produced from sodium chloride as one of the raw materials? Give chemical equation for the reaction involved. (b) The compound mentioned in (a) above is also an ingredient of antacids. Why?

Q71. CBSE 2025 · 3 marks You have two solutions 'X' and 'Y'. 'X' gives red colour and 'Y' gives blue colour with universal indicator. (a) In which solution is the hydrogen ion concentration more than the other? Give reason to justify your answer. (b) If 'X' and 'Y' are mixed in proper amounts and the resultant mixture of 'X' and 'Y', with the universal indicator turns green, what would be the nature of the resultant mixture? Justify your answer.

Q72. CBSE 2024 · 3 marks Write the common name and the chemical name of the compound $\text{CaSO}_4 \cdot 12\text{H}_2\text{O}$. Write the method of its preparation. Give chemical equation for the reaction, when water reacts with $\text{CaSO}_4 \cdot 12\text{H}_2\text{O}$.

Q73. CBSE 2024 · 3 marks A small amount of copper oxide was taken in a beaker and dilute hydrochloric acid was added with continuous stirring of the solution. Name the compound formed and state the colour of its solution. Write balanced chemical equation for the reaction that occurs. Based on the reaction, state the nature (acidic/basic) of copper oxide.

Q74. CBSE 2023 · 3 marks (i) Why is acidified water considered to be a good conductor of electricity? (ii) Write a chemical equation showing the ionic products formed on dissolving potassium hydroxide in water. (iii) Care must be taken while diluting concentrated nitric acid with water. Why?

Q75. CBSE 2023 · 3 marks (i) While electrolysis of 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.

Q76. CBSE 2023 · 3 marks Consider the following salts: (i) YCl (ii) NH_4X (iii) ZCO_3 (a) What would be the pH of the salt solution if in YCl , Y is sodium? Give reason for your answer. (b) If in salt NH_4X , X is nitrate, then its solution will give what colour with universal indicator? Why? (c) What would be the change in colour in blue litmus solution if ZCO_3 is added to it and Z is potassium?

Q77. CBSE 2023 · 3 marks (a) How is a universal indicator better than litmus solution? (b) State two features of pH scale. (c) Why should we not add water to a concentrated acid?



LONG ANSWER (7)

Q78. CBSE 2025 · 5 marks (a) (i) A compound 'X' having two carbon atoms in its molecule turns blue litmus red and 5 – 8% solution of 'X' in water is widely used as a preservative. Identify the compound 'X' and write its structure. (ii) Compare its pH nature with a mineral acid. (iii) 'X' on reacting with alcohols produces sweet smelling compounds, used in making perfumes. Name the reaction and write its chemical equation. (iv) When sodium carbonate is added to 'X', a colourless gas is produced which turns lime water milky. Write the chemical equation for the reaction giving the name of the salt produced. OR (b) (i) Differentiate between saturated and unsaturated hydrocarbons by giving one example each, with a structural formula. (ii) Write the method of converting an unsaturated hydrocarbon into a saturated hydrocarbon. Name the industry where this reaction is commonly used. (iii) Write the name and structure of a hydrocarbon having double bond and four carbon atoms in its one molecule.

Q79. CBSE 2025 · 5 marks (a) Name and state in brief the process used to obtain sodium hydroxide from brine. In this process, along with the main product (i.e., sodium hydroxide), two gases A and B are also produced at the two electrodes. Name A and B specifying the name of their respective electrodes. One of these gases, when reacting with dry calcium hydroxide, produces a compound C which is used as an oxidising agent in many chemical industries as well as to make drinking water free from germs. Name C and write the chemical equation for the reaction in its formation.

Q80. CBSE 2025 · 5 marks (b) (i) A small amount of copper oxide is taken in a beaker and dilute HCl is added to it slowly. Name the compound formed and state the colour of the solution formed. Write the balanced chemical equation for the reaction that occurs. (ii) A compound 'X' on heating at 373 K, loses water molecules and becomes 'Y'. Substance 'Y' is used by doctors for supporting fractured bones in the right position. I. Identify 'X' and 'Y'. II. How can 'X' be obtained from 'Y'?

Q81. CBSE 2025 · 5 marks (a) (i) Give the relation between hydrogen ion concentration of an aqueous solution and its pH. (ii) Concentrated acids should not be diluted by adding water to acid. Why? (iii) Why do same molar concentrations of hydrochloric acid and acetic acid not produce same amounts of hydrogen ions?

Q82. CBSE 2024 · 5 marks (a) A few crystals of ferrous sulphate were taken in a dry boiling tube and heated. Tiny water droplets were observed in the tube after some time. (i) From where did these water droplets appear? Explain. (ii) What colour change will be observed during heating? (iii) How many molecules of water are attached per molecule of FeSO_4 crystal? Write the molecular formula of crystalline forms of (I) Copper sulphate, and (II) Sodium carbonate. (iv) State how is Plaster of Paris obtained from gypsum. Write two uses of Plaster of Paris.

Q83. CBSE 2024 · 5 marks (a) Explain chlor-alkali process and write balanced chemical equations for the reactions that occur. Name the gases obtained at the anode and cathode respectively. Mention two uses each of the two gases obtained in the above process.

Q84. CBSE 2024 · 5 marks Name and explain the process used to obtain sodium hydroxide from the aqueous solution of sodium chloride (Brine). Name the two gases which are given at the anode and the cathode respectively. List two uses of each of these gases.

CASE-BASED (7)**CASE STUDY · CBSE 2026**

The pH plays an important role in our daily life. Strength of acids and bases depends on the number of H^+ ions and OH^- ions produced by these respectively. pH scale helps in predicting the strength of acids and bases by measuring hydrogen ion concentration in a solution.

Q85. CBSE 2026 · 4 marks (a) What type of indicator is used to predict how strong an acid or base is?

CASE STUDY · CBSE 2025

Seawater contains many salts dissolved in it. Common salt is separated from these salts. Deposits of solid salt are also found in several parts of the world. These large crystals are often brown due to impurities. This is called rock salt and is mined like coal. The common salt is an important raw material for chemicals of daily use.

Q86. CBSE 2025 · 1 mark Write balanced chemical equations to show the products formed during electrolysis of brine.

CASE STUDY · CBSE 2025

Acid-base indicators can be used to distinguish between an acid and a base. Universal indicator, a mixture of several indicators, shows different colours at different concentrations of acids and bases, thereby indicating their pH on the pH scale of 0–14. The pH of a solution is measured by pH paper, which is a paper impregnated with a universal indicator.

Q87. CBSE 2025 · 4 marks (a) Solution P is a strong acid while solution Q is a strong base. On the pH scale, where would you place the solutions P and Q?

CASE STUDY · CBSE 2025

'A' and 'B' are two salts used for washing purposes. Salt 'A' is used for bathing also. Four test tubes I, II, III and IV as mentioned below are taken. I. Rain water + solution of salt 'A'. II. Rain water + solution of salt 'B'. III. Tubewell water + solution of salt 'A'. IV. Tubewell water + solution of salt 'B'. The test tubes are shaken one by one almost identically for the same time and the lengths of foam formed in each test tube is noted.

Q88. CBSE 2025 · 4 marks (a) In which one of the four test tubes is the foam formed the minimum?

CASE STUDY · CBSE 2023

The teacher while conducting practicals in the laboratory divided the students into three groups and gave them various solutions to find out their pH and classify them into acidic, basic and neutral solutions. Group A: Lemon juice, vinegar, colourless aerated drink. Group B: Tomato juice, coffee, ginger juice. Group C: Sodium hydroxide, sodium chloride, lime water.

Q89. CBSE 2023 · 1 mark For the solutions provided, which group is/are likely to have pH value (i) less than 7, and (ii) greater than 7?

CASE STUDY · CBSE 2023

These compounds are termed ionic because they are formed by the transfer of electrons from a metal to a non-metal. The electron transfer in such compounds is controlled by the electronic configuration of the elements involved. Every element tends to attain a completely filled valence shell of its nearest noble gas or a stable octet.

Q90. CBSE 2023 · 2 marks (B) Give reasons: (i) Why do ionic compounds in the solid state not conduct electricity? (ii) What happens at the cathode when electricity is passed through an aqueous solution of sodium chloride?

CASE STUDY · CBSE 2023

Metals are required for a variety of purposes. For this we need their extraction from their ores. Ores mined from the earth are usually contaminated with many impurities which must be removed prior to the extraction of metals. The extraction of pure metal involves the following steps: (1) Concentration of ore (2) Extraction of the metal from the concentrated ore (3) Refining of the metal

Q91. CBSE 2023 · 2 marks We cannot use carbon to obtain sodium from sodium oxide. Why? State the reactions taking place at cathode and anode during electrolytic reduction of sodium chloride.

3 Metals and Non-metals

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (40)

Q1. CBSE 2026 · 1 mark Which one of the following metals does not react with cold water?

- (a) Sodium (b) Potassium (c) Calcium (d) Magnesium

Q2. CBSE 2026 · 1 mark Alloys are homogeneous mixture of metal with a metal or non-metal. Which among the following alloys contain non-metal as one of its constituents?

- (a) Brass (b) Bronze (c) Amalgam (d) Steel

Q3. CBSE 2026 · 1 mark Which one of the following metals neither reacts with cold water nor reacts with hot water but reacts with steam?

- (a) Sodium (b) Calcium (c) Iron (d) Magnesium

Q4. CBSE 2026 · 1 mark Solder is an alloy of

- (a) copper and zinc (b) lead and zinc (c) lead and tin (d) copper and tin

Q5. CBSE 2026 · 1 mark Which gas is evolved when magnesium metal reacts with very dilute HNO_3 ?

- (a) Oxygen (b) Nitrogen (c) Hydrogen (d) Nitrogen Dioxide

Q6. CBSE 2026 · 1 mark Which of the following is an amphoteric oxide?

- (a) Na_2O (b) K_2O (c) CO_2 (d) Al_2O_3

Q7. CBSE 2026 · 1 mark On reaction with dilute HCl , which of the following pair of metals will evolve hydrogen gas?

- (a) copper and zinc (b) copper and iron (c) silver and magnesium (d) magnesium and aluminium

Q8. CBSE 2026 · 1 mark Galvanization is a process of coating iron articles with a thin layer of zinc to prevent iron from rusting. The iron is protected even if the zinc coating is scratched and iron is exposed. Which of the following is/are true about how zinc prevents the rusting of iron? (P) A galvanised iron article does not undergo oxidation. (Q) The zinc coating prevents contact of iron with air. (R) Zinc provides continuous protection to iron from rusting.

- (a) Only (P) (b) Only (Q) (c) (Q) and (R) (d) (P) and (Q)

Q9. CBSE 2026 · 1 mark When Mg metal is treated with hot water, it starts floating on the surface of the water. The reason for its different behaviour is:

- (a) Mg is a lighter element than water.
(b) Mg reacts with water to produce H_2 gas which helps in floating.
(c) Mg reacts with water to produce N_2 gas which helps in floating.
(d) Mg reacts with water to form CO_2 gas which helps in floating.

Q10. CBSE 2026 · 1 mark A student notices that her silver jewellery turned dull and had a grey-black coating over it after wearing for a few months. What results in the change in colour of the silver metal?

- (a) The polish over the jewellery was removed after wearing for a few months.
(b) The jewellery comes in contact with air, moisture and acids and corrodes.
(c) Dust particles over the jewellery change its colour.
(d) Its colour changes due to rusting.



Q11. CBSE 2026 · 1 mark The reaction of calcium with cold water is:

- (a) Less violent, but the heat evolved is sufficient for the hydrogen to catch fire.
- (b) Very violent and exothermic and hydrogen catches fire.
- (c) Exothermic, but the heat evolved is not sufficient for the hydrogen to catch fire.
- (d) Slow and endothermic.

Q12. CBSE 2026 · 1 mark When zinc reacts with NaOH, the product formed is:

- (a) Na₂O (b) ZnO (c) Na₂ZnO₂ (d) Zn(OH)₂

Q13. CBSE 2026 · 1 mark To a small amount of copper oxide in a beaker, when we add dilute hydrochloric acid slowly with stirring, the change in the colour of the solution is due to the formation of:

- (a) Copper(II) oxide, which is black in colour.
- (b) Copper(I) chloride, which is blue in colour.
- (c) Copper(II) chloride, which is blue-green in colour.
- (d) Copper(I) oxide, which is black in colour.

Q14. CBSE 2025 · 1 mark The products formed when Aluminium and Magnesium are burnt in the presence of air respectively are :

- (a) Al₂O₃ and MgO (b) Al₂O₃ and Mg
- (c) Al₂O₃ and MgO (d) Al₂O₃ and MgO₂

Q15. CBSE 2025 · 1 mark Reaction between two elements A and B, forms a compound C. A loses electrons and B gains electrons. Which one of the following properties will not be shown by compound C ?

- (a) It has high melting point. (b) It is highly soluble in water.
- (c) It has weak electrostatic forces of attraction between its oppositely charged ions.
- (d) It conducts electricity in its molten state or aqueous solution.

Q16. CBSE 2025 · 1 mark The metals obtained from their molten chlorides by the process of electrolytic reduction are :

- (a) Gold and silver (b) Calcium and magnesium
- (c) Aluminium and silver (d) Sodium and iron

Q17. CBSE 2025 · 1 mark Aluminium powder is used in thermit welding because:

- (a) Its reaction with iron is highly exothermic.
- (b) When it is heated with iron (III) oxide, molten iron is obtained.
- (c) When it is heated with iron (III) oxide, molten aluminium oxide is obtained to join railway tracks.
- (d) Its melting point is low as compared to iron and a molten alloy of iron and aluminium is formed on heating which is used to join railway tracks.

Q18. CBSE 2025 · 1 mark Two metals zinc and tin are dissolved separately in definite proportions in molten copper (the primary metal) to obtain two different alloys respectively known as:

- (a) Bronze and Brass (b) Brass and Solder
- (c) Brass and Bronze (d) Solder and Bronze

Q19. CBSE 2025 · 1 mark Assertion (A): The metals high up in the reactivity series cannot be obtained from their compounds by heating with carbon. Reason (R): Displacement reactions can also be used to obtain metal.

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

Q20. CBSE 2025 · 1 mark A few pieces of granulated zinc are taken in a test tube and 2 mL of sodium hydroxide solution is added to it. When the contents are warmed, the product formed is:

- (a) Na₂ZnO (b) NaZnO₂ (c) Na₂ZnO₂ (d) NaZn(OH)₂

Q21. CBSE 2025 · 1 mark Assertion (A): Nichrome is an alloy which is commonly used in electrical heating devices such as electric irons, toasters, etc. Reason (R): The resistivity of nichrome is high and its resistance decreases with increase in temperature.

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

Q22. CBSE 2025 · 1 mark Assertion (A): Ductility is that property of metals which enables copper to be used in making cooking utensils. Reason (R): Copper is a metal which is ductile as well as malleable.

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

Q23. CBSE 2025 · 1 mark The most common method of extraction of metals from their oxide ores is:

- (a) Reduction with carbon (b) Reduction with hydrogen
- (c) Reduction with aluminium (d) Electrolytic reduction

Q24. CBSE 2025 · 1 mark 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.

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

Q25. CBSE 2025 · 1 mark The most malleable metals are:

- (a) Iron and gold (b) Copper and silver (c) Silver and gold
- (d) Gold and copper



Q26. CBSE 2025 · 1 mark Consider the reactions of dil. hydrochloric acid with the following metals: Aluminium, Copper, Iron, Magnesium and Zinc. The correct observation is:

- (a) Most vigorous reaction with aluminium and no reaction with iron
- (b) Most vigorous reaction with magnesium and no reaction with iron
- (c) Most vigorous reaction with magnesium and no reaction with copper
- (d) Most vigorous reaction with zinc and no reaction with copper

Q27. CBSE 2025 · 1 mark Consider the following cases: (i) $\text{CaSO}_4 + \text{Mg}$ (ii) $\text{CuSO}_4 + \text{Ca}$ (iii) $\text{ZnSO}_4 + \text{Fe}$ (iv) $\text{FeSO}_4 + \text{Zn}$. The cases in which new products will form, are:

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

Q28. CBSE 2024 · 1 mark The metals which are found in both free state as well as combined state are:

- (a) Gold and platinum (b) Platinum and silver
- (c) Copper and silver (d) Gold and silver

Q29. CBSE 2024 · 1 mark Assertion (A): The extraction of metals from their sulphide ores cannot take place without roasting of the ore. Reason (R): Roasting converts sulphide ores directly into metals.

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

Q30. CBSE 2024 · 1 mark A metal is used in the thermite process. When heated with oxygen, it gives an oxide whose nature is amphoteric. The metal and its oxide respectively are:

- (a) Mn, MnO_2 (b) Al, Al_2O_3 (c) Fe, Fe_2O_3 (d) Mg, MgO

Q31. CBSE 2024 · 1 mark A metal is used in the thermite process. When the metal burns, it produces an oxide whose thermite reaction characteristics are:

- (a) Mn, MnO_2 (b) Al, Al_2O_3 (c) Fe, Fe_2O_3 (d) Mg, MgO

Q32. CBSE 2024 · 1 mark The salt present in tooth enamel is:

- (a) Calcium phosphate (b) Magnesium phosphate
- (c) Sodium phosphate (d) Aluminium phosphate

Q33. CBSE 2024 · 1 mark A metal is used in the thermite process to produce a molten metal which has a melting point higher than the metal itself. The metal and its oxide respectively are:

- (a) Mn, MnO_2 (b) Al, Al_2O_3 (c) Fe, Fe_2O_3 (d) Mg, MgO

Q34. CBSE 2024 · 1 mark The most reactive metal among the following towards cold water is:

- (a) Aluminium (b) Potassium (c) Sodium (d) Calcium

Q35. CBSE 2023 · 1 mark When zinc reacts with sodium hydroxide, the product formed is:

- (a) Sodium oxide (b) Sodium zincate (c) Zinc hydroxide
- (d) Zinc oxide

Q36. CBSE 2023 · 1 mark Among the following, the metal with lowest density is:

- (a) Lithium (b) Lead (c) Magnesium (d) Aluminium

Q37. CBSE 2023 · 1 mark The number of electrons in the outermost shell of the atom of a non-metal can be:

- (a) 1, 2 or 3 (b) 3, 4 or 5 (c) 5, 6 or 7 (d) 5, 6 or 8

Q38. CBSE 2023 · 1 mark Assertion (A): Sodium, calcium and magnesium are obtained by the electrolysis of their molten oxides. Reason (R): These metals have more affinity for oxygen than carbon.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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

Q39. CBSE 2023 · 1 mark A metal ribbon 'X' burns in oxygen with a dazzling white flame forming a white ash 'Y'. The correct description of X, Y and the type of reaction is:

- (a) $\text{X} = \text{Ca}$; $\text{Y} = \text{CaO}$; Type of reaction = Decomposition
- (b) $\text{X} = \text{Mg}$; $\text{Y} = \text{MgO}$; Type of reaction = Combination
- (c) $\text{X} = \text{Al}$; $\text{Y} = \text{Al}_2\text{O}_3$; Type of reaction = Thermal decomposition
- (d) $\text{X} = \text{Zn}$; $\text{Y} = \text{ZnO}$; Type of reaction = Endothermic

Q40. CBSE 2023 · 1 mark The balanced chemical equation showing reaction between quicklime and water is:

- (a) $2\text{CaO} + \text{H}_2\text{O} \rightarrow 2\text{CaOH} + \text{H}_2 + \text{Heat}$
- (b) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{H}_2 + \text{Heat}$
- (c) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{Heat}$
- (d) $2\text{CaO} + 3\text{H}_2\text{O} \rightarrow 2\text{Ca(OH)}_3 + \text{O}_2 + \text{Heat}$

VERY SHORT ANSWER (5)

Q41. CBSE 2025 · 2 marks (a) (i) What is an alloy? (ii) Write the composition of solder and the property which makes it suitable for welding electric wires.

Q42. CBSE 2024 · 2 marks Some metals react with acids to produce salt and hydrogen gas. Illustrate it with an example. How will you test the presence of this gas?

Q43. CBSE 2024 · 2 marks (a) Copper powder is taken in a china dish and heated over a burner. Name the product formed and state its colour. Write the chemical equation for the reaction involved.

Q44. CBSE 2024 · 2 marks When a strip of aluminium metal is dipped in a solution of ferrous sulphate, the pale green colour of the solution fades away. State the conclusion you can draw from this observation. Write chemical equation for the reaction that occurs in this case.

Q45. CBSE 2023 · 2 marks When copper powder is heated in a watch glass, a black substance is formed. (i) Why is this black substance formed? Name it. (ii) How can this black substance be reversed to its original form?



SHORT ANSWER (26)

Q46. CBSE 2026 · 3 marks (A) (i) Which method will be used to convert each of them to their respective metal oxides? (a) Carbonate ore (b) Sulphide ore (ii) Write a chemical reaction to illustrate the use of aluminium for joining cracked railway tracks. (iii) During extraction of metals, electrolytic refining is used to obtain pure metals. Which material will be used as anode and cathode for the refining of copper metal by this process?

Q47. CBSE 2026 · 2 marks (i) In which of the test tubes will he observe the reaction to be the most vigorous and why? (ii) Write a balanced equation for the reaction involved. One student was comparing the reactivity of different metals for his science project. He added iron filings in four test tubes A, B, C and D containing aqueous solutions of ZnSO_4 , CuSO_4 , FeSO_4 and $\text{Al}_2(\text{SO}_4)_3$.

Q48. CBSE 2026 · 3 marks (a) (i) Write one example each of one metal that is so soft that it can be cut with a knife, and one non-metal that is a good conductor of electricity. (ii) Using the electronic configuration, explain how Mg atom combines with oxygen to form magnesium oxide by transfer of electrons. [Atomic number: Mg = 12, O = 8]

Q49. CBSE 2026 · 3 marks (a) Why can the oxides of highly reactive metals not be reduced by carbon? (b) Why do ionic compounds have high melting and boiling points? (c) Why is a solder, an alloy of lead and tin, used for welding electrical wires together?

Q50. CBSE 2026 · 3 marks Define the following terms: (i) Corrosion (ii) Rancidity (iii) Exothermic reaction

Q51. CBSE 2026 · 3 marks (b) Write the preparation of the following compounds with balanced chemical equation: (i) NaOH by chlor-alkali process (ii) Baking Soda (iii) Plaster of Paris

Q52. CBSE 2025 · 3 marks (a) "Displacement reactions also play a key role in extracting metals in the middle of the reactivity series." Justify this statement with two examples. (b) Why can metals high up in the reactivity series not be obtained by reduction of their oxides by carbon?

Q53. CBSE 2025 · 3 marks (a) With the help of an activity, explain the conditions under which iron articles get rusted.

Q54. CBSE 2025 · 3 marks "Displacement reactions also play a key role in extracting metals in the middle of the reactivity series." Justify this statement with two examples. Why can metals high up in the reactivity series not be obtained by reduction of their oxides by carbon?

Q55. CBSE 2025 · 3 marks (a) What is a reactivity series of elements? How is it developed? Arrange the following elements as they are arranged in the reactivity series: Aluminum, Calcium, Copper, Lead. (b) Write balanced chemical equation to show the reaction of iron (III) oxide (Fe_2O_3) with aluminium.

Q56. CBSE 2025 · 3 marks Using flow chart, show the steps involved in the method of extraction of a metal of medium reactivity from its ore.

Q57. CBSE 2024 · 3 marks Write the common name and the chemical name of the compound $\text{CaSO}_4 \cdot 12\text{H}_2\text{O}$. Write the method of its preparation. Give chemical equation for the reaction, when water reacts with $\text{CaSO}_4 \cdot 12\text{H}_2\text{O}$.

Q58. CBSE 2024 · 3 marks Name the ore of mercury and state the form in which it is found in nature. Write the chemical equations along with the condition required for the reactions involved in the extraction of mercury from its ore.

Q59. CBSE 2024 · 3 marks Suggest an activity to differentiate between the chemical properties (acidic or basic character) of the product obtained on burning a metal (magnesium) and a non-metal (sulphur).

