

Core Concepts: Understand the rules for predicting products at the anode and cathode during electrolysis of aqueous solutions, including the role of water and the reactivity series. Recall half-equations for common electrode reactions.

Section A: Key Terms & Basic Understanding

A1. The diagram below shows an electrolysis cell. Label the components using the terms provided.

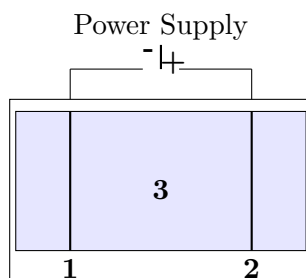


Figure 1: An electrolysis cell.

Match the numbers to the correct terms:

- **1:** _____
- **2:** _____
- **3:** _____

A2. Complete the sentences below using appropriate scientific terms.

- (i) Electrolysis is the process of using _____ to break down an _____.
- (ii) The substance being electrolysed must be molten or dissolved in water so that its _____ are free to _____.
- (iii) The positive electrode is called the _____ and the negative electrode is called the _____.
- (iv) At the cathode, _____ occurs, which is the _____ of electrons. At the anode, _____ occurs, which is the _____ of electrons.

Section B: Core Concepts & Explanations

B1. Explain why solid ionic compounds do not conduct electricity, but molten ionic compounds do.

B2. Describe what happens to positive ions (cations) and negative ions (anions) during electrolysis.

B3. When electrolysing an aqueous solution, explain the rule for predicting the product at the cathode.

B4. When electrolysing an aqueous solution, explain the rule for predicting the product at the anode.

Section C: Exam Application & Extended Writing

C1. Aqueous copper(II) sulfate (CuSO_4) is electrolysed using inert electrodes.

(i) List all the ions present in the aqueous copper(II) sulfate solution.

(ii) Predict the products formed at the cathode and anode, giving a reason for each prediction.

C2. Aqueous sodium chloride (NaCl) is electrolysed using inert electrodes. Describe the processes occurring at both electrodes, including the half-equations and observations you would expect to see. (6 marks)
