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Acids & Bases Practice Paper

Sec 3 & 4 · O-Level Chemistry

50 marks · Sections A, B and C · model answers in examiner wording included

How to use this paper. Sit it in 55 minutes without notes. Then mark it against the model answers at the back — the wording there is the wording that earns the mark, so compare your sentences word by word, not just your final answers.

Questions marked ★ **pure-only** (A4, B5, C1) are for Pure Chemistry students. Combined Science students: skip those three and mark yourself out of 39.

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Instructions: Section A — circle the best answer. Sections B & C — answer in the spaces provided. Use exam-correct language throughout: write chemical equations with state symbols; use $\text{H}^+(\text{aq})$ for acids and $\text{OH}^-(\text{aq})$ for alkalis; write $\text{NH}_3(\text{aq})$ for aqueous ammonia; use arrow $\rightarrow$ for strong acid ionisation and equilibrium arrow $\rightleftharpoons$ for weak acid ionisation. (Relative atomic masses, where needed, are provided in each question.)

SECTION A — Multiple Choice (8 marks)

A1 Which statement correctly defines an alkali? [1]

- A. A substance that dissociates in water to produce $\text{H}^+(\text{aq})$ ions
- B. Any substance that neutralises an acid to produce a salt and water
- C. A soluble base that dissociates in water to produce $\text{OH}^-(\text{aq})$ ions
- D. A substance that turns Universal Indicator orange

A2 A solution has a pH of 11. Which row correctly describes the solution? [1]

Relative ion concentrations	Colour with Universal Indicator	
A.	$[\text{H}^+] > [\text{OH}^-]$	Red
B.	$[\text{H}^+] = [\text{OH}^-]$	Green
C.	$[\text{OH}^-] > [\text{H}^+]$	Blue
D.	$[\text{OH}^-] > [\text{H}^+]$	Yellow

Which row is correct?

- A. Row A
- B. Row B
- C. Row C
- D. Row D

A3 Oxide P dissolves in aqueous sodium hydroxide but does not react with dilute hydrochloric acid.

Which type of oxide is P? [1]

- A. Basic
- B. Neutral
- C. Acidic
- D. Amphoteric

A4 Solution J and Solution K each have a concentration of 0.10 mol/dm^3 . Solution J has a pH of 1 and Solution K has a pH of 3. Which statement correctly explains the difference in pH? [1]

- A. J is more concentrated than K, so it produces more H^+ ions per dm^3 .
- B. J is a strong acid that fully ionises in water; K is a weak acid that only partially ionises in water.
- C. J is a weak acid and K is a strong acid; weak acids have more H^+ ions.
- D. J reacts faster with water than K, producing more H^+ ions per unit time.

A5 Dry hydrogen chloride (HCl) gas is passed over a piece of dry blue litmus paper. Which observation is correct, and why? [1]

- A. The litmus turns red immediately, because HCl is an acid that releases H^+ ions.
- B. The litmus turns white, because dry HCl gas bleaches the paper.
- C. The litmus does not change colour, because dry HCl exists as covalent molecules and does not produce $\text{H}^+(\text{aq})$ ions without water.
- D. The litmus turns purple, because dry HCl is neutral in the absence of water.

A6 Excess copper(II) oxide (CuO) is added to dilute sulfuric acid in a beaker. After the acid is fully neutralised, excess solid CuO remains in the beaker. Which statement about the final pH is correct? [1]

- A. The pH is below 7, because CuO is a metal oxide and makes the solution acidic.
- B. The pH is equal to 7, because CuO is insoluble and cannot release OH^- ions into solution.
- C. The pH is above 7, approaching 14, because excess base always makes the solution strongly alkaline.
- D. The pH cannot be determined without knowing the exact mass of CuO added.

A7 Which reaction does NOT show a characteristic acidic property? [1]

- A. $\text{Mg(s)} + 2\text{HCl(aq)} \rightarrow \text{MgCl}_2(\text{aq}) + \text{H}_2(\text{g})$
- B. $\text{CuO(s)} + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{CuSO}_4(\text{aq}) + \text{H}_2\text{O(l)}$
- C. $\text{CaCO}_3(\text{s}) + 2\text{HNO}_3(\text{aq}) \rightarrow \text{Ca}(\text{NO}_3)_2(\text{aq}) + \text{H}_2\text{O(l)} + \text{CO}_2(\text{g})$
- D. $\text{AgNO}_3(\text{aq}) + \text{NaCl(aq)} \rightarrow \text{AgCl(s)} + \text{NaNO}_3(\text{aq})$

