CBSE CLASS X

Science (086)

QUESTION PAPER

AI-generated question paper

Code: CKTQ4B	Questions: 35	Maximum Marks: 76	Generated: 2026-06-25 17:38

SELECTIONS USED

Subject	Science
Lessons	2 Acids, Bases and Salts
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: 12 straightforward · 18 medium · 5 deep | Types: 12 MCQ · 7 Short · 6 Very short · 4 Assertion–reason · 3 Long · 3 Case-based | Sections: A 16Q/16m · B 6Q/12m · C 7Q/21m · D 3Q/15m · E 3Q/12m

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

Which of the following substances will turn blue litmus red?
(A) Sodium hydroxide solution
(B) Baking soda solution
(C) Lemon juice
(D) Potassium hydroxide solution

A Sodium hydroxide solution
B Baking soda solution
C Lemon juice
D Potassium hydroxide solution

◆ Acids, Bases and Salts

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

When zinc granules are added to dilute sulphuric acid, the gas evolved is:
(A) Oxygen
(B) Sulphur dioxide
(C) Hydrogen
(D) Carbon dioxide

A Oxygen
B Sulphur dioxide
C Hydrogen
D Carbon dioxide

◆ Acids, Bases and Salts

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

Dry HCl gas does not change the colour of dry litmus paper because:
(A) HCl is a weak acid
(B) HCl does not ionise in the absence of water
(C) Litmus reacts only with bases
(D) HCl gas has no hydrogen in it

A HCl is a weak acid
B HCl does not ionise in the absence of water
C Litmus reacts only with bases
D HCl gas has no hydrogen in it

◆ **Acids, Bases and Salts**

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

The process of electrolysis of brine produces three useful products. Which of the following is NOT one of them?
(A) Sodium hydroxide
(B) Chlorine
(C) Hydrogen
(D) Oxygen

A Sodium hydroxide
B Chlorine
C Hydrogen
D Oxygen

◆ **Acids, Bases and Salts**

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

Tooth enamel begins to corrode when the pH of the mouth falls below:
(A) 7.0
(B) 6.0
(C) 5.5
(D) 4.5

A 7.0
B 6.0
C 5.5
D 4.5

◆ **Acids, Bases and Salts**

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

Which of the following is the correct chemical formula of Plaster of Paris?
(A) $CaSO_4$
(B) $CaSO_4.\frac{1}{2}H_2O$
(C) $CaSO_4.H_2O$
(D) $CaSO_4.2H_2O$

A $CaSO_4$
B $CaSO_4.\frac{1}{2}H_2O$
C $CaSO_4.H_2O$
D $CaSO_4.2H_2O$

◆ **Acids, Bases and Salts**

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

When carbon dioxide gas is passed in excess through lime water, the white precipitate of calcium carbonate:
(A) Remains unchanged
(B) Turns yellow
(C) Dissolves to form a soluble compound
(D) Changes to calcium oxide

A Remains unchanged
B Turns yellow
C Dissolves to form a soluble compound
D Changes to calcium oxide

◆ **Acids, Bases and Salts**

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

Salts of a strong acid and a weak base have a pH:
(A) Equal to 7
(B) Greater than 7
(C) Less than 7
(D) Equal to 14

A Equal to 7
B Greater than 7
C Less than 7
D Equal to 14

◆ **Acids, Bases and Salts**

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

Baking powder used in cooking is a mixture of baking soda and:
(A) Washing soda
(B) A mild edible acid such as tartaric acid
(C) Common salt
(D) Slaked lime

A Washing soda
B A mild edible acid such as tartaric acid
C Common salt
D Slaked lime

◆ **Acids, Bases and Salts**

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

Among the following, which is an olfactory indicator?
(A) Litmus
(B) Phenolphthalein
(C) Onion
(D) Methyl orange

A Litmus
B Phenolphthalein
C Onion
D Methyl orange

◆ **Acids, Bases and Salts**

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

A base that is soluble in water is specifically called:
(A) A salt
(B) An acid
(C) An alkali
(D) An indicator

A A salt
B An acid
C An alkali
D An indicator

◆ **Acids, Bases and Salts**

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

Reaction of zinc with sodium hydroxide solution produces hydrogen gas and:
(A) Zinc chloride
(B) Zinc oxide
(C) Sodium zincate
(D) Zinc sulphate

A Zinc chloride
B Zinc oxide
C Sodium zincate
D Zinc sulphate

◆ **Acids, Bases and Salts**

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

Assertion (A): When an aqueous solution of an acid is diluted, its pH value increases.
Reason (R): Dilution decreases the concentration of H_3O^+ ions per unit volume of the solution.

