CBSE CLASS X

Science (086)

QUESTION PAPER

AI-generated question paper

Code: MFWVEW **Questions: 33** **Maximum Marks: 97** **Generated: 2026-06-25 17:39**

SELECTIONS USED

Subject	Science
Lessons	2 Acids, Bases and Salts
Level of understanding	Thorough understanding
Question selection	Curated chapter coverage (~5 questions per section + 8 synthesis)
Model	claude-sonnet-4-6

Composition — Difficulty: 2 straightforward · 22 medium · 9 deep | Types: 24 Short · 6 Long · 3 MCQ

Q1. medium · thorough-understanding · § Introduction **[3]**

A student spills some soap solution on a yellow curry stain on a white cloth. The stain turns reddish-brown. When the cloth is later rinsed thoroughly with plenty of water, the stain turns yellow again. What do these two colour changes tell you about the chemical nature of soap and water, and what property of the indicators involved explains why the colour reverses on rinsing?

◆ **Acids, Bases and Salts**

Q2. deep · thorough-understanding · § Introduction **[2]**

Both litmus and turmeric can distinguish between acidic and basic solutions, yet neither is used when the exact strength of acidity or basicity needs to be determined. Identify one key limitation shared by these natural indicators compared to a universal indicator, and explain how this limitation affects their practical usefulness in a chemistry laboratory.

◆ **Acids, Bases and Salts**

Q3. straightforward · thorough-understanding · § 2.1 UNDERSTANDING THE CHEMICAL PROPERTIES OF ACIDS AND BASES **[2]**

When zinc granules are added to dilute sulphuric acid, a gas is evolved. What is this gas, and how would you confirm its identity?

◆ **Acids, Bases and Salts**

Q4. medium · thorough-understanding · § 2.1 UNDERSTANDING THE CHEMICAL PROPERTIES OF ACIDS AND BASES **[2]**

Curd and sour substances should not be stored in brass or copper vessels. Why?

◆ **Acids, Bases and Salts**

Q5. deep · thorough-understanding · § 2.1 UNDERSTANDING THE CHEMICAL PROPERTIES OF ACIDS AND BASES **[5]**

Zinc reacts with dilute sulphuric acid to produce hydrogen gas, and it also reacts with sodium hydroxide solution to produce hydrogen gas. Write the chemical equations for both reactions, identify the other product formed in each case, and use this information to explain what the nature of zinc oxide reveals about metallic oxides in general.

◆ **Acids, Bases and Salts**

Q6. medium | thorough-understanding | § 2.1 UNDERSTANDING THE CHEMICAL PROPERTIES OF ACIDS AND BASES **[2]**

When carbon dioxide gas is bubbled through lime water, a white precipitate forms. However, if excess carbon dioxide continues to be passed, the precipitate disappears. What chemical change causes the precipitate to dissolve?

◆ **Acids, Bases and Salts**

Q7. medium | thorough-understanding | § 2.1 UNDERSTANDING THE CHEMICAL PROPERTIES OF ACIDS AND BASES **[3]**

Copper oxide is a black solid. When it is added to dilute hydrochloric acid with stirring, the black solid dissolves and the solution turns blue-green. Write the chemical equation for this reaction and use the nature of the products to explain how metallic oxides should be classified chemically.

◆ **Acids, Bases and Salts**

Q8. medium | thorough-understanding | § 2.2 WHAT DO ALL ACIDS AND ALL BASES HAVE IN COMMON? **[3]**

Glucose and hydrochloric acid both contain hydrogen, yet only HCl is classified as an acid. When solutions of both are tested for electrical conductivity, what difference in observation would you expect, and what does this reveal about what makes a substance acidic?

◆ **Acids, Bases and Salts**

Q9. medium | thorough-understanding | § 2.2 WHAT DO ALL ACIDS AND ALL BASES HAVE IN COMMON? **[2]**

Why does dry HCl gas not exhibit acidic properties, even though HCl is a well-known acid?

◆ **Acids, Bases and Salts**

Q10. straightforward | thorough-understanding | § 2.2 WHAT DO ALL ACIDS AND ALL BASES HAVE IN COMMON? **[1]**

Which of the following best explains why an aqueous solution of sodium hydroxide conducts electricity?
(A) NaOH molecules carry charge through the solution as intact units.
(B) NaOH dissolves in water to produce Na^+ and OH^- ions, which act as charge carriers.
(C) Water molecules break down into H^+ and OH^- ions when NaOH is added, and it is these water-derived ions alone that conduct electricity.
(D) The high solubility of NaOH increases the density of the solution, enabling charge flow.

A NaOH molecules carry charge through the solution directly.
B NaOH dissolves in water to produce Na^+ and OH^- ions, which carry the electric current.
C NaOH reacts with water to produce H_2 gas, which aids conduction.
D Water itself becomes a good conductor when NaOH is added due to the rise in temperature.