A8 A student titrates aqueous sodium hydroxide (strong alkali) with ethanoic acid (weak acid, CH_3COOH). At the end-point the solution is slightly alkaline (pH slightly above 7). Which indicator is most suitable? [1]

- A. Methyl orange (changes colour near pH 4: red in acid, yellow in alkali)
- B. Litmus (changes near pH 7: red in acid, blue in alkali)
- C. Universal Indicator (gives a gradual colour change across pH 0-14)
- D. Thymolphthalein (changes near pH 10: colourless in acid, blue in alkali)

SECTION B — Structured Questions (32 marks)

B1 A student performs a titration to determine the concentration of a sodium hydroxide solution. 25.0 cm^3 of NaOH(aq) of unknown concentration is pipetted into a conical flask. Hydrochloric acid of concentration 0.200 mol/dm^3 is added from a burette. The mean volume of acid used is 22.5 cm^3 .

(a) Write the chemical equation, with state symbols, for this reaction. [1]

(b) Write the ionic equation for this neutralisation. [1]

(c) Calculate the number of moles of HCl used in the titration. Show your working. (Use $n = c \times V(\text{dm}^3)$.) [1]

(d) Deduce the number of moles of NaOH that reacted. [1]

(e) Calculate the concentration of the NaOH solution in mol/dm³. Show your working. [2]

(f) The student mixes 10.0 cm³ of 0.200 mol/dm³ HCl(aq) with 10.0 cm³ of 0.180 mol/dm³ NaOH(aq). Show by calculation which reactant is in excess, and state whether the pH of the resulting mixture is above 7, equal to 7, or below 7. [2]

B2 A student adds excess zinc to dilute sulfuric acid in a test tube.

(a) Write the balanced chemical equation, with state symbols, for this reaction. [1]

(b) Describe TWO observations the student would make during this reaction. [2]

(c) The student then adds lead(II) carbonate (PbCO₃) to a fresh sample of dilute sulfuric acid. Effervescence is observed initially, but soon stops even though solid PbCO₃ and dilute H₂SO₄ both remain.

(i) Write the balanced chemical equation, with state symbols, for this reaction. [1]

(ii) Explain why effervescence stops before all the reactants are used up. [2]

(d) State the name of the gas produced in part (a) and describe how you would test for this gas. [1]

B3 The table below shows the results of testing four unknown oxides D, E, F and G with dilute hydrochloric acid and with aqueous sodium hydroxide.

Oxide | Reacts with HCl(aq)? | Reacts with NaOH(aq)?

D	Yes	No
E	No	Yes
F	Yes	Yes
G	No	No

(a) Classify each oxide as acidic, basic, amphoteric or neutral. Give one mark for each correct classification. [4]

(b) Oxide F is one of the three amphoteric oxides you should know. Name one oxide that could be oxide F and write the balanced chemical equation, with state symbols, for its reaction with dilute hydrochloric acid. [2]

B4 Calcium oxide (CaO) is a liming agent used to treat acidic soil.

(a) State the name and formula of ONE other substance that can also be used as a liming agent to treat acidic soil. [1]

(b) Write the chemical equation, with state symbols, for the reaction of calcium oxide with water. [1]

(c) Write the ionic equation to show how the liming agent neutralises excess H^+ ions in the soil. [1]

(d) A farmer applies 112 g of calcium oxide to his field. Calculate the maximum mass of calcium hydroxide that could be produced. (A_r : Ca = 40, O = 16, H = 1.) Show all working. [3]

(i) Calculate the molar mass of CaO and the number of moles of CaO used.

(ii) Calculate the maximum mass of $\text{Ca}(\text{OH})_2$ produced.