Q60. CBSE 2024 · 3 marks (a) Name and explain the most widely used method for refining impure metals. OR (b) With the help of chemical equations differentiate between roasting and calcination. How is metal reduced from the product obtained after roasting/calcination of the ore? Write the chemical equation for the reaction involved.

Q61. CBSE 2023 · 3 marks With the help of suitable chemical equations, list the two main differences between roasting and calcination. How is metal reduced from the product obtained after roasting/calcination of the ore? Write the chemical equation for the reaction involved.

Q62. CBSE 2023 · 3 marks (a) Copper reacts with moist air and loses its shiny surface gradually. The surface becomes rough and a green coating forms on it. Identify the green coating formed on the surface of copper. (b) How is copper obtained from its sulphide ore? Write the chemical equations for the reaction involved in its extraction.

Q63. CBSE 2023 · 3 marks (a) Write a balanced equation to show the reaction that occurs when a piece of aluminium is dipped in a dilute solution of (i) sulphuric acid and (ii) sodium hydroxide. (b) Write the colour of the solution formed when copper oxide is treated with hydrochloric acid. Give reason for this observation.

Q64. CBSE 2022 · 2 marks The electrons in the atoms of two elements X and Y are distributed in three shells having 1 and 7 electrons respectively in their outermost shells. (a) Write the group numbers of these elements in the Modern Periodic Table. (b) Write the molecular formula of the compound formed when X and Y combine with each other. (c) Which of the two is electropositive?

Q65. CBSE 2022 · 3 marks (a) List two advantages of adopting the atomic number of an element as the basis of classification of elements in the Modern Periodic Table. (b) Write the electronic configurations of the elements X (atomic number 13) and Y (atomic number 20).

Q66. CBSE 2022 · 2 marks Two elements, A and B belong to the 3rd period of Modern Periodic Table. Element A belongs to Group 1 whereas Element B belongs to Group 16. Compare the following characteristics of A and B, giving justification for each: (a) Atomic size (b) Metallic character

Q67. CBSE 2022 · 2 marks Why do the following three elements form such a triad? N (14); P (31); As (75) (Atomic masses are given in parenthesis)

Q68. CBSE 2022 · 3 marks List two advantages of adopting the atomic number of an element as the basis of classification of elements in the Modern Periodic Table. Write the electronic configurations of the elements X (atomic number 13) and Y (atomic number 20).



Q69. CBSE 2022 · 2 marks State the criteria used by Mendeleev for creating his Periodic Table. Compare the position of elements in Mendeleev's Periodic Table and in the Modern Periodic Table.

Q70. CBSE 2022 · 2 marks Write the electronic configuration of an element X having atomic number 24. Explain how on the basis of this electronic configuration we can determine the valency, group number and the period number of X.

Q71. CBSE 2022 · 2 marks In the modern periodic table, compare the tendency of the elements to lose electrons while moving (i) down a group, and (ii) from left to right in a period.

LONG ANSWER (2)

Q72. CBSE 2026 · 5 marks (A) (i) Give reasons for the following: (I) Ionic compound have generally high melting points and boiling points. (II) Solder, an alloy of lead and tin, is used for welding electrical wires. (III) Carbon cannot reduce the oxides of Na or Mg. (ii) The reaction of compound 'X' with aluminium is used to join railway tracks: (I) Identify the compound 'X'. (II) Name the reaction. (III) Write the balanced chemical equation of the reaction of compound 'X' with aluminium.

Q73. CBSE 2025 · 5 marks (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. 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.

CASE-BASED (3)

CASE STUDY · CBSE 2026

An electrochemical process is used for refining metals by selectively dissolving and depositing them through electrolysis. Electrolytic refining is used for metals like Copper, Zinc, Tin, Nickel, Silver and Gold.

Q74. CBSE 2026 · 4 marks (a) Define anode mud.

CASE STUDY · CBSE 2024

Three metal samples of magnesium, aluminium and iron were taken and rubbed with sand paper. These samples were then put separately in test tubes containing dilute hydrochloric acid. Thermometers were also suspended in each test tube so that their bulbs dipped in the acid. The rate of formation of bubbles was observed. The above activity was repeated with dilute nitric acid and the observations were recorded.

Q75. CBSE 2024 · 4 marks (a) When activity was done with dilute hydrochloric acid, then in which one of the test tubes was the rate of formation of bubbles the fastest and the thermometer showed the highest temperature ?

CASE STUDY · CBSE 2023

Metals are required for a variety of purposes. For this we need their extraction from their ores. Ores mined from the earth are usually contaminated with many impurities which must be removed prior to the extraction of metals. The extraction of pure metal involves the following steps: (1) Concentration of ore (2) Extraction of the metal from the concentrated ore (3) Refining of the metal

Q76. CBSE 2023 · 1 mark Name an ore of Mercury and state the form in which Mercury is present in it.

4 Carbon and its Compounds

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (18)

Q1. CBSE 2026 · 1 mark Assertion (A): Pure ethanoic acid is also known as glacial acetic acid. Reason (R): Pure ethanoic acid often freezes during winter due to its low melting point of 290 K.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q2. CBSE 2026 · 1 mark Which of the following set of compounds does not belong to same homologous series?

- (a) CH₄ and C₄H₁₀ (b) C₂H₆ and C₃H₈
- (c) C₃H₈ and C₅H₁₂ (d) C₄H₈ and C₅H₁₂

Q3. CBSE 2026 · 1 mark Which of the following will not undergo addition reaction?

- (a) C₄H₈ (b) C₂H₂ (c) C₃H₈ (d) C₂H₄

Q4. CBSE 2026 · 1 mark Assertion (A): Carbon compounds can form chains, branched and ring structures. Reason (R): Carbon exhibits the property of catenation.

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



Q5. CBSE 2026 · 1 mark Assertion (A): Carbon shows the property of catenation. Reason (R): C – C bond is weak due to its small size.

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

Q6. CBSE 2026 · 1 mark Assertion (A): Carbon shows the property of catenation. Reason (R): This is due to strong C – C bond.

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

Q7. CBSE 2026 · 1 mark Assertion (A): There are large number of compounds with many carbon atoms linked to each other. Reason (R): Carbon-Carbon bond is very strong and stable.

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

Q8. CBSE 2026 · 1 mark Which of the following compounds will undergo addition reaction?

- (a) C₄H₁₀ (b) C₄H₈ (c) C₃H₈ (d) CH₄

Q9. CBSE 2026 · 1 mark Which of the following compounds does not undergo addition reaction?

- (a) C₄H₈ (b) C₂H₂ (c) C₅H₁₀ (d) C₃H₈

Q10. CBSE 2025 · 1 mark Assertion (A): Propanal and propanone are structural isomers. Reason (R): Propanal and propanone both have the same molecular formula.

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

Q11. CBSE 2025 · 1 mark Choose the incorrect statement about the common reaction used in hydrogenation of vegetable oils.

- (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.

Q12. CBSE 2025 · 1 mark The number of covalent bond(s) present in a nitrogen molecule is/are: (Atomic number of nitrogen is 7)

- (a) 1 (b) 3 (c) 5 (d) 7

Q13. CBSE 2024 · 1 mark The number of single and double bonds present in a molecule of benzene (C₆H₆) respectively, are:

- (a) 6 and 6 (b) 9 and 3 (c) 3 and 9 (d) 3 and 3

Q14. CBSE 2024 · 1 mark Assertion (A): Some vegetable oils are healthy. Reason (R): Vegetable oils generally have long unsaturated carbon chains.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q15. CBSE 2024 · 1 mark One mole of a hydrocarbon, on combustion in air, produces two moles of CO₂, two moles of H₂O and a large amount of heat. This hydrocarbon is:

- (a) ethyne (b) ethene (c) ethane (d) methane

Q16. CBSE 2023 · 1 mark The total number of electrons shared in the formation of an ethyne molecule is:

- (a) 6 (b) 3 (c) 10 (d) 4

Q17. CBSE 2023 · 1 mark When ethanol reacts with sodium two products are formed. These products are:

- (a) Sodium ethanoate and oxygen
- (b) Sodium ethanoate and hydrogen
- (c) Sodium ethoxide and oxygen
- (d) Sodium ethoxide and hydrogen

Q18. CBSE 2023 · 1 mark The electron dot structure of chlorine molecule is:

- (a) (a) (b) (b) (c) (c) (d) (d)

VERY SHORT ANSWER (9)

Q19. CBSE 2026 · 1 mark (b) Write chemical formula of Plaster of Paris. At what temperature gypsum is heated to obtain Plaster of Paris?

Q20. CBSE 2025 · 2 marks (a) Select from the following the members of same homologous series: (1) HC(H)(H)C(H)(H)C(H)(H)=O (2) HC(H)(H)C(H)(OH)C(H)(H)H (3) HC(H)(OH)C(H)(H)C(H)(H)OH (4) HC(H)(H)C(H)(H)C(H)(H)C(H)(H)=O (b) What happens to (i) the melting point, and (ii) the solubility of compounds as the molecular mass of the compounds in a homologous series increases?

Q21. CBSE 2025 · 2 marks (a) Select from the following the members of same homologous series: (1) Propanal (2) Propanol (3) Propane-1,3-diol (4) Butanal (b) What happens to (i) the melting point, and (ii) the solubility of compounds as the molecular mass of the compounds in a homologous series increases?

Q22. CBSE 2025 · 2 marks What are micelles? Draw the structure.

Q23. CBSE 2024 · 2 marks Distinguish between a saturated and an unsaturated hydrocarbon by flame test. List the products of combustion reaction of a saturated hydrocarbon.

Q24. CBSE 2024 · 2 marks When a soap is dissolved in water, the soap molecules form structures. What are these structures called? Draw a labelled diagram of these structures.



Q25. CBSE 2024 · 2 marks The melting and boiling points of carbon compounds are generally low and they are largely non-conductors of electricity. State two conclusions based on these two properties.

Q26. CBSE 2024 · 2 marks Identify the functional group present in the following compounds and also name them: (a) $\text{H}-\text{C}(\text{O})-\text{OH}$ with H atoms, and (b) $\text{H}-\text{C}(=\text{O})-\text{H}$ with H atoms

Q27. CBSE 2024 · 2 marks Write the formula and the molecular mass of the third homologue of alcohols. State how the boiling point of an alcohol changes as one moves from lower to higher homologues.

SHORT ANSWER (13)

Q28. CBSE 2026 · 4 marks Alcohol forms a homologous series with general formula $\text{C}_n\text{H}_{2n+1}-\text{OH}$ and $-\text{OH}$ group as functional group. Ethanol is commonly called alcohol and is used in alcoholic drinks. It is good solvent, used in medicines, cough syrups, tonics etc. (a) Write structural formula and name of 4th member of alcohol homologous series. (b) What happens when ethanol is heated with alkaline KMnO_4 ? Write chemical equation involved. (c) Write the chemical equation of reaction of ethanol with ethanoic acid in the presence of concentrated H_2SO_4 . Write the name of this reaction.

Q29. CBSE 2026 · 4 marks Alcohol forms a homologous series with general formula $\text{C}_n\text{H}_{2n+1}-\text{OH}$ and $-\text{OH}$ group as functional group. Ethanol is commonly called alcohol and is used in alcoholic drinks. It is good solvent, used in medicines, cough syrups, tonics etc. (a) Write structural formula and name of 4th member of alcohol homologous series. (b) What happens when ethanol is heated with alkaline KMnO_4 ? Write chemical equation involved.

Q30. CBSE 2024 · 3 marks Why is the conversion of ethanol to ethanoic acid an oxidation reaction? Name the oxidising agent used in this conversion. Write chemical equation for this oxidation reaction. How is this reaction different from the reaction in which ethanol burns in the presence of oxygen?

Q31. CBSE 2024 · 3 marks Write chemical equations for the following reactions, giving the conditions for the reaction in each case: (a) Reaction of ethanol with ethanoic acid (b) Reaction of an ester with a base (NaOH) (c) Formation of ethene from ethanol

Q32. CBSE 2024 · 3 marks Consider the following organic compounds: $\text{C}_2\text{H}_5\text{CHO}$, CH_3COOH , $\text{C}_2\text{H}_5\text{OH}$, CH_3COCH_3 . (a) Which one of these compounds when heated at 443 K in excess conc. H_2SO_4 forms ethene as its major product? State the role of conc. H_2SO_4 in the reaction. Also, write the chemical equation for the chemical reaction involved. (b) Give chemical equation for the chemical reaction when CH_3COOH and $\text{C}_2\text{H}_5\text{OH}$ react in the presence of conc. H_2SO_4 .

Q33. CBSE 2022 · 2 marks (a) Write the molecular formula of the following carbon compounds: (i) Methane (ii) Propane (b) Carbon compounds have low melting and boiling points. Why?

Q34. CBSE 2022 · 3 marks (a) Draw two different possible structures of a saturated hydrocarbon having four carbon atoms in its molecule. What are these two structures of the hydrocarbon having same molecular formula called? Write the molecular formula and the common name of this compound. Also write the molecular formula of its alkene.

Q35. CBSE 2022 · 2 marks The molecular formulae of two alkynes, A and B are C_xH_2 and C_3H_y respectively. Find the values of x and y. Write the names of A and B.

Q36. CBSE 2022 · 2 marks The atomic number of a non-metal is 8. (a) Write the name and valency of the element. (b) Draw the electron dot structure of its molecule.

Q37. CBSE 2022 · 2 marks Draw the electron dot structure of the following: (a) Cyclohexane (b) Butane

Q38. CBSE 2022 · 3 marks State the reason why (i) carbon compounds have low melting and boiling points. (ii) carbon compounds do not conduct electricity. (iii) carbon can form only covalent compounds.

Q39. CBSE 2022 · 2 marks Draw the electron dot structure of the following: (a) Benzene (b) Ethane

Q40. CBSE 2022 · 2 marks Draw two structural isomers of butane.

LONG ANSWER (13)

Q41. CBSE 2026 · 5 marks (A) (i) Carbon cannot form C_4^+ cation and C_4^- anion. Explain. (ii) Define homologous series of carbon compounds. Why are the melting and boiling points of C_4H_{10} higher than C_3H_8 or C_2H_6 ? (iii) What happens when ethanol is heated with acidified potassium dichromate?

Q42. CBSE 2026 · 5 marks (a) A carbon compound 'P' of molecular formula $\text{C}_2\text{H}_6\text{O}$ is found to be neutral when tested with red and blue litmus. A gas that burns with a pop sound is produced when sodium metal reacts with compound 'P'. (i) Identify the compound 'P'. (ii) The carbon compound 'P' is heated with conc. H_2SO_4 at 443 K to produce compound 'Q'. (I) Write the chemical equation for the reaction. (II) What is the role of conc. H_2SO_4 in this reaction? (iii) What is likely to be observed on heating compound 'P' with ethanoic acid with an acid as a catalyst? Write the chemical equation for the reaction.

Q43. CBSE 2026 · 5 marks (a) (i) What is homologous series? Which two of the following organic compounds belong to the same homologous series? C_2H_4 , C_4H_{10} , C_3H_4 , C_4H_8 (ii) Write the product(s) in the following reactions: (I) $\text{CH}_3-\text{CH}_2-\text{OH} + \text{CH}_3\text{COOH} \rightarrow$ (II) $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \rightarrow$ (iii) Why does micelle formation take place when soap is added to water?

Q44. CBSE 2026 · 5 marks (a)(i) What is homologous series? Which two of the following organic compounds belong to the same homologous series? C_2H_4 , C_4H_{10} , C_3H_4 , C_4H_8

Q45. CBSE 2025 · 5 marks (a) (i) Draw two isomeric structures of Butene (C_4H_8). (ii) Name the following compounds: (I) $\text{HHH}-\text{C}-\text{C}-\text{C}-\text{HHH}$ (II) $\text{H}-\text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{HH}-\text{OH}-\text{H}-\text{H}$ (iii) Write the chemical equations for the following reactions. Mention one essential condition each for these reactions to take place. (I) Ethanol undergoes complete oxidation (II) Propene undergoes hydrogenation (III) Ethanoic acid reacts with ethanol



Q46. CBSE 2025 · 5 marks A saturated organic compound 'A' with two carbon atoms belongs to the homologous series of alcohols. On oxidation, it forms an organic acid 'B' with molecular mass 60 u. On heating 'A' with excess concentrated sulphuric acid at 443 K, an unsaturated hydrocarbon 'C' is formed. Name A, B and C. Calculate molecular mass of C. What happens when a pinch of sodium carbonate is added to compound B? Write chemical equation for the reaction. Draw electron dot structure of compound B.

Q47. CBSE 2025 · 5 marks (a) (i) Draw electron dot structure of chlorine molecule. (Atomic Number of Chlorine = 17) (ii) What happens when chlorine reacts with methane in the presence of sunlight? Write the name of the reaction. (iii) Name the two oxidising agents used for the conversion of alcohols to acids. (iv) List four differences in properties between covalent compounds and ionic compounds.

Q48. CBSE 2025 · 5 marks (a) (i) A compound 'X' having two carbon atoms in its molecule turns blue litmus red and 5–8% solution of 'X' in water is widely used as a preservative. Identify the compound 'X' and write its structure. (ii) Compare its pH nature with a mineral acid. (iii) 'X' on reacting with alcohols produces sweet smelling compounds, used in making perfumes. Name the reaction and write its chemical equation. (iv) When sodium carbonate is added to 'X', a colourless gas is produced which turns lime water milky. Write the chemical equation for the reaction giving the name of the salt produced. OR (b) (i) Differentiate between saturated and unsaturated hydrocarbons by giving one example each, with a structural formula. (ii) Write the method of converting an unsaturated hydrocarbon into a saturated hydrocarbon. Name the industry where this reaction is commonly used. (iii) Write the name and structure of a hydrocarbon having double bond and four carbon atoms in its one molecule.

Q49. CBSE 2023 · 5 marks (b) (i) Name the simplest saturated hydrocarbon. Draw its electron dot structure. Which type of bonds exist in this compound? (ii) Name any two mixtures of the carbon compound used as a fuel in daily life, of which the above mentioned compound is an important component. (iii) In which homologous series of carbon compounds can this compound be placed? Write the general formula of the series. (iv) Which type of flame is produced on burning it?

Q50. CBSE 2023 · 5 marks (a) An acid X reacts with an alcohol Y in the presence of a suitable catalyst to form a sweet-smelling compound Z which is not a soap. Identify X, Y and Z. Write the chemical equation for the reaction that occurs and name it, giving justification for the name.

Q51. CBSE 2023 · 5 marks (a) An unsaturated organic compound D (of formula C_2H_6O) reacts with acidified $K_2Cr_2O_7$ to give another organic compound Y of acidic nature. X and Y when heated in the presence of conc. H_2SO_4 give a sweet-smelling organic compound Z. (i) Identify X, Y and Z. (ii) Write the chemical equations for the reactions in the conversion of (1) X to Y and (2) X to Z. (iii) State the role of (1) acidified $K_2Cr_2O_7$ in the conversion of X to Y and (2) conc. H_2SO_4 in the reaction of X and Y. (iv) Name the reaction which occurs when Z reacts with an alkali.

Q52. CBSE 2023 · 5 marks (a) (i) Butane had both Carbon – Carbon bonds as well as Carbon – Hydrogen bonds. Draw its structural formula and state the number of (1) C – H bonds and (2) C – C bonds in it. (ii) You have two carbon compounds with the molecular formula C_3H_6O . Name two compounds with this formula and also draw their structural formula.

Q53. CBSE 2023 · 5 marks (a) Explain why carbon forms compounds mainly by covalent bonds. Explain in brief two main reasons for carbon forming a large number of compounds. Why does carbon form strong bonds with most other elements?

CASE-BASED (4)

CASE STUDY · CBSE 2025

'A' and 'B' are two salts used for washing purposes. Salt 'A' is used for bathing also. Four test tubes I, II, III and IV as mentioned below are taken. I. Rain water + solution of salt 'A'. II. Rain water + solution of salt 'B'. III. Tubewell water + solution of salt 'A'. IV. Tubewell water + solution of salt 'B'. The test tubes are shaken one by one almost identically for the same time and the lengths of foam formed in each test tube is noted.

Q54. CBSE 2025 · 4 marks (c) (i) What are esters? What happens when an ester reacts with an alkali (say sodium hydroxide)? Give chemical equation for the reaction. OR (c) (ii) What is the cause of hardness of water? Sometimes it is observed that while bathing foam is formed with difficulty and an insoluble substance is formed. Name this substance and write the cause of its formation.

CASE STUDY · CBSE 2025

All compounds of carbon which contain only carbon and hydrogen are called hydrocarbons. Among these, saturated hydrocarbons are called 'alkanes', unsaturated compounds with one or more double bonds are called 'alkenes' and compounds containing one or more triple bonds are called 'alkynes'.

Q55. CBSE 2025 · 4 marks (a) Identify the following compound and write its name. $CH_3 - C \equiv CH$

CASE STUDY · CBSE 2024

Carbon is a versatile element that forms the basis of all living organisms and many of the things we use. A large variety of compounds is formed because of its tetravalency. Compounds of carbon are formed with oxygen, hydrogen, nitrogen, sulphur, chlorine and many other elements.

Q56. CBSE 2024 · 1 mark What are hydrocarbons?

CASE STUDY · CBSE 2023

These compounds are termed ionic because they are formed by the transfer of electrons from a metal to a non-metal. The electron transfer in such compounds is controlled by the electronic configuration of the elements involved. Every



element tends to attain a completely filled valence shell of its nearest noble gas or a stable octet.

Q57. CBSE 2023 · 1 mark Show the electron transfer in the formation of magnesium chloride.

5 Life Processes

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (46)

Q1. CBSE 2026 · 1 mark In human beings the oxygen rich blood is pumped out to the body by:

- (a) contraction of right atrium (b) relaxation of left ventricle
- (c) contraction of right ventricle
- (d) contraction of left ventricle

Q2. CBSE 2026 · 1 mark Opening of stomata is regulated by:

- (a) Entry of water into guard cells
- (b) Exit of water from guard cells
- (c) Entry of air into the stomatal pore
- (d) Entry of water into the stomatal pore

Q3. CBSE 2026 · 1 mark Four chambered heart is a characteristic of:

- (a) Fishes (b) Amphibians (c) Reptiles (d) Mammals

Q4. CBSE 2026 · 1 mark Translocation is the process in which plants deliver:

- (a) Minerals from leaves to other parts of the plant.
- (b) Plant growth hormones from leaves to other parts of the plant.
- (c) Water and inorganic substances from leaves to other parts of the plant.
- (d) Organic substances from leaves to the other parts of the plant.

Q5. CBSE 2026 · 1 mark Identify the part that controls the closing and opening of the stomatal pore in leaves of plants.

- (a) Stomata (b) Epidermal cells (c) Guard cells
- (d) Chloroplasts

Q6. CBSE 2026 · 1 mark Choose the equation of reaction that correctly represents anaerobic respiration in muscles:

- (a) Glucose → Pyruvate (Absence of O₂) → Ethanol + CO₂ + Energy
- (b) Glucose → O₂ → Pyruvate O₂ → Energy
- (c) Glucose → O₂ → Pyruvate (Lack of oxygen) → Ethanol + Energy
- (d) Glucose → Pyruvate (Lack of oxygen) → Lactic acid + Energy

Q7. CBSE 2026 · 1 mark Assertion (A): The peristaltic movements occur all along the gut. Reason (R): The lining of the gut has muscles that contract rhythmically to push the food in regulated manner.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q8. CBSE 2026 · 1 mark The carbohydrates, which are not used immediately in plants, are stored in the form of 'a', which serves as an internal energy reserve. What does 'a' stand for?

- (a) Starch (b) Sugar (c) Fat (d) Protein

Q9. CBSE 2026 · 1 mark The following events occur during the process of photosynthesis. Choose the option that indicates the correct events. (i) Oxidation of carbon dioxide to carbohydrates (ii) Conversion of light energy into chemical energy (iii) Absorption of light energy by chlorophyll (iv) Conversion of hydrogen and oxygen into water

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

Q10. CBSE 2026 · 1 mark Assertion (A): Blood plasma transports carbon dioxide in dissolved form, while oxygen is transported by respiratory pigments. Reason (R): Carbon dioxide is more soluble in water than in oxygen.

