

Chemical reactions

Total Mark - 15

Question: 1

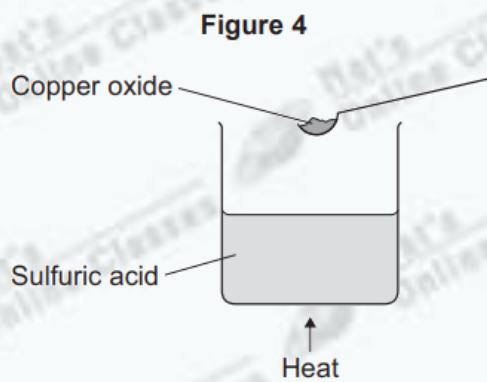
2 This question is about sulfuric acid, copper sulfate and ethene.

2 (a) A student added copper oxide to sulfuric acid to make copper sulfate.

The word equation for the reaction is:



Figure 4 shows the first stage of the student's method.



2 (a) (i) The state symbol for CuO is missing from the equation below.

Use the correct answer from the box to complete the equation.

[1 mark]

aq	g	l	s
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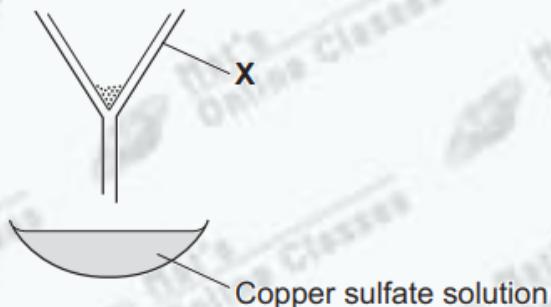


2 (a) (ii) Why is the sulfuric acid heated?

[1 mark]

2 (b) Figure 5 shows the second stage of the student's method.

Figure 5



2 (b) (i) Name the apparatus labelled X on Figure 5.

[1 mark]

2 (b) (ii) What could the student do to the copper sulfate solution to get copper sulfate crystals?

[1 mark]

2 (c) The student weighed the copper sulfate crystals.

Why was the mass of the copper sulfate crystals less than the student expected?

[1 mark]

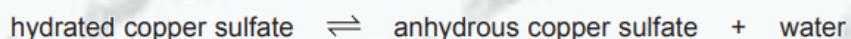
Tick (✓) one box.

The student added too much copper oxide.

The student left some copper sulfate crystals in the apparatus.

The student weighed the copper sulfate crystals when they were wet.

2 (d) The equation shows the reaction when blue hydrated copper sulfate crystals are heated.



2 (d) (i) What colour is anhydrous copper sulfate?

[1 mark]

2 (d) (ii) What would you see if water is added to anhydrous copper sulfate?

[1 mark]

2 (e) Ethene and sulfuric acid are used to make many substances.

Table 1 shows data about wealth of countries, ethene production and sulfuric acid production.

Table 1

Country	Wealth of country in billions of dollars	Ethene production in kilotonnes	Sulfuric acid production in kilotonnes
A	4000	13 900	36 000
B	1300	4 400	6 600
C	1290	2 700	26 000
D	460	1 500	2 500

2 (e) (i) Use the correct answer from the box to complete the sentence.

[1 mark]

alloys chlorine graphite polymers

Ethene is used to make _____.

2 (e) (ii) Describe the relationship, if any, between the wealth of a country and the production of ethene.

[1 mark]

2 (e) (iii) Describe the relationship, if any, between the wealth of a country and the production of sulfuric acid.

[1 mark]

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)(i)	s		1	AO2 2.6.1a
2(a)(ii)	to speed up the reaction		1	AO2 2.6.1b
2(a)(iii)	tick (✓) by: 1		1	AO1 2.6.2d
2(a)(iv)	tick (✓) by: To make sure all the sulfuric acid has reacted		1	AO1 2.6.1b
2(b)(i)	funnel	accept filter funnel	1	AO1 2.6.1b
2(b)(ii)	heat / evaporate / boil	accept cool accept leave (to evaporate) do not accept heat until all water gone	1	AO1 2.6.1b
2(c)	tick (✓) by: The student left some copper sulfate crystals in the apparatus.		1	AO3 2.3.3d

2(d)(i)	white	accept grey	1	AO1 2.5.1d
2(d)(ii)	it goes blue	accept steam / water vapour ignore unspecified colour change	1	AO1 2.5.1d
2(e)(i)	polymers		1	AO1 2.2.5a
2(e)(ii)	as wealth decreases, ethene production decreases	accept converse	1	AO2 2.6; 3.7.12
2(e)(iii)	no relationship		1	AO2 2.6; 3.7.12
Total			12	

Question: 2

5 Sodium hydroxide reacts with hydrochloric acid. Sodium chloride and water are made.

What is the name of this type of reaction?

- A Neutralisation
- B Oxidation
- C Reduction
- D Thermal decomposition

Your answer

[1]

5	A	1	
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Question: 3

6 Neutralisation occurs when acids react with alkalis.

What is the ionic equation for neutralisation?

- A $H^+ + OH^- \rightarrow H_2O$
- B $H^- + OH^+ \rightarrow H_2O$
- C $H^+ + OH^+ \rightarrow H_2O$
- D $H^- + OH^- \rightarrow H_2O$

Your answer

[1]

6	A	1
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Question: 4

3 Look at the balanced symbol equation.



What does the symbol (s) represent in the balanced symbol equation?

- A Solid
- B Solute
- C Solution
- D Substance

Your answer

[1]

3	A	1	1.1
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