Compounds, formulae and equations

OCR A H032 and H432 · AS and A level

Show your working where needed.

Name _____ Date _____

1. Use the periodic table

Predict the charges on the ions formed from barium, bromine and oxygen. Write the formulae of the ionic compounds barium bromide and barium oxide.

2. Write three formulae

Write the formulae of ammonium sulfate, zinc hydroxide and silver carbonate. Show the ions you used for each compound.

3. Check a label

A metal ion M forms a salt containing two nitrate ions for each metal ion. A label gives the formula MNO_{32}. State the charge on M and write the correct formula of the salt.

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4. Represent a decomposition

On heating, solid silver nitrate decomposes to solid silver, nitrogen dioxide gas and oxygen gas. Write a balanced equation with state symbols, using the smallest whole-number coefficients.

5. Mix two solutions

Calcium nitrate solution and sodium fluoride solution form a precipitate of calcium fluoride. Write the ionic equation with state symbols and name the spectator ions.

6. Compare two equations

Sodium carbonate solution reacts with dilute hydrochloric acid. The products are sodium chloride solution, water and carbon dioxide. Write both the full equation and the ionic equation, including state symbols.

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7. A precipitate and water

Barium hydroxide solution reacts with dilute sulfuric acid. The only products are solid barium sulfate and water. Write a single ionic equation with state symbols that accounts for both products.

8. Correct an ionic equation

Limited aqueous sodium hydroxide is added to aluminium sulfate solution. Solid aluminium hydroxide forms. A student writes $Al^{3+}(aq) + OH^{-}(aq) \rightarrow Al(OH)_3(s)$. Correct their equation and show that atoms and charge balance.

9. Extra challenge · Resolve a misleading precipitate

An aqueous sample contains sodium carbonate and may contain sodium chloride. Adding aqueous silver nitrate to one portion gives a precipitate. Both silver carbonate and silver chloride are insoluble.

Explain why this observation does not identify chloride. Design a test using a fresh portion and dilute nitric acid to check for chloride. Write ionic equations with state symbols for the reactions used to justify your method.

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