

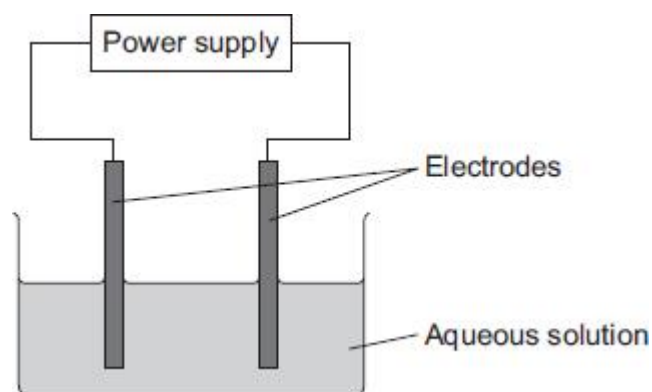
C6.2 Electrolysis Homework task 2

Q1.

This question is about electrolysis.

A student investigated the electrolysis of aqueous solutions using inert electrodes.

The figure below shows the apparatus used.



- (a) The electrodes are made of graphite.

Which element is graphite a form of?

Tick (✓) **one** box.

Aluminium

Carbon

Copper

Silicon

(1)

- (b) The electrodes are inert.

What does 'inert' mean?

(1)

- (c) What is meant by an 'aqueous solution'?

(1)

The student electrolysed four aqueous solutions.

The table below shows some of the results.

Aqueous solution	Product at negative electrode	Product at positive electrode
Copper bromide		bromine
Copper chloride	copper	chlorine
Sodium bromide	hydrogen	
Sodium sulfate		oxygen

(d) Complete the table above.

Choose answers from the box.

bromine chlorine copper hydrogen oxygen sodium
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(3)

(e) An aqueous solution of copper chloride was electrolysed.

Give **one** observation seen at the:

- negative electrode
- positive electrode.

Use the table above.

Negative electrode _____

Positive electrode _____

(2)

(f) What would you use to test for chlorine gas?

Tick (✓) **one** box.

A burning splint

A glowing splint

Damp litmus paper

(1)

(g) Complete the sentence.

Choose the answer from the box.

gaseous	molten	solid
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Copper chloride can conduct electricity when in aqueous solution or when

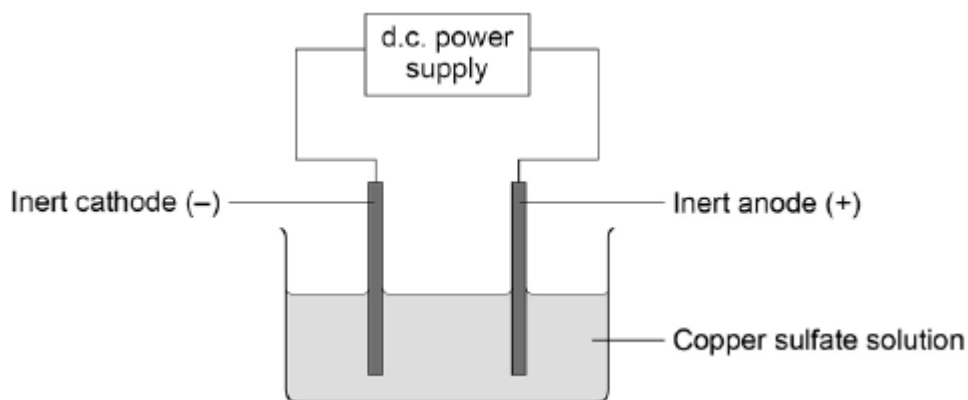
_____.

(1)

(Total 10 marks)

Q2.

The figure below shows an apparatus to produce elements from a solution of an ionic compound.



(a) What is the name of the process in the figure?

Tick **one** box.

Combustion

Crystallisation

Distillation

Electrolysis

(1)

- (b) The table below shows the products formed from three experiments using different compounds and the apparatus shown in the figure above.

