

CLASS 10

SCIENCE

EXTRA QUESTIONS

Extra Questions: Class 10 Science Chapter 2 Acids, Bases and Salts

These go beyond the standard exercise into genuine HOTS (Higher Order Thinking Skills) territory -- distinguishing tests, real-world identification questions, and process-based reasoning. See the standard-level Solutions first if you haven't already.

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Extra Questions (HOTS Level): Acids, Bases and Salts (Class 10 Science Chapter 2)

How These Differ From the Standard Exercise

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Extra Questions (HOTS Level): Acids, Bases and Salts (Class 10 Science Chapter 2)

Q1. Write the ionic equation for the neutralisation reaction between HCl and NaOH, and explain what actually happens at the ion level.

Full equation: $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$.

Ionic form: $\text{H}^+(\text{aq}) + \text{Cl}^-(\text{aq}) + \text{Na}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{Na}^+(\text{aq}) + \text{Cl}^-(\text{aq}) + \text{H}_2\text{O}(\text{l})$.

Na^+ and Cl^- are spectator ions (unchanged on both sides), so the actual reaction is simply: **$\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$** . Neutralisation is fundamentally the combination of H^+ ions from the acid with OH^- ions from the base to form neutral water.

Q2. Give two chemical tests to distinguish between baking soda (NaHCO_3) and washing soda ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$), given that both react with dilute HCl to release CO_2 gas.

Test 1 (heating): Heating baking soda decomposes it: $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2\uparrow$, releasing CO_2 and water vapour. Washing soda does not decompose this way on ordinary heating (it only loses its water of crystallisation).

Test 2 (litmus/pH): A solution of washing soda is more strongly basic (turns red litmus blue more intensely) than a baking soda solution, which is only mildly basic.

Q3. Assertion (A): Dry HCl gas does not turn dry blue litmus paper red. Reason (R): Acids show acidic behaviour only in the presence of water. Which is correct?

Both the Assertion and Reason are individually correct: dry HCl gas genuinely does not affect dry litmus. This is because HCl only ionises to release H^+ ions when dissolved in water — without water, there's no ionisation and hence no acidic behaviour.

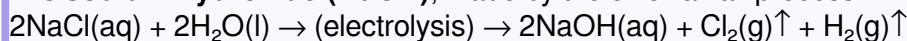
Both A and R are true, and R is the correct explanation of A.

Q4. Plaster of Paris is made by heating gypsum at around 373 K, not at a much higher temperature. Explain why the temperature matters.

Heating gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) at around 373 K removes three-quarters of its water of crystallisation to give Plaster of Paris ($\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$), which retains the ability to re-absorb water and set hard — this is exactly what makes it useful. If heated to a much higher temperature, all the water of crystallisation is lost, forming “dead burnt plaster” (anhydrous CaSO_4), which has lost its setting property and is no longer useful for casts or moulds.

Q5. A compound X of sodium is used in the manufacture of soap and is obtained by the electrolysis of a concentrated NaCl solution (brine). Identify X, write the reaction, and name two other uses of X.

X is **sodium hydroxide (NaOH)**, made by the chlor-alkali process:



Other uses of NaOH : in the manufacture of paper and detergents, and for degreasing metals before electroplating.

Q6. Why should sour/acidic foods like curd or pickles not be stored in brass or copper vessels?

Acids present in sour foods react with the metal of brass/copper vessels, forming toxic metal salts (metal + acid reactions release soluble metal compounds). Consuming food contaminated this way can cause metal poisoning, which is why such foods are stored in glass, ceramic, or stainless-steel containers instead.

How These Differ From the Standard Exercise

The main exercise tests whether you know the core reactions and pH concepts. These HOTS questions test whether you can apply that knowledge to distinguish similar-looking substances, explain industrial processes, and reason about real household situations — exactly the style CBSE uses for its higher-mark (3–5 mark) reasoning and case-based questions.

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