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**

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

Assertion (A): Metallic oxides are called basic oxides.
Reason (R): Metallic oxides react with acids to form a salt and water, similar to the reaction of a base with an acid.

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**

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

Assertion (A): Plaster of Paris should always be stored in a moisture-proof container.
Reason (R): Plaster of Paris reacts with water to form gypsum ($CaSO_4.2H_2O$), losing its ability to set.

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**

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

Assertion (A): Non-metallic oxides are acidic in nature.
Reason (R): Carbon dioxide reacts with sodium hydroxide (a base) to produce a salt and water, behaving like an acid.

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**

Q17. medium exam-ready **[2]**

Glucose and alcohol both contain hydrogen atoms but are not considered acids. What experimental evidence would you use to justify this, and what does it tell us about the nature of H^+ ions in acids?

◆ **Acids, Bases and Salts**

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

A farmer finds that the crop yield in his field is poor and suspects soil acidity is the problem. Name two substances he could add to the soil to improve it and explain the chemical basis of their action.

◆ **Acids, Bases and Salts**

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

State what is meant by 'water of crystallisation'. Give one example of a salt that contains water of crystallisation, stating its chemical formula, and describe what you would observe on strongly heating a few crystals of this salt.

◆ **Acids, Bases and Salts**

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

A bee sting causes an acidic reaction on the skin. What type of substance should be applied to relieve the pain, and why? Name the substance traditionally found in the leaves of the dock plant that serves this purpose.

◆ **Acids, Bases and Salts**

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

What is acid rain? State the pH value below which rain is classified as acid rain and explain one harmful effect it has on aquatic ecosystems.

◆ **Acids, Bases and Salts**

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

Sodium hydrogencarbonate ($NaHCO_3$) is used as an antacid and also as an ingredient in baking powder. Write the equation for its decomposition on heating and explain why it makes bread soft and spongy.

◆ **Acids, Bases and Salts**

Q23. medium exam-ready **[3]**

Equal concentrations of hydrochloric acid (HCl) and acetic acid (CH_3COOH) are taken. Which of the two is a stronger acid? Explain your answer and state how their pH values would compare at the same concentration.

◆ **Acids, Bases and Salts**

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

Describe how bleaching powder is manufactured from chlorine. Write the balanced chemical equation for this reaction and list any two uses of bleaching powder.

◆ **Acids, Bases and Salts**

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

What happens when sodium carbonate (Na_2CO_3) reacts with dilute hydrochloric acid? Write the balanced equation and describe a test you would perform to identify the gas produced.

◆ **Acids, Bases and Salts**

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

Our stomach produces hydrochloric acid to help in digestion. (a) What happens during indigestion? (b) What type of substances are used as antacids? (c) Why is magnesium hydroxide preferred over sodium hydroxide as an antacid?

◆ **Acids, Bases and Salts**

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

Write the balanced chemical equation for the chlor-alkali process. Name the electrode at which (i) chlorine is produced and (ii) hydrogen is produced. State one industrial use of the sodium hydroxide produced.

◆ **Acids, Bases and Salts**

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

Fresh milk has a pH of about 6. As the milk turns to curd, does the pH increase or decrease? Explain why. A milkman adds a small amount of baking soda to fresh milk — how does this affect the time taken for the milk to set into curd and why?

◆ **Acids, Bases and Salts**

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

Two solutions X and Y are tested with universal indicator. Solution X shows a pH of 2 and solution Y shows a pH of 12. (a) Identify the nature of each solution. (b) Which solution has a higher concentration of OH^- ions? (c) If equal volumes of X and Y are mixed, predict whether the resulting solution will be acidic, basic or neutral, giving a reason.