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

Q11. CBSE 2026 · 1 mark If the stomatal pore is open, it indicates which situation from the following?

- (a) The guard cells have shrunk.
- (b) The water comes out of the guard cells.
- (c) Large amount of water is lost through stomata.
- (d) The guard cells have swelled due to inflow of water.

Q12. CBSE 2026 · 1 mark Select the option that represents the correct balanced equation for the process of photosynthesis:

- (a) CO₂ + O₂ + H₂O → C₆H₁₂O₆ + H₂O (with Chlorophyll)
- (b) 6CO₂ + 6H₂O → C₆H₁₂O₆ + O₂ (with Chlorophyll and Sunlight)
- (c) CO₂ + H₂O → C₆H₁₂O₆ (with Sunlight)
- (d) 6CO₂ + 12H₂O → C₆H₁₂O₆ + 6O₂ + 6H₂O (with Chlorophyll and Sunlight)

Q13. CBSE 2026 · 1 mark Assertion (A): The basic filtration unit in the kidneys, like in the lungs, is a cluster of very thin-walled blood capillaries. Reason (R): Each capillary cluster in the kidney is associated with the cup-shaped end of a coiled tube called Bowman's capsule.

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



Q14. CBSE 2026 · 1 mark The sexually transmitted disease caused by bacteria is:

- (a) Diarrhoea (b) AIDS (c) Gonorrhoea (d) Wart

Q15. CBSE 2026 · 1 mark Assertion (A): Arteries have valves as they have to withstand high pressure. Reason (R): Arteries are vessels which carry blood away from the heart to various organs.

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

Q16. CBSE 2025 · 1 mark Secretion of less saliva in mouth will effect the conversion of :

- (a) proteins into amino acids
(b) fats into fatty acids and glycerol
(c) starch into simple sugars (d) sugars into alcohol

Q17. CBSE 2025 · 1 mark The breakdown of glucose has taken the following pathway: Glucose (a) → Pyruvate + Energy (b) → Lactic acid + Energy. The sites 'a' and 'b' respectively are :

- (a) Mitochondria and Oxygen deficient muscle cells
(b) Cytoplasm and Oxygen rich muscle cells
(c) Cytoplasm and Yeast cells
(d) Cytoplasm and Oxygen deficient muscle cells

Q18. CBSE 2025 · 1 mark The opening and closing of stomata is regulated by:

- (a) CO₂ concentration in stomata
(b) Temperature in guard cells
(c) O₂ concentration in stomata
(d) Amount of water in guard cells

Q19. CBSE 2025 · 1 mark One-cell thick blood vessels are known as:

- (a) Alveoli (b) Capillaries (c) Arteries (d) Veins

Q20. CBSE 2025 · 1 mark Assertion (A): Animals will not get energy if they eat (consume) coal as food. Reason (R): Specific enzymes are needed for the breakdown of a particular food.

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

Q21. CBSE 2025 · 1 mark The essential element used in the synthesis of proteins is:

- (a) Nitrogen (b) Phosphorus (c) Iron (d) Magnesium

Q22. CBSE 2025 · 1 mark Select the correct option from the following statements about the functioning of the human heart.

- (a) Right atrium receives deoxygenated blood from different parts of the body and sends it to pulmonary veins.
(b) Left atrium sends oxygenated blood to right ventricle which pumps it to different parts of the body.
(c) Right atrium receives deoxygenated blood from the body and sends it to the right ventricle.
(d) Left atrium receives oxygenated blood from the pulmonary arteries and sends it to the left ventricle.

Q23. CBSE 2025 · 1 mark The gastric glands present in the wall of the stomach release:

- (a) Mucus and Trypsin (b) Pepsin and Trypsin
(c) Mucus and Pepsin (d) Pepsin and Salivary amylase

Q24. CBSE 2025 · 1 mark The valves in the human heart ensure that:
(i) Oxygen-rich blood flows from left atrium to left ventricle only.
(ii) Deoxygenated blood flows from left atrium to left ventricle only. (iii) Oxygen-rich blood flows from right atrium to right ventricle only. (iv) Deoxygenated blood flows from right atrium to right ventricle only.

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

Q25. CBSE 2025 · 1 mark Assertion (A): Transpirational pull helps in the absorption and upward movement of water and dissolved minerals in plants. Reason (R): The effect of root pressure in transport of water is more significant at night.

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

Q26. CBSE 2025 · 1 mark Breakdown of proteins in the stomach takes place by the enzyme:

- (a) Trypsin (b) Lipase (c) Salivary Amylase (d) Pepsin

Q27. CBSE 2024 · 1 mark In human beings, when the process of digestion is completed, the (i) proteins, (ii) carbohydrates, and (iii) fats are respectively finally converted into:

- (a) (i) Amino acids, (ii) glucose and (iii) fatty acids
(b) (i) Amino acids, (ii) glucose, (iii) fatty acids and glycerol
(c) (i) Glucose, (ii) fatty acids and glycerol, (iii) amino acids
(d) (i) Sugars, (ii) amino acids, (iii) fatty acids and glycerol

Q28. CBSE 2024 · 1 mark Assertion (A): In the human heart ventricles have thicker muscular walls than atria. Reason (R): Ventricles have to pump the blood into various organs.

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



Q29. CBSE 2024 · 1 mark Assertion (A): Most of the plants close their stomata at night. Reason (R): Closing of stomata helps to conserve water as large amount of water evaporates from the leaves.

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

Q30. CBSE 2024 · 1 mark Assertion (A): Oxygen is essential for all aerobic forms of life. Reason (R): Free oxygen atoms combine with molecular oxygen to form ozone.

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

Q31. CBSE 2024 · 1 mark The process in which transport of soluble products of photosynthesis takes place in plants is known as:

- (a) Transpiration (b) Evaporation (c) Conduction
- (d) Translocation

Q32. CBSE 2024 · 1 mark Select from the following the conditions responsible for the rapid spread of bread mould on a slice of bread: (i) Formation of large number of spores (ii) Presence of moisture and nutrients in bread (iii) Low temperature (iv) Presence of hyphae

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

Q33. CBSE 2024 · 1 mark Select from the following the conditions responsible for the rapid spread of bread mould on a slice of bread:

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

Q34. CBSE 2024 · 1 mark The incorrect statement about placenta is:

- (a) It is a disc embedded in the uterine wall.
- (b) It is embedded in the tissue of the uterus.
- (c) It has a very small surface area for glucose and oxygen to pass from mother to the embryo.
- (d) The embryo obtains oxygen and nutrients through the placenta from the mother's blood.

Q35. CBSE 2024 · 1 mark An organism which breaks down the food material outside the body and then absorbs it is:

- (a) Bread mould (b) Cuscuta (c) Lice (d) Tapeworm

Q36. CBSE 2024 · 1 mark During respiration, exchange of gases occurs in:

- (a) Alveoli (b) Bronchi (c) Larynx (d) Trachea

Q37. CBSE 2023 · 1 mark Sphincter muscles are present at the exit of:

- (a) Stomach and small intestine (b) Stomach and anus
- (c) Small intestine and large intestine
- (d) Oesophagus and stomach

Q38. CBSE 2023 · 1 mark During vigorous exercise, the occurrence of cramps in the outer muscles of an athlete is due to the conversion of pyruvate to:

- (a) Glucose (b) Ethanol (c) Lactic acid (d) Lactose

Q39. CBSE 2023 · 1 mark One of the events that does not occur during photosynthesis is:

- (a) Chlorophyll absorbs solar energy.
- (b) Carbon dioxide is released during the process.
- (c) Oxygen is released during the process.
- (d) Carbon dioxide is absorbed during the process.

Q40. CBSE 2023 · 1 mark Assertion (A): The inner walls of the small intestine have finger like projections called villi which are rich in blood. Reason (R): These villi have a large surface area to help the small intestine in completing the digestion of food.

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

Q41. CBSE 2023 · 1 mark Opening and closing of stomata is due to:

- (a) High pressure of gases inside the cells.
- (b) Movement of water in and out of the guard cells.
- (c) Stimulus of light in the guard cells.
- (d) Diffusion of CO₂ in and out of the guard cells.

Q42. CBSE 2023 · 1 mark Water in the root enters due to:

- (a) the function of the root to absorb water.
- (b) difference in the concentration of ions between the root and the soil.
- (c) excess water present in the soil.
- (d) diffusion of water in the roots.

Q43. CBSE 2023 · 1 mark The process in which loss of water in the form of vapours from the aerial parts of plants takes place is X, which helps in Y. Here X and Y respectively are:

- (a) transpiration and photosynthesis.
- (b) transpiration and temperature regulation.
- (c) translocation and movement of soluble products of photosynthesis in phloem.
- (d) translocation and absorption of water and minerals from soil by roots.

Q44. CBSE 2023 · 1 mark As compared to terrestrial organisms, the rate of breathing in aquatic organisms is:

- (a) faster because they need more oxygen for their survival.
- (b) faster because the amount of dissolved oxygen in water is fairly low.
- (c) slower because the amount of dissolved oxygen in water is fairly low.
- (d) slower because the capacity of water of dissolving atmospheric air is limited.



Q45. CBSE 2023 · 1 mark Assertion (A): The walls of atria are thicker than those of the ventricles. Reason (R): Ventricles have to pump blood into various organs at high pressure.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q46. CBSE 2023 · 1 mark The bacterial and the viral infections that may be caused due to unsafe sex respectively are:

- (a) Warts and HIV-AIDS (b) HIV-AIDS and Warts
(c) Gonorrhoea and Syphilis (d) Syphilis and Warts

VERY SHORT ANSWER (23)

Q47. CBSE 2026 · 2 marks "Transpiration in plants is a necessary evil." Comment on the statement giving two reasons.

Q48. CBSE 2026 · 2 marks The leaves of a plant first prepares food 'P' by photo-synthesis. Food 'P' is then converted to food 'Q', which is stored in the leaves if not used immediately. What are 'P' and 'Q'? What are the raw materials and conditions required for synthesis of 'P'?

Q49. CBSE 2026 · 2 marks Why the lungs always contain a residual volume of air?

Q50. CBSE 2025 · 2 marks (a) Besides minimising the loss of blood, why is it essential to plug any leak in a blood vessel? Name the component of blood which helps in this process and state how this component perform this function.

Q51. CBSE 2025 · 2 marks State the main function of veins in human circulatory system. Why do they not need thick walls?

Q52. CBSE 2025 · 2 marks Give reasons: (a) During a breathing cycle, the lungs always contain a residual volume of air. (b) As compared to oxygen, carbon dioxide is mostly transported in dissolved form in our blood.

Q53. CBSE 2025 · 2 marks How is the small intestine in humans designed to absorb the digested food?

Q54. CBSE 2025 · 2 marks (a) Explain how tendrils help a pea plant climb up other plants or fences.

Q55. CBSE 2025 · 2 marks Explain how circulation of blood takes place in fishes.

Q56. CBSE 2024 · 2 marks (a) We need to water the soil in plants on a regular basis. But it ultimately reaches the leaves of the plant. Explain how this takes place.

Q57. CBSE 2024 · 2 marks (a) Sometimes while running, the athletes suffer from muscle cramps. Why? How is the respiration in this case different from aerobic respiration?

Q58. CBSE 2024 · 2 marks Identify the organ in the human female reproductive system where the sperm encounters the egg cell. What will happen if it is blocked? Name the technique by which it can be blocked.

Q59. CBSE 2024 · 2 marks Give reason for the following: (a) Fine hair and mucus are present in the nasal passage. (b) Rings of cartilage are present in the throat.

Q60. CBSE 2023 · 2 marks Why is it important to prevent oxygenated and deoxygenated blood from mixing in birds and mammals? Which animals can tolerate some mixing of the oxygenated and deoxygenated blood streams? On what factor does the body temperature of these animals depend?

Q61. CBSE 2023 · 2 marks What will happen if: (a) Xylem tissue in a plant is removed? (b) We are injured and start bleeding?

Q62. CBSE 2023 · 2 marks State the role of the following in the process of digestion : (a) Bile juice and bile salts (b) Pancreatic enzymes

Q63. CBSE 2023 · 2 marks Two green plants are kept separately in oxygen free containers, one in the dark and other in sunlight. It was observed that plant kept in dark could not survive longer. Give reason for this observation.

Q64. CBSE 2023 · 2 marks Give two reasons, why bile juice is considered to be an important secretion of liver in the process of digestion?

Q65. CBSE 2023 · 2 marks What is the other name of 'tissue fluid'? Write its two functions.

Q66. CBSE 2023 · 2 marks List the events in proper sequence that take place during the process of photosynthesis.

Q67. CBSE 2023 · 2 marks In the process of digestion of food in human beings, two protein-digesting enzymes are secreted. Name the enzymes along with the glands that secrete them.

Q68. CBSE 2023 · 2 marks (a) Why is it important to prevent oxygenated and deoxygenated blood from mixing in birds and mammals? (b) Which animals can tolerate some mixing of the oxygenated and deoxygenated blood streams? On what factor does the body temperature of these animals depend?

Q69. CBSE 2023 · 2 marks Write one important function each of the following in the human respiratory system: (a) Rings of Cartilage (b) Alveoli (c) Haemoglobin (d) Lining of mucus

SHORT ANSWER (24)

Q70. CBSE 2026 · 2 marks (A) Varun is diabetic. His latest ultrasound reports showed a blockage in his pancreatic duct. How will this affect the dual functioning of the pancreas?

Q71. CBSE 2026 · 2 marks Give reasons for the following: (a) Plants do not have an excretory system so how they excrete their wastes? (b) Why do mammals and birds have double circulation?

Q72. CBSE 2026 · 2 marks Give a diagrammatic representation of nutrition in Amoeba.

Q73. CBSE 2026 · 2 marks Briefly mention the steps in double-circulation through human heart.

Q74. CBSE 2026 · 3 marks Complete the pathways given below, showing the breakdown of glucose. Identify 'A', 'B', 'C', 'D', 'E' and 'F'.

Q75. CBSE 2026 · 3 marks (a) What change will be observed in Cases 'P', 'Q' and 'R'? Give reasons.



Q76. CBSE 2026 · 3 marks (a) Draw a neat diagram of the human respiratory system and label its lungs, trachea, bronchi and alveoli. (b) State the roles of the following in the process of respiration: (i) Alveoli (ii) Respiratory pigments

Q77. CBSE 2026 · 2 marks What kind of respiration provides more energy and why?

Q78. CBSE 2026 · 2 marks Separation of right side and left side of the heart is useful to keep oxygenated and deoxygenated blood from mixing. Various organisms have different types of heart. (I) Fill in the blanks (i) to (iii) correctly according to the type of organisms and their evolution in terms of blood circulation: (II) Which type of circulation is most efficient?

Q79. CBSE 2026 · 3 marks In xylem tissue, vessels and tracheids of the roots, stems and leaves are interconnected to form a continuous system of water-conducting channels reaching all parts of the plant. Explain how this is achieved.

Q80. CBSE 2026 · 3 marks Give reasons for the following: (a) Herbivores have a longer small intestine. (b) Inner lining of small intestine has numerous finger-like projections. (c) Rate of breathing in aquatic organisms is much faster than that in terrestrial organisms.

Q81. CBSE 2025 · 3 marks On the basis of the characteristics of the processes given in the brackets in each case, differentiate between the following: (a) Products of breakdown of pyruvate in aerobic and anaerobic respiration in human beings (product(s) of the processes) (b) Respiration and photosynthesis in plants (gas released) (c) Respiration in terrestrial animals and fishes (organs involved)

Q82. CBSE 2025 · 3 marks (a) Write the end products of the breakdown of pyruvate in yeast cells and in our muscle cells under anaerobic conditions. (b) In which part of the cell does the above process take place?

Q83. CBSE 2025 · 3 marks (a) Explain the process of translocation of food and other substances in the phloem of plants.

Q84. CBSE 2025 · 3 marks Explain how urine is produced in kidneys.

Q85. CBSE 2024 · 3 marks (b) List two roles of each of the following in human reproductive system: (i) Seminal vesicles and prostate gland (ii) Oviduct (iii) Testis

Q86. CBSE 2023 · 3 marks (a) (i) What is the first step in the breakdown of glucose during aerobic and anaerobic respiration? Where does it take place? (ii) ATP is called the energy currency of the cell. Why? (iii) What is meant by residual volume of air in a breathing cycle?

Q87. CBSE 2023 · 3 marks (a) (i) What is meant by excretion? (ii) Name the organ that connects the kidneys with the urinary bladder. State its function. (iii) List two factors on which the amount of water reabsorbed depends.

Q88. CBSE 2023 · 3 marks (i) How does Paramecium obtain its food? (ii) List the role of each of the following in our digestive system: (a) Hydrochloric acid (b) Trypsin (c) Muscular walls of stomach (d) Salivary amylase

Q89. CBSE 2023 · 3 marks (A) (i) How does Paramecium obtain its food? (ii) List the role of each of the following in our digestive system: (a) Hydrochloric acid (b) Trypsin (c) Muscular walls of stomach (d) Salivary amylase OR (B) (i) What is double circulation? (ii) Why is the separation of the right side and the left side of the heart useful? How does it help birds and mammals?

Q90. CBSE 2023 · 3 marks (a) With the help of an activity, explain the action of saliva on the food we eat. (b) Why is bile juice important in the process of digestion?

Q91. CBSE 2022 · 2 marks (a) What happens when in a human female the egg released by the ovary is not fertilised? (b) Name one bacterial and one viral infection caused due to unsafe sex.

Q92. CBSE 2022 · 3 marks (a) Mention one function each of the following organs in human male reproductive system: (i) Testis (ii) Scrotum (iii) Vas deferens (iv) Prostate gland (b) Name the type of germ cell which (i) is motile, and (ii) stores food.

Q93. CBSE 2022 · 2 marks Suggest any two contraceptive methods to control the size of human population and explain them.

LONG ANSWER (5)

Q94. CBSE 2026 · 5 marks (A) (a) Draw a labelled diagram showing open and closed stomatal pore. (b) List the main events that occur during the process of photo-synthesis. (c) Write a balanced chemical equation showing photo-synthesis in plants.

Q95. CBSE 2026 · 4 marks Kidneys help to regulate the volume of fluid and various metabolites waste products in the body. Normally, kidney filter about 180 L of fluid daily but the volume actually excreted out is only a litre or two a day. Patients with kidney failures can be saved by dialysis and kidney transplant. (a) Write the structure and function of Bowman's capsule. (b) Although kidneys filter a large amount (about 180 L daily) of fluids, still the excretion from the body is only about a litre or two. Why? (c) What is excretion? Why is it necessary for any living organism?

Q96. CBSE 2025 · 5 marks (a) (i) "The length of the small intestine in various animals depends on the food they eat." Justify the statement. (ii) Discuss the role of the pancreas and bile juice in the digestion of food in human beings. (iii) How is the small intestine designed to absorb digested food? OR (b) (i) State the role of rings of cartilage present in the throat. (ii) Discuss the role of the ribs and diaphragm when air is taken in during the breathing cycle. (iii) Why do we get muscle cramps during heavy exercise? Explain.

Q97. CBSE 2024 · 5 marks (a) Design an experiment to demonstrate that carbon dioxide is essential for photosynthesis. Write the observation and conclusion of the experiment.

Q98. CBSE 2024 · 5 marks (b) (i) List two functions each of the following parts of the human female reproductive system: (1) oviduct (2) uterus (3) ovary (ii) How does the embryo get nourishment inside the mother's womb?

CASE-BASED (5)

CASE STUDY · CBSE 2026



Not all plants carry out photosynthesis by the same mechanism. In most plants, it depends directly on gaseous carbon dioxide that diffuses into the leaf. However, some plants can store carbon dioxide in the vacuole of the leaf cells as part of a complex carbon compound. This compound is transported to the chloroplast and releases carbon dioxide when required for photosynthesis. This special mechanism is believed to have evolved as an adaptation in such plants which do not open stomata during the daytime to conserve water for survival in dry conditions (desert conditions).

Q99. CBSE 2026 · 4 marks (a) (i) Which process in these plants is minimised to help the plants survive in dry conditions? (ii) Which part of the leaf is responsible for exchange of gases during photosynthesis?

Q100. CBSE 2026 · 4 marks (a)(i) Which process in these plants is minimised to help the plants survive in dry conditions?

CASE STUDY · CBSE 2025

The maintenance functions of all living organisms must go on even when they are not doing anything particular. Even when we are just sitting in a class or even asleep, this maintenance job has to go on. These maintenance processes require energy to prevent damage and break-down of cells and tissues, which is obtained by the individual organism from the food prepared by the autotrophs, called producers.

Q101. CBSE 2025 · 1 mark Name and define the process by which green plants prepare food.

CASE STUDY · CBSE 2024

Kidneys are vital organs for survival. Several factors like infections, injury or restricted blood flow to kidneys reduce the activity of kidneys. This leads to accumulation of poisonous wastes in the body, which can even lead to death. In case of kidney failure, an artificial kidney can be used. An artificial kidney is a device to remove waste products from the blood through dialysis.

Q102. CBSE 2024 · 1 mark (a) (i) Name the artery that brings oxygenated blood to the kidney.

CASE STUDY · CBSE 2024

The maintenance functions of every living organism on the earth keeps going on even when they are not doing anything particular. The processes which together perform the job of maintenance of life are known as life processes. These processes are nutrition, respiration, transportation and excretion.

Q103. CBSE 2024 · 1 mark The maintenance functions of every living organism on the earth keeps going on even when they are not doing anything particular. The processes which together perform the job of maintenance of life are known as life processes. These processes are nutrition, respiration, transportation and excretion. (i) List two types of nutrition.

6 Control and Coordination

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (23)

Q1. CBSE 2026 · 1 mark Following are the statements about the different parts of the brain. Select the correct statements. (i) The thinking part of the brain is the forebrain. (ii) Centres for smell, hearing, memory, sight are located in forebrain. (iii) Salivation, vomiting, blood pressure are controlled by medulla in the hind brain. (iv) Cerebellum does not control the posture and balance of the body.

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

Q2. CBSE 2026 · 1 mark Identify the endocrine gland that regulates the growth of human body.

- (a) Pituitary gland (b) Thyroid gland (c) Pancreas
(d) Adrenal gland

Q3. CBSE 2026 · 1 mark Assertion (A): In case of iodine deficiency in our diet, there is a possibility that we might suffer from goitre. Reason (R): One of the symptoms of goitre is swelling of neck.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q4. CBSE 2026 · 1 mark Identify the type of tropic movement that is responsible for the movement of the pollen tube towards an ovule from the following options.

- (a) Hydrotropism (b) Geotropism (c) Chemotropism
(d) Phototropism

Q5. CBSE 2026 · 1 mark Walking in a straight line and riding a bicycle are activities which are possible due to coordination of which part of the brain?

- (a) Fore-Brain, Cerebrum (b) Mid-Brain, Cerebellum
(c) Hind-Brain, Cerebellum (d) Hind-Brain, Medulla

Q6. CBSE 2026 · 1 mark In a synapse, the chemical signal is transmitted from:

- (a) Dendritic end of one neuron to axonal end of another neuron.
(b) Axon to cell body of the same neuron.
(c) Cell body to axonal end of the same neuron.
(d) Axonal end of one neuron to dendritic end of another neuron.



Q7. CBSE 2026 · 1 mark The growth of tendrils in grapes plants is due to:

- (a) Effect of light (b) Effect of gravity
- (c) Rapid cell division in tendril cells in contact with the support
- (d) Rapid cell division in tendril cells that are away from the support

Q8. CBSE 2026 · 1 mark In plants, the role of cytokinin is to/in:

- (a) promote cell division (b) wilting of leaves
- (c) promote opening of stomatal pore (d) growth of stem

Q9. CBSE 2025 · 1 mark The plant hormone whose concentration stimulates the cells to grow longer on the side of the shoot which is away from light is :

- (a) Cytokinins (b) Gibberellins (c) Adrenaline (d) Auxins

Q10. CBSE 2025 · 1 mark The part of the brain which maintains the posture and balance of the body is:

- (a) Pons (b) Cerebrum (c) Cerebellum (d) Medulla

Q11. CBSE 2025 · 1 mark The plant hormone present in greater concentration in the areas of rapidly dividing cells is:

- (a) Auxin (b) Cytokinins (c) Gibberellins (d) Absciscic acid

Q12. CBSE 2025 · 1 mark 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.

