

## Chemical reactions

**Total Mark - 15**

### **Question: 1**

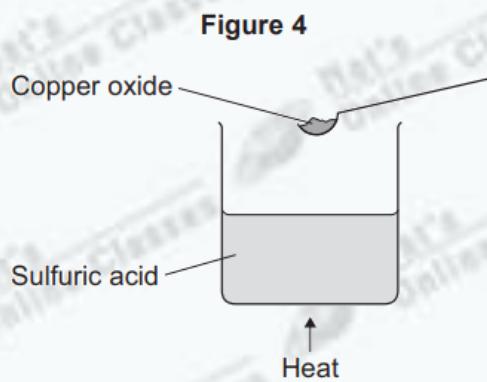
2 This question is about sulfuric acid, copper sulfate and ethene.

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?

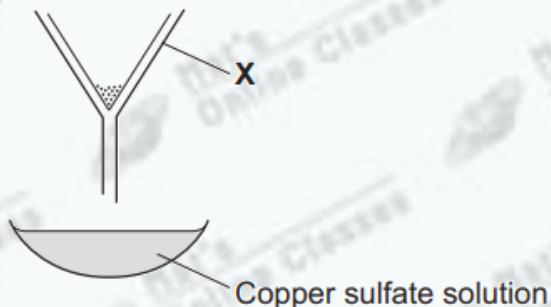
**[1 mark]**

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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]

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

[1 mark]

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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]

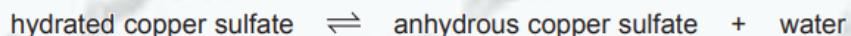
Tick (✓) one box.

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]

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

[1 mark]

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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]

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

[1 mark]

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## 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]

## Question: 3

6 Neutralisation occurs when acids react with alkalis.

What is the ionic equation for neutralisation?

- A  $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$
- B  $\text{H}^- + \text{OH}^+ \rightarrow \text{H}_2\text{O}$
- C  $\text{H}^+ + \text{OH}^+ \rightarrow \text{H}_2\text{O}$
- D  $\text{H}^- + \text{OH}^- \rightarrow \text{H}_2\text{O}$

Your answer

[1]

## **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]