Compound	State	Product at cathode	Product at anode
Copper chloride	Molten	Copper	Chlorine
Copper chloride	Aqueous solution	Copper	Chlorine
Potassium bromide	Molten	Potassium	Bromine

Use the table above to name the products formed at each electrode if using an aqueous solution of potassium bromide.

At cathode _____ At anode _____

(2)

- (c) Explain why copper is formed at the cathode during the electrolysis of its salts.

(2)

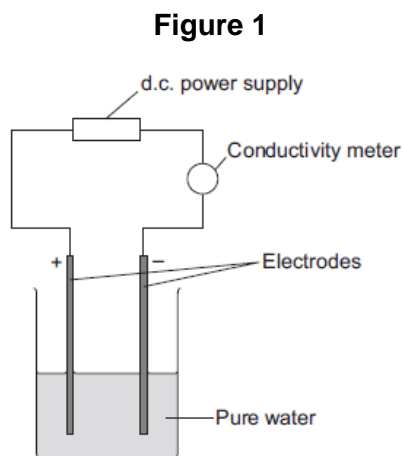
(Total 5 marks)

HIGHER TIER QUESTIONS

Q3.

A student investigated the conductivity of different concentrations of sodium chloride solution.

The student set the apparatus up as shown in **Figure 1**.



The student measured the conductivity of the pure water with a conductivity meter.

The reading on the conductivity meter was zero.

(a) The student:

- added sodium chloride solution one drop at a time
- stirred the solution
- recorded the reading on the conductivity meter.

The student's results are shown in the table below.

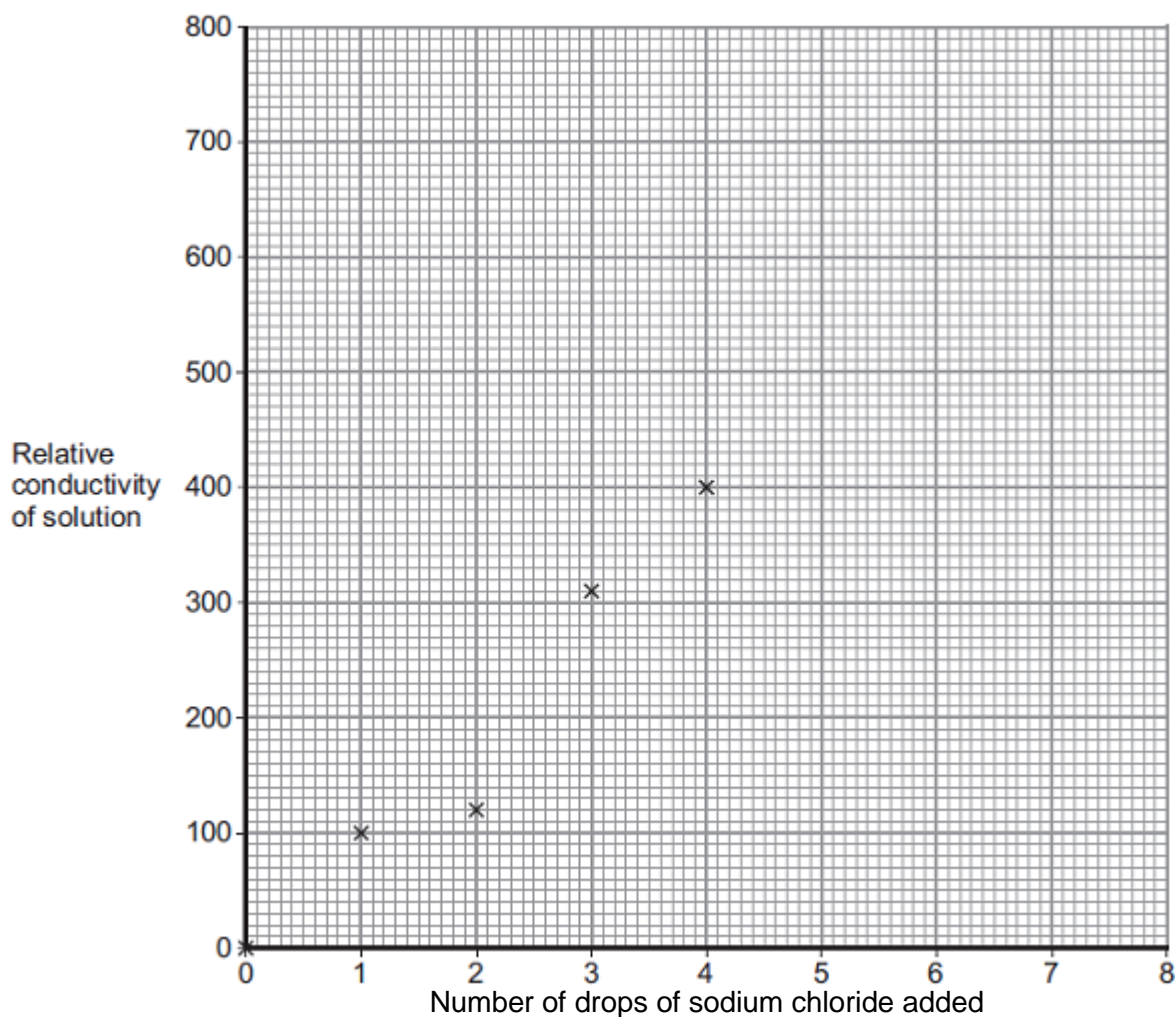
Number of drops of sodium chloride solution added	Relative conductivity of solution
0	0
1	100
2	120
3	310
4	400
5	510
6	590
7	710
8	800

