CBSE CLASS X

Science (086)

QUESTION PAPER

AI-generated question paper

Code: JK5VHC **Questions: 36** **Maximum Marks: 77** **Generated: 2026-06-25 16:42**

SELECTIONS USED

Subject	Science
Lessons	1 Chemical Reactions and Equations
Level of understanding	Exam-ready
Question selection	CBSE board paper, whole lesson (~80 marks across Sections A-E)
Model	claude-sonnet-4-6

Composition — Difficulty: 15 straightforward · 17 medium · 4 deep | Types: 14 MCQ · 7 Short · 6 Very short · 3 Assertion–reason · 3 Long · 3 Case-based | Sections: A 17Q/17m · B 6Q/12m · C 7Q/21m · D 3Q/15m · E 3Q/12m

Q1. straightforward exam-ready **[1]**

When magnesium ribbon is burned in air, the product formed is:
(A) Magnesium nitride
(B) Magnesium hydroxide
(C) Magnesium oxide
(D) Magnesium carbonate

A Magnesium nitride
B Magnesium hydroxide
C Magnesium oxide
D Magnesium carbonate

◆ **Chemical Reactions and Equations**

Q2. straightforward exam-ready **[1]**

The reaction $CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq) + Heat$ is an example of:
(A) Decomposition reaction
(B) Displacement reaction
(C) Combination reaction
(D) Double displacement reaction

A Decomposition reaction
B Displacement reaction
C Combination reaction
D Double displacement reaction

◆ **Chemical Reactions and Equations**

Q3. straightforward exam-ready **[1]**

When lead nitrate powder is heated, the brown fumes produced are of:
(A) Nitrogen monoxide
(B) Nitrogen dioxide
(C) Lead oxide
(D) Oxygen

A Nitrogen monoxide
B Nitrogen dioxide
C Lead oxide
D Oxygen

◆ **Chemical Reactions and Equations**

Q4. straightforward exam-ready **[1]**

Which of the following is a precipitation reaction?
(A) $CaO + H_2O \rightarrow Ca(OH)_2$
(B) $2Mg + O_2 \rightarrow 2MgO$
(C) $Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$
(D) $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

A $CaO + H_2O \rightarrow Ca(OH)_2$
B $2Mg + O_2 \rightarrow 2MgO$
C $Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$
D $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

◆ **Chemical Reactions and Equations**

Q5. medium exam-ready **[1]**

In the reaction $ZnO + C \rightarrow Zn + CO$, carbon is:
(A) Oxidised
(B) Reduced
(C) Neither oxidised nor reduced
(D) Both oxidised and reduced

A Oxidised
B Reduced
C Neither oxidised nor reduced
D Both oxidised and reduced

◆ **Chemical Reactions and Equations**

Q6. straightforward exam-ready **[1]**

The decomposition of silver chloride in sunlight is used in:
(A) Manufacture of cement
(B) Black and white photography
(C) Whitewashing of walls
(D) Electrolysis of water

A Manufacture of cement
B Black and white photography
C Whitewashing of walls
D Electrolysis of water

◆ **Chemical Reactions and Equations**

Q7. medium exam-ready **[1]**

What is the correct balanced form of the skeletal equation: $Fe + H_2O \rightarrow Fe_3O_4 + H_2$?

(A) $Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

(B) $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

(C) $3Fe + 3H_2O \rightarrow Fe_3O_4 + 3H_2$

(D) $2Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

A $Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

B $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

C $3Fe + 3H_2O \rightarrow Fe_3O_4 + 3H_2$

D $2Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

◆ **Chemical Reactions and Equations**

Q8. straightforward exam-ready **[1]**

Respiration is classified as an exothermic reaction because:

(A) It produces carbon dioxide as a waste product

(B) It requires sunlight to proceed

(C) Energy is released during the breakdown of glucose

(D) It takes in oxygen from the surroundings

A It produces carbon dioxide gas

B It requires sunlight to proceed

C It releases energy in the form of heat

D It absorbs oxygen from the atmosphere

◆ **Chemical Reactions and Equations**

Q9. straightforward exam-ready **[1]**

When iron nails are placed in copper sulphate solution, the blue colour of the solution gradually fades. Which of the following correctly explains this observation?

(A) Iron dissolves in copper sulphate to form a blue precipitate

(B) Copper is displaced by iron, and iron sulphate solution is formed

(C) Copper sulphate undergoes photochemical decomposition

(D) A double displacement reaction produces iron oxide

A Iron dissolves in copper sulphate to form a blue precipitate

B Iron displaces copper from copper sulphate, forming iron sulphate

C Copper sulphate undergoes thermal decomposition

D A double displacement reaction forms iron oxide

◆ **Chemical Reactions and Equations**

Q10. straightforward exam-ready **[1]**

The green coating that forms on copper objects exposed to moist air is an example of:

