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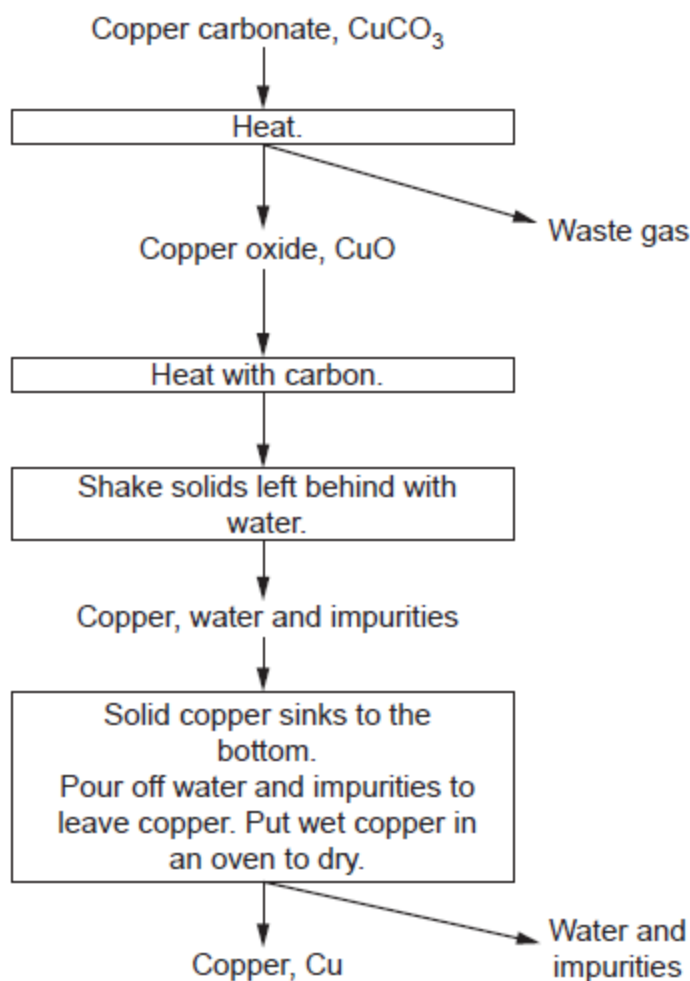
## **GCSE Chemistry B (Twenty First Century Science)**

**J258/04** Depth in chemistry (Higher Tier)

### **Question Set 16**

1. Malachite is an ore of copper that contains copper carbonate,  $\text{CuCO}_3$ . It is mined on a large scale all over the world.

The flowchart in **Fig. 5.1** shows how copper can be made from copper carbonate, either in industry, or on a small scale in the laboratory.



**Fig. 5.1**

(a) Write a **symbol equation** for the reaction that happens when copper carbonate is heated. [2]

(b) Copper made by the method in **Fig. 5.1** contains solid impurities. [2]

Name **two** solid impurities that the copper may contain. [2]

(c) Jane uses the flowchart in **Fig. 5.1** as a method in the laboratory.

Jane's teacher gives her this equation to help her to work out her theoretical yield of copper.

**theoretical yield = 0.51 × mass of copper carbonate at start**

(i) Jane uses the equation to work out what mass of copper carbonate she should use to make a theoretical yield of 5.0 g of copper.

Calculate the starting mass of copper carbonate she should use.

Give your answer to **2** significant figures.

Mass of copper carbonate = ..... g **[3]**

(ii) When Jane follows her method, she only makes 2.4 g of copper.

Calculate Jane's percentage yield.

Percentage yield = ..... % **[2]**

(iii) Jane comments on her method.

**Jane**  
I followed the flowchart (**Fig 5.1**), but I think some of my method could be improved to make sure I get the highest possible percentage yield.



Suggest what Jane could do to make sure she gets the highest possible percentage yield.

Use the flowchart in **Fig. 5.1** to support your answer.

(d) New methods of copper extraction have been developed. **[2]**

One of these methods uses bacteria to extract copper from the ground around old mines.

Evaluate the effects on the environment of using bacteria to extract copper compared to the method in the flow chart.

**[3]**

**Total Marks for Question Set 16: 14**

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