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

Q13. CBSE 2025 · 1 mark The part of the hindbrain present immediately above the medulla is:

- (a) Cerebellum (b) Pons (c) Cerebrum (d) Spinal cord

Q14. CBSE 2025 · 1 mark Application of Absciscic acid on plants promotes:

- (a) Development of fruits (b) Wilting of leaves
- (c) Elongation of stem (d) Formation of flowers

Q15. CBSE 2024 · 1 mark A plant growth inhibitor hormone which causes wilting of leaves is called:

- (a) Auxin (b) Cytokinin (c) Absciscic acid (d) Gibberellin

Q16. CBSE 2024 · 1 mark The correct sequence of events when a hot object is touched unconsciously by hand is:

- (a) Receptors in skin → Motor neuron → Relay neuron → Sensory neuron → Effector muscle in arm
- (b) Receptors in skin → Relay neuron → Sensory neuron → Motor neuron → Effector muscle in arm
- (c) Receptors in skin → Sensory neuron → Relay neuron → Motor neuron → Effector muscle in arm
- (d) Receptors in skin → Sensory neuron → Effector muscle in arm → Motor neuron → Relay neuron

Q17. CBSE 2024 · 1 mark Sense organ in which olfactory receptors are present is:

- (a) Nose (b) Skin (c) Tongue (d) Inner ear

Q18. CBSE 2024 · 1 mark Identify an involuntary action from the following:

- (a) Riding a bicycle (b) Picking up a pencil
- (c) Regular beating of heart (d) Walking in a straight line

Q19. CBSE 2024 · 1 mark When you touch a hot object unconsciously, the sequence of events that takes place is:

- (a) Receptors in skin → Motor neuron → Relay neuron → Sensory neuron → Effector muscle in arm
- (b) Receptors in skin → Relay neuron → Sensory neuron → Motor neuron → Effector muscle in arm
- (c) Receptors in skin → Sensory neuron → Relay neuron → Motor neuron → Effector muscle in arm
- (d) Receptors in skin → Sensory neuron → Effector muscle in arm → Motor neuron → Relay neuron

Q20. CBSE 2024 · 1 mark In a nerve cell (neuron), the conversion of electrical signal to chemical signal occurs in/at:

- (a) dendritic end (b) cell body (c) axon (d) axonal end

Q21. CBSE 2023 · 1 mark During adolescence, reproductive phase starts and:

- (a) general growth rate begins to slow down
- (b) height becomes less (c) the body weight is reduced
- (d) hair growth decreases

Q22. CBSE 2023 · 1 mark Sensory nerve of a reflex arc carries information from the receptor cells to the:

- (a) spinal cord (b) brain (c) muscles of the effector organ
- (d) bones of the receptor organ

Q23. CBSE 2023 · 1 mark The part in which gustatory receptors are present in our body is:

- (a) inner ear (b) skin (c) tongue (d) inner lining of nose

VERY SHORT ANSWER (10)

Q24. CBSE 2026 · 2 marks (A) Varun is diabetic. His latest ultrasound reports showed a blockage in his pancreatic duct. How will this affect the dual functioning of the pancreas?

Q25. CBSE 2026 · 2 marks What are hormones? State any one function of the following hormones: (i) Insulin (ii) Adrenaline

Q26. CBSE 2025 · 2 marks Name the parts of hind-brain of the human brain. Which part of the hind-brain controls involuntary actions such as blood pressure and salivation?

Q27. CBSE 2025 · 2 marks A person is making a list to purchase few things from a nearby market. Explain how the fore-brain plays an important role in performing this activity.

Q28. CBSE 2025 · 2 marks (a) Explain how tendrils help a pea plant climb up other plants or fences.

Q29. CBSE 2025 · 2 marks (b) List two major limitations of the use of electrical impulses as a means of communication between the cells in most multicellular animals.



Q30. CBSE 2024 · 2 marks (a) Name the part of human brain which is responsible for the following actions: (i) Thinking (ii) Blood pressure (iii) Maintaining posture and balance (iv) Salivation OR (b) Name the organ/part of a plant which shows: (i) Positive hydrotropism (ii) Positive phototropism (iii) Negative geotropism (iv) Positive chemotropism

Q31. CBSE 2023 · 2 marks Name the hormone secreted in scary situations by animals. Write any three responses which enable the animal body to deal with it.

Q32. CBSE 2023 · 2 marks Name a plant hormone responsible for bending of a shoot of a plant when it is exposed to unidirectional light. How does it promote phototropism?

Q33. CBSE 2023 · 2 marks (a) How is the brain and spinal cord protected in human beings? (b) State one main function each of (i) Medulla and (ii) Cerebellum.

SHORT ANSWER (14)

Q34. CBSE 2026 · 3 marks Give reasons for the following: (a) Adrenal gland is known as the stress gland of the body. (b) Prenatal sex determination is banned in India. (c) Vegetative propagation is advantageous in some plants.

Q35. CBSE 2026 · 2 marks (B) Sunil unconsciously touched the hot iron rod and immediately withdrew his hand. Which type of action is involved? Also define this action. Draw a flow chart to show the path followed for this action.

Q36. CBSE 2026 · 3 marks (a) Mention the gland and the hormone secreted by it in scary situation in human beings. (b) Write two responses that enable the human body to be ready to deal with such situation.

Q37. CBSE 2026 · 2 marks (a) "The timing and the amount of hormone secreted by a gland are regulated in the human body." Justify this statement with the help of an example.

Q38. CBSE 2025 · 3 marks Plants have neither a nervous system nor muscles, even then they respond to stimuli. For example, the leaves of chhui-mui (touch-me-not) plant when touched begin to fold up and droop. (a) How is the information communicated in "touch-me-not" plants? (b) What enables the plant cells to bring out the observable response? (c) Differentiate the movement mentioned above from the movement of tendrils in a pea plant.

Q39. CBSE 2025 · 3 marks Name the glands that secrete: (i) Adrenaline (ii) Thyroxine. Explain with example how the timing and amount of hormone released are regulated in the human body.

Q40. CBSE 2025 · 3 marks A hormone 'X' is secreted in blood when a person is under scary situation. (a) Identify the hormone 'X' and the gland that secretes it. (b) Explain its role in dealing with scary or emergency situations.

Q41. CBSE 2025 · 3 marks (a) Define hormone. (b) "Hormones should be secreted in precise quantities. We have a feedback mechanism through which this is done." With the help of an example justify the statement.

Q42. CBSE 2025 · 3 marks (a) What is meant by reflex arc? Where are they formed in the human body? (b) Why have reflex arcs evolved in animals?

Q43. CBSE 2024 · 3 marks Taking the example of any two animal hormones along with their gland of secretion, explain how these hormones help (i) in growth and development and (ii) regulate metabolism, in the body.

Q44. CBSE 2024 · 3 marks Name a plant growth hormone synthesized at the shoot tip. Explain its effect on the growth of a plant in response to light.

Q45. CBSE 2024 · 3 marks (a) Name the (i) hormone released, and the (ii) gland which secretes it in human beings during scary situations. Explain how our body responds to enable it to deal with such situations. OR (b) Name the plant growth hormone which is synthesized at the shoot tip. Explain why the shoot of a potted plant bends towards light coming from a window.

Q46. CBSE 2023 · 3 marks Name the hormone released and the gland which secretes it in human beings during scary situations. How does the body respond to enable it to deal with the situation?

Q47. CBSE 2023 · 3 marks Explain the directional movement due to growth in response to touch in a pea plant.

LONG ANSWER (2)

Q48. CBSE 2024 · 5 marks (a) (i) Define a reflex arc. Why have reflex arcs evolved in animals? Trace the sequence of events which occur, when you suddenly touch a hot object. (ii) Name the part of nervous system which helps in communication between the central nervous system and other parts of the body. What are the two components of this system?

Q49. CBSE 2023 · 5 marks (a) (i) List three points of difference between nervous and hormonal mechanisms for control and coordination in animals. (ii) How are auxins related with the bending of plant shoot towards unidirectional light? Explain.

CASE-BASED (3)

CASE STUDY · CBSE 2026

Plants exhibit movements in response to various environmental stimuli to adopt and survive in their surroundings. These movements, influenced by external factors such as light, gravity, water and chemicals are regulated by specific plant hormones. For example, the differential growth of plant parts allows them to bend, grow or orient themselves in particular directions. Roots and shoots often show contrasting response to the same stimulus, highlighting the complex mechanisms involved in plant growth and development.

Q50. CBSE 2026 · 4 marks (a) Why is hydrotropism essential for plants?

CASE STUDY · CBSE 2026

A middle-aged person is facing some cognitive changes in himself. His early symptoms included mild forgetfulness. For example, forgetting where he left his mobile or failing to find words to complete his sentences. He was facing problems in



driving a car, climbing up and down the stairs, inserting a plug into an outlet. He slowly developed a sad mood and anxiety.

Q51. CBSE 2026 · 4 marks (a) What are voluntary actions?

CASE STUDY · CBSE 2025

A person while climbing up a rocky hill comes into a panic state and fear. His body starts reacting in a "flight-or-flight" condition to adjust to the dangerous and stressful situation.

Q52. CBSE 2025 · 4 marks (a) (i) Name the hormone secreted in the blood of the person in this situation. OR (a) (ii) Name the source gland of the hormone secreted in this condition.

7 How do Organisms Reproduce?

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (30)

Q1. CBSE 2026 · 1 mark If the part 'P' of the flower is removed, which of the following processes will not take place?

- (a) Formation of pollens (b) Formation of flower
(c) Formation of fruit (d) Formation of seed

Q2. CBSE 2026 · 1 mark Assertion (A): Variations are not often seen in off-springs produced by asexual reproduction. Reason (R): DNA molecule generated by replication is not similar to the original DNA.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q3. CBSE 2026 · 1 mark Assertion (A): Reproduction, like any other life process, is essential to maintain the life of an individual organism. Reason (R): Reproduction involves creation of a DNA copy and additional cellular apparatus by the cell involved in the process.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q4. CBSE 2026 · 1 mark In human beings, the implantation of fertilised egg takes place in which part of female reproductive system?

- (a) Oviduct (b) Cervix (c) Uterus (d) Vagina

Q5. CBSE 2026 · 1 mark Yeast multiplies by which of the following methods?

- (a) Fragmentation (b) Binary Fission (c) Multiple Fission
(d) Budding

Q6. CBSE 2026 · 1 mark Assertion (A): Bacteria produced as a result of asexual reproduction would be similar. Reason (R): There would be only minor differences between the bacteria generated due to small inaccuracies in DNA replication.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q7. CBSE 2026 · 1 mark Spirogyra, despite being a multi-cellular organism, still shows a simple reproductive method. Select the correct option with regard to reproduction in Spirogyra:

- (a) Asexual reproduction by division of cells into two cells
(b) Sexual reproduction by division of cells into many cells
(c) Asexual reproduction by breaking up of Spirogyra filaments into smaller parts
(d) Sexual reproduction by the formation of gametes after meiosis of cells of filaments followed by fusion of male and female gametes

Q8. CBSE 2026 · 1 mark Identify the type of tropic movement that is responsible for the movement of the pollen tube towards an ovule from the following options.

- (a) Hydrotropism (b) Geotropism (c) Chemotropism
(d) Phototropism

Q9. CBSE 2026 · 1 mark Which of the following represents the correct sequence of events of sexual reproduction in a flower?

- (a) Pollination, Fertilization, Seed, Embryo
(b) Seed, Embryo, Fertilization, Pollination
(c) Seed, Plant, Flower, Pollination, Fertilization
(d) Pollination, Fertilization, Embryo, Seed

Q10. CBSE 2025 · 1 mark The correct/true statement(s) for a bisexual flower is/are :

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

Q11. CBSE 2025 · 1 mark The correct/true statement(s) for a bisexual flower is/are: (i) They possess both stamen and pistil. (ii) They possess either stamen or pistil. (iii) They exhibit either self-pollination or cross-pollination. (iv) They cannot produce fruits on their own.

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

Q12. CBSE 2025 · 1 mark If pea plants with round and green seeds (RRyy) are crossed with pea plants having wrinkled and yellow seeds (rrYY), the seeds developed by the plants of F₁ generation will be:

- (a) 50% round and green (b) 75% wrinkled and green
(c) 100% round and yellow (d) 75% wrinkled and yellow

Q13. CBSE 2025 · 1 mark Bryophyllum produces new plant through:

- (a) Apical buds formed on the tip of the plant
(b) Vegetative buds produced in the notches of the leaf
(c) Flowers produced in the notches of the branches
(d) Fruits formed on the branches of the plant



Q14. CBSE 2025 · 1 mark The number of chromosomes in a cell division is halved. This kind of cell division is observed in:

- (a) Only testis (b) Only ovary (c) Ovary and testis both
(d) All cells of the body

Q15. CBSE 2025 · 1 mark Which one of the following statements is not correct for the plants raised by vegetative propagation?

- (a) Can bear flowers and fruits earlier than those produced from seeds.
(b) Those plants that have lost the capacity to produce seeds can be grown.
(c) As compared to the parent plant, vegetatively propagated plants show more variations.
(d) All the plants produced in this way are genetically similar to the parent plant.

Q16. CBSE 2025 · 1 mark Which of the following is the correct sequence of parts of female reproductive system of flowering plants in terms of their placement?

- (a) Stigma, ovule, ovary, style (b) Ovule, stigma, ovary, style
(c) Style, stigma, ovule, ovary (d) Stigma, style, ovary, ovule

Q17. CBSE 2025 · 1 mark Match Column-I with Column-II and select the correct option from the choices provided. Column-I: a. Site of fertilisation of egg with the sperm b. Site of implantation of embryo c. Site of entry of sperm into the female reproductive tract d. Site through which the waste materials generated by the developing embryo are removed Column-II: (i) Vagina (ii) Uterus (iii) Oviduct (iv) Placenta (v) Cervix

- (a) a-(ii), b-(i), c-(v), d-(iv) (b) a-(iii), b-(i), c-(v), d-(iv)
(c) a-(iv), b-(ii), c-(iii), d-(i) (d) a-(iii), b-(ii), c-(i), d-(iv)

Q18. CBSE 2025 · 1 mark Select a pair of bisexual flowers from the following:

- (a) Papaya and mustard (b) Hibiscus and mustard
(c) Hibiscus and papaya (d) Hibiscus and watermelon

Q19. CBSE 2025 · 1 mark The end product of meiosis in a reproductive cell in plants is:

- (a) Zygote (b) Pollen grains (c) Sperms (d) Egg

Q20. CBSE 2024 · 1 mark The plants that can be raised by the method of vegetative propagation are:

- (a) Sugarcane, roses, grapes (b) Sugarcane, mustard, potato
(c) Banana, orange, mustard (d) Papaya, mustard, potato

Q21. CBSE 2024 · 1 mark The part of seed which is a source of food during germination of seed is:

- (a) Cotyledon (b) Radicle (c) Plumule (d) Embryo

Q22. CBSE 2024 · 1 mark The part of the flower which attracts insects for pollination is/are:

- (a) Stigma and style (b) Sepals and petals (c) Petals only
(d) Sepals only

Q23. CBSE 2024 · 1 mark The incorrect statement about placenta is:

- (a) It is a disc embedded in the uterine wall.
(b) Villi are present on the side of the embryo.
(c) It has a very small surface area for glucose and oxygen to pass from mother to the embryo.
(d) The embryo gets nutrition from the mother through the placenta.

Q24. CBSE 2024 · 1 mark Select from the following the conditions responsible for the rapid spread of bread mould on a slice of bread:

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

Q25. CBSE 2024 · 1 mark Select from the following the conditions responsible for the rapid spread of bread mould on a slice of bread: (i) Formation of large number of spores (ii) Presence of moisture and nutrients in bread (iii) Low temperature (iv) Presence of hyphae

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

Q26. CBSE 2024 · 1 mark The part of a seed that stores food, the future root and the future shoot respectively are:

- (a) Plumule, radicle, cotyledon
(b) Cotyledon, plumule, radicle
(c) Cotyledon, radicle, plumule
(d) Radicle, plumule, cotyledon

Q27. CBSE 2023 · 1 mark Plants which bear unisexual flowers are:

- (a) Mustard and Papaya (b) Hibiscus and Watermelon
(c) Mustard and Hibiscus (d) Watermelon and Papaya

Q28. CBSE 2023 · 1 mark The number of chromosomes in parents and offsprings of a particular species undergoing sexual reproduction remain constant due to:

- (a) doubling of chromosomes after zygote formation.
(b) halving of chromosomes after zygote formation.
(c) doubling of chromosomes before gamete formation.
(d) halving of chromosomes at the time of gamete formation.

Q29. CBSE 2023 · 1 mark During adolescence, reproductive phase starts and:

- (a) general growth rate begins to slow down
(b) height becomes less (c) the body weight is reduced
(d) hair growth decreases

Q30. CBSE 2023 · 1 mark The bacterial and the viral infections that may be caused due to unsafe sex respectively are:

- (a) Warts and HIV-AIDS (b) HIV-AIDS and Warts
(c) Gonorrhoea and Syphilis (d) Syphilis and Warts

VERY SHORT ANSWER (4)

Q31. CBSE 2025 · 2 marks Draw labelled diagrams to show different stages of budding in Hydra.

Q32. CBSE 2025 · 2 marks (a) Write one function each of the following, in a seed: (i) Seed coat (ii) Cotyledon (iii) Radicle (iv) Plumule OR (b) Write the main steps to culture yeast in the laboratory.



Q33. CBSE 2024 · 2 marks Some unicellular organisms such as Plasmodium and Leishmania differ in the manner in which they reproduce. Name and explain the reproductive process taking place in them.

Q34. CBSE 2024 · 2 marks Identify the organ in the human female reproductive system where the sperm encounters the egg cell. What will happen if it is blocked? Name the technique by which it can be blocked.

SHORT ANSWER (9)

Q35. CBSE 2024 · 3 marks (a) Explain with the help of a labelled diagram, the process of reproduction in Hydra by budding. Name the cells used for reproduction in this process.

Q36. CBSE 2024 · 3 marks How is the sex of a newborn individual determined in different species of animals? Give three examples to support your answer.

Q37. CBSE 2022 · 2 marks (a) Which of the following flowers will have higher possibility of self-pollination? Mustard, Papaya, Watermelon, Hibiscus (b) List the two reproductive parts of a bisexual flower.

Q38. CBSE 2022 · 2 marks Which one of the two multicellular organisms Spirogyra and Planaria reproduces by regeneration and why? Give an example of any other organism which can also reproduce by the same process.

Q39. CBSE 2022 · 3 marks (a) Mention one function each of the following organs in human male reproductive system: (i) Testis (ii) Scrotum (iii) Vas deferens (iv) Prostate gland (b) Name the type of germ cell which (i) is motile, and (ii) stores food.

Q40. CBSE 2022 · 2 marks Which of the following flowers will have higher possibility of self-pollination? Mustard, Papaya, Watermelon, Hibiscus. List the two reproductive parts of a bisexual flower.

Q41. CBSE 2022 · 2 marks Suggest any two contraceptive methods to control the size of human population and explain them.

Q42. CBSE 2022 · 2 marks Name the part/organ of the human female reproductive system (a) where contraceptive devices such as loop or copper-T are placed to prevent pregnancy. (b) which is blocked to prevent the transfer of eggs. (c) where formation of green cells as ova takes place. (d) from where the fetus gets nutrition from its mother's blood.

Q43. CBSE 2022 · 2 marks Name the part/organ of the human male reproductive system (a) which is a common passage for both sperms as well as urine. (b) where formation of germ cells or sperms takes place. (c) which is blocked to prevent the transfer of sperm. (d) which provides nutrition to the sperms.

LONG ANSWER (10)

Q44. CBSE 2026 · 5 marks (A) (i) In an angiospermic flower, fertilization is said to take place when male gametes carried in the pollen tube fuse with the female gamete, present in the embryo sac. This results in lot of changes in different parts of the flower. State the changes taking place in the following structures of flower post fertilization: (a) Zygote (b) Ovule (c) Ovary (d) Sepals (ii) Define germination.

Q45. CBSE 2026 · 5 marks (A) (i) Sugarcane does not produce seeds so name the process through which it will be able to reproduce. (ii) List any two advantages of this method. (iii) Besides sugarcane, give two more examples of plants that reproduce by this method. (iv) Why regeneration is not possible in all the types of animals ?

Q46. CBSE 2026 · 5 marks (a) (i) Name an organ that helps in the formation of male germ cells in humans and also mention the condition that favours the formation of male germ cells. (ii) In male reproductive system, write the pathway followed to deliver male germ cells to the site of fertilisation. (iii) Mention the main physical feature of the male germ cell that helps it move towards the female germ cell.

Q47. CBSE 2025 · 5 marks (a) (i) Write the functions of the following parts of human female reproductive system: (I) Ovary (II) Fallopian tube (III) Uterus (ii) State briefly two contraceptive methods used by human males.

Q48. CBSE 2025 · 5 marks Write the functions of the following parts of human female reproductive system: (I) Ovary (II) Fallopian tube (III) Uterus. State briefly two contraceptive methods used by human males.

Q49. CBSE 2025 · 5 marks (a) (i) In which form is the information for inheritance of features transmitted from one generation to the next generation? (ii) Differentiate between binary fission in Amoeba and Leishmania. (iii) "Fragmentation cannot be a method of reproduction in all multicellular organisms." Justify this statement.

Q50. CBSE 2025 · 5 marks (a) (i) Differentiate between self-pollination and cross-pollination. (ii) Explain the events taking place in a flower after a pollen lands on a suitable stigma, till fruit-formation.

Q51. CBSE 2024 · 5 marks (a) (i) What is vegetative propagation? Is this process sexual or asexual? Justify your answer. (ii) List three advantages of practising the process/technique by the farmers. (iii) Select two plants from the following which are obtained by this technique: Banana, Papaya, Jasmine, Mustard

Q52. CBSE 2023 · 5 marks (i) Name and explain the two modes of asexual reproduction observed in hydra. (ii) What is vegetative propagation? List two advantages of using this technique.

Q53. CBSE 2023 · 5 marks (a) (i) Where are testes located in the human males and why? State two function of the testes. (ii) In the human female, one of the ovaries releases an egg every month. State the changes that take place if (1) the egg is fertilized, and (2) the egg is not fertilized. (iii) What is done during the surgical method in males and females to prevent pregnancy?

CASE-BASED (6)

CASE STUDY · CBSE 2025

When a girl is born, the ovaries already contain thousands of immature eggs. On reaching puberty, some of these start maturing. One matured egg is released every month by one of the ovaries. The two oviducts unite into an elastic bag-like structure known as uterus.



Q54. CBSE 2025 · 4 marks (a) Write the site of fertilization in human female.

CASE STUDY · CBSE 2024

Pollination is an important process in sexual reproduction of plants. It is an essential process that facilitates fertilisation in plants. Pollinating agents can be wind, water, insects and birds. Several changes take place in the flower after the fertilization has taken place.

Q55. CBSE 2024 · 1 mark Write the main difference between self-pollination and cross-pollination.

CASE STUDY · CBSE 2023

All the reproductive methods of living organisms are broadly categorized into two types: 1. Asexual reproduction, and 2. Sexual reproduction. Asexual reproduction involves the participation of a single parent without the formation of gametes, fertilisation and transfer of genetic material. This method is a common means of rapidly increasing offsprings under favourable conditions.

Q56. CBSE 2023 · 1 mark Name the type of fission that occurs in Leishmania and Plasmodium.