- (i) The student plotted the results on the grid shown in **Figure 2**.

Plot the four remaining results.

Draw a line of best fit, ignoring the anomalous result.

Figure 2



(3)

- (ii) One of the points is anomalous.

Suggest **one** error that the student may have made to cause the anomalous result.

(1)

- (iii) The student wanted to compare the conductivity of sodium chloride solution with the conductivity of potassium chloride solution.

State **one** variable he should keep constant when measuring the conductivity of the two solutions.

(1)

- (b) (i) Explain, in terms of bonding, why pure water does **not** conduct electricity.

(2)

- (ii) Explain why sodium chloride solution conducts electricity.

(2)

- (iii) After he had added sodium chloride solution, the student noticed bubbles of gas at the negative electrode.

Complete the sentence.

The gas produced at the negative electrode is _____

(1)

(Total 10 marks)

Q4.

This question is about electrolysis.

- (a) Some metals are extracted from molten compounds using electrolysis.

Why is electrolysis used to extract some metals?

(1)

- (b) Aluminium is produced by electrolysis of a molten mixture.

What **two** substances does the molten mixture contain?

1 _____

2 _____

(2)

(c) Copper and chlorine are produced when molten copper chloride is electrolysed.

Complete the half equation for the reaction at each electrode.

Half equation at negative electrode

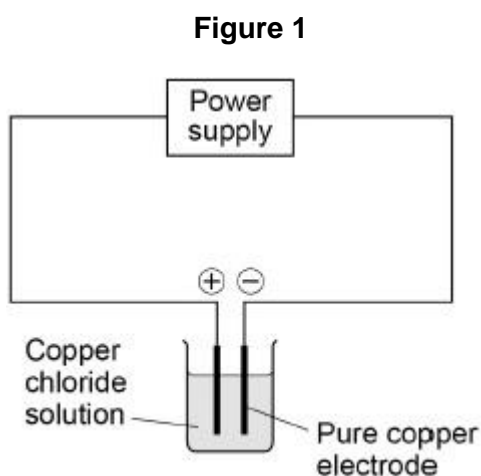


Half equation at positive electrode



(2)

The **Figure 1** shows the apparatus a student used to electrolyse copper chloride solution.



The student:

- measured the mass of copper deposited on the negative electrode after 60 minutes
- compared the mass deposited with the expected value.

(d) Suggest **two** reasons why the mass deposited was different from the expected value.

1 _____

2 _____

(2)

(Total 7 marks)