◆ **Acids, Bases and Salts**

Q11. deep | thorough-understanding | § 2.2 WHAT DO ALL ACIDS AND ALL BASES HAVE IN COMMON? **[5]**

A student adds excess sodium hydroxide solution to a fixed volume of hydrochloric acid. (a) Write the ionic equation for the neutralisation reaction that occurs. (b) Explain, using the concept of ions, why the resulting solution is basic rather than neutral. (c) Predict the colour of universal indicator in the original HCl solution and in the final solution after excess NaOH has been added, giving reasons for each.

◆ **Acids, Bases and Salts**

Q12. medium | thorough-understanding | § 2.3 HOW STRONG ARE ACID OR BASE SOLUTIONS? **[3]**

Two solutions have pH values of 3 and 11 respectively. Compare their $H^+(aq)$ ion concentrations and explain what each pH value indicates about the chemical nature of the solutions.

◆ **Acids, Bases and Salts**

Q13. medium | thorough-understanding | § 2.3 HOW STRONG ARE ACID OR BASE SOLUTIONS? **[3]**

Equal concentrations of hydrochloric acid and acetic acid are tested with a universal indicator. Hydrochloric acid shows a lower pH than acetic acid. What does this difference tell you about the two acids, and what is the underlying reason for it?

◆ **Acids, Bases and Salts**

Q14. medium | thorough-understanding | § 2.3 HOW STRONG ARE ACID OR BASE SOLUTIONS? **[2]**

Acid rain flows into a freshwater river. Describe the chemical change it causes in the river water and explain, with reference to pH, why a sustained change of this kind poses a threat to aquatic life.

◆ **Acids, Bases and Salts**

Q15. medium | thorough-understanding | § 2.3 HOW STRONG ARE ACID OR BASE SOLUTIONS? **[3]**

A patient suffering from excess acid production in the stomach is given milk of magnesia. Explain why this treatment works, using your understanding of pH and neutralisation.

◆ **Acids, Bases and Salts**

Q16. deep | thorough-understanding | § 2.3 HOW STRONG ARE ACID OR BASE SOLUTIONS? **[5]**

Tooth enamel is the hardest substance in the human body, yet it gets corroded after eating sugary food. Explain the sequence of events responsible for this, and suggest one way to prevent it.

◆ **Acids, Bases and Salts**

Q17. medium | thorough-understanding | § 2.4 MORE ABOUT SALTS **[3]**

Sodium chloride, potassium nitrate, copper sulphate and sodium acetate are all salts. What determines whether a salt solution is acidic, basic or neutral?

◆ **Acids, Bases and Salts**

Q18. medium | thorough-understanding | § 2.4 MORE ABOUT SALTS **[3]**

In the chlor-alkali process, electrolysis of brine produces products at both electrodes. Name the products released at each electrode, give their uses, and explain why the process is called 'chlor-alkali'.

◆ **Acids, Bases and Salts**

Q19. medium | thorough-understanding | § 2.4 MORE ABOUT SALTS **[3]**

Bleaching powder is produced by passing chlorine gas over dry slaked lime. Would the same reaction work with wet slaked lime or with calcium oxide? Justify your answer and write the balanced chemical equation for the preparation of bleaching powder.

◆ **Acids, Bases and Salts**

Q20. deep | thorough-understanding | § 2.4 MORE ABOUT SALTS **[3]**

A baker accidentally uses washing soda instead of baking soda while making a cake. The cake turns out flat and dense. Explain, in terms of the chemistry of both compounds, why this happened.

◆ **Acids, Bases and Salts**

Q21. medium | thorough-understanding | § 2.4 MORE ABOUT SALTS **[1]**

Which of the following best explains why Plaster of Paris must be stored in a moisture-proof container?
(A) Moisture causes Plaster of Paris to decompose into calcium oxide and water.
(B) Moisture reacts with Plaster of Paris to convert it back to gypsum, making it hard and unusable.
(C) Moisture dissolves Plaster of Paris, washing it away.
(D) Moisture causes Plaster of Paris to lose its water of crystallisation.

A Moisture causes Plaster of Paris to decompose into calcium oxide and water.
B Moisture reacts with Plaster of Paris to convert it back to gypsum, making it hard and unusable.
C Moisture dissolves Plaster of Paris, washing it away.
D Moisture causes Plaster of Paris to lose its water of crystallisation.

◆ **Acids, Bases and Salts**

Q22. medium | thorough-understanding | § 2.4 MORE ABOUT SALTS **[2]**

Blue copper sulphate crystals turn white when heated strongly, but regain their blue colour when a few drops of water are added to the white powder. What does this experiment reveal about water of crystallisation? Write the chemical equations for both the forward and reverse changes observed.