CASE STUDY · CBSE 2023

The most obvious outcome of the reproductive process is the generation of individuals of similar design, but in sexual reproduction they may not be exactly alike. The resemblances as well as differences are marked. The rules of heredity determine the process by which traits and characteristics are reliably inherited. Many experiments have been done to study the rules of inheritance.

Q57. CBSE 2023 · 1 mark Why an offspring of human being is not a true copy of his parents in sexual reproduction?

CASE STUDY · CBSE 2022

The modes by which various organisms reproduce depend on the body design of the organisms. In asexual reproduction, a single individual parent produces offsprings without the involvement of gametes. This method is a common means of increasing the offsprings rapidly under favourable conditions. Asexual reproduction occurs mostly in unicellular organisms, some plants and certain simple multicellular animals.

Q58. CBSE 2022 · 1 mark State the name of the organism in which binary fission takes place in a definite orientation. Also name the disease caused by this organism.

Q59. CBSE 2022 · 1 mark Why is regeneration not same as reproduction?

8 Heredity

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (29)

Q1. CBSE 2026 · 1 mark Identify the traits that cannot be transmitted from parents to the off-springs: (i) Swimming technique (ii) Blood group (iii) Eye colour (iv) Dancing skills
(a) (i) and (ii) (b) (i) and (iv) (c) (iii) and (iv) (d) (ii) and (iii)

Q2. CBSE 2026 · 1 mark Two pea plants, one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds were crossed with each other which produced F1 progeny that have only round yellow (RrYy) seeds. When F1 plants are self-pollinated, the F2 progeny will have which new combination of characters, as compared to the parents: (i) Round, yellow (ii) Round, green (iii) Wrinkled, yellow (iv) Wrinkled, green
(a) (i) and (ii) (b) (i) and (iv) (c) (ii) and (iv) (d) (i) and (iii)

Q3. CBSE 2026 · 1 mark Two pea plants, one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds were crossed with each other which produced F1 progeny that have only round yellow (RrYy) seeds. When F1 plants are self-pollinated, the F2 progeny will have which new combination of characters, as compared to the parents: (i) Round, yellow (ii) Round, green (iii) Wrinkled, yellow (iv) Wrinkled, green. Correct options are:
(a) (i) and (ii) (b) (i) and (iv) (c) (ii) and (iv) (d) (i) and (iii)

Q4. CBSE 2026 · 1 mark Assertion (A): Variations are not often seen in off-springs produced by asexual reproduction. Reason (R): DNA molecule generated by replication is not similar to the original DNA.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q5. CBSE 2026 · 1 mark When a human egg is fertilized by a sperm having 'Y' chromosome, the zygote has the following combination of chromosomes:

- (a) 44 + XX (b) 22 + XX (c) 44 + XY (d) 22 + XY

Q6. CBSE 2026 · 1 mark Assertion (A): Bacteria that can withstand heat have better chances of survival in a heat wave. Reason (R): Accumulation of variations in a species increases the chances of its survival in changing environment.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.



Q7. CBSE 2026 · 1 mark The genotype of green stemmed tomato plant is denoted by 'GG' and that of purple stemmed tomato plant as 'gg'. Hybrid of a cross between these two were self-pollinated to obtain F₂ progeny. What will be the ratio of GG, Gg and gg in this F₂ progeny?

- (a) 2 : 1 : 1 (b) 3 : 1 : 0 (c) 1 : 1 : 2 (d) 1 : 2 : 1

Q8. CBSE 2026 · 1 mark The number of chromosomes in parents and offspring of a particular species undergoing sexual reproduction remains constant due to:

- (a) doubling of chromosomes after zygote formation.
(b) halving of chromosomes after zygote formation.
(c) doubling of chromosomes before gamete formation.
(d) halving of chromosomes at the time of gamete formation.

Q9. CBSE 2025 · 1 mark If pea plants with round and green seeds (RRyy) are crossed with pea plants having wrinkled and yellow seeds (rrYY), the seeds developed by the plants of F₁ generation will be :

- (a) 50% round and green (b) 75% wrinkled and green
(c) 100% round and yellow (d) 75% wrinkled and yellow

Q10. CBSE 2025 · 1 mark Assertion (A) : A human child bears all the basic features of human beings. Reason (R) : It looks exactly like its parents, showing very little variations.

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

Q11. CBSE 2025 · 1 mark The number of chromosomes in a cell division is halved. This kind of cell division is observed in:

- (a) Only testis (b) Only ovary (c) Ovary and testis both
(d) All cells of the body

Q12. CBSE 2025 · 1 mark Assertion (A): A mango seed will germinate to form a mango tree. Reason (R): Heredity determines the process by which traits and characteristics are reliably inherited from parents to offspring.

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

Q13. CBSE 2025 · 1 mark In garden pea, violet colour flower is the dominant trait over white colour flower which is the recessive trait. When parent plant with violet coloured flowers (Vv) is crossed with a parent plant with white flowers, the possible percentage of occurrence of traits in the F₁ progeny would be:

- (a) 100% violet (b) 50% violet, 50% white
(c) 25% violet, 75% white (d) 75% violet, 25% white

Q14. CBSE 2025 · 1 mark The unit of heredity is:

- (a) Chromosome (b) Chromatin (c) Gene (d) DNA

Q15. CBSE 2024 · 1 mark A zygote is formed by the fusion of a male gamete and a female gamete. The number of chromosomes in the zygote of a human is:

- (a) 23 (b) 44 (c) 46 (d) 92

Q16. CBSE 2024 · 1 mark Assertion (A): Sex of the children will be determined by what they inherit from their mother. Reason (R): Women have XX sex chromosomes.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q17. CBSE 2024 · 1 mark Two pea plants, one round green (RRyy) seeds and another with wrinkled yellow (rrYY) seeds produce F₁ progeny that has round yellow (RrYy) seeds. If the F₁ progeny plants are selfed, then the minimum number of plants of the F₂ progeny will have the following observable characters:

- (a) Wrinkled green (b) Wrinkled yellow (c) Round green
(d) Round yellow

Q18. CBSE 2024 · 1 mark Assertion (A): Chromosomes inherited from the parents decide the sex of a child. Reason (R): Y chromosome in a male child is inherited from the father.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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 and Reason (R) is false.
(d) Assertion (A) is false and Reason (R) is true.

Q19. CBSE 2023 · 1 mark When a bacterium carrying the X chromosome divides into two bacteria, the following combination of chromosomes:

- (a) 44 + XX (b) 44 + XY (c) 22 + XX (d) 22 + XY

Q20. CBSE 2023 · 1 mark Assertion (A): When a bacterium divides into two, and the resultant two bacteria divide again, the four bacteria produced would be almost similar. Reason (R): DNA copying involves small inaccuracies in the reproduction process.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q21. CBSE 2023 · 1 mark When a chromosome carrying gene for yellow body colour is removed from a female fruitfly, the resulting zygote in the progeny will have the following combination of chromosomes:

- (a) 44 + XX (b) 44 + XY (c) 22 + XX (d) 22 + XY

Q22. CBSE 2023 · 1 mark When a bacterium carrying the chromosome divides into two, the resulting pair of bacteria will have which of the following combination of chromosomes :

- (a) 44 + XX (b) 44 + XY (c) 22 + XX (d) 22 + XY



Q23. CBSE 2023 · 1 mark Which pair of sex chromosome will determine a male?

- (a) XO (b) XX (c) XY (d) YY

Q24. CBSE 2023 · 1 mark Assertion (A): In humans, if gene (B) is responsible for black eyes and gene (b) is responsible for brown eyes, then the colour of eyes of the progeny having gene combination Bb, bb or BB will be black only. Reason (R): The black colour of the eyes is a dominant trait.

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

Q25. CBSE 2023 · 1 mark The number of chromosomes in parents and offsprings of a particular species undergoing sexual reproduction remain constant due to:

- (a) doubling of chromosomes after zygote formation.
 (b) halving of chromosomes after zygote formation.
 (c) doubling of chromosomes before gamete formation.
 (d) halving of chromosomes at the time of gamete formation.

Q26. CBSE 2023 · 1 mark Which one of the given statements is incorrect:

- (a) DNA has the complete information for a particular characteristic.
 (b) DNA is the molecule responsible for the inheritance of characters from parents to offsprings.
 (c) Change in information will produce a different protein.
 (d) Characteristics will remain the same even if protein changes.

Q27. CBSE 2023 · 1 mark A cross between pea plant with white flowers (vv) and pea plant with violet flowers (VV) resulted in F_2 progeny in which ratio of violet (VV) and white (vv) flowers will be:

- (a) 1 : 1 (b) 2 : 1 (c) 3 : 1 (d) 1 : 3

Q28. CBSE 2023 · 1 mark Consider the following two statements: (i) The trait that expresses itself in F_1 generation. (ii) The trait that keeps on passing from one generation to another. The appropriate terms for the statements (i) and (ii) respectively are:

- (a) Recessive trait, Dominant trait
 (b) Dominant trait, Recessive trait
 (c) Dominant trait, Inherited trait
 (d) Recessive trait, Inherited trait

Q29. CBSE 2023 · 1 mark Assertion (A): Human populations show a great deal of variations in traits. Reason (R): All variations in a species have equal chances of surviving in the environment in which they live.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

VERY SHORT ANSWER (6)

Q30. CBSE 2025 · 2 marks (a) Explain how the proteins control the 'characteristics' in an organism with the help of an example of 'tallness' trait in pea plant. (b) Name the section of DNA that controls the 'characteristics' in an organism.

Q31. CBSE 2024 · 2 marks The survival of a species is promoted through creation of variations. Illustrate with an example.

Q32. CBSE 2024 · 2 marks Mendel crossed pea plants with two pairs of contrasting characters. R₂YY × r₂yy (Round, Yellow × Wrinkled, Green). He observed 4 types of combinations in F_2 generation. Which of the combinations were new? Write the conclusion drawn by this experiment.

Q33. CBSE 2024 · 2 marks Explain how equal genetic contribution of male and female parents is ensured in the progeny.

Q34. CBSE 2024 · 2 marks Explain how the original number of chromosomes present in the parents are restored in the progeny. Name the cell division by which chromosome number is maintained in the progeny.

Q35. CBSE 2023 · 2 marks Mendel crossed a pure tall pea plant (TT) with a pure short pea plant (tt) and obtained all tall plants in F_1 generation. (a) What is the gene combination present in the plants of F_1 generation? (b) Give reason why only tall plants are observed in F_1 progeny. (c) What will be the ratio of the plants obtained in the F_2 generation when F_1 plants are self-pollinated?

SHORT ANSWER (27)

Q36. CBSE 2026 · 3 marks Use the following information for Pea plants: Dominant allele for tall plants – T, Recessive allele for short plants – t, Dominant allele for purple flowers – P, Recessive allele for white flowers – p. (a) Perform a cross between pure plant dominant for both the traits with another plant which is recessive for both the traits and work out the progeny upto F_2 generation. (b) What is the probability of obtaining tall plants with white flowers in F_2 progeny?

Q37. CBSE 2026 · 3 marks Based on Mendel's experiment show the cross between round, yellow seeds of pea plant (RRYY) with wrinkled and green seeds of pea plant (rryy) upto F_2 generation. Write the number of seeds/plants with following genetic (Genotype) makeup in F_2 generation: (i) R₂YY (ii) r₂yy

Q38. CBSE 2026 · 3 marks (a) Show a cross between a pea plant having round & green seed with a pea plant having wrinkled and yellow seeds upto F_2 generation. (b) Also write down results of F_2 generation.

Q39. CBSE 2026 · 2 marks "Variation is useful for the survival of species over time." Explain this statement with the help of an example.

Q40. CBSE 2026 · 3 marks (a) Giving two examples, justify the statement that the sex of the offspring in all animals is not always genetically determined.

Q41. CBSE 2026 · 2 marks Do all variations in a species have equal chances of surviving in the environment in which they find themselves? Explain.



Q42. CBSE 2026 · 3 marks (a) Giving two examples, justify the statement that the sex of the offspring in all animals is not always genetically determined. (b) Differentiate between the sex chromosomes of male and female human beings.

Q43. CBSE 2026 · 3 marks Show the cross and observations made by Mendel when he crossed pure tall pea plant with a pure short pea plant to get F1 progeny.

Q44. CBSE 2026 · 3 marks A blue colour flower (BB) bearing plant is crossed with a plant with white coloured flowers (bb). (a) State the colour of the flowers you would expect in their F1 progeny. (b) What must be the percentage of white flower plants in the F2 generation, if the F1 plants are self-pollinated? (c) State the expected ratio of genotypes BB and bb in F2 progeny.

Q45. CBSE 2025 · 3 marks (a) What are chromosomes? (b) Explain in brief how stability of DNA content of a species is ensured in sexually reproducing organisms?

Q46. CBSE 2025 · 3 marks In one of Mendelian experiments, when F1 generation pea plants with round yellow seeds were self-pollinated, pea seeds with the following combinations were obtained in F2 generation: Round yellow - 800, Round green - 275, Wrinkled yellow - 268, Wrinkled green - 90. Analyse the result and describe the mechanism of inheritance of traits which explains the above results.

Q47. CBSE 2025 · 3 marks (a) How many chromosomes are present in human beings? Out of these how many are sex chromosomes? (b) Explain how, in sexually reproducing organisms, the number of chromosomes in the progeny is maintained.

Q48. CBSE 2025 · 3 marks A pure pea plant bearing terminal flowers was cross-pollinated with a pure plant having axillary flowers. In F1 generation, plants with axial flowers only were obtained. F1 generation plants are self-pollinated and F2 generation is obtained. (a) Work out the pattern of inheritance in this case. (b) What will be the ratio of plants obtained in F2 generation?

Q49. CBSE 2025 · 3 marks A pure pea plant having round (R), yellow (Y) seeds is crossed with another pure pea plant having wrinkled (r), green (y) seeds. Subsequently F1 progeny is self-pollinated to obtain F2 progeny. (a) What do the seeds of F1 generation look like? (b) Give the possible combinations of traits in seeds of F2 generation. Also give their ratio. (c) State the reason of obtaining seeds of new combination of traits in F2 generation.

Q50. CBSE 2024 · 3 marks List two differences between dominant traits and recessive traits. What percentage of pea plants in the F2 generation were with yellow seeds in yellow (YY) and green coloured (yy) seeds?

Q51. CBSE 2024 · 3 marks (a) Name any two pairs of contrasting characters other than height used by Mendel in his experiments. (b) On crossing a tall and a short pea plant, Mendel obtained F1 generation in which all pea plants were tall. (i) Are these plants exactly the same as tall plants of the parent generation? Write their gene combination. (ii) Give the percentage of short plants obtained in F2 generation when F1 plants are self-pollinated. (iii) In what ratio would you find TT and Tt in F2 generation?

Q52. CBSE 2024 · 3 marks Mendel crossed pure tall pea plants (TT) with pure short pea plants (tt) and obtained F1 progeny. When the plants of F1 progeny were self-pollinated, plants of F2 progeny were obtained. (a) What did the plants of F1 progeny look like? Give their gene combination. (b) Why could the gene for shortness not be expressed in plants of F1 progeny? (c) Write the ratio of the plants obtained in F2 progeny and state the conclusion that can be drawn from this experiment.

Q53. CBSE 2024 · 3 marks A plant with violet flowers (VV) was crossed with a plant with white flowers (vv). (a) What colour of flowers was obtained in the plants of F1 generation and why? (b) Write the percentage of plants with white flowers in F2 generation plants, if F1 plants were self-pollinated. Give reason why this trait was not expressed in F1 generation. (c) In what ratio did we get the plants with (VV) and (Vv) gene combination in the F2 generation?

Q54. CBSE 2024 · 3 marks Is it possible that a trait gets inherited, but not expressed? Give an example to justify your answer.

Q55. CBSE 2022 · 2 marks (a) What is variation? List two main reasons that may lead to variation in a population.

Q56. CBSE 2022 · 2 marks Why do the following three elements form such a triad? N (14); P (31); As (75) (Atomic masses are given in parenthesis)

Q57. CBSE 2022 · 3 marks A cross was made between green-stemmed tomato plants denoted by (GG) and purple-stemmed tomato plants denoted as (gg) to obtain F1 progeny. What colour of the stem would you expect in their F1 progeny and why? Give the percentage of purple-stemmed plants if F1 plants are allowed to self-pollinate to produce F2 progeny. Write the ratio between GG and gg plants in the F2 progeny?

Q58. CBSE 2022 · 3 marks List two advantages of adopting the atomic number of an element as the basis of classification of elements in the Modern Periodic Table. Write the electronic configurations of the elements X (atomic number 13) and Y (atomic number 20).

Q59. CBSE 2022 · 3 marks A red-eyed individual is crossed with a white-eyed individual to produce F1 progeny with red eyes. When F1 individuals are intercrossed, F2 progeny is formed with both red as well as white-eyed individuals. (a) How is the dominant trait identified? (b) What are recessive traits? (c) If 12 individuals are produced in F2 generation, then how many white-eyed individuals would be obtained? Calculate the ratio of red-eyed individuals to white-eyed individuals.

Q60. CBSE 2022 · 2 marks Mendel crossed two pea plants with visible contrasting characteristics and found that there were no half-way characteristics in the plants of F1 progeny. Explain the reason for this observation of Mendel.

Q61. CBSE 2022 · 3 marks How did Mendel's experiments show that traits are inherited independently? Explain.

Q62. CBSE 2022 · 3 marks How did Mendel's experiments demonstrate that traits are inherited independently? Explain.

CASE-BASED (6)

CASE STUDY · CBSE 2025



The process of determining the sex of a newborn is purely genetic. But still many people in some societies believe that only the woman (mother) is responsible for determination of the sex of the child and blame her. In fact, the sex of the child is genetically determined. But there are some animals where sex is not genetically determined.

Q63. CBSE 2025 · 4 marks (a) Define sex chromosomes.

CASE STUDY · CBSE 2023

The most obvious outcome of the reproductive process is the generation of individuals of similar design, but in sexual reproduction they may not be exactly alike. The resemblances as well as differences are marked. The rules of heredity determine the process by which traits and characteristics are reliably inherited. Many experiments have been done to study the rules of inheritance.

Q64. CBSE 2023 · 1 mark While performing experiments on inheritance in plants, what is the difference between F1 and F2 generation?

Q65. CBSE 2023 · 4 marks (i) Why an offspring of human being is not a true copy of his parents in sexual reproduction?

CASE STUDY · CBSE 2023

In some families, either rural or urban, females are tortured for giving birth to a female child. They do not seem to understand the scientific reason behind the birth of a boy or a girl. In fact the mother is not responsible for the sex of the child and it has been genetically proved that the sex of a newborn is determined by what the child inherits from the father.

Q66. CBSE 2023 · 1 mark State the basis on which the sex of a newborn baby is determined in humans.

CASE STUDY · CBSE 2022

The mechanism by which the sex of an individual is determined is called sex-determination. In human beings, sex of a newborn is genetically determined, whereas in some others it is not. There are 46 (23 pairs) chromosomes in human beings. Out of these, 44 (22 pairs) control the body characters and 2 (one pair) are known as sex chromosomes. The sex chromosomes are of two types – X chromosome and Y chromosome. At the time of fertilisation, depending upon which type of male gamete fuses with the female gamete, the sex of the newborn child is decided.

Q67. CBSE 2022 · 2 marks Why is a pair of sex chromosomes in human beings called a mismatched pair in terms of type and size?

Q68. CBSE 2022 · 2 marks The mechanism by which the sex of an individual is determined is called sex-determination. In human beings, sex of a newborn is genetically determined, whereas in some others it is not. There are 46 (23 pairs) chromosomes in human beings. Out of these, 44 (22 pairs) control the body characters and 2 (one pair) are known as sex chromosomes. The sex chromosomes are of two types – X chromosome and Y chromosome. At the time of fertilisation, depending upon which type of male gamete fuses with the female gamete, the sex of the newborn child is decided. (a) What is the statistical probability of getting either a male or a female child? Justify your answer.

9 Light — Reflection and Refraction

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (21)

Q1. CBSE 2026 · 1 mark Rays from the sun converge at a point 25 cm behind a convex lens. The distance at which an object be placed in front of the lens to get a virtual image, is:

- (a) 20 cm (b) 40 cm (c) 50 cm (d) More than 50 cm

Q2. CBSE 2026 · 1 mark From the following options choose the one which gives negative magnification greater than one:

- (a) Concave mirror; Nature of image – real
(b) Concave mirror; Nature of image – virtual
(c) Convex mirror; Nature of image – real
(d) Convex mirror; Nature of image – virtual

Q3. CBSE 2025 · 1 mark Mirror 'X' is used to concentrate sunlight in solar furnace and Mirror 'Y' is fitted on the side of the vehicle to see the traffic behind the driver. Which of the following statements are true for the two mirrors ?

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

Q4. CBSE 2025 · 1 mark Mirror 'X' is used to concentrate sunlight in solar furnace and Mirror 'Y' is fitted on the side of the vehicle to see the traffic behind the driver. Which of the following statements are true for the two mirrors? (i) The image formed by mirror 'X' is real, diminished and at its focus. (ii) The image formed by mirror 'Y' is virtual, diminished and erect. (iii) The image formed by mirror 'X' is virtual, diminished and erect. (iv) The image formed by mirror 'Y' is real, diminished and at its focus.

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

Q5. CBSE 2025 · 1 mark The white light entering a glass prism, gets split into its constituent colours. It is observed that:

- (a) Red light deviates the most.
(b) Violet light deviates the least.
(c) Yellow light deviates more than the blue light.
(d) Green light deviates more than the orange light.

Q6. CBSE 2025 · 1 mark The phenomenon responsible for making the smoke particles visible when a beam of sunlight enters a smoke filled room through a narrow hole is:

- (a) scattering of light (b) dispersion of light
(c) reflection of light (d) internal reflection of light



Q7. CBSE 2025 · 1 mark If the absolute refractive indices of two media X and Y are $\frac{6}{5}$ and $\frac{4}{3}$ respectively, then the refractive index of Y with respect to X will be:

- (a) $\frac{10}{9}$ (b) $\frac{9}{10}$ (c) $\frac{9}{8}$ (d) $\frac{8}{9}$

Q8. CBSE 2025 · 1 mark An object is placed at a distance of 30 cm from the pole of a concave mirror. If its real and inverted image is formed at 60 cm in front of the mirror, the focal length of the mirror is:

- (a) - 15 cm (b) - 20 cm (c) + 20 cm (d) + 15 cm

Q9. CBSE 2025 · 1 mark Absolute refractive index of water and glass is $\frac{4}{3}$ and $\frac{3}{2}$ respectively. If the speed of light in glass is 2×10^8 m/s, the speed of light in water is:

- (a) $\frac{9}{4}$ m/s (b) $\frac{7}{3}$ m/s (c) $\frac{16}{9}$ m/s (d) $\frac{9}{8}$ m/s

Q10. CBSE 2025 · 1 mark A 5 cm long rod is placed vertically in front of a concave mirror. If its 5 cm long image is formed at 20 cm in front of the mirror, the focal length of the mirror is:

- (a) - 20 cm (b) - 10 cm (c) - 5 cm (d) 20 cm

Q11. CBSE 2025 · 1 mark An optical device which always produces images of $m = +1$ is:

- (a) Plane mirror (b) Convex mirror (c) Concave mirror
(d) Convex lens

Q12. CBSE 2025 · 1 mark Refractive index of diamond with respect to glass is 1.6. If the absolute refractive index of glass is 1.5, the absolute refractive index of diamond is:

- (a) 1.09 (b) 1.96 (c) 2.4 (d) 2.5

Q13. CBSE 2025 · 1 mark Concave mirror finds its application in which of the following cases?

- (a) A solar furnace (b) A rear-view mirror in vehicles
(c) To view full size erect image of distant tall buildings
(d) To produce divergent beam of light

Q14. CBSE 2024 · 1 mark Absolute refractive index of glass and water is $\frac{2}{3}$ and $\frac{3}{4}$ respectively. If the speed of light in glass is 2×10^8 m/s, the speed of light in water is:

- (a) $\frac{4}{9} \times 10^8$ m/s (b) $\frac{2}{5} \times 10^8$ m/s (c) $\frac{3}{7} \times 10^8$ m/s
(d) $\frac{9}{16} \times 10^8$ m/s

Q15. CBSE 2024 · 1 mark How will the image formed by a convex lens be affected, if the upper half of the lens is wrapped with a black paper?