(A) Rancidity

(B) Reduction

(C) Corrosion

(D) Precipitation

A Rancidity

B Reduction

C Corrosion

D Precipitation

◆ **Chemical Reactions and Equations**

Q11. straightforward exam-ready **[1]**

Chips manufacturers flush bags of chips with nitrogen gas in order to:
(A) Increase the crunchiness of chips
(B) Prevent the chips from getting oxidised
(C) Speed up the decomposition of fats
(D) Replace carbon dioxide which makes chips stale

A Increase the crunchiness of chips
B Prevent the chips from getting oxidised
C Speed up the decomposition of fats
D Replace carbon dioxide which makes chips stale

◆ **Chemical Reactions and Equations**

Q12. medium exam-ready **[1]**

In the reaction: $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(l)$, which substance is reduced?
(A) H_2
(B) H_2O
(C) Cu
(D) CuO

A H_2
B H_2O
C Cu
D CuO

◆ **Chemical Reactions and Equations**

Q13. straightforward exam-ready **[1]**

Which type of reaction is: $2AgCl(s) \rightarrow 2Ag(s) + Cl_2(g)$ when exposed to sunlight?
(A) Thermal decomposition
(B) Electrolytic decomposition
(C) Photochemical decomposition
(D) Combination reaction

A Thermal decomposition
B Electrolytic decomposition
C Photochemical decomposition
D Combination reaction

◆ **Chemical Reactions and Equations**

Q14. straightforward exam-ready **[1]**

In a balanced chemical equation, the notation '(aq)' written alongside a chemical formula indicates that the substance is:
(A) Acidic in nature
(B) Dissolved in water
(C) Present in a gaseous state
(D) An insoluble solid suspended in water

A It shows the substance is acidic
B It indicates the substance is dissolved in water
C It indicates the substance is in a gaseous state
D It shows the substance is aqueous and insoluble

◆ **Chemical Reactions and Equations**

Q15. medium exam-ready **[1]**

Assertion (A): When ferrous sulphate crystals are heated, they first lose water and then decompose to give ferric oxide, sulphur dioxide and sulphur trioxide.
Reason (R): Ferrous sulphate crystals contain water of crystallisation, and heating provides energy to break the compound into simpler substances.
(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.

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.

◆ **Chemical Reactions and Equations**

Q16. medium exam-ready **[1]**

Assertion (A): A chemical equation must be balanced to be used for stoichiometric calculations.
Reason (R): According to the law of conservation of mass, the total mass of reactants must equal the total mass of products in any chemical reaction.
(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.

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.

◆ **Chemical Reactions and Equations**

Q17. medium exam-ready **[1]**

Assertion (A): Rancidity in food can be slowed down by storing food in airtight containers.
Reason (R): Airtight containers reduce the contact of food with oxygen, thereby preventing the oxidation of fats and oils.
(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.

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.

◆ **Chemical Reactions and Equations**

Q18. straightforward exam-ready **[2]**

When copper powder is heated in air, its surface turns black. Write the chemical equation for this reaction and identify what type of reaction it is.

◆ **Chemical Reactions and Equations**

Q19. straightforward exam-ready **[2]**

Why does a magnesium ribbon need to be cleaned with sandpaper before it is burned in air?

◆ **Chemical Reactions and Equations**

Q20. straightforward exam-ready **[2]**

List any two observations that indicate that a chemical reaction has taken place when zinc granules are added to dilute sulphuric acid.

◆ **Chemical Reactions and Equations**

Q21. medium exam-ready **[2]**

What is meant by a skeletal chemical equation? State the law that makes it necessary to balance such an equation before it can be used.

◆ **Chemical Reactions and Equations**

Q22. straightforward exam-ready **[2]**

Calcium hydroxide solution is passed through excess carbon dioxide gas. Name the type of reaction that occurs, write the balanced chemical equation, and state one observable change you would expect.

◆ **Chemical Reactions and Equations**

Q23. deep exam-ready **[2]**

Identify the substance oxidised and the substance reduced in the following reaction:
$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$
Give a reason for your answer.

◆ **Chemical Reactions and Equations**

Q24. medium exam-ready **[3]**

What is corrosion? With reference to the rusting of iron, write the chemical formula of rust and explain the conditions required for this process. State one harmful consequence of rusting.

◆ **Chemical Reactions and Equations**

Q25. medium exam-ready **[3]**

With the help of one example each, distinguish between a displacement reaction and a double displacement reaction. Write balanced chemical equations for both examples.

◆ **Chemical Reactions and Equations**

Q26. medium exam-ready **[3]**

Balance the following chemical equations:
(i) $HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + H_2O$
(ii) $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$
(iii) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + HCl$

◆ **Chemical Reactions and Equations**

Q27. medium exam-ready **[3]**

Thermal decomposition of calcium carbonate is an important industrial reaction. Write the balanced chemical equation for this reaction, name the type of decomposition, and state one industrial use of the product formed.

