

## G631: Electrons in Action – Sample Assignment B1

<b>Unit Name:</b> Electrons in Action	<b>Unit Number:</b> G631
<b>Assignment Title:</b> Copper Plating	<b>Assignment Number:</b> G631 Sample Assignment B 1
<b>Date Set:</b>	<b>Due Date:</b>
<b>Assessment Objective(s):</b> AO2(b), AO3(a), (b) & (c), (AO1(b) part)	

### Assignment Brief:

The cost of energy is rising very rapidly. A company whose business is the copper plating of objects such as mugs and vases wants to reduce its energy costs.

The company commissions research to find out if a change in the conditions used to plate the objects could reduce the electrical power required whilst still maintaining the standard of the copper plating.

### Assignment:

You are the spokesperson for the team of scientists who have carried out the research. You are to provide a report which shows that the following tasks have been done.

**Task 1:**

AO1(b)

Carry out research into:

- the theory of electrolysis and electroplating
- standard experimental methods of investigating electroplating.

Produce a presentation of your work.

**Task 2:**

AO3(a)

Complete a detailed risk assessment for the experimental method selected.

Adapt the method so that conditions are changed.

Carry out the experiments.

Supply full practical details used with your report and include:

- the solutions needed
- measurement taken
- information on which conditions you changed and how you did it.

Produce evidence that the experimental work has been completed.

For MB3 you need to include further information of any practical techniques you used that improved your results.

**Task 3:**

AO3(b)

Record all the data collected from your experimental work in suitable ways.

Present it with your final report.

**Task 4:**

AO2(b)

Calculate the power needed to deposit a known mass of copper using the experimental data.

Produce evidence of all your calculations for the final report.

**Task 5:**

AO3(c)

You should:

- analyse the results
- make conclusions that relate to the energy requirements and the standard of plating under different conditions
- discuss the accuracy of the experimental method
- suggest possible alternative methods.

Present this work together with evidence from the other tasks, in a suitable form, to give to the Copper Plating company.

**The complete portfolio work for AO3 is made up of 2 assignments each can be marked out of 26 and the total divided by 2.**

**[ Max marks possible for this task: 13 ]**

**Resources:**

- Chemistry textbooks
- Guidelines for Copper Plating assignment.

## Assignment Guide

### G631: Electrons in Action – Sample Assignment B

Outline Guidance for G631 Sample Assignment B	Commentary on Mark Allocation
<p><b>Task 1 – Research</b></p> <p><b>Introduction</b></p> <p>Theory of electrolysis and electroplating which includes definitions of the terms stated in 3.12.3.</p>	<p>Consideration of the theory should lead to the choice of conditions to change.</p> <p>One of the conditions changed should show no effect if MB3 is to be obtained.</p>
<p><b>Task 2</b></p> <p><b>Experimental work</b></p> <p>This can be done in the laboratory using experimental details supplied.</p> <p>Task requires practical details to be included but there is no necessity for students to rewrite experimental procedures however they should include details of:</p> <ul style="list-style-type: none"> <li>• risk assessments used/composed</li> <li>• solutions needed</li> <li>• measurements to be taken</li> <li>• information on the conditions to be changed and how this will be done</li> <li>• reasons for choice.</li> </ul> <p>Explanation of practical techniques to improve results (MB3).</p>	<p>Procedures that are used to ensure an accurate measurement must be stated and used for MB3, e.g. repetition of measurements, removal of any contaminants.</p> <p>If only one condition used for experiment, then only MB1 possible.</p> <p>No risk assessment, no marks.</p>

### **Task 3, Task 4 and Task 5**

#### **Results and calculations**

Results tabulated and analysed.

Results displayed in a different way (e.g. graphically) from other assignment for AO3b.

#### **Calculations made**

Opportunity for further analysis of results linked to calculations.

#### **Conclusions**

Drawn from the data and applied to the brief.

#### **Accuracy, evaluation of procedures**

- discussion of the accuracy of the apparatus used
- limitations of the method
- possible other methods.

Must be at least two sets of results in order to achieve MB1.

If help has been given, only MB1 possible.

MB3 requires the data to be tabulated to the accuracy of which the apparatus is capable and the data to be displayed with units etc. and in 'easy-to-read' formats.

Possible contribution to AO2. Actual mark will depend on whether the calculations are straightforward or complex.

MB1 will be given for an obvious conclusion. Conclusion must be related to the theory of electrolysis for MB3.

MB3 is awarded only if alternative methods are suggested.