B5 Solution X is 0.10 mol/dm^3 hydrochloric acid (HCl). Solution Y is 0.10 mol/dm^3 ethanoic acid (CH_3COOH). Solution X has a pH of 1; Solution Y has a pH of 3. (★ pure-only)

(a) Explain why Solution X has a lower pH than Solution Y, even though both have the same concentration. Your answer must refer to the extent of ionisation. [2]

(b) Write an equation, using the correct type of arrow, to show the ionisation of Solution Y (ethanoic acid) in water. [1]

(c) A student adds excess zinc to separate 25 cm^3 samples of X and Y, both at 0.10 mol/dm^3 . She finds that X reacts more vigorously at the start, but the total volume of hydrogen gas collected at the end is the same for both. Explain both observations. [2]

SECTION C — Application (10 marks)

C1 A student titrates 25.0 cm^3 of 0.100 mol/dm^3 phosphoric acid (H_3PO_4) with 0.150 mol/dm^3 sodium hydroxide solution. The pH curve shows three sharp vertical rises, at 16.7 cm^3 , 33.3 cm^3 and 50.0 cm^3 of NaOH added. (★ pure-only)

(a) State the basicity of H_3PO_4 and explain how you deduced this from the pH curve. [2]

(b) Write the chemical equation, with state symbols, for the reaction at the FIRST end-point (16.7 cm^3 of NaOH added). [1]

(c) Calculate the number of moles of H_3PO_4 used. Then verify by calculation that 16.7 cm^3 of 0.150

mol/dm³ NaOH is correct for the first end-point. Show all working. [2]

(d) The student wishes to collect only the product formed at the first end-point. She is choosing between methyl orange (changes near pH 4) and thymolphthalein (changes near pH 10). State which indicator she should use and explain your choice. [1]

C2 Sulfur dioxide (SO₂) is released when coal is burned. When SO₂ dissolves in rainwater, it forms sulfurous acid (H₂SO₃, a weak dibasic acid). This acidic rainwater then falls on agricultural soil.

(a) Classify SO₂ as acidic, basic, amphoteric or neutral. Justify your classification by describing its reaction with aqueous sodium hydroxide and writing a balanced chemical equation for that reaction, with state symbols. [2]

(b) A farmer applies calcium hydroxide to the field to counteract the acid. Write the ionic equation that represents the neutralisation of excess H⁺ ions in the soil. [1]

(c) The farmer asks whether aluminium oxide (Al₂O₃) could also neutralise the acidic soil. State and explain whether Al₂O₃ would be effective. Name the category of oxide that Al₂O₃ belongs to and give the other TWO oxides in the same category. [1]

Model answers — the wording that earns the mark

For teacher / self-marking. Award marks per the [] allocation shown. Pure-only items are marked with a star (★ pure-only).

Section A — Multiple Choice

A1 C — an alkali is a soluble base that dissociates in water to produce $\text{OH}^-(\text{aq})$ ions. (A describes an acid; B describes any base, not specifically an alkali; D is wrong — orange UI colour indicates pH 3-4, which is acidic, not alkaline.) [1]

A2 C — pH 11 is alkaline: $[\text{OH}^-] > [\text{H}^+]$; Universal Indicator turns blue (pH 8-12) and violet (pH 13-14). At pH 11, the correct colour is blue. Row C is correct. [1]

A3 C — an acidic oxide reacts with bases/alkalis (such as NaOH) but does not react with dilute acids (such as HCl). P fits this profile: reacts with NaOH, does not react with HCl. (An amphoteric oxide would react with BOTH; a basic oxide would react with HCl but not NaOH; a neutral oxide reacts with neither.) [1]

A4 ★ pure-only B — J is a strong acid (fully ionises in water: all molecules produce $\text{H}^+(\text{aq})$ ions) giving pH 1. K is a weak acid (partially ionises: only a fraction of molecules produce $\text{H}^+(\text{aq})$ ions) giving pH 3 at the same concentration. (A is wrong — both have the same concentration. C is wrong — J is the strong acid with the lower pH, not the weak acid.) [1]

A5 C — dry HCl gas exists as covalent molecules. Without water, HCl cannot dissociate into $\text{H}^+(\text{aq})$ ions, so it shows no acidic properties. Dry blue litmus paper does not change colour. Acidic properties only appear when HCl dissolves in water: $\text{HCl}(\text{aq}) \rightarrow \text{H}^+(\text{aq}) + \text{Cl}^-(\text{aq})$. (B is wrong — HCl does not bleach; bleaching is a property of Cl_2 .) [1]

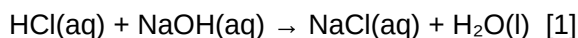
A6 B — CuO is an insoluble base. Once all the acid is neutralised, excess CuO cannot dissolve further and so cannot release OH^- ions into solution. The pH stays at 7 (neutral salt solution). This is why excess insoluble base is the preferred method for salt preparation — the excess can be filtered off and the solution stays at pH 7. (C is wrong — only excess SOLUBLE alkali raises pH above 7.) [1]