◆ **Acids, Bases and Salts**

Q23. deep | thorough-understanding | § 2.4 MORE ABOUT SALTS **[5]**

Sodium hydrogencarbonate (baking soda) is used both in fire extinguishers and as an antacid. Explain, with relevant equations, how the same compound serves two such different purposes.

◆ **Acids, Bases and Salts**

Q24. medium | thorough-understanding | § 2.4 MORE ABOUT SALTS **[3]**

Starting from common salt (NaCl), outline the sequence of steps by which washing soda ($Na_2CO_3 \cdot 10H_2O$) is obtained industrially. Why is the recrystallisation step essential, and what role does the water of crystallisation play in the properties of washing soda?

◆ **Acids, Bases and Salts**

Q25. medium | thorough-understanding | § Group Activity **[3]**

[short_answer] In a soda-acid fire extinguisher, dilute sulphuric acid reacts with sodium hydrogencarbonate solution. (a) Write the balanced chemical equation for this reaction. (b) Name the gas produced and explain two properties of this gas that make it effective at extinguishing a fire.

◆ **Acids, Bases and Salts**

Q26. deep | thorough-understanding | § (whole-chapter synthesis) **[3]**

Zinc reacts with both dilute sulphuric acid and sodium hydroxide solution to produce hydrogen gas, yet these two reactions differ in the type of salt formed. Compare the two reactions — what does this tell you about the nature of zinc, and why does the salt formed with NaOH contain an oxyanion while the one formed with H_2SO_4 does not?

◆ **Acids, Bases and Salts**

Q27. medium | thorough-understanding | § (whole-chapter synthesis) **[3]**

Dry HCl gas does not change the colour of dry litmus paper, but when HCl dissolves in water it turns blue litmus red. Using the ionic picture of acids, explain why water is essential for HCl to exhibit acidic behaviour. In light of this, why is it incorrect to say that HCl itself is an acid, rather than its aqueous solution?

◆ **Acids, Bases and Salts**

Q28. deep | thorough-understanding | § (whole-chapter synthesis) **[5]**

A farmer notices that his crops are growing poorly. He tests the soil and finds its pH is around 4. He treats the field with slaked lime.
(i) Why does a low soil pH harm crops?
(ii) What chemical reaction takes place when slaked lime is added to the acidic soil?
(iii) After treatment, the soil pH rises to 7. Has a salt been formed? Justify.

◆ Acids, Bases and Salts

Q29. medium | thorough-understanding | § (whole-chapter synthesis) **[1]**

Assertion (A): When excess carbon dioxide is bubbled through lime water that has already turned milky, the white precipitate dissolves and the solution becomes clear again.
Reason (R): Calcium carbonate reacts with water and carbon dioxide to form calcium hydrogencarbonate, which is soluble in water.

Choose the correct option:
(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.

◆ Acids, Bases and Salts

Q30. medium | thorough-understanding | § (whole-chapter synthesis) **[5]**

Baking soda and washing soda are both manufactured starting from sodium chloride, yet they serve very different purposes. (i) Trace the sequence of industrial/chemical steps (Solvay process and beyond) that connect NaCl to each of these two products. (ii) For each product, explain one specific use that depends directly on its chemical nature — acidic, basic, or otherwise. (iii) How are baking soda and washing soda chemically related to each other?

◆ Acids, Bases and Salts

Q31. medium | thorough-understanding | § (whole-chapter synthesis) **[3]**

Two students dissolve equal moles of HCl and CH_3COOH separately in water and measure the pH. Student A finds that the HCl solution has a lower pH than the CH_3COOH solution of equal concentration. Student B argues both should have the same pH since equal moles of acid were used. Who is correct, and what concept explains the difference?

◆ Acids, Bases and Salts

Q32. deep | thorough-understanding | § (whole-chapter synthesis) **[3]**

Tooth enamel begins to corrode when the pH of the mouth falls below 5.5 after a meal. (i) Identify the substance responsible for this drop in pH and explain its origin. (ii) How does the chemical nature of toothpaste counteract this effect? (iii) Why is it advisable to rinse your mouth with water immediately after consuming acidic foods or drinks, even before brushing?

◆ Acids, Bases and Salts

Q33. medium | thorough-understanding | § (whole-chapter synthesis) **[2]**

Copper sulphate crystals are blue but turn white on strong heating, and white Plaster of Paris sets hard when mixed with water. What common chemical principle underlies both these changes, and in which direction does each process go with respect to water of crystallisation?

◆ **Acids, Bases and Salts**

Available for free from:
https://cbsegrade10studyguide.com
https://github.com/orgs/cbse-free-resources/repositories