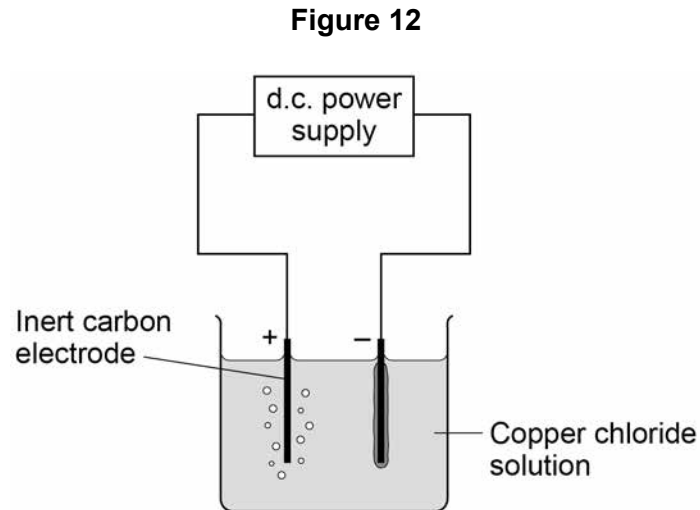


0 5

This question is about electrolysis.

A student investigates the mass of copper produced during electrolysis of copper chloride solution.

Figure 12 shows the apparatus.

**0 5 . 1**

Which gas is produced at the positive electrode (anode)?

[1 mark]

Tick **one** box.

carbon dioxide

chlorine

hydrogen

oxygen



0 5 . 2 Copper is produced at the negative electrode (cathode).

What does this tell you about the reactivity of copper?

[1 mark]

Tick **one** box.

Copper is less reactive than hydrogen

Copper is less reactive than oxygen

Copper is more reactive than carbon

Copper is more reactive than chlorine

Table 4 shows the student's results.

Table 4

Time in mins	Total mass of copper produced in mg			
	Experiment 1	Experiment 2	Experiment 3	Mean
1	0.60	0.58	0.62	0.60
2	1.17	1.22	1.21	1.20
4	2.40	2.41	2.39	2.40
5	3.02	X	3.01	3.06

0 5 . 3 Determine the **mean** mass of copper produced after 3 minutes.

[1 mark]

Mass = _____ mg

Question 5 continues on the next page

Turn over ►



0 5 . 4 Calculate the mass **X** of copper produced in **Experiment 2** after 5 minutes.

Use **Table 4** on page 19

[2 marks]

Mass **X** = _____ mg

0 5 . 5 The copper chloride solution used in the investigation contained 300 grams per dm^3 of solid CuCl_2 dissolved in 1 dm^3 of water.

The students used 50 cm^3 of copper chloride solution in each experiment.

Calculate the mass of solid copper chloride used in each experiment.

[3 marks]

Mass = _____ g



Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	chlorine		1	AO2 5.4.3.4
05.2	copper is less reactive than hydrogen		1	AO2 5.4.3.4
05.3	1.8 (mg)	allow an answer in range 1.7–1.9	1	AO3 5.4.3.4
05.4	$\frac{3.02 + 3.01 + x}{3} = 3.06$ 3.15 (mg)	an answer of 3.15 (mg) scores 2 marks allow any other suitable method if no other mark awarded allow 9.18 for 1 mark	1 1	AO2 5.4.3.4
05.5	$\frac{50}{1000} \text{ or } \frac{1}{20} \text{ or } 0.05$ (0.05) × 300 15 (g) or $\frac{300}{1000} \text{ or } \frac{3}{10} \text{ or } 0.03 (1)$ (0.3) × 50 (1) 15 (g) (1)	an answer of 15 (g) scores 3 marks the second mark is dependent on the first mark being scored the second mark is dependent on the first mark being scored if no other mark awarded allow 150 or 15 000 for 1 mark	1 1 1	AO2 5.3.2.5
Total			8	