- (a) The size of the image formed will be one-half of the size of the image due to complete lens.
(b) The image of upper half of the object will not be formed.
(c) The brightness of the image will reduce.
(d) The lower half of the inverted image will not be formed.

Q16. CBSE 2024 · 1 mark The phenomena of light involved in the formation of rainbow are:

- (a) Refraction, reflection and dispersion
(b) Refraction, dispersion and internal reflection
(c) Reflection, dispersion and internal reflection
(d) Refraction, dispersion, scattering and total internal reflection

Q17. CBSE 2024 · 1 mark The colour of light for which the refractive index of glass is minimum, is:

- (a) Red (b) Yellow (c) Green (d) Violet

Q18. CBSE 2024 · 1 mark A ray of light is incident on a plane mirror at an angle of incidence of 15° . The deviation in the ray produced by the mirror is:

- (a) 30° (b) 60° (c) 120° (d) 150°

Q19. CBSE 2024 · 1 mark For an object, a convex mirror always forms an image which is:

- (a) Virtual, erect and magnified
(b) Virtual, erect and diminished
(c) Virtual, inverted and diminished
(d) Real, erect and diminished

Q20. CBSE 2023 · 1 mark An object is placed in front of a convex mirror at infinity. According to the New Cartesian Sign Convention, the sign of the focal length and the sign of the image distance in this case are respectively:

- (a) +, - (b) -, + (c) -, - (d) +, +

Q21. CBSE 2023 · 1 mark Assertion (A) : The angle through which a ray of light bends on passing through a prism is called the angle of deviation. Reason (R) : The peculiar shape of a prism makes the emergent ray bend at an angle to the direction of the incident ray.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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

VERY SHORT ANSWER (14)

Q22. CBSE 2026 · 2 marks When an incident ray of light enters in a medium 'X' from medium 'Y', it bends away from the normal. Comment about the following: (a) Speed of light in medium 'X' with respect to the speed of light in medium of 'Y'. (b) Optical density of medium 'X' with respect to the optical density of medium 'Y'. Give reason for your answer in each case.

Q23. CBSE 2026 · 2 marks Draw the ray diagram showing refraction through a glass slab and write the relation between angle of incidence, angle of refraction and refractive index of glass.

Q24. CBSE 2025 · 2 marks An object is placed at a distance of 60 cm from a concave lens of focal length 30 cm. Use lens formula to find the position of the image formed in this case.

Q25. CBSE 2025 · 2 marks An object is placed at a distance of 30 cm in front of a concave mirror of focal length 20 cm. Use mirror formula to determine the position of the image formed in this case.

Q26. CBSE 2025 · 2 marks An object is placed at a distance of 10 cm in front of a concave mirror of focal length 15 cm. Use mirror formula to determine the position of the image formed by this mirror.



Q27. CBSE 2025 · 2 marks (a) Out of the two lenses, one concave and the other convex, state which one will diverge a parallel beam of light falling on it. Draw a ray diagram to show the principal focus of the lens. OR (b) A ray of light after refraction from a convex lens emerges parallel to its principal axis. (i) Draw a labelled ray diagram to show it. (ii) In this case, the incident ray before refraction from the lens passes through a point on its principal axis. Name the point.

Q28. CBSE 2025 · 2 marks An object is placed 25 cm in front of a concave mirror of focal length 15 cm. Use mirror formula and new cartesian sign convention to determine the position of the image formed.

Q29. CBSE 2025 · 2 marks Draw a ray diagram to show the path of a ray of light which falls obliquely on one of the faces of an equilateral triangular prism made of glass and mark on it the angle of incidence ($\angle i$) and the angle of deviation ($\angle D$).

Q30. CBSE 2025 · 2 marks An object is placed 18 cm in front of a concave mirror of focal length 12 cm. Use mirror formula to determine the position of the image formed in this case.

Q31. CBSE 2024 · 2 marks The heat produced at a point due to concentration of sunlight by a convex lens burns a paper. (a) Explain why it happens. (b) Name the term (in the context of the lens used) given to the point at which the paper starts burning. What does the bright spot formed on the paper represent?

Q32. CBSE 2024 · 2 marks Define power of a lens. Find power of a lens whose focal length is 50 cm.

Q33. CBSE 2024 · 2 marks The linear magnification produced by a spherical mirror is +3. Based on this statement answer the following questions: (a) What is the type of mirror? (b) Where is the object located? (c) List two properties of the image formed (other than the size/magnification).

Q34. CBSE 2024 · 2 marks (a) List four properties of the images formed by a plane mirror. OR (b) Write the definitions of the following terms in the context of a concave mirror: (i) Pole (ii) Centre of curvature (iii) Radius of curvature (iv) Principal axis

Q35. CBSE 2023 · 2 marks When and where does a rainbow appear in the sky? Draw a labelled ray diagram to show its formation.

SHORT ANSWER (20)

Q36. CBSE 2026 · 3 marks A mirror used for rear-view of an automobile has a focal length 2.0 m. If a car is located at 8.0 m from the mirror - (a) Find out the position of the image of this car as seen in the mirror. (b) Draw the ray-diagram for image formation by the rear-view mirror.

Q37. CBSE 2026 · 3 marks (a) Draw the ray diagram for refraction of light through a glass prism and mark angle of refraction and angle of deviation. (b) When the path of a light ray refracted through a glass prism is reversed how will the angle of deviation change? Explain.

Q38. CBSE 2026 · 3 marks (a) A ray of light after reflection from a concave mirror becomes parallel to its principal axis. Draw a labelled ray diagram to show this. (b) (i) Differentiate between the virtual images formed by a convex mirror and concave mirror. (ii) The value of magnification 'm' for a mirror is -2. Calculate the height of object if the height of image is 20 cm.

Q39. CBSE 2026 · 2 marks (a) Define absolute refractive index of an optical medium. (b) Material Medium | Refractive Index | A | 1.50 | B | 1.46 | C | 1.31 | D | 1.77 | Arrange these material mediums given in the table in increasing order of speed of light through them.

Q40. CBSE 2026 · 3 marks An object is placed at a distance of 30 cm in front of a convex lens of focal length 15 cm. Use lens formula to determine the position of the image. What will be the size of the image in this case ?

Q41. CBSE 2026 · 3 marks An object of height 6 cm is placed at a distance of 30 cm from the optical centre of a concave lens of focal length 15 cm. Use lens formula to determine: (a) The distance of image from the optical centre. (b) The height of the image formed.

Q42. CBSE 2026 · 3 marks (a) Write the expression for the magnification produced by a lens in terms of object distance and image distance.

Q43. CBSE 2026 · 3 marks (a) Write the name of the lens and position of the object in front of it so that a virtual and magnified image is formed. (b) An object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. If object is located at 30 cm from this lens, using lens formula find out the position and nature of the image formed.

Q44. CBSE 2026 · 2 marks (a) Which one of these two media is optically denser than the other medium? Justify your answer. (b) If the speed of light in medium A is V_A and in medium B is V_B , then what is the refractive index of medium B with respect to medium A?

Q45. CBSE 2025 · 3 marks Draw ray diagrams to show the nature, position and relative size of the image formed by a convex mirror when the object is placed (i) at infinity and (ii) between infinity and pole P of the mirror.

Q46. CBSE 2025 · 3 marks A convex lens forms an 80 cm long image of a 20 cm long object which is kept at a distance of 60 cm from the optical centre of the lens. If the object and the image are on the same side of the lens, find (i) the nature of the image, (ii) the position of the image, and (iii) the focal length of the lens.

Q47. CBSE 2025 · 3 marks An object is placed at a distance of 20 cm from the optical centre of a concave lens and its image is formed on the same side of the lens as the object. If the distance of the image from optical centre of the lens is 10 cm, use lens formula to determine (i) focal length, and (ii) power of the lens in new Cartesian sign conventions.

Q48. CBSE 2025 · 3 marks A convex mirror used for rear view on an automobile has a focal length of 15 m. If a 3 m high bus is located at 60 m from the mirror, use mirror formula to determine the position and size of the image of the bus as seen in the mirror.

Q49. CBSE 2024 · 3 marks (b) What is dispersion of white light? State its cause. Draw a diagram to show dispersion of a beam of white light by a glass prism.



Q50. CBSE 2023 · 3 marks (a) A student has focussed the image of an object of height 3 cm on a white screen using a concave mirror of focal length 12 cm. If the distance of the object from the mirror is 18 cm, find the values of the following: (i) Distance of the image from the mirror (ii) Height of the image

Q51. CBSE 2023 · 3 marks List two differences in the characteristic properties of the virtual images formed by the two types of spherical lenses (concave and convex). How are these characteristics of the two lenses used in the correction of the two common defects of vision namely myopia and hypermetropia?

Q52. CBSE 2023 · 3 marks An object is kept at a distance of 1m from a lens of power +2D: (i) Identify the type of lens. (ii) Calculate its focal length and distance of the image formed.

Q53. CBSE 2023 · 3 marks The magnification produced when an object is placed at a distance of 20 cm from a spherical mirror is +1/2. Where should the object be placed to reduce the magnification to +1/3.

Q54. CBSE 2023 · 3 marks (a) (i) An object of 5 cm height is placed at a distance of 20 cm from the optical centre of a concave lens of focal length 18 cm. Calculate (1) image distance and (2) the magnification in this case. (ii) Compare the values of magnification obtained by a concave lens and a convex lens when both the lenses form virtual images.

Q55. CBSE 2022 · 3 marks Draw the pattern of magnetic field lines around a bar magnet. Mark the position of North Pole, South Pole and the places where the magnetic field is strongest. Why do the magnetic field lines not intersect each other?

LONG ANSWER (9)

Q56. CBSE 2026 · 1 mark (a) Without calculation, find out the focal length of the given convex lens. Justify your answer.

Q57. CBSE 2025 · 5 marks (b) (i) Draw a ray diagram to show the refraction of a ray of light through a rectangular glass slab when it falls obliquely from air into glass. (ii) State Snell's law of refraction of light. (iii) Differentiate between the virtual images formed by a convex lens and a concave lens on the basis of: (I) object distance, and (II) magnification.

Q58. CBSE 2025 · 5 marks (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. 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.

Q59. CBSE 2024 · 5 marks (a) The variation of image distance (v) with object distance (u) for a convex lens is given in the following observation table. Analyse it and answer the questions that follow: S. No. 1 2 3 4 5 6, Object distance (u) cm: 150 75 50 37.5 30 15, Image distance (v) cm: +30 +37.5 +50 +75 +150 +37.5. (i) Without calculation, find the focal length of the convex lens. Justify your answer. (ii) Which observation is not correct? Why? Draw ray diagram to find the position of the image formed for this position of the object. (iii) Find the approximate value of magnification for $u = 30$ cm.

Q60. CBSE 2024 · 5 marks The variation of image distance (v) with object distance (u) for a convex lens is given in the following observation table. Analyse it and answer the questions that follow: (i) Without calculation, find the focal length of the convex lens. Justify your answer. (ii) Which observation is not correct? Why? Draw ray diagram to find the position of the image formed for this position of the object. (iii) Find the approximate value of magnification for $u = 30$ cm.

Q61. CBSE 2024 · 5 marks (a) (i) State laws of reflection of light. (ii) An object of height 5.0 cm is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed, so that a focussed image is obtained on it? Find the height of the image.

Q62. CBSE 2023 · 5 marks (b) A student has focussed the image of a candle flame on a white screen using a convex lens. The situation is as given below: Length of the flame = 2 cm, Focal length of the lens = 12 cm, Distance of the flame from the lens = 16 cm. If the flame is perpendicular to the principal axis of the lens, calculate the values of the following: (i) Distance of the image from the lens (ii) Length of the image formed

Q63. CBSE 2023 · 5 marks (a) Name the type of mirror that should be used to obtain the following types of images: (i) A magnified and virtual image of an object (ii) A diminished and virtual image of an object (b) Draw labelled ray diagrams to justify your answers in each case mentioned above. (c) Which of these mirrors can also be used to obtain a magnified and real image of an object? State the position of the object in this case.

Q64. CBSE 2023 · 5 marks (a) Draw a ray diagram for showing the convergence of a parallel beam of light by a concave mirror and mark the positions of pole and the centre of curvature in it. (b) An object 4 cm in size is placed at 25 cm in front of a concave mirror of focal length 15 cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image? Find the nature and size of the image. (c) List any two uses of a concave mirror.

CASE-BASED (4)

CASE STUDY · CBSE 2024

A highly polished surface such as a mirror reflects most of the light falling on it. In our daily life we use two types of mirrors — plane and spherical. The reflecting surface of a spherical mirrors may be curved inwards or outwards. In concave mirrors, reflection takes place from the inner surface, while in convex mirrors reflection takes place from the outer surface.



Q65. CBSE 2024 · 1 mark Define the principal axis of a concave mirror.

CASE STUDY · CBSE 2024

Case No. | Lens | Focal Length | Object Distance 1 | A | 50 cm | 25 cm 2 | B | 20 cm | 60 cm 3 | C | 15 cm | 30 cm

Q66. CBSE 2024 · 1 mark A student has three convex lenses A, B and C of different focal lengths. He wants to observe the images formed by these lenses on a screen by placing a candle flame at different distances as given in following table.
(i) List two properties of the image formed by the lens B in case no. 2.

CASE STUDY · CBSE 2023

The ability of a medium to refract light is expressed in terms of its optical density. Optical density has a definite connotation. It is not the same as mass density. On comparing two media, the one with the large refractive index is optically denser medium

than the other. The other medium with a lower refractive index is optically rarer. Also the speed of light through a given medium is inversely proportional to its optical density.

Q67. CBSE 2023 · 1 mark Determine the speed of light in diamond if the refractive index of diamond with respect to vacuum is 2.42. Speed of light in vacuum is 3×10^8 m/s.

CASE STUDY · CBSE 2023

Many optical instruments consist of a number of lenses. They are combined to increase the magnification and sharpness of the image. The net power (P) of the lenses placed in contact is given by the algebraic sum of the powers of the individual lenses $P_1, P_2, P_3, \dots$ $P = P_1 + P_2 + P_3$. This is also termed as the simple additive property of the power of lens, widely used to design lens systems of cameras, microscopes and telescopes. These lens systems can have a combination of convex lenses and also concave lenses.

Q68. CBSE 2023 · 1 mark What is the nature (convergent / divergent) of the combination of a convex lens of power + 4 D and a concave lens of power - 2 D?

10 The Human Eye and the Colourful World

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (16)

Q1. CBSE 2026 · 1 mark The pair of eye parts responsible for admitting different amount of light in to the eyes is

- (a) Iris and pupil (b) Ciliary muscles and pupil
(c) Retina and Iris (d) Ciliary muscles and cornea

Q2. CBSE 2026 · 1 mark The vision defect which arises due to gradual weakening of the ciliary muscles and diminishing flexibility of eye lens is:

- (a) Myopia (b) Hypermetropia (c) Presbyopia
(d) Myopia and hypermetropia both

Q3. CBSE 2026 · 1 mark To restore clear vision in persons whose size of the eye ball has reduced, he/she is suggested to use suitable

- (a) Converging lens (b) Diverging lens (c) Bifocal lens
(d) Cylindrical lens

Q4. CBSE 2026 · 1 mark A thin beam of white light falls on a face of a glass prism and a spectrum is obtained on a screen. Which of the following options is the correct sequence of colours from top to bottom on the screen?

- (a) Red, Green, Yellow, Violet, Blue
(b) Red, Yellow, Green, Blue, Violet
(c) Violet, Blue, Green, Yellow, Red
(d) Violet, Red, Green, Yellow, Blue

Q5. CBSE 2026 · 1 mark Vision defect far-sightedness is found in the eye defects named as:

- (a) Myopia and cataract (b) Myopia and hypermetropia
(c) Presbyopia and hypermetropia
(d) Presbyopia and myopia

Q6. CBSE 2025 · 1 mark An old person is suffering from an eye defect caused by weakening of ciliary muscles and diminishing flexibility of the eye lens. If the defect of vision is 'a' which can be corrected by lens 'b', then 'a' and 'b' respectively are :

- (a) hypermetropia and convex lens
(b) presbyopia and bifocal lens (c) myopia and concave lens
(d) myopia and bifocal lens

Q7. CBSE 2025 · 1 mark The white light entering a glass prism, gets split into its constituent colours. It is observed that:

- (a) Red light deviates the most.
(b) Violet light deviates the least.
(c) Yellow light deviates more than the blue light.
(d) Green light deviates more than the orange light.

Q8. CBSE 2025 · 1 mark In the human eye, most of the refraction for the light rays entering the eye occurs at the surface of:

- (a) Cornea (b) Crystalline lens (c) Pupil
(d) Aqueous humor

Q9. CBSE 2025 · 1 mark The part of the human eye which can modify the curvature of the eye lens to some extent is:

- (a) Pupil (b) Cornea (c) Ciliary muscles
(d) Aqueous humour

Q10. CBSE 2025 · 1 mark When a beam of white light passes through a region of very fine dust particles, the colour of light that scatters the most in that region is:

- (a) red (b) orange (c) blue (d) yellow



Q11. CBSE 2025 · 1 mark Assertion (A): Due to scattering of sunlight, the clear sky predominantly appears blue. Reason (R): The wavelength of blue light is nearly 1.8 times the wavelength of red light.

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

Q12. CBSE 2024 · 1 mark When a beam of white light passes through a region having very fine dust particles, the colour of light mainly scattered in that region is:

- (a) Red (b) Orange (c) Blue (d) Yellow

Q13. CBSE 2024 · 1 mark The phenomena of light involved in the formation of rainbow are:

- (a) Refraction, reflection and dispersion
- (b) Refraction, dispersion and internal reflection
- (c) Reflection, dispersion and internal reflection
- (d) Refraction, dispersion, scattering and total internal reflection

Q14. CBSE 2024 · 1 mark The colour of light for which the refractive index of glass is minimum, is:

- (a) Red (b) Yellow (c) Green (d) Violet

Q15. CBSE 2024 · 1 mark Consider the following statements: i. Ciliary muscles adjust for changing the intensity of light entering the eye. ii. Myopic eye can be corrected by converging lenses of suitable power. iii. The function of the pupil is to regulate the quantity of light entering the eye. iv. When ciliary muscles are completely relaxed, the focal length of the eye lens is maximum. The correct statements are:

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

Q16. CBSE 2023 · 1 mark Assertion (A): A person suffering from myopia cannot see the distant objects clearly. Reason (R): A converging lens is used for the correction of myopic eye as it can form real as well as virtual images of the objects placed in front of it.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

VERY SHORT ANSWER (5)

Q17. CBSE 2025 · 2 marks (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. 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.

Q18. CBSE 2024 · 2 marks A person suffering from presbyopia needs bifocal lens. If he needs two lens of power -4.0 dioptre and $+2.0$ dioptre, which one of these two lenses is for the correction of distant vision and what is its focal length?

Q19. CBSE 2024 · 2 marks Name the phenomenon of light responsible for Tyndall effect. Write an event where this phenomenon can be observed.

Q20. CBSE 2024 · 2 marks What would have been the colour of the sky, if the Earth had no atmosphere? Give reason to justify your answer.

Q21. CBSE 2023 · 2 marks When and where does a rainbow appear in the sky? Draw a labelled ray diagram to show its formation.

SHORT ANSWER (15)

Q22. CBSE 2026 · 3 marks Explain the phenomenon of rainbow formation in the sky. Draw the labelled ray diagram in support of your explanation.

Q23. CBSE 2026 · 2 marks (a) Explain the role of UV radiation in the formation of ozone layer. (b) Why is UV radiation considered as highly damaging to organisms?

Q24. CBSE 2026 · 3 marks A person is suffering from a defect of vision due to the elongation of his/her eye ball. (a) Write the name of the defect of vision and write the other possible cause of this defect of vision. (b) This defect can be corrected by using a suitable lens. Draw the ray diagram for correction of this defect of vision.

Q25. CBSE 2026 · 2 marks (A) (i) How does the change in curvature of the eye lens helps us in the process of seeing the nearby objects clearly? (ii) State the range of the power of accommodation of a normal human eye.

Q26. CBSE 2026 · 2 marks (a) How does the focal length of eye lens change as the distance of the object from the eyes is altered? Explain.

Q27. CBSE 2026 · 3 marks What is scattering of light? How is scattering of light different from reflection of light? Explain.

Q28. CBSE 2026 · 2 marks (a) What happens when light is scattered from (i) very fine particles and (ii) very large size particles of medium? Justify your answer in each case.

Q29. CBSE 2025 · 3 marks What is a rainbow? Draw a labelled diagram to show its formation.

Q30. CBSE 2024 · 3 marks Define the term power of accommodation of human eye. What happens to the image distance in the eye when we increase the distance of an object from the eye? Name and explain the role of the part of human eye responsible for it in this case.

Q31. CBSE 2024 · 3 marks (b) What is dispersion of white light? State its cause. Draw a diagram to show dispersion of a beam of white light by a glass prism.

Q32. CBSE 2024 · 3 marks When and where does a rainbow appear in the sky? List the phenomena of light in proper sequence which occurs during the formation of a rainbow. Why can a rainbow not be seen from the surface of the moon?



Q33. CBSE 2023 · 3 marks (A) Define the term dispersion of white light. State the colour which bends (i) the most, (ii) the least while passing through a glass prism. Draw a diagram to show the dispersion of white light. OR (B) What is a rainbow? Draw a labelled diagram to show its formation.

Q34. CBSE 2023 · 3 marks (a) State one important function of the following parts of the human eye: (i) Retina (ii) Pupil. (b) State the role of ciliary muscles in focussing objects at varying distances from the eye.

Q35. CBSE 2023 · 3 marks Draw a labelled diagram of a common type of bifocal lens. State the function of each of its parts. Name the defect for the correction of which it is used and state its main cause.

Q36. CBSE 2023 · 3 marks Draw a labelled diagram to show (i) dispersion of a beam of white light, and (ii) formation of a rainbow.

LONG ANSWER (4)

Q37. CBSE 2025 · 5 marks (a) (i) The power of a lens 'X' is -2.5 D . Name the lens and determine its focal length in cm. For which eye defect of vision will an optician prescribe this type of lens as a corrective lens? (ii) "The value of magnification 'm' for a lens is -2 ." Using new Cartesian Sign Convention and considering that an object is placed at a distance of 20 cm from the optical centre of this lens, state: (I) the nature of the image formed; (II) size of the image compared to the size of the object; (III) position of the image, and (IV) sign of the height of the image. (iii) The numerical values of the focal lengths of two lenses A and B are 10 cm and 20 cm respectively. Which one of the two will show higher degree of convergence/divergence? Give reason to justify your answer.

Q38. CBSE 2025 · 5 marks The power of a lens 'X' is -2.5 D . Name the lens and determine its focal length in cm. For which eye defect of vision will an optician prescribe this type of lens as a corrective lens? "The value of magnification 'm' for a lens is -2 ." Using new Cartesian Sign Convention and considering that an object is placed at a distance of 20 cm from the optical centre of this lens, state: (I) the nature of the image formed; (II) size of the image compared to the size of the object; (III) position of the image, and (IV) sign of the height of the image. The numerical values of the focal lengths of two lenses A and B are 10 cm and 20 cm respectively. Which one of the two will show higher degree of convergence/divergence? Give reason to justify your answer.

Q39. CBSE 2025 · 5 marks (a) (i) Define the term power of accommodation of human eye. What happens to the image distance in the eyes when the distance of an object is increased gradually from about 5 m to 500 m from our eyes? Name and explain the role of the part of human eye responsible for it in this case. (ii) A person is unable to see distinctly the objects placed beyond 2 m from his eyes. Name the defect of vision the person is suffering from. List two possible causes of this defect and write the type of lenses used for the correction of this defect.