A7 D — the reaction $\text{AgNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3(\text{aq})$ is a precipitation (double decomposition) reaction, not an acid reaction. No acid is involved. A, B and C all show characteristic acid reactions: acid + metal (A), acid + base (B), acid + carbonate (C). [1]

A8 D — for a weak acid + strong alkali titration, the end-point pH is slightly above 7 (the salt formed, sodium ethanoate, is slightly alkaline in solution). Thymolphthalein changes colour near pH 10, which is within the steep part of the pH curve at the end-point for this combination. Methyl orange (A) changes at $\text{pH} \approx 4$, which is too acidic. Litmus (B) gives a gradual colour change, not suitable for precision titrations. Universal Indicator (C) gives no sharp colour change. [1]

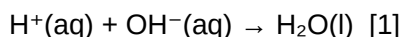
Section B — Structured

B1(a) Chemical equation: [1]



Marker note: Award [1] for balanced equation with correct state symbols. Accept 'water' spelled out.

B1(b) Ionic equation for neutralisation: [1]



Marker note: Accept without state symbols per LO 5.1(e). Charges on ions must be shown.

B1(c) Moles of HCl: [1]

$$\begin{aligned} n(\text{HCl}) &= c \times V = 0.200 \text{ mol/dm}^3 \times (22.5 \div 1000) \text{ dm}^3 \\ &= 0.200 \times 0.0225 = 4.50 \times 10^{-3} \text{ mol} \quad [1] \end{aligned}$$

B1(d) Moles of NaOH: [1]

From the equation, $\text{HCl} : \text{NaOH} = 1 : 1$ (molar ratio).

$$\text{Therefore } n(\text{NaOH}) = 4.50 \times 10^{-3} \text{ mol} \quad [1]$$

B1(e) Concentration of NaOH solution: [2]

$$\begin{aligned} c(\text{NaOH}) &= n \div V = (4.50 \times 10^{-3}) \div (25.0 \div 1000) \quad [1 \text{ method}] \\ &= (4.50 \times 10^{-3}) \div 0.025 = 0.180 \text{ mol/dm}^3 \quad [1 \text{ answer}] \end{aligned}$$

Marker note: Method mark for correct division of n by V(dm³). Answer mark for 0.180 mol/dm³.

B1(f) Limiting reagent and pH: [2]

$$n(\text{HCl}) = 0.200 \times 0.010 = 2.00 \times 10^{-3} \text{ mol}$$

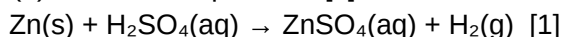
$$n(\text{NaOH}) = 0.180 \times 0.010 = 1.80 \times 10^{-3} \text{ mol}$$

$\text{HCl} : \text{NaOH} = 1 : 1$; $n(\text{HCl}) > n(\text{NaOH})$, so HCl is in excess. [1]

The mixture contains excess H^+ ions $\rightarrow$ the solution is acidic $\rightarrow \text{pH} < 7$. [1]

Marker note: Both marks require correct mole calculation AND correct pH prediction. Allow error carried forward from (e) for the NaOH moles used here.

B2(a) Balanced equation: [1]



Marker note: Must have state symbols and be balanced. ZnSO₄ must be shown as aqueous.

B2(b) Two observations: [2]

[1] Effervescence (bubbles of gas) / zinc gradually dissolves.

[1] The lighted splint held at the mouth of the test tube is extinguished with a 'pop' sound.

Marker note: Award [1] for each valid observation. Accept 'colourless gas produced'. Must use the quoted 'pop' sound or describe the lighted-splint test explicitly.

B2(c)(i) Equation for $\text{PbCO}_3 + \text{H}_2\text{SO}_4$: [1]



Marker note: PbSO₄ must be shown as solid (s) — this is critical to the explanation in (c)(ii).

B2(c)(ii) Explanation for effervescence stopping: [2]

[1] PbSO_4 is insoluble and forms on the surface of the solid PbCO_3 .

[1] It forms a non-porous coating around the solid PbCO_3 , preventing further contact between the acid and the carbonate. The reaction stops before all reactants are used up.

Marker note: Both marks needed: [1] for identifying PbSO_4 as insoluble / forms a coating; [1] for explaining the blocking mechanism (prevents acid reaching unreacted PbCO_3).

