Paper 1

Questions are applicable for both core and extended candidates

1 Copper(II) sulfate crystals are blue. They are made by adding an excess of copper(II) oxide to sulfuric acid.

The mixture is heated and stirred.

The mixture is then filtered and the filtrate is allowed to evaporate, leaving blue crystals.

Why is filtration necessary?

A to remove soluble impurities

B to remove sulfuric acid

C to remove the blue crystals

D to remove unreacted copper(II) oxide

2 Which barium salts are soluble in water?

1 barium carbonate

2 barium chloride

3 barium nitrate

4 barium sulfate

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

3 Copper(II) sulfate is prepared by adding excess copper(II) carbonate to sulfuric acid.

Why is an **excess** of copper(II) carbonate added?

A to ensure all the copper(II) carbonate has reacted

B to ensure all the sulfuric acid has reacted

C to increase the rate of reaction

D to increase the amount of copper(II) sulfate produced

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

4 Which substance reacts with dilute sulfuric acid to form a salt that can be removed from the resulting mixture by filtration? **(extended only)**

A aqueous barium chloride

B aqueous sodium hydroxide

C copper

D copper(II) carbonate

5 An aqueous solution reacts with a solid. The products are an alkaline gas, a salt and water.

What are the aqueous solution and the solid?

	aqueous solution	solid
A	sodium hydroxide	magnesium carbonate
B	hydrochloric acid	magnesium carbonate
C	hydrochloric acid	ammonium chloride
D	sodium hydroxide	ammonium chloride

6 Copper(II) sulfate is prepared by adding excess copper(II) carbonate to sulfuric acid.

Why is an **excess** of copper(II) carbonate added?

A to ensure all the copper(II) carbonate has reacted

B to ensure all the sulfuric acid has reacted

C to increase the rate of reaction

D to increase the amount of copper(II) sulfate produced

7 Which method produces the salt copper(II) carbonate? **(extended only)**

A Add copper(II) oxide to water, then add excess aqueous sodium carbonate. Filter off the precipitate.

B Add copper(II) oxide to dilute sulfuric acid, then add excess aqueous sodium carbonate. Filter off the precipitate.

C Add copper to dilute hydrochloric acid, then add aqueous sodium carbonate. Filter off the precipitate.

D Add copper(II) oxide to excess aqueous sodium carbonate. Filter off the precipitate.

8 Copper(II) sulfate is formed by reacting excess solid copper(II) carbonate with dilute sulfuric acid.

Which processes are part of the preparation of solid copper(II) sulfate?

1 crystallisation

2 distillation

3 filtration

4 titration

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

9 Which type of reaction is represented by the equation shown? **(extended only)**

$$Pb^{2+}(aq) + 2NO_3^-(aq) + 2Na^+(aq) + 2I^-(aq) \rightarrow PbI_2(s) + 2Na^+(aq) + 2NO_3^-(aq)$$

A addition

B redox

C neutralisation

D precipitation

10 Information about some silver compounds is shown.

compound	formula	solubility in water
silver carbonate	Ag_2CO_3	insoluble
silver chloride	$AgCl$	insoluble
silver nitrate	$AgNO_3$	soluble
silver oxide	Ag_2O	insoluble

Which equation shows a reaction which **cannot** be used to make a silver salt?

A $AgNO_3(aq) + HCl(aq) \rightarrow AgCl(s) + HNO_3(aq)$

B $Ag_2O(s) + 2HNO_3(aq) \rightarrow 2AgNO_3(aq) + H_2O(l)$

C $Ag_2CO_3(s) + 2HNO_3(aq) \rightarrow 2AgNO_3(aq) + H_2O(l) + CO_2(g)$

D $2Ag(s) + 2HCl(aq) \rightarrow 2AgCl(s) + H_2(g)$

11 Aqueous ethanoic acid is a weak acid. **(extended only)**

Aqueous sodium hydroxide is a strong base.

Aqueous ethanoic acid is neutralised by aqueous sodium hydroxide.

Which statements are correct?

1 Aqueous ethanoic acid accepts protons from hydroxide ions.

2 The aqueous ethanoic acid used is fully dissociated into ions.

3 The aqueous sodium hydroxide used is fully dissociated into ions.

4 The reaction produces a salt and water.

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

12 The equation for the reaction between barium chloride and dilute sulfuric acid is shown.

$$BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$$

Which row shows the state symbols for this equation?

	$BaCl_2$	H_2SO_4	$BaSO_4$	$2HCl$
A	(aq)	(aq)	(s)	(aq)
B	(aq)	(l)	(s)	(aq)
C	(l)	(aq)	(s)	(l)
D	(aq)	(l)	(aq)	(l)