Q40. CBSE 2025 · 5 marks (a) (i) When and where does a rainbow appear in the sky? List the phenomena of light which occur during the formation of a rainbow in proper sequence. Draw a labelled diagram to show the formation of a rainbow. (ii) List two conditions to observe a rainbow in the sky. Why can a rainbow not be seen from the surface of the moon? Explain.

CASE-BASED (3)

CASE STUDY · CBSE 2025

A person allowed a narrow beam of white light from the sun to enter a dark room through a small aperture and placed a glass prism in its path in such a manner that the beam falls on the face AB of the prism. A screen S is placed on the other side of the prism, facing AC. On turning the prism slowly, a beautiful band of colours is obtained on the screen. It is the spectrum of sunlight.

Q41. CBSE 2025 · 1 mark Name the phenomenon due to which a prism splits the incident white light into a band of colours.

CASE STUDY · CBSE 2024

A student has three convex lenses A, B and C of different focal lengths. He wants to observe the images formed by these lenses on a screen by placing a candle flame at different distances as given in following table: Case No. | Lens | Focal Length | Object Distance 1 | A | 50 cm | 25 cm 2 | B | 20 cm | 60 cm 3 | C | 15 cm | 30 cm

Q42. CBSE 2024 · 2 marks (a) Name the type of lens presented by opticians for the correction of hypermetropia. State the role of such lenses in correcting the vision of the person suffering from this defect.

CASE STUDY · CBSE 2023

Many optical instruments consist of a number of lenses. They are combined to increase the magnification and sharpness of the image. The net power (P) of the lenses placed in contact is given by the algebraic sum of the powers of the individual lenses $P_1, P_2, P_3 \dots P = P_1 + P_2 + P_3 \dots$ This is also termed as the simple additive property of the power of lens, widely used to design lens systems of cameras, microscopes and telescopes. These lens systems can have a combination of convex lenses and also concave lenses.

Q43. CBSE 2023 · 1 mark What is the nature (convergent / divergent) of the combination of a convex lens of power $+4\text{ D}$ and a concave lens of power -2 D ?



MULTIPLE CHOICE AND ASSERTION-REASON (27)

Q1. CBSE 2026 · 1 mark Four solutions, namely fructose, ethanol, hydrochloric acid and sodium hydroxide filled in four separate beakers are connected one by one in an electric circuit with a bulb. The solutions in which the bulb will glow when current is passed are :

- (a) ethanol and hydrochloric acid (b) fructose and ethanol
- (c) fructose and sodium hydroxide
- (d) hydrochloric acid and sodium hydroxide

Q2. CBSE 2026 · 1 mark The correct way to connect an ammeter and a voltmeter in an electric circuit is:

- (a) Ammeter in parallel and voltmeter in series
- (b) Ammeter and voltmeter both in parallel
- (c) Ammeter in series and voltmeter in parallel
- (d) Ammeter and voltmeter both in series

Q3. CBSE 2026 · 1 mark In an electric circuit carrying current I , a $2\ \Omega$ resistor is replaced by an $8\ \Omega$ resistor without changing the connected (ideal) battery. Then:

- (a) current becomes $I/4$ and potential difference $V/4$
- (b) current becomes $I/4$ and potential difference remains V
- (c) current becomes $4I$ and potential difference remains V
- (d) current becomes $4I$ and potential difference $V/4$

Q4. CBSE 2025 · 1 mark An electric bulb is connected to a power supply of 220 V. If the current drawn by the bulb from the supply is 500 mA, the power of the bulb is:

- (a) 11 W (b) 110 W (c) 220 W (d) 1100 W

Q5. CBSE 2025 · 1 mark Assertion (A): Nichrome is an alloy which is commonly used in electrical heating devices such as electric irons, toasters, etc. Reason (R): The resistivity of nichrome is high and its resistance decreases with increase in temperature.

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

Q6. CBSE 2025 · 1 mark The resistivity of a wire made of an alloy is generally:

- (a) Lower than that of its constituent metals.
- (b) Higher than that of its constituent metals.
- (c) Decreases with increase in its area of cross-section.
- (d) Increases with increase in its length.

Q7. CBSE 2025 · 1 mark Assertion (A): The bending of a wire in the form of a coil of several turns does not affect its electrical resistance. Reason (R): The electrical resistance of a wire is directly proportional to its electrical resistivity.

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

Q8. CBSE 2025 · 1 mark A wire of length 'l' is gradually stretched so that its length increases to $3l$. If its original resistance is R , then its new resistance will be:

- (a) $3R$ (b) $6R$ (c) $9R$ (d) $27R$

Q9. CBSE 2025 · 1 mark Which one of the following factors affects the electrical resistivity of a conductor?

- (a) Temperature (b) Length (c) Shape (d) Thickness

Q10. CBSE 2025 · 1 mark Assertion (A): In our homes we receive supply of electric power through a main supply. One of the wires in this supply, usually with red insulation, is called live wire and another wire with green insulation is called neutral wire. Reason (R): In our country, the potential difference between the live wire and the neutral wire is 220 volts.

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

Q11. CBSE 2024 · 1 mark Four solutions, namely glucose, alcohol, hydrochloric acid and sulphuric acid filled in four separate beakers are connected one by one in an electric circuit with a bulb. The solutions in which the bulb will glow when current is passed are:

- (a) Glucose and alcohol (b) Alcohol and hydrochloric acid
- (c) Glucose and sulphuric acid
- (d) Hydrochloric acid and sulphuric acid

Q12. CBSE 2024 · 1 mark Consider the following combinations of resistors. The combinations having equivalent resistance $1\ \Omega$ is/are:

- (a) I and IV (b) Only IV (c) I and II (d) I, II and III

Q13. CBSE 2024 · 1 mark An electric iron of resistance $20\ \Omega$ draws a current of 5 A. The heat developed in the iron in 30 seconds is:

- (a) 15000 J (b) 6000 J (c) 1500 J (d) 3000 J

Q14. CBSE 2024 · 1 mark Assertion (A): Electrons move from lower potential to higher potential in a conductor. Reason (R): A dry cell maintains electric potential difference across the ends of a conductor.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q15. CBSE 2024 · 1 mark Two resistors of $1\ \Omega$ and $3\ \Omega$ are connected in parallel in a circuit. If a current of 1 ampere is flowing through the circuit, the current flowing through the $3\ \Omega$ resistor is:

- (a) 1.0 ampere (b) 0.75 ampere (c) 0.33 ampere
- (d) 0.25 ampere



Q16. CBSE 2024 · 1 mark Two wires of same metal have the same length but their cross-sectional areas are in the ratio of 4 : 1. They are joined in series. The resistance of the thicker wire is $20\ \Omega$. The total resistance of the combination is:

- (a) $25\ \Omega$ (b) $100\ \Omega$ (c) $16\ \Omega$ (d) $340\ \Omega$

Q17. CBSE 2023 · 1 mark In the given experimental set-up, if the experiment is carried out separately with each of the following solutions the cases in which the bulb will glow is/are:

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

Q18. CBSE 2023 · 1 mark For verification of Ohm's law we show the arrangement of different circuit components. We find that with respect to the resistor, the:

- (a) ammeter is connected in parallel and the voltmeter in series
(b) ammeter is connected in series and the voltmeter in parallel
(c) ammeter and voltmeter are both connected in series
(d) ammeter and voltmeter are both connected in parallel

Q19. CBSE 2023 · 1 mark In a resistive circuit if the current is increased to two times, the percentage change in the amount of heat dissipated in the circuit would be:

- (a) 400% (b) 300% (c) 200% (d) 100%

Q20. CBSE 2023 · 1 mark To verify Ohm's law, we design a circuit diagram in which we show the arrangement of different circuit components. We find that with respect to the resistor, the:

- (a) ammeter is connected in parallel and the voltmeter in series
(b) ammeter is connected in series and the voltmeter in parallel
(c) ammeter and voltmeter are both connected in series
(d) ammeter and voltmeter are both connected in parallel

Q21. CBSE 2023 · 1 mark In the given experimental set-up, if the experiment is carried out separately with each of the following solutions the cases in which the bulb will glow is/are : (i) Dilute hydrochloric acid (ii) Dilute sulphuric acid (iii) Glucose solution (iv) Alcohol

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

Q22. CBSE 2023 · 1 mark In a circuit diagram showing Ohm's law verification, with respect to the resistor, the :

- (a) ammeter is connected in parallel and the voltmeter in series
(b) ammeter is connected in series and the voltmeter in parallel
(c) ammeter and voltmeter are both connected in series
(d) ammeter and voltmeter are both connected in parallel

Q23. CBSE 2023 · 1 mark The resistance of a resistor is reduced to half of its initial value. If other parameters of the electrical circuit remain unaltered, the amount of heat produced in the resistor will become:

- (a) four times (b) two times (c) half (d) one fourth

Q24. CBSE 2023 · 1 mark Two LED bulbs of 10W and 5W are connected in series. If the current flowing through 5W bulb is 0.005A, the current flowing through 10W bulb is:

- (a) 0.02A (b) 0.01A (c) 0.005A (d) 0.0025A

Q25. CBSE 2023 · 1 mark Two LED bulbs of 12W and 6W are connected in series. If the current through 12W bulb is 0.06A the current through 6W bulb will be:

- (a) 0.04A (b) 0.06A (c) 0.08A (d) 0.12A

Q26. CBSE 2023 · 1 mark The expressions that relate (i) Q, I and t and (ii) Q, V and W respectively are (Here the symbols have their usual meanings):

- (a) (i) $I = tQ$ (ii) $W = QV$ (b) (i) $Q = I \times t$ (ii) $W = V \times Q$
(c) (i) $Q = tI$ (ii) $V = QW$ (d) (i) $I = tQ$ (ii) $Q = WV$

Q27. CBSE 2023 · 1 mark An electric kettle consumes 1 kW of electric power when operated at 220 V. The minimum rating of the fuse wire to be used for it is

- (a) 1 A (b) 2 A (c) 4 A (d) 5 A

VERY SHORT ANSWER (14)

Q28. CBSE 2026 · 2 marks (A) A fuse in electric circuit is rated 4 A. Can it be used with an electric heater of rating 2 kW, 200 V? Explain your answer.

Q29. CBSE 2026 · 2 marks (a) Define volt, the unit of potential difference.

Q30. CBSE 2025 · 2 marks (a) A wire of resistance R is cut into three equal parts. If these three parts are then joined in parallel, calculate the total resistance of the combination so formed.

Q31. CBSE 2025 · 2 marks (a) Consider two lamps A and B of rating 50 W; 220 V and 25 W; 220 V respectively. Find the ratio of the resistances of the two lamps (i.e. $R_A : R_B$).

Q32. CBSE 2025 · 2 marks An electric kettle is rated 750 W; 220 V. Can this kettle be used in a circuit which has a fuse of current rating 3 A? Give reason for your answer.

Q33. CBSE 2025 · 2 marks An electric fuse is rated 8 A. Can it be used with an electrical appliance of rating 5 kW, 200 V? Justify your answer.

Q34. CBSE 2025 · 2 marks How and why is an electric fuse used in an electric circuit? Briefly describe its function.

Q35. CBSE 2025 · 2 marks An electric kettle is rated 230 V; 1000 W. Calculate the resistance of its heating element when in operation.

Q36. CBSE 2024 · 2 marks Two wires A and B of same material, having same lengths and diameters 0.2 mm and 0.3 mm respectively, are connected one by one in a circuit. Which one of these two wires will offer more resistance to the flow of current in the circuit? Justify your answer.

Q37. CBSE 2024 · 2 marks State Joule's law of heating. How is this effect useful in electric circuits where fuse is used as a safety device?

Q38. CBSE 2024 · 2 marks Calculate the resistance of a copper wire of length 1000 m and area of cross-section 2 mm^2 . Resistivity of copper is $1.6 \times 10^{-8}\ \Omega\text{ m}$.



Q39. CBSE 2024 · 2 marks An electric source can supply a charge of 500 coulomb. If the current drawn by a device is 25 mA, find the time in which the electric source will be discharged completely.

Q40. CBSE 2024 · 2 marks An electric source can supply a charge of 750 coulomb. If the current drawn by a device is 15 mA, find the time in which the electric source will be discharged completely.

Q41. CBSE 2024 · 2 marks The filament of an electric lamp draws a current of 0.5 A, which lights for 2 hours. Calculate the charge that flows through the circuit.

SHORT ANSWER (21)

Q42. CBSE 2026 · 3 marks (a) Why does an electric bulb become dim when an electric heater in parallel circuit is switched ON? (b) How to connect three resistors each of resistance $8\ \Omega$, so that the equivalent resistance of the combination is $12\ \Omega$? Draw diagram of the combination and justify your answer.

Q43. CBSE 2026 · 3 marks The values of current I flowing in a given resistor for the corresponding values of potential difference V applied across the ends of resistor are given below in the table: I (Amperes): 0.4, 0.8, 1.2, 1.6, 2.0 V (Volts): 1.2, 2.4, 3.6, 4.8, 6.0. Plot a graph between V and I and calculate the resistance of that resistor.

Q44. CBSE 2026 · 3 marks (a) Name a device which is used to: (i) Maintain a constant potential difference in a circuit. (ii) Change the electric current in an electric circuit. (b) When the potential difference between the terminals of an electric heater is 110 V, a current of 5 A flows through it. What will be the value of current flowing through it when the potential difference is increased to 220 V?

Q45. CBSE 2025 · 3 marks (a) Write the relationship between resistivity and resistance of a cylindrical conductor of length l and area of cross-section A . Hence derive the SI unit of resistivity. (b) Why are alloys used in electrical heating devices?

Q46. CBSE 2025 · 3 marks Define one ampere. The resistance of a wire of 0.01 cm radius is $14\ \Omega$. If the resistivity of the material of the wire is $44 \times 10^{-8}\ \Omega\text{ m}$, find the length of the wire. (Given $\pi = 22/7$)

Q47. CBSE 2025 · 3 marks (a) Define one volt potential difference between two points in an electric field. (b) Draw a schematic diagram of an electric circuit of a cell of 1.5 V, $5\ \Omega$ and $10\ \Omega$ resistor and a plug key, all connected in series. Calculate the current drawn from the cell when the key is closed.

Q48. CBSE 2025 · 3 marks Three resistors of $2\ \Omega$, $3\ \Omega$ and $6\ \Omega$ are connected in (i) series, and (ii) parallel. Draw the arrangements of the resistors and find the equivalent resistance of each arrangement.

Q49. CBSE 2025 · 3 marks Resistance of a wire of length 1 m is $35\ \Omega$ at 20°C . If the diameter of the wire is 0.2 mm, determine the resistivity of the material of the wire at that temperature. How will the resistivity of the wire change if the length and diameter of the wire both are doubled? Justify your answer. (Given that $\pi = 22/7$)

Q50. CBSE 2025 · 3 marks Show the arrangement of three resistors of $2\ \Omega$, $3\ \Omega$ and $6\ \Omega$ which are connected in such a way that the total/equivalent resistance of the combination is (a) $1\ \Omega$, and (b) $4\ \Omega$. Justify your answer in each case.

Q51. CBSE 2025 · 3 marks (a) Write mathematical expression for Joule's law of heating. (b) Calculate the amount of heat generated while transferring 72000 coulomb of charge in two hours through a potential difference of 220 V.

Q52. CBSE 2024 · 3 marks Earthing wire is a safety measure in household electric circuits. Validate this statement explaining its role in case of accidental leakage of electric appliances.

Q53. CBSE 2024 · 3 marks A 2000 W heater has a resistance of about $25\ \Omega$, whereas a 100 W bulb has a resistance of $500\ \Omega$. When 220 V is applied on these, then which of the two (a) can carry large currents? (b) may be used with an electrical circuit having 1.0 A rating? (c) will be fitted with a 15 A electric board and not with a 5 A electric board? Justify your answer in each case.

Q54. CBSE 2024 · 3 marks (a) (i) How does an electric fuse prevent the circuit and the appliances from possible damage due to short circuiting or overloading? (ii) How is the type of current used in household supply different from the one given by dry cells or storage batteries? (iii) For distant transmission of electric power, an alternating current (ac) is considered to be advantageous over direct current (dc). Why?

Q55. CBSE 2023 · 3 marks Explain the meaning of overloading of an electrical circuit. List two possible causes due to which overloading may occur in household circuits. Write one preventive measure that should be taken to avoid overloading of domestic circuits.

Q56. CBSE 2023 · 3 marks (i) Why is an alternating current (A.C.) considered to be advantageous over direct current (D.C.) for the long distance transmission of electric power? (ii) How is the type of current used in household supply different from the one given by a battery of dry cells? (iii) How does an electric fuse prevent the electric circuit and the appliances from a possible damage due to short circuiting or overloading.

Q57. CBSE 2022 · 3 marks (a) Three resistors R_1 , R_2 and R_3 are connected in parallel and the combination is connected to a battery, an ammeter, a voltmeter and a key. Draw suitable circuit diagram to show the arrangement of these circuit components along with the direction of current flowing. (b) Calculate the equivalent resistance of the following network:

Q58. CBSE 2022 · 3 marks (a) (i) Define Electric Power and write its SI unit. (ii) Two bulbs rated 100 W; 220 V and 60 W; 220 V are connected in parallel to an electric mains of 220 V. Find the current drawn by the bulbs from the mains.

Q59. CBSE 2022 · 3 marks Define Electric Power and write its SI unit. Two bulbs rated 100 W; 220 V and 60 W; 220 V are connected in parallel to an electric mains of 220 V. Find the current drawn by the bulbs from the mains.



Q60. CBSE 2022 · 3 marks Calculate the resistance of a metal wire of length 2 m and area of cross-section $1.55 \times 10^{-6} \text{ m}^2$. (Resistivity of the metal is $2.8 \times 10^{-8} \Omega \text{ m}$) Why are alloys preferred over pure metals to make the heating elements of electrical heating devices?

Q61. CBSE 2022 · 3 marks For a heater, rated 4 kW and 220 V, calculate the following: (a) The current (b) Energy consumed in 2 hours (c) If 1 kWh is priced at ₹ 4.50, then the cost of energy consumed

Q62. CBSE 2022 · 2 marks An electric heater rated 1100 W operates at 220 V. Calculate (i) its resistance, and (ii) the current drawn by it.

LONG ANSWER (9)

Q63. CBSE 2026 · 4 marks Three students Shweta, Ayesha and Samridhi were performing an experiment to understand the factors on which the resistance of a conductor depends. Each one of them completed electric circuit with the help of a cell, an ammeter, a plug key and wire. Shweta put nichrome wire of length 'l' in the circuit and after plugging the key, noted current in the ammeter. Ayesha put nichrome wire of same thickness but twice the length i.e. '2l' in the circuit and after plugging the key, noted current in the ammeter. Samridhi took copper wire of length 'l' and same thickness in the circuit and after plugging the key, noted current in the ammeter. (a) If the ammeter reading is X ampere with nichrome wire of length 'l', then what will be the ammeter reading if the length of nichrome wire is doubled with same area of cross-section? (b) What happens to the ammeter reading if the area of cross-section of nichrome wire is doubled, keeping the length of wire 'l' the same? (c) Define 'resistivity'. Write its SI unit. Compare the resistivity of an alloy with its constituents metals.

Q64. CBSE 2026 · 5 marks (A) (i) List any two features of the electric current used in the houses of India. (ii) Write any two differences between direct current and an alternating current. (iii) How will you identify live wire and neutral wire in a domestic electric circuit?

Q65. CBSE 2026 · 4 marks Three students Shweta, Ayesha and Samridhi were performing an experiment to understand the factors on which the resistance of a conductor depends. Each one of them completed electric circuit with the help of a cell, an ammeter, a plug key and wire. Shweta put nichrome wire of length 'l' in the circuit and after plugging the key, noted current in the ammeter. Ayesha put nichrome wire of same thickness but twice the length i.e. '2l' in the circuit and after plugging the key, noted current in the ammeter. Samridhi took copper wire of length 'l' and same thickness in the circuit and after plugging the key, noted current in the ammeter. (a) If the ammeter reading is X ampere with nichrome wire of length 'l', then what will be the ammeter reading if the length of nichrome wire is doubled with same area of cross-section? (b) What happens to the ammeter reading if the area of cross-section of nichrome wire is doubled, keeping the length of wire 'l' the same?

Q66. CBSE 2026 · 5 marks (b) (i) Draw a schematic diagram of a domestic electric circuit which includes the following devices: (I) A fuse (II) A power meter (III) One light point (IV) A power plug (ii) Why is it necessary to connect an earth wire to the electrical appliances having metallic covers?

Q67. CBSE 2026 · 5 marks (a) A person was repairing an electric heater. He observed that there were three different connecting wires of three different colours in the cable attached to the heater. (i) What are these three different wires called? Name them colourwise. (ii) What is the value of standard potential difference at which electricity is supplied in Indian homes for lighting? (iii) What is the role of (I) earthing and (II) fuse in domestic electric circuits?

Q68. CBSE 2024 · 5 marks (a) (i) The potential difference across the two ends of a circuit component is decreased to one-third of its initial value, while its resistance remains constant. What change will be observed in the current flowing through it? Name and state the law which helps us to answer this question. (ii) Draw a schematic diagram of a circuit consisting of a battery of four 1.5 V cells, a 5Ω resistor, a 10Ω resistor and a 15Ω resistor and a plug key, all connected in series. Now find (I) the electric current passing through the circuit, and (II) potential difference across the 10Ω resistor when the plug key is closed.

Q69. CBSE 2024 · 5 marks (a) (i) Write the relation between resistivity (ρ) and resistance (R) for a uniform metallic conductor of length (l) and area of cross-section (A). Use this relation to obtain the SI unit of resistivity. (ii) The resistance of a metallic wire of 100 m is 20Ω . If the radius of the wire is 5 mm, find the resistivity of the metal of the wire.

Q70. CBSE 2023 · 5 marks There are three resistors of 10Ω , 20Ω and 30Ω joined in parallel in a circuit. The potential difference across the electric circuit is 10 V. (a) Draw a circuit diagram for the above case. (b) Find the total resistance of the combination of resistors. (c) Calculate the electric current drawn from the same source.

Q71. CBSE 2023 · 5 marks (a) Define electric power and state its SI unit. The commercial unit of electric energy is kWh. Write the relationship between kWh and Joule. (b) In a house, 2 bulbs of 50 W each are used for 6 hours daily and an electric geyser of 1 kW is used for 1 hour daily. Calculate the total energy consumed in a month of 30 days and its cost at the rate of ₹ 8.00 per kWh.

CASE-BASED (3)

CASE STUDY · CBSE 2026

Three students Shweta, Ayesha and Samridhi were performing an experiment to understand the factors on which the resistance of a conductor depends. Each one of them completed electric circuit with the help of a cell, an ammeter, a plug key and wire. Shweta put nichrome wire of length 'l' in the circuit and after plugging the key, noted current in the ammeter. Ayesha put nichrome wire of same thickness but twice the length i.e. '2l' in the circuit and after plugging the key, noted current in the ammeter. Samridhi took copper wire of length 'l' and same thickness in the circuit and after plugging the key, noted current in the ammeter.

Q72. CBSE 2026 · 4 marks (a) If the ammeter reading is X ampere with nichrome wire of length 'l', then what will be the ammeter reading if the length of nichrome wire is doubled with same area of cross-section?



CASE STUDY · CBSE 2026

Swati, a class 10 student, observes that when she passes close to the refrigerator in her kitchen, she feels the heat, although the things kept inside the refrigerator are cool.

Q73. CBSE 2026 · 4 marks (a) Describe the cause of heating in the above-mentioned case.

CASE STUDY · CBSE 2025

In our homes, we receive the supply of electric power through a main supply also called mains, either supported through overhead electric poles or by underground cables. In our country the potential difference between the two wires (live wire and neutral wire) of this supply is 220 V.

Q74. CBSE 2025 · 1 mark Write the colours of the insulation covers of the line wires through which supply comes to our homes.