B2(d) Gas name and test: [1]

Hydrogen (H_2) gas. Hold a lighted splint at the mouth of the test tube — it is extinguished with a 'pop' sound. [1]

B3(a) Classification of oxides D, E, F, G: [4]

D: basic (reacts with acid, not with alkali) [1]

E: acidic (reacts with alkali, not with acid) [1]

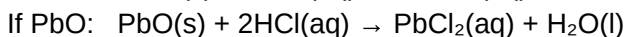
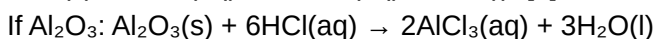
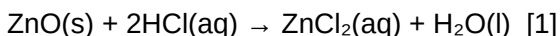
F: amphoteric (reacts with BOTH acid and alkali) [1]

G: neutral (reacts with neither acid nor alkali) [1]

B3(b) Oxide F identity and equation: [2]

[1] Any ONE of the three amphoteric (ZAP) oxides: ZnO , Al_2O_3 or PbO .

Example using ZnO :



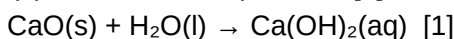
Marker note: Award [1] for naming any ZAP oxide. Award [1] for correct balanced equation matching the named oxide, with state symbols. Mark consequentially.

B4(a) Second liming agent: [1]

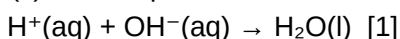
Calcium hydroxide, Ca(OH)_2 (slaked lime) [1]

Marker note: Must give both name and formula for the mark.

B4(b) $\text{CaO} + \text{H}_2\text{O}$ equation: [1]



B4(c) Ionic equation for neutralisation of H^+ ions: [1]



Marker note: Accept without state symbols per LO 5.1(e). Charges must be shown.

B4(d) Mass calculation: [3]

(i) $M_r(\text{CaO}) = 40 + 16 = 56 \text{ g/mol}$ [part of working]

$$n(\text{CaO}) = \text{mass} \div M_r = 112 \div 56 = 2.00 \text{ mol} \quad [1]$$

(ii) From $\text{CaO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Ca(OH)}_2\text{(aq)}$, molar ratio = 1:1

$$n(\text{Ca(OH)}_2) = 2.00 \text{ mol} \quad [1 \text{ consequential}]$$

$$M_r(\text{Ca(OH)}_2) = 40 + 2(16 + 1) = 40 + 34 = 74 \text{ g/mol}$$

$$\text{mass} = 2.00 \times 74 = 148 \text{ g} \quad [1]$$

Marker note: [1] for $n(\text{CaO}) = 2.00 \text{ mol}$; [1] for correct mole ratio; [1] for mass = 148 g. Allow error carried forward from (i) for the final mass mark.

B5(a) ★ pure-only Extent of ionisation explanation: [2]

[1] HCl (Solution X) is a strong acid: it fully (completely) ionises in water.

All HCl molecules produce $\text{H}^+\text{(aq)}$ ions: $\text{HCl(aq)} \rightarrow \text{H}^+\text{(aq)} + \text{Cl}^-\text{(aq)}$.

This gives a high concentration of $\text{H}^+\text{(aq)}$ → lower pH (pH 1).

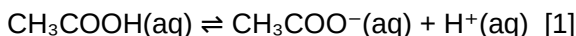
[1] Ethanoic acid (Solution Y) is a weak acid: it only partially ionises in water.

Only a small fraction of CH_3COOH molecules produce $\text{H}^+(\text{aq})$ ions.

Lower concentration of $\text{H}^+(\text{aq})$ at the same total acid concentration $\rightarrow$ higher pH (pH 3).

Marker note: Must reference 'fully ionises' and 'partially ionises' (or equivalent) for both marks. Do NOT accept 'X is more concentrated' — both are 0.10 mol/dm^3 .

B5(b) ★ pure-only Ionisation equation for ethanoic acid: [1]



Marker note: Equilibrium arrow ($\rightleftharpoons$) is required for the mark. A single forward arrow ($\rightarrow$) scores zero.

B5(c) ★ pure-only Rate observation and total volume explanation: [2]

[1] X (HCl) reacts more vigorously at the start because it fully ionises, giving a higher concentration of $\text{H}^+(\text{aq})$ ions initially $\rightarrow$ higher initial reaction rate. Y (CH_3COOH) only partially ionises, so $[\text{H}^+(\text{aq})]$ is lower initially $\rightarrow$ slower initial rate.

