Section A:

1. Complete the gaps below.

Electrolysis

Comes from: Electro- [ ] -lysis [ ]

Electrolysis definition: _____

_____

2. Add the following labels to the diagram below.

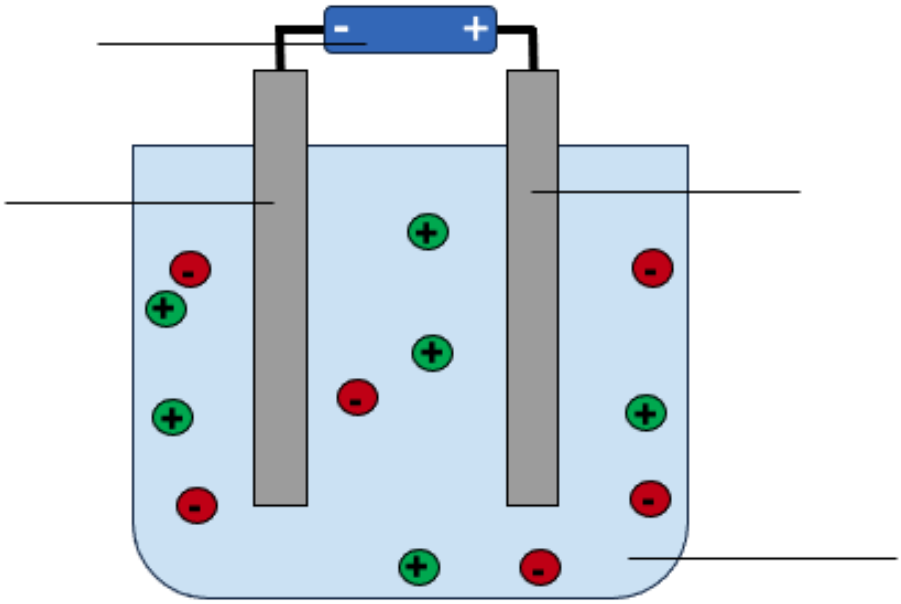
Battery or power source **Anode** **Electrolyte** **Cathode**

The liquid that contains the ions (current is passed through)

Negatively charged electrode

Generates a current to flow through the electrolyte

Positively charged electrode



3. Complete the table below to show the ions in different electrolytes.

Name of electrolyte	Positive ion (cation)	Negative ion (anion)
Potassium chloride		
Zinc nitrate		
Iron oxide		

4. Complete the sentences below.

- *During electrolysis, passing an electric current through electrolytes causes the _____ to move to the electrodes.*
- *Positively charged ions move to the _____ electrode where they receive electrons and are _____.*
- *Negatively charged ions move to the _____ electrode where they lose electrons and are _____.*

5. Explain why an ionic compound must be liquid when used as an electrolyte.

_____

_____

6. Explain why liquid ammonia (NH_3) cannot be electrolysed.

_____

_____

_____

Section B - Molten potassium fluoride can be electrolysed.

1. Molten potassium fluoride contains ions.

   (a) Explain why molten potassium fluoride can be described as an electrolyte.

   _____

   _____

   (b) Write the chemical formula for potassium fluoride. _____

   (c) State the ions present in potassium fluoride. _____

   (d) State which electrodes these ions move to during electrolysis.

   _____

   (e) At the negative electrode (cathode), ions gain electrons and are reduced.

   Explain what happens to ions at the **positive electrode** (anode).

   _____

   _____

   (f) State what is formed at each electrode.

   Negative electrode _____

   Positive electrode _____

   (g) Write the half equations to show what happens at both electrodes during the electrolysis of potassium fluoride. (HT Only)

   Negative electrode _____

   Positive electrode _____

2. The melting point of potassium fluoride is 858 °C.

   (a) What state is potassium fluoride at room temperature (~25 °C)?

   _____

   (b) Explain why electrolysis of potassium fluoride cannot take place when it is at room temperature.

   _____

   _____

Section C - The table below shows some information about metals and their ores.

Metal	Source	First extracted	Extraction method

Platinum	Found as pure metal in the Earth	Used by ancient civilisations in South America	Removing from rocks
Zinc	Zinc oxide	c.1300 in India	Reduction with carbon
Magnesium	Magnesium carbonate Magnesium chloride	1808 by Sir Humphry Davy	Electrolysis

1. Explain why platinum is found as pure metal in the Earth

   _____

   _____

2. Zinc can be extracted from zinc oxide by reduction with carbon.

   (a) Explain why carbon is used to extract zinc from zinc oxide.

   _____

   _____

   (b) Write the word equation for this reaction.

   _____

   (c) Write the balanced symbol equation for this reaction.

   _____

3. Explain why magnesium was extracted much later than zinc and platinum.

   _____

   _____

4. Electrolysis is used in industry to extract magnesium from magnesium chloride. Graphite can be used as electrodes because graphite is a good electrical conductor.
   (a) Explain why graphite conducts electricity.

   _____

   _____

   (b) State what is produced at the anode and cathode when magnesium chloride is electrolysed.

   Anode _____ Cathode _____

   (c) Suggest why other chemicals are added to the molten magnesium chloride to decrease the melting point of the mixture.

   _____

   _____