12 Magnetic Effects of Electric Current

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (18)

Q1. CBSE 2026 · 1 mark Assertion (A): With the help of compass, magnetic field lines can be traced outside the bar magnet. Reason (R): The north pole of a compass needle always points towards the south pole of the magnet when brought close to it.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q2. CBSE 2026 · 1 mark Assertion (A): The needle of a magnetic compass kept in strong external magnetic field, always aligns itself in north-south direction on the earth. Reason (R): Behaviour of the needle of a compass is same as that of a freely suspended bar magnet.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q3. CBSE 2026 · 1 mark Assertion (A): Direction of force exerted on a current-carrying conductor placed in a magnetic field remains same if the directions of both magnetic field and current flowing through the conductor are reversed. Reason (R): The direction of force exerted on a current-carrying conductor placed in an external magnetic field can be determined by using magnetic compass.

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

Q4. CBSE 2026 · 1 mark Assertion (A): The needle of a compass, kept in an external magnetic field, always aligns itself in the North-South direction of the Earth. Reason (R): The behaviour of the needle of the compass is similar to the behaviour of a freely suspended bar magnet.

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

Q5. CBSE 2025 · 1 mark Assertion (A) : No two magnetic field lines are found to cross each other. Reason (R) : The compass needle cannot point towards two directions at the point of intersection of two magnetic field lines.

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

Q6. CBSE 2025 · 1 mark Which one of the following statements is not true about a bar magnet?

- (a) It sets itself in north-south direction when suspended freely.
- (b) It has attractive power for iron filings.
- (c) It produces magnetic field lines.
- (d) The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.

Q7. CBSE 2025 · 1 mark The strength of magnetic field produced inside a long straight current carrying solenoid does not depend upon:

- (a) number of turns in the solenoid
- (b) direction of current flowing through the solenoid
- (c) material of the core filled inside the solenoid
- (d) radius of the coil of the solenoid



Q8. CBSE 2025 · 1 mark 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.

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

Q9. CBSE 2025 · 1 mark The strength of the magnetic field inside a current carrying long straight solenoid is:

- (a) maximum at its centre (b) minimum at its centre
- (c) maximum at the ends and minimum at its centre
- (d) uniform throughout its length

Q10. CBSE 2024 · 1 mark Assertion (A): Magnetic field lines never intersect each other. Reason (R): If they intersect, then at the point of intersection, the compass needle would point towards two directions, which is not possible.

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

Q11. CBSE 2024 · 1 mark The current carrying device which produces a magnetic field similar to that of a bar magnet is:

- (a) A straight conductor (b) A circular loop (c) A solenoid
- (d) A circular coil

Q12. CBSE 2024 · 1 mark Assertion (A): The intensity of the magnetic field produced at the centre of a current carrying circular coil increases on increasing the number of turns in the coil. Reason (R): The current that flows in each turn of the coil has the same magnitude and same direction and the magnetic field, due to each turn, just adds up.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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 and Reason (R) is false.
- (d) Assertion (A) is false and Reason (R) is true.

Q13. CBSE 2023 · 1 mark Assertion (A): Magnetic field lines do not intersect each other. Reason (R): Magnetic field lines are imaginary lines, the tangent to which at any point gives the direction of the field at that point.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q14. CBSE 2023 · 1 mark The correct pattern of magnetic field lines of the field produced by a current carrying circular loop is:

- (a) (a) (b) (b) (c) (c) (d) (d)

Q15. CBSE 2023 · 1 mark Assertion (A): A current carrying straight conductor experiences a force when placed perpendicular to the direction of magnetic field. Reason (R): The net charge on a current carrying conductor is always zero.

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

Q16. CBSE 2023 · 1 mark For a current in a long straight solenoid, N and S poles are created at the two ends. Among the following statements, the incorrect statement is:

- (a) The magnetic field lines inside the solenoid are in the form of straight lines, which indicates that the magnetic field is uniform at all points inside the solenoid.
- (b) The strong magnetic field produced inside the solenoid can magnetize the soft iron placed inside it.
- (c) The pattern of the magnetic field associated with a current carrying solenoid is different from the pattern of the magnetic field around a bar magnet.
- (d) The N and S poles exchange positions when the direction of current through the solenoid is reversed.

Q17. CBSE 2023 · 1 mark Assertion (A): Two magnetic field lines around a current carrying straight wire do not intersect each other. Reason (R): The magnitude of the magnetic field produced at a given point increases as the current through the wire increases.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q18. CBSE 2023 · 1 mark Assertion (A): The magnetic field lines around a current carrying straight wire do not intersect each other. Reason (R): The magnitude of the magnetic field produced at a given point increases as the current through the wire increases.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

VERY SHORT ANSWER (3)

Q19. CBSE 2026 · 2 marks (B) How is an electromagnet made? Write any two ways by which the strength of electromagnet can be increased.

Q20. CBSE 2024 · 2 marks Write the shape of the magnetic field produced by a current carrying straight conductor. State the rule to find the direction of this field.



Q21. CBSE 2023 · 2 marks Consider a circular loop of thick copper wire lying horizontally on a table. Let the current pass through the loop anticlockwise. Draw the magnetic field lines to show the direction and the pattern of the magnetic field inside and outside the loop.

SHORT ANSWER (13)

Q22. CBSE 2024 · 3 marks A student fixes a sheet of white paper on a drawing board. He places a bar magnet in the centre of it. He sprinkles some iron filings uniformly around the bar magnet. Then he taps the drawing board gently and observes that the iron filings arrange themselves in a particular pattern. (a) Why do iron filings arrange in a particular pattern? (b) What does the crowding of iron filings at the ends of the magnet indicate? (c) What do the lines, along which the iron filings align, represent? (d) If the student places a cardboard horizontally in a current carrying solenoid and repeats the above activity, in what pattern would the iron filings arrange? State the conclusion drawn about the magnetic field based on the observed pattern of the lines.

Q23. CBSE 2024 · 3 marks (a) How is a solenoid prepared? Differentiate between a circular coil and a solenoid. (b) Draw the pattern of the magnetic field lines inside a current carrying solenoid. What does this pattern indicate?

Q24. CBSE 2024 · 3 marks (a) What happens when a bundle of wires of soft iron is placed inside the coil of a solenoid carrying a steady current? Name the device obtained. Why is it called so? (b) Draw the magnetic field lines inside a current carrying solenoid. What does this pattern of magnetic field lines indicate?

Q25. CBSE 2024 · 3 marks (b) (i) A straight conductor is suspended horizontally with its axis perpendicular to the magnetic field of a strong horseshoe magnet. The conductor gets displaced towards the right when a steady current is passed through it. What will happen to the displacement of the conductor if the: (1) Polarity of the horseshoe magnet is reversed? (2) Direction of current in the conductor is reversed? (3) Current through the conductor is increased? (ii) Name and state the rule for determining the direction of force on a current carrying conductor placed in a magnetic field.

Q26. CBSE 2023 · 3 marks What is a solenoid? Draw a diagram to show the pattern of magnetic field around a current carrying solenoid. Name the region of uniform magnetic field.

Q27. CBSE 2023 · 3 marks (a) List two factors on which the magnitude of magnetic field produced by a current carrying straight conductor depends. (b) State the rule which determines the direction of magnetic field in the above case. (c) Draw the pattern of magnetic field lines produced in this case.

Q28. CBSE 2023 · 3 marks (a) (i) A straight cylindrical conductor is suspended with its axis perpendicular to the magnetic field of a horse-shoe magnet. The conductor gets displaced towards left when a current is passed through it. What will happen to the displacement of the conductor if the (1) current through it is increased? (2) horse-shoe magnet is replaced by another stronger horse-shoe magnet? (3) direction of current through it is reversed?

Q29. CBSE 2023 · 3 marks (a) (i) A straight cylindrical conductor is suspended with its axis perpendicular to the magnetic field of a horse-shoe magnet. The conductor gets displaced towards left when a current is passed through it. What will happen to the displacement of the conductor if the (1) current through it is increased? (2) horse-shoe magnet is replaced by another stronger horse-shoe magnet? (3) direction of current through it is reversed? (ii) Name and state the rule for determining the direction of force on a current carrying conductor in a magnetic field.

Q30. CBSE 2022 · 2 marks (a) (i) Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field which is perpendicular to it. (ii) An alpha particle while passing through a magnetic field gets projected towards north. In which direction will an electron project when it passes through the same magnetic field?

Q31. CBSE 2022 · 2 marks Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field which is perpendicular to it. An alpha particle while passing through a magnetic field gets projected towards north. In which direction will an electron project when it passes through the same magnetic field?

Q32. CBSE 2022 · 3 marks What is a Solenoid? Draw the pattern of the magnetic field lines around a current carrying solenoid. Mark on the pattern the region where the magnetic field is uniform.

Q33. CBSE 2022 · 3 marks (a) Draw the pattern of magnetic field lines around a bar magnet. Mark the position of North Pole, South Pole and the places where the magnetic field is strongest. (b) Why do the magnetic field lines not intersect each other?

Q34. CBSE 2022 · 3 marks Draw the pattern of magnetic field lines produced by a current carrying circular loop showing the direction of current in the loop and the direction of the magnetic field lines. State the rule which can be applied to know the direction of magnetic field lines in the above case.

LONG ANSWER (4)

Q35. CBSE 2026 · 5 marks (A) (i) Draw a diagram showing the magnetic field lines around a bar magnet. Write any two characteristics of magnetic field lines. (ii) Write the statement of Right hand thumb rule. (iii) The concentric circles representing the magnetic field around a current carrying straight wire become larger and larger as we move away from the wire. How does magnetic field change on these concentric circles?

Q36. CBSE 2026 · 5 marks (a) (i) What is a solenoid? Draw a diagram showing the magnetic field pattern due to a current-carrying solenoid (inside and outside). (ii) Name any two factors on which the magnitude of the magnetic field due to a current-carrying solenoid depends. (iii) A current-carrying solenoid is stretched and converted into a straight wire carrying current. Draw a diagram showing the magnetic field pattern around it and mark the direction of the magnetic field.



Q37. CBSE 2026 · 5 marks (a)(i) Write the name and statement of the rule used to determine the direction of the: (I) force experienced by a straight current-carrying conductor placed in a uniform magnetic field perpendicular to the field. (II) magnetic field produced around a straight conductor carrying electric current. (ii) Differentiate between the magnetic field due to a bar magnet and the magnetic field due to a current-carrying solenoid.

Q38. CBSE 2026 · 5 marks (b)(i) Write the name and statement of the rule used to determine the direction of the: (I) force experienced by a straight current-carrying conductor placed in a uniform magnetic field perpendicular to the field. (II) magnetic field produced around a straight conductor carrying electric current.

CASE-BASED (3)

CASE STUDY · CBSE 2022

A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt-sprinkler. On tapping the board gently, she observes that the iron filings have arranged themselves in a particular pattern.

Q39. CBSE 2022 · 1 mark (a) Draw a diagram to show this pattern of iron filings.

Q40. CBSE 2022 · 4 marks Draw a diagram to show the pattern of iron filings arranged around a bar magnet.

Q41. CBSE 2022 · 1 mark A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt-sprinkler. On tapping the board gently, she observes that the iron filings have arranged themselves in a particular pattern. (a) Draw a diagram to show this pattern of iron filings.

13 Our Environment

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (30)

Q1. CBSE 2026 · 1 mark Assertion (A): Highest percentage of pesticides is found in tertiary consumers in a food chain. Reason (R): Chemicals / pesticides get accumulated progressively at each trophic level.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q2. CBSE 2026 · 1 mark In terms of various trophic levels of a food chain, which of the following organisms belong to the same level?

- (a) Snake and Grasshopper (b) Grass and tree
- (c) Lizard and elephant (d) Bacteria and grass

Q3. CBSE 2026 · 1 mark Which of the following is a non-biodegradable pollutant?

- (a) Paper (b) DDT (c) Wood (d) Vegetable peel

Q4. CBSE 2026 · 1 mark In an ecosystem, the decomposers perform an important role. Select the option indicating the role of decomposers.

- (a) Convert inorganic materials to simpler forms
- (b) Break down complex organic substances to simple inorganic substances.
- (c) Break down inorganic substances into organic substances.
- (d) Do not act on organic compounds.

Q5. CBSE 2026 · 1 mark The reasons for excessive generation of wastes are : (i) Use and throw policy. (ii) Increased availability of packaged food. (iii) Increased construction wastes. (iv) Non-sorting of dry and wet wastes. Which of the following options are correct ?

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

Q6. CBSE 2026 · 1 mark An ecosystem contains maximum number of:

- (a) Producers (b) Herbivores (c) Carnivores
- (d) Omnivores

Q7. CBSE 2026 · 1 mark Select the incorrect statement from the following:

- (a) Ozone is a molecule formed by three atoms of oxygen.
- (b) Ozone shields earth's surface from harmful infrared radiations.
- (c) CFC's are linked to decline of O₃ layer in our atmosphere.
- (d) Ozone at higher levels is a product of UV radiations acting on oxygen molecule.

Q8. CBSE 2026 · 1 mark Which of the following limits the number of trophic levels in a food chain?

- (a) Availability of water (b) Deficient food supply
- (c) Decrease in energy at higher levels (d) Pollution in air

Q9. CBSE 2026 · 1 mark Assertion (A): There are generally a greater number of individuals at the lower trophic levels of an ecosystem. Reason (R): The greatest number is of the producers.

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



Q10. CBSE 2026 · 1 mark Organisms of a higher trophic level which feed on several types of organisms belonging to a lower trophic level form the:

- (a) Food web (b) Ecosystem (c) Ecological pyramid
(d) Food chain

Q11. CBSE 2026 · 1 mark In accumulation of toxic substances at higher trophic levels of an ecosystem through the food chain, which of the following organisms is affected the most?

- (a) Small aquatic plants (b) Human beings (c) Small fish
(d) Large fish

Q12. CBSE 2026 · 1 mark Assertion (A): Natural replenishment of soil will not take place in absence of microbes. Reason (R): Microbes, comprising of bacteria and fungi, break down dead remains and waste products of organisms, and they go into the soil.

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

Q13. CBSE 2026 · 1 mark Assertion (A): Ozone (O₃) gas at higher levels of atmosphere is a product of UV radiation acting on Oxygen (O₂). Reason (R): The amount of ozone in the atmosphere began to drop sharply in 1980s.

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

Q14. CBSE 2025 · 1 mark Which of the following groups do not constitute a food chain ?

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

Q15. CBSE 2025 · 1 mark The percentage of solar energy which is not converted into food energy by the leaves of green plants in a terrestrial ecosystem is about :

- (a) 1% (b) 10% (c) 90% (d) 99%

Q16. CBSE 2025 · 1 mark Assertion (A) : The amount of ozone in the atmosphere began to drop sharply in the 1980s. Reason (R) : The oxygen atoms combine with molecular oxygen to form ozone.

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

Q17. CBSE 2025 · 1 mark Which of the following groups do not constitute a food chain? (i) Wolf, rabbit, grass, lion (ii) Plankton, man, grasshopper, fish (iii) Hawk, grass, snake, grasshopper, frog (iv) Grass, snake, wolf, tiger

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

Q18. CBSE 2025 · 1 mark Identify from the following a group containing all non-biodegradable substances.

- (a) Leather, Glass, Plastic (b) Cotton, Wood, Nylon
(c) DDT, Polyester, Glass (d) Leather, Silk, Wool

Q19. CBSE 2025 · 1 mark Other than the abiotic components, which of the given biotic components are not required to make an aquarium with small herbivorous fishes a self-sustaining system?

(i) Aquatic plants and aquatic animals (ii) Terrestrial plants and terrestrial animals (iii) Decomposers as bacteria and fungi (iv) Consumers as clown fishes and sea urchins

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

Q20. CBSE 2025 · 1 mark 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.

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

Q21. CBSE 2025 · 1 mark The organism occupying the fourth trophic level in a food chain operating in grassland is:

- (a) Green plants (b) Frog (c) Grasshopper (d) Snake

Q22. CBSE 2025 · 1 mark Which one of the following statements is incorrect about the effect on our environment as a result of our activities?

- (a) Improvement in our lifestyle has resulted in greater amounts of waste
(b) Packaging of materials has resulted in lesser amount of non-biodegradable waste
(c) Use of disposable cups/kulhads results in loss of fertile topsoil
(d) Harmful wastes that are non-biodegradable persist in the environment for a long time

Q23. CBSE 2025 · 1 mark In an ecosystem, 10% of energy available for transfer from one trophic level to the next in a food chain is in the form of:

- (a) heat energy (b) chemical energy (c) mechanical energy
(d) light energy

Q24. CBSE 2024 · 1 mark Some wastes are given below: (i) Garden waste (ii) Ball point pen refills (iii) Empty medicine bottles made of glass (iv) Peels of fruits and vegetables (v) Old cotton shirt. The non-biodegradable wastes among these are:

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



Q25. CBSE 2024 · 1 mark Assertion (A): Oxygen is essential for all aerobic forms of life. Reason (R): Free oxygen atoms combine with molecular oxygen to form ozone.

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

Q26. CBSE 2024 · 1 mark Which one of the following is not a natural ecosystem?

- (a) Pond ecosystem (b) Grassland ecosystem
- (c) Forest ecosystem (d) Cropland ecosystem

Q27. CBSE 2024 · 1 mark Assertion (A): Ozone layer protects the surface of the Earth from harmful UV radiations. Reason (R): Chlorofluorocarbons (CFCs) are responsible for depletion of ozone layer.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q28. CBSE 2024 · 1 mark Assertion (A): Green plants trap only 1% of the energy of sunlight that falls on their leaves. Reason (R): All green plants are the producers in a food chain.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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.

Q29. CBSE 2024 · 1 mark Consider the following groups: i. Cotton, silk, nylon, leather ii. Wool, wood, soap, wheat iii. Banana, cat, rat, tree iv. Soap, detergent, silk, polyester The groups of biodegradable material are:

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

Q30. CBSE 2024 · 1 mark Assertion (A): Greater number of individuals are present in lower trophic levels of all food chains. Reason (R): As the amount of energy decreases at each successive trophic level, larger number of individuals are required at the lower trophic levels to support higher/next trophic levels.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the 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 and Reason (R) is false.
- (d) Assertion (A) is false and Reason (R) is true.

VERY SHORT ANSWER (11)

Q31. CBSE 2026 · 2 marks Explain why food chains generally consist of three or four steps.

Q32. CBSE 2026 · 2 marks What are decomposers? List two important roles they play in the environment.

Q33. CBSE 2025 · 2 marks "Excessive use of chemicals and pesticides in agriculture adversely effect the environment." Justify this statement.

Q34. CBSE 2023 · 2 marks We do not clean ponds or lakes but an aquarium needs to be cleaned regularly. Why?

Q35. CBSE 2023 · 2 marks What is meant by trophic level? On an average, what percentage of energy is transferred to the second trophic level from the first trophic level? Which categories of consumers do the organisms of the second trophic level belong to?

Q36. CBSE 2023 · 2 marks Ozone, although a deadly poison, performs an essential function for the earth and its inhabitants. Explain.

Q37. CBSE 2023 · 2 marks (i) State the essential function performed by ozone at the higher levels of the atmosphere. (ii) Why was there a sharp drop in the amount of ozone in the atmosphere in 1980's.

Q38. CBSE 2023 · 2 marks "Although gardens are created by man but they are considered to be an ecosystem." Justify this statement.

Q39. CBSE 2023 · 2 marks In the following food chain, if 50 J of energy was available to the hawk, how much energy would have been present at the first and third trophic levels? Justify your answer. Grass → Grasshopper → Frog → Snake → Hawk

Q40. CBSE 2023 · 2 marks State two reasons why human-made materials like plastics persist for a long time in the environment.

Q41. CBSE 2023 · 2 marks What is the difference between biodegradable and non-biodegradable substances? List two methods of safe disposal of biodegradable domestic waste.

SHORT ANSWER (22)

Q42. CBSE 2026 · 3 marks (a) Mention any one harmful effect of using plastic bags on the environment. Suggest better alternatives to the usage of plastic bags. (b) Paddy fields require a large amount of water. The pesticides and chemical fertilizers used are washed down into the soil or waterbodies. How do these chemicals reach our bodies? What is this phenomenon known as?

Q43. CBSE 2026 · 2 marks Suggest one best way to dispose of the following wastes: (i) Kitchen waste (ii) Metallic waste (iii) Plastic bottles (iv) Sanitary waste

Q44. CBSE 2026 · 2 marks Suggest two ways of dealing with waste generated at home.

Q45. CBSE 2026 · 2 marks Suggest one precaution to be taken before disposing of the following: (a) Sewage from homes (b) Industrial wastes

Q46. CBSE 2026 · 2 marks (i) Chlorofluorocarbons (CFCs) have been linked to depletion of ozone layer. In 1987, the United Nations Environment Programme (UNEP) succeeded in making an agreement. State this agreement. (ii) What is the role of ozone in our atmosphere?



Q47. CBSE 2026 · 2 marks In the following food chain, 5 J of energy is available to man. Calculate, how much energy was available at the producer level. Why? Plant → Goat → Man

Q48. CBSE 2025 · 3 marks Write the essential function performed by ozone at the higher levels of the atmosphere. How is it formed in the upper atmosphere? Write the name of the group of chemicals mainly responsible for the depletion of ozone layer.

Q49. CBSE 2025 · 3 marks Some harmful chemicals get accumulated in human bodies through the food chain. Name this phenomenon. Explain the reason of maximum concentration of these chemicals found in our bodies.

Q50. CBSE 2025 · 3 marks (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.

Q51. CBSE 2025 · 3 marks (a) Define the term biological magnification. (b) In the given aquatic food chain, which trophic level will have highest effect of biological magnification and why? Phytoplankton → Zooplankton → Fishes → Human

Q52. CBSE 2024 · 3 marks Differentiate between biodegradable and non-biodegradable wastes. We generate a lot of non-biodegradable wastes in our daily life. Write any two harmful effects caused by these wastes if not disposed off properly.

Q53. CBSE 2024 · 3 marks Differentiate between food chain and food web. In a food chain consisting of deer, grass and tiger, if the population of deer decreases, what will happen to the population of organisms belonging to the first and third trophic levels?

Q54. CBSE 2024 · 3 marks (a) What are decomposers? Explain how the decomposers (i) keep the environment clean, and also (ii) replenish the soil nutrients. OR (b) What does a food chain represent? State the reason to justify the statement that the number of trophic levels in any food chain is limited.

Q55. CBSE 2023 · 3 marks Explain how some harmful chemicals enter our bodies through the food chain. Why is the concentration of these harmful chemicals found to be maximum in human beings?

Q56. CBSE 2023 · 3 marks Write one difference between biodegradable and non-biodegradable wastes. List two impacts of each type of the accumulated waste on environment if not disposed off properly.

Q57. CBSE 2022 · 2 marks (a) What is ozone? How is it formed in the upper layers of the atmosphere? How does ozone affect our ecosystem?

Q58. CBSE 2022 · 3 marks (a) Name the group of organisms which form in the first trophic level of all food chains. Why are they called so? (b) Why are the human beings most adversely affected by bio-magnification? (c) State one ill-effect of the absence of decomposers from a natural ecosystem.

Q59. CBSE 2022 · 3 marks Name the group of organisms which form in the first trophic level of all food chains. Why are they called so? Why are the human beings most adversely affected by bio-magnification? State one ill-effect of the absence of decomposers from a natural ecosystem.

Q60. CBSE 2022 · 2 marks Kulhads (disposable cups made of clay) and disposable paper cups both are used as an alternative for disposable plastic cups. Which one of these two can be considered as a better alternative to plastic cups and why?

Q61. CBSE 2022 · 3 marks What are human-made ecosystems? Give an example. Can a human-made ecosystem become a self-sustaining ecosystem? Give reason to justify your answer.

Q62. CBSE 2022 · 3 marks Explain the reason why in a food chain (a) the number of individuals decreases as we move from lower trophic level to higher trophic level, and (b) the flow of energy is unidirectional.

Q63. CBSE 2022 · 3 marks What are decomposers? State the role of decomposers in the natural replenishment of the soil. Why are decomposers not helpful in decomposing the plastic waste?