◆ **Chemical Reactions and Equations**

Q28. medium exam-ready **[3]**

When a solution of lead(II) nitrate is mixed with a solution of potassium iodide, a yellow precipitate is formed.
(i) Name the yellow precipitate formed.
(ii) Write the balanced chemical equation for this reaction with state symbols.
(iii) What type of reaction is this?

◆ **Chemical Reactions and Equations**

Q29. medium exam-ready **[3]**

Translate the following word equations into balanced chemical equations, adding state symbols wherever appropriate:
(i) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.
(ii) Barium chloride reacts with aluminium sulphate to give barium sulphate and aluminium chloride.
(iii) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.

◆ **Chemical Reactions and Equations**

Q30. deep exam-ready **[3]**

Using the reaction $ZnO + C \rightarrow Zn + CO$ as an example, explain why oxidation and reduction are said to occur simultaneously. Identify the substance oxidised and the substance reduced, giving a reason for each.

◆ **Chemical Reactions and Equations**

Q31. medium exam-ready **[5]**

What is a chemical reaction? Describe, with the help of an activity, how the evolution of a gas and a change in colour each serve as evidence that a chemical reaction has occurred. Write balanced chemical equations for the reactions involved.

◆ **Chemical Reactions and Equations**

Q32. medium exam-ready **[5]**

(a) What are exothermic and endothermic reactions? Give one example of each with a balanced chemical equation.
(b) When quick lime is added to water, a large amount of heat is produced. Name the type of reaction that takes place and write its balanced chemical equation.
(c) Why is the decomposition of water by electricity classified as an endothermic reaction? Name the type of decomposition involved.

◆ **Chemical Reactions and Equations**

Q33. deep exam-ready **[5]**

(a) Define oxidation and reduction in terms of gain or loss of oxygen or hydrogen. Give one example of each.
(b) In the refining of silver, copper metal is used to displace silver from silver nitrate solution. Write the balanced chemical equation for this reaction and name the type of reaction.
(c) A shiny brown metal 'X', when heated in air, forms a black oxide. When hydrogen gas is passed over this heated black oxide, the original metal is recovered. Identify the metal 'X', write the equations for both reactions, and identify the substance oxidised and reduced in the second reaction.

◆ **Chemical Reactions and Equations**

Q34. medium exam-ready **[4]**

Read the following and answer the questions that follow:

During whitewashing, calcium oxide (quick lime) is first mixed with water to produce calcium hydroxide (slaked lime). This reaction produces a large amount of heat. The slaked lime is then applied to walls. Over two to three days, calcium hydroxide slowly reacts with the carbon dioxide present in air to form a thin layer of calcium carbonate, which gives the walls a shiny finish. Interestingly, marble has the same chemical formula as this calcium carbonate layer.

(i) Write the balanced chemical equation for the reaction between calcium oxide and water. What type of reaction is it — exothermic or endothermic? (1 mark)
(ii) Write the balanced chemical equation for the reaction between calcium hydroxide and carbon dioxide. Name the type of reaction. (1 mark)
(iii) What is the chemical formula of marble, and how is it related to the product of whitewashing? (1 mark)
(iv) Name the broad category of chemical reaction (from types of reactions) that the first step — formation of slaked lime — belongs to. (1 mark)

◆ **Chemical Reactions and Equations**

Q35. medium exam-ready **[4]**

Read the following and answer the questions that follow:

A science teacher demonstrates an experiment where lead nitrate powder is heated in a boiling tube. Brown fumes are observed coming out of the tube, and a yellow solid remains at the bottom. The teacher then performs another experiment where a white solid, silver chloride, is placed in a china dish and kept in direct sunlight. After some time, the white solid turns grey, indicating the formation of silver metal and a greenish-yellow gas.

(i) Name the brown fumes produced when lead nitrate is heated and write the balanced chemical equation for this reaction. (1 mark)
(ii) Write the balanced chemical equation for the decomposition of silver chloride in sunlight. (1 mark)
(iii) What form of energy is responsible for the decomposition of silver chloride? How does this differ from the energy used to decompose lead nitrate? (1 mark)
(iv) Both reactions above are decomposition reactions. What is the general characteristic of all decomposition reactions in terms of energy? (1 mark)

◆ **Chemical Reactions and Equations**

Q36. deep exam-ready **[4]**

Read the following and answer the questions that follow:

Rajan noticed that a new iron gate installed at his home developed a reddish-brown coating after a few months. His grandmother found that cooking oil stored in an open container had developed an unpleasant smell and taste over time. Rajan's science teacher explained that both changes result from oxidation reactions occurring in everyday life.

(i) Name the reddish-brown coating on the iron gate and state the chemical process responsible for its formation. (1 mark)
(ii) What is the term for the spoilage of fats and oils by oxidation? Name one gas whose contact with the oil causes this change. (1 mark)
(iii) Suggest one method to prevent the iron gate from corroding and one method to slow down the spoilage of the cooking oil. (1 mark)
(iv) State one way in which rusting and rancidity are similar and one way in which they differ as chemical processes. (1 mark)

◆ **Chemical Reactions and Equations**

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