◆ **Acids, Bases and Salts**

Q30. deep exam-ready **[5]**

(a) With a suitable example, explain what is meant by a neutralisation reaction. Write the ionic equation that represents all such reactions between a strong acid and a strong base.
(b) A metal oxide X reacts with dilute sulphuric acid to form a blue-green solution. Identify X and write the balanced chemical equation for the reaction. What class of oxide does X belong to, and why?
(c) Write the balanced chemical equation for the reaction of zinc with sodium hydroxide. How does this reaction differ from the general reaction of a metal with an acid?

◆ **Acids, Bases and Salts**

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

(a) What is the pH scale? Explain how pH is related to the concentration of $H^+(aq)$ ions in a solution. How does the pH of a solution change when it is diluted?
(b) Explain why our body is sensitive to pH changes. Give two specific examples from everyday life where pH plays a critical role in living systems or health.
(c) A universal indicator turns orange (pH ≈ 4) in one solution and violet (pH ≈ 11) in another. Compare the concentrations of H^+ and OH^- ions in these two solutions.

◆ **Acids, Bases and Salts**

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

(a) Common salt (sodium chloride) is described as a raw material for several important chemicals. Starting from brine, describe the preparation of sodium hydroxide, naming the process and writing the balanced equation.
(b) How is washing soda prepared from sodium carbonate? Write the equation. State two industrial or domestic uses of washing soda.
(c) Gypsum on heating at 373 K gives Plaster of Paris. Write the balanced equation. When Plaster of Paris is mixed with water, it sets into a hard mass — explain what happens chemically and state one practical use of this property.

◆ **Acids, Bases and Salts**

Q33. medium exam-ready **[4]**

Read the following and answer the questions:

Rahul and Priya are performing an experiment in the school laboratory. They dissolve different substances — hydrochloric acid, sulphuric acid, glucose solution, and alcohol — in water and connect each solution to a simple electrical circuit containing a bulb. They observe that the bulb glows brightly for hydrochloric acid and sulphuric acid solutions, but does not glow at all for glucose and alcohol solutions. Their teacher then explains that when an acid is dissolved in water, something special happens at the ionic level that allows electricity to flow.

(i) Why does the bulb glow when HCl or H_2SO_4 solution is used but not with glucose or alcohol? (1 mark)
(ii) Write the equation showing what happens when HCl dissolves in water. What is the ion formed called? (1 mark)
(iii) NaOH solution conducts electricity but NaOH in its solid state does not. Explain why, and state what type of ion is responsible for the basic nature of NaOH solution. (1 mark)
(iv) Both glucose and alcohol contain hydrogen atoms. Why are they not classified as acids? (1 mark)

◆ **Acids, Bases and Salts**

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

Read the following and answer the questions:

During a science fair, students set up a display about the importance of pH in daily life. One student brings a chart showing: tooth enamel corroding below pH 5.5; the human body maintaining a pH of 7.0–7.8 for metabolic activity; acid rain having a pH below 5.6; and a stomach producing HCl to aid digestion. Another student points out that toothpastes are basic, and explains why we use them. A third student adds that farmers sometimes treat acidic soil with quicklime.

(i) Why does tooth decay begin only when pH of the mouth drops below 5.5 and not before? (1 mark)
(ii) How do toothpastes help in preventing tooth decay? (1 mark)
(iii) What is the source of the acid that lowers pH in the mouth after eating? (1 mark)
(iv) Write a balanced chemical equation showing how quicklime (CaO) could help neutralise excess acid (HCl) in soil. (1 mark)

◆ **Acids, Bases and Salts**

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

Read the following and answer the questions:

A chemistry teacher demonstrates two reactions to the class. In the first, she adds dilute HCl to a test tube containing sodium carbonate powder and passes the gas produced through lime water — the lime water first turns milky. She then passes excess gas and the milkiness disappears. In the second demonstration, she places copper oxide powder into a beaker and slowly adds dilute HCl with stirring, and the contents gradually turn blue-green.

(i) Name the gas produced in the first reaction and write the balanced equation for its reaction with lime water to produce the white precipitate. (1 mark)
(ii) Why does the milky white precipitate disappear when excess gas is passed? Write the equation for this reaction. (1 mark)
(iii) In the second reaction, what causes the blue-green colour of the solution? Write the balanced equation for the reaction. (1 mark)
(iv) Based on the second reaction, explain why copper oxide is classified as a basic oxide. (1 mark)

◆ Acids, Bases and Salts

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