# Past Paper Audit

Prepared for Student Y

**LEVEL**

Year 3 Chemistry

**TEST**

Common Test 2026

**RESULT**

25 / 45 (55.6%)

# Quick Summary

- Did well in most calculation questions, including percentage composition, relative atomic mass and percentage yield.
- The empirical and molecular formula sequence broke down at the simplest ratio and subsequent mass calculation.
- Also lost marks through concept application, recall and question interpretation.
- Chemical calculations and ion charge concepts need focused revision.

**7**

Easy marks to recover

# Performance by Topic

| Topic | Questions | Marks | Result |
|---|---|---|---|
| The Particulate Nature of Matter | Q1–Q6, B1, B2(b–c) | 15 / 18 | 83.3% |
| Chemical Bonding and Structure | Q7, Q9 | 1 / 2 | 50.0% |
| Chemical Calculations | Q10–Q15, B2(a), B3, B4 | 9 / 25 | 36.0% |
| Total | | 25 / 45 | 55.6% |

# Lost Marks Analysis

## The Particulate Nature of Matter

| Question | Learning objective | Classification | Knowledge gaps |
|---|---|---|---|
| Q1 | Describe changes of state using kinetic particle theory. | Application | Treated a cooling plateau as melting instead of freezing. |
| Q8 | Describe atomic structure using protons, neutrons and electrons. | Interpretation | Selected true statements when asked which were not correct. |
| B1(d) | Explain isotope separation using mass spectrometry. | Application | Selected $Sr^{2+}$ rather than $Mg^{2+}$ as more strongly deflected. |
| B2(a) | Define relative atomic and molecular or formula mass. | Explanation | Omitted the carbon-12 comparison. |
| B2(b) | Relate diffusion rate to particle mass. | Application | Treated an inverse trend as an exact rule. |

## Chemical Bonding and Structure

| Question | Learning objective | Classification | Knowledge gaps |
|---|---|---|---|
| Q9 | Relate ion charge to electrons lost or gained. | Application | Said loss of two electrons produces a 2− ion. |

# Lost Marks Analysis

## Chemical Calculations

| Question | Learning objective | Classification | Knowledge gaps |
|---|---|---|---|
| Q10 | Write ionic compound formulae from ion charges. | Application | Chose $Pb^{4+}$ instead of $Pb^{2+}$ in $Pb_2CO_3Cl_2$. |
| Q13 | Calculate amount using mass and molar mass. | Calculation | Omitted the mg-to-g conversion. |
| Q15 | Use stoichiometric ratios for reacting quantities and gas volumes. | Calculation | Used a 1:1 rather than 1:3 propane:$CO_2$ ratio. |
| B3(a) | Determine empirical and molecular formulae. | Calculation | Did not complete the simplest ratio and molecular formula. |
| B3(b)(i) | Use concentration, volume and mole relationships. | Interpretation | Used 750 $cm^3$ instead of the 25.0 $cm^3$ aliquot. |
| B3(b)(ii) | Use concentration, volume and mole relationships. | Calculation | Carried the incorrect formula and Mr into tablet mass. |
| B4(a)(i) | Recall common acid names and formulae. | Recall | Named $HNO_3$ “hydrogen nitrate”. |
| B4(a)(ii) | Write and balance chemical equations. | Calculation | Used an incorrect calcium nitrate formula. |
| B4(b)(ii) | Calculate percentage purity. | Calculation | Calculated 3 × 164.1 as 328.2 instead of about 492.3. |

# What Went Well

Student Y scored well in these concepts:

- Isotope definitions and particle deductions (B1(a-c)).
- Diffusion and particle-model explanations (Q2 and Q4).
- Percentage composition and relative atomic mass calculations (Q12 and Q14).
- Percentage yield (B4(b)(i)).
- Molecular-mass and diffusion explanation (B2(c)).

# Quick Wins

| Question | Mistake | | Correction |
|---|---|---|---|
| Q1 | Cooling plateau treated as melting | → | Cooling plateau means freezing. |
| Q8 | Selected true statements | → | Underline “not correct” or “except”. |
| Q9 | Electron loss said to give 2− | → | Losing two electrons gives 2+. |
| Q13 | Milligrams used without conversion | → | Convert mg to g before calculating moles. |
| B4(a)(i) | $HNO_3$ called hydrogen nitrate | → | $HNO_3$ is nitric acid. |
| Q10 | $Pb^{4-}$ selected in $Pb_2CO_3Cl_2$ | → | Balance total charge: each Pb is 2+. |
| B2(a) | Gave only the addition rule | → | Include the carbon-12 comparison as well as the sum of relative atomic masses. |

# Concepts to Revisit

## The Particulate Nature of Matter + Chemical Bonding and Structure

| Concept | Question(s) | What to practise |
| --- | --- | --- |
| Freezing versus Melting | Q1 | Read the direction of temperature change first. |
| Diffusion and Particle Mass | B2(b) | Distinguish a trend from an exact rule. |
| Negative Command Words and Atomic Structure | Q8 | Mark “not correct” or “except” before evaluating options. |
| Relative Formula Mass Definition | B2(a) | State the carbon-12 comparison and sum of relative atomic masses. |
| Deflection in Mass Spectrometry | B1(d) | Compare charge-to-mass effects. |
| Electron Loss and Ion Charge | Q9 | Link electron loss to positive charge. |

# Concepts to Revisit

## Chemical Calculations

| Concept | Question(s) | What to practise |
|---|---|---|
| Ionic Charge Balance | Q10 | Balance total positive and negative charge. |
| Common Acid Names | B4(a)(i) | Recall nitric acid, $HNO_3$, and other syllabus acid names. |
| Empirical and Molecular Formulae | B3(a) | Percentage → mass → moles → simplest ratio → formula. |
| Mass and Particle-Number Units | Q13 | Convert mg to g before moles and molecules. |
| Polyatomic-Ion Formulae and Equations | B4(a)(ii) | Use brackets, subscripts and balanced equations. |
| Stoichiometric Gas Ratios | Q15 | Use coefficients as volume ratios. |
| Aliquot, Concentration and Mr Dependencies | B3(b)(i-ii) | Choose the correct volume and check formula and Mr. |
| Percentage-Purity Arithmetic | B4(b)(ii) | Estimate, multiply carefully and reverse-check. |