

Section A:

1. Match each key word with the correct definition.

Cation	The negatively charged electrode used in electrolysis.
Anion	The positively charged electrode used in electrolysis.
Cathode	A positively charged ion, e.g. Na^+
Anode	A negatively charged ion, e.g. Cl^-

2. Complete the sentences below to describe the electrolysis of molten magnesium oxide.

- There are Mg^{2+} and O^{2-} ions present in molten magnesium oxide. The _____ is Mg^{2+} and the _____ is O^{2-} .
- Mg^{2+} ions move towards the _____ where they are discharged because they have _____ electrons and been reduced. This forms Mg atoms which appear as solid, silver metal.
- O^{2-} ions move towards the anode where... _____.

This forms... _____.

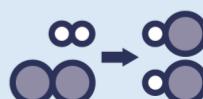
3. Ions can be discharged at electrodes.

Explain what the term 'discharged' means.

4. Complete the table below.

Electrolyte name	Cation in the electrolyte	Anion in the electrolyte	Ion discharged at the <u>cathode</u> What is observed?	Ion discharged at the <u>anode</u> What is observed?
Molten lithium bromide				Br^- Brown/red liquid
Molten sodium fluoride				
Molten potassium chloride				

Section B



Ionic compounds, such as lead chloride ($PbCl_2$), can be electrolysed when molten.

1. Describe a use of electrolysis.

2. At the negative electrode...

Tick (\checkmark) **one** box.

A. gases are produced.

B. ions are reduced.

C. anions are present.

3. State the ions present in lead chloride.

4. During the electrolysis of molten lead chloride, describe what happens at each electrode.

Include:

- which ions move to each electrode
- whether electrons are lost or gained
- what is reduced and what is oxidised
- *half equations to show this (HT only)*
- what is discharged at each electrode.

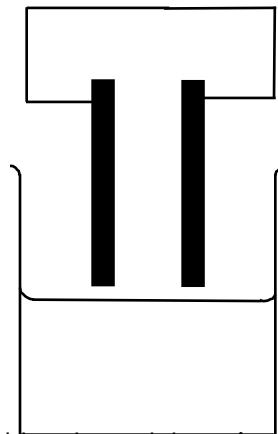
5. Graphite electrodes were used to electrolyse molten lead chloride because they both conduct electricity and are inert.

Explain why inert substances are used as electrodes.

Section C



1. Electrolysis cannot be carried out using the equipment shown in the diagram below.



(a) One improvement would be to add a circuit component.

(i) Draw the symbol of this component below.

(ii) Describe the function of this component.

(b) Describe another improvement that could be made so that electrolysis can be carried out

2. Using the correct equipment, molten sodium bromide was electrolysed.

(a) State what would be produced at the cathode.

(b) Write a half equation to show what happens at the cathode. (HT only)

(c) Explain why a brown gas was seen at the anode.

(d) Explain why sodium bromide has a very high melting point of 661°C.