[1] The total volume of H_2 is the same because both solutions have the same molar concentration (0.10 mol/dm^3) and the same volume (25 cm^3), so $n(\text{acid})$ is equal. With excess Zn, all acid molecules eventually react: as H^+ is consumed, the equilibrium $\text{CH}_3\text{COOH} \rightleftharpoons \text{CH}_3\text{COO}^- + \text{H}^+$ shifts to the right, replenishing H^+ until all the acid is used up.

Marker note: Both marks require correct reference to concentration of $\text{H}^+(\text{aq})$ (not just 'strength'). Second mark must mention equal moles of acid OR equal n leading to equal H_2 .

Section C — Application

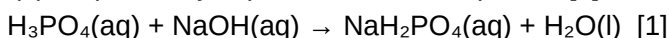
C1(a) ★ pure-only Basicity of H_3PO_4 : [2]

[1] The basicity of H_3PO_4 is 3 (tribasic).

[1] This is deduced from the pH curve: there are THREE sharp vertical rises (end-points), one for each H^+ ion released per molecule of H_3PO_4 .

Marker note: Both marks required: [1] state basicity = 3; [1] link to number of vertical rises in curve.

C1(b) ★ pure-only Equation at first end-point: [1]



Marker note: Must show NaH_2PO_4 as the product (acid salt, not normal salt). State symbols needed.

C1(c) ★ pure-only Mole verification: [2]

$$[1] \quad n(\text{H}_3\text{PO}_4) = c \times V = 0.100 \times 0.025 = 2.50 \times 10^{-3} \text{ mol}$$

At the first end-point, $\text{H}_3\text{PO}_4 : \text{NaOH} = 1 : 1$ (one H^+ removed per molecule).

$$n(\text{NaOH}) \text{ needed} = 2.50 \times 10^{-3} \text{ mol} \quad [1 \text{ method}]$$

$$V(\text{NaOH}) = n \div c = (2.50 \times 10^{-3}) \div 0.150 = 0.01667 \text{ dm}^3 = 16.7 \text{ cm}^3 \quad \checkmark \quad [1 \text{ answer}]$$

Marker note: [1] for correct $n(\text{H}_3\text{PO}_4)$; [1] for correct V calculation matching 16.7 cm^3 . Accept 0.01667 dm^3 or 16.7 cm^3 as equivalent.

C1(d) ★ pure-only Indicator choice: [1]

Methyl orange. [1]

At the first end-point, the solution contains NaH_2PO_4 (slightly acidic, $\text{pH} \approx 4\text{-}5$). Methyl orange changes colour near pH 4, the closest match to the first end-point; its colour change is complete just before the

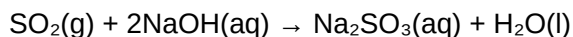
exact end-point. Thymolphthalein changes near pH 10, which corresponds to the third end-point, not the first.

Marker note: Award [1] for methyl orange WITH a valid reason linking its transition pH (~4) to the slightly acidic nature of the first end-point product. Do NOT award the mark for 'methyl orange' alone without a reason.

C2(a) SO₂ classification and reaction with NaOH: [2]

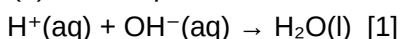
[1] SO₂ is an acidic oxide. It dissolves in water / reacts with bases but does not react with dilute acids.

[1] Reaction with NaOH:



Marker note: [1] for correct classification as acidic WITH justification (reacts with alkali/base, not with acid). [1] for balanced equation with state symbols. Na₂SO₃ is sodium sulfite (accept sodium sulfate(IV)).

C2(b) Ionic equation for neutralisation: [1]



Marker note: This is the universal ionic equation for acid-alkali neutralisation (LO 5.1e). Accept without state symbols.

C2(c) Al₂O₃ as liming agent; ZAP category: [1]

[1] Al₂O₃ would be effective: it is an amphoteric oxide (ZAP category), which means it reacts with acids. It would neutralise the excess H⁺ ions in the acidic soil. The other two oxides in the ZAP category are ZnO and PbO.

Marker note: Award [1] only if all three are correct: (i) effective/yes; (ii) amphoteric named as the category; (iii) ZnO and PbO both identified. Giving only one other ZAP oxide does not score.

Marker note: Totals: Section A 8 + Section B 32 (B1:8 + B2:7 + B3:6 + B4:6 + B5:5) + Section C 10 = 50 marks. Backport scope -- pure-only: A4, B5, C1. All others are universal.