1. Some properties of forms of carbon are shown in the table.

Form of carbon	Conducts electricity?	Conducts heat?	Melting point
X	yes	yes	very high
Y	no	yes	high
Z	no	no	very high

i. Which form of carbon should you choose to use as an electrode in an electrolysis experiment with a molten electrolyte?

Explain your answer.

Form of carbon _____

Reason _____

_____ **[2]**

ii. All of the melting points in the table are high.

Why is it important that electrodes used in a **molten** electrolyte have a high melting point?

Tick (✓) **one** box.

Electrodes need to remain liquid, and not freeze at low temperatures ☐

Electrodes need to remain liquid, and not melt at high temperatures ☐

Electrodes need to remain solid, and not freeze at low temperatures ☐

Electrodes need to remain solid, and not melt at high temperatures ☐

[1]

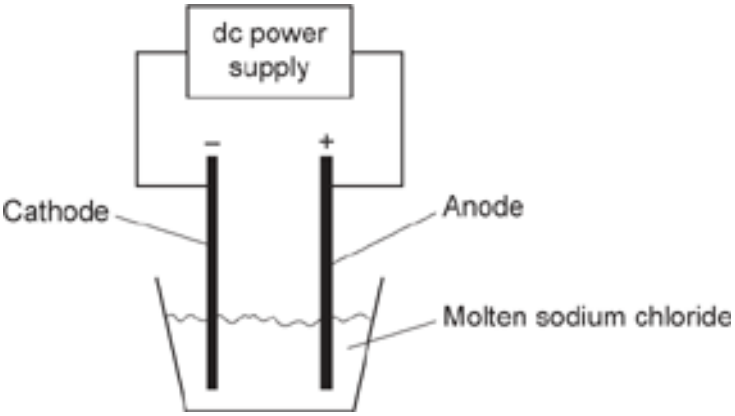
2. The electrolysis of molten copper chloride makes copper metal and chlorine gas.

Which row describes what happens to the inert electrodes during the electrolysis of molten copper chloride?

A Mass of both electrodes decreases
B Mass of both electrodes increases
C Mass of one electrode increases, mass of one electrode decreases
D Mass of one electrode increases, mass of one electrode stays the same

Your answer ☐ **[1]**

3. The diagram shows the electrolysis of molten sodium chloride.



Which products are made in the electrolysis of molten sodium chloride?

	Product at anode	Product at cathode
A	chlorine	hydrogen
B	chlorine	sodium
C	hydrogen	chlorine
D	sodium	chlorine

Your answer ☐ **[1]**

4(a). A teacher wants to make hydrogen and chlorine using electrolysis.

Some **possible** steps they can use in the electrolysis experiment are listed.

1. Put test tubes over the electrodes to collect gases.

2. Weigh each electrode.

3. Put the electrodes into a solution of sodium chloride.

4. Put on safety goggles.

5. Connect the battery.

6. Put the electrodes into solid sodium chloride.

Put the **four** steps that the teacher should use in the correct order.

[3]

(b). A teacher sets up an electrolysis experiment using copper sulfate solution, $CuSO_4$.

The table shows their results.

Experiment	Mass of copper made (mg)	Volume of oxygen made (cm^3)
1	7.9	2.8
2	21.1	7.5
3	28.2	10.0
4	35.3	
5	42.4	14.9

i. Estimate how much oxygen will be made in experiment **4**.

Volume of oxygen made = ... cm^3 **[1]**

ii. Describe the relationship between the amount of copper made and the amount of oxygen made.

---

[1]

(c). Copper sulfate solution is an electrolyte.

What type of compound is an electrolyte?

Tick (✓) **one** box.

Covalent ☐

Ionic ☐

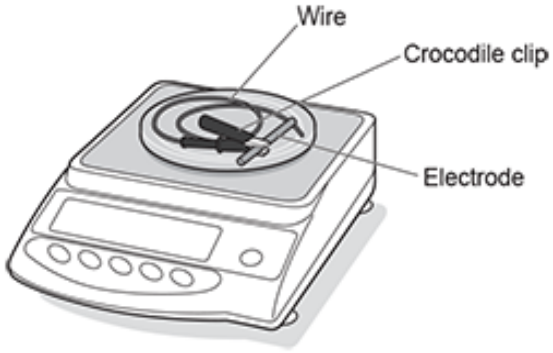
Molecular ☐

[1]

(d). Another teacher repeats the electrolysis experiment.

They record the mass of the electrode at the start of the experiment.

At the end of the experiment, they remove the electrode from the solution and record the mass **immediately** as shown in the diagram.



They notice that the mass is **higher** than they expect.

Suggest **two** changes the teacher could make to get a more accurate mass.

1 _____

_____

2 _____

_____

[2]

5. Which products are formed in the electrolysis of aqueous copper sulfate, $CuSO_4$ using inert electrodes?

A Copper and oxygen
B Copper and sulfur dioxide
C Hydrogen and oxygen
D Hydrogen and sulfur dioxide

Your answer ☐ **[1]**

6. During the electrolysis of molten sodium chloride, sodium and chlorine are formed.

What happens at the **positive** electrode (anode)?

A The chloride ion, Cl^-, gains an electron.
B The chloride ion, Cl^-, loses an electron.
C The sodium ion, Na^+, gains an electron.
D The sodium ion, Na^+, loses an electron.

Your answer ☐ **[1]**