



Rewarding Learning

General Certificate of Secondary Education
2025

Centre Number

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Candidate Number

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Double Award Science: Chemistry

Unit 7 Practical Skills
Booklet B
Higher Tier



[GDW77]

GDW77

FRIDAY 13 JUNE, MORNING

TIME

30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete questions in black ink and use a dark HB pencil for drawings and graphs.

Do not write with a gel pen.

Answer **all four** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **35**.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You may use a scientific calculator.

Quality of written communication will be assessed in Question **1(a)**.

A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.

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- 1 (a) Group 1 metals are called the alkali metals. Two of the alkali metals are lithium and potassium. They react with water.

Describe the reactions of lithium with water and of potassium with water using the following headings:

- Give the **names** of the products of the reaction of potassium with water.
- Give three observations which are the **same** for the reactions of both lithium with water and potassium with water.
- Give two observations which are **different** for the reactions of both lithium with water and potassium with water.

In this question you will be assessed on the quality of your written communication skills, including the use of specialist scientific terms.

Give the **names** of the products of the reaction of potassium with water.

Give three observations which are the **same** for the reactions of both lithium with water and potassium with water.

Give two observations which are **different** for the reactions of both lithium with water and potassium with water.

[6]



(b) Describe how the alkali metals should be stored.

[1]

(c) Write a balanced symbol equation for the reaction of lithium with water.
Include state symbols.

[4]

[Turn over]

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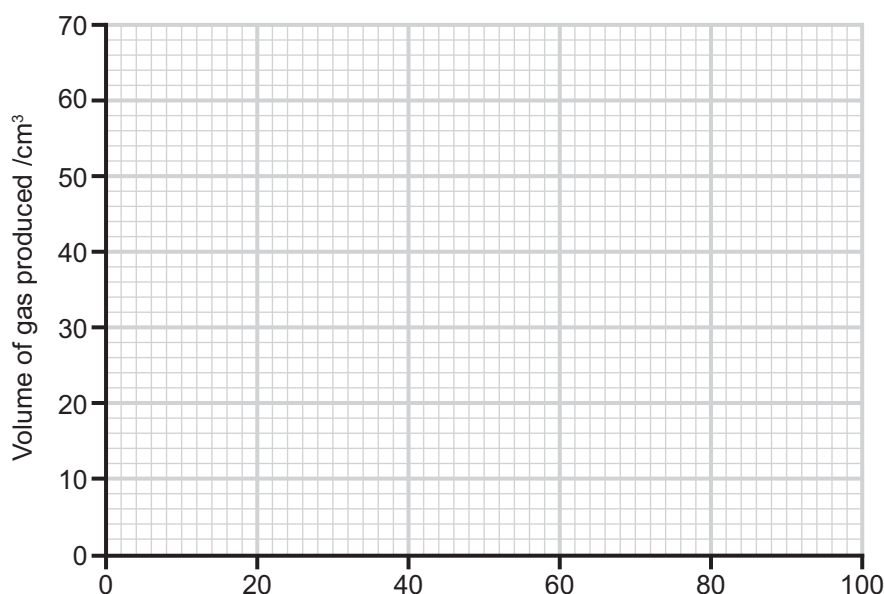
- 2 A student reacted a large piece of calcium carbonate of mass 0.5g, with an excess of dilute hydrochloric acid at room temperature (20°C). The gas produced was collected and its volume recorded every 20 seconds for 100 seconds.

The results obtained in the experiment are shown in the table below.

Time /s	0	20	40	60	80	100
Volume of gas produced /cm ³	0	30	48	56	60	60

- (a) Using the results in the table above, plot a graph on the grid below by completing the following:

- label the x-axis
- plot the results on the grid below
- draw a curve of best fit



[3]



(b) Using the graph you have drawn in (a), answer the following questions:

(i) What was the total volume of gas produced?

_____ [1]

(ii) At what time did the reaction finish?

_____ [1]

(c) On the graph, sketch the line you would expect to obtain if the experiment was repeated using 0.5 g of **powdered** calcium carbonate, with excess dilute hydrochloric acid at room temperature (20°C). [1]

(d) Draw a labelled diagram of the assembled apparatus used to carry out the experiment. Include the following:

conical flask

delivery tube

gas syringe

stop clock

[3]

[Turn over]

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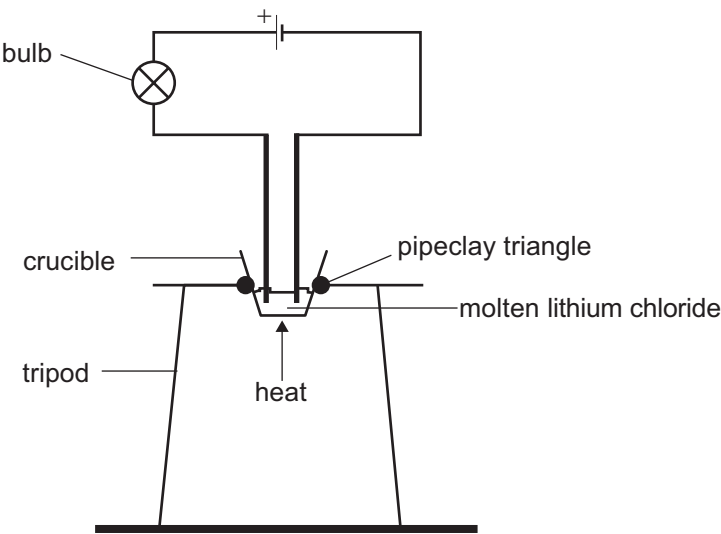
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- (e) Carbon dioxide gas is produced when calcium carbonate reacts with hydrochloric acid. Describe the test for carbon dioxide and give the result for a positive test.

[3]



3 The diagram shows the apparatus used for the electrolysis of molten lithium chloride.



Complete the table below for the electrolysis of molten lithium chloride.

	Cathode	Anode
Observations	silver grey metallic bead	
Name of product		
Balanced half equation	$\text{Li}^+ + \text{e}^- \rightarrow \text{Li}$	

[7]



- 4 (a) A student was asked to determine the number of moles of water of crystallisation present in a sample of hydrated copper(II) sulfate, $\text{CuSO}_4 \cdot x\text{H}_2\text{O}$.

When the student heated a sample of 2.0 g of hydrated copper(II) sulfate to a constant mass, 1.28 g of anhydrous copper(II) sulfate was obtained.
(Relative atomic masses (A_r): H = 1; O = 16; S = 32; Cu = 64)

- (i) Calculate the mass of water lost when the sample of hydrated copper(II) sulfate was heated to a constant mass.

mass of water lost = _____ g [1]

- (ii) Calculate the number of moles of water lost.

moles of water lost = _____ [1]

- (iii) Calculate the number of moles of anhydrous copper(II) sulfate obtained.

moles of anhydrous copper(II) sulfate = _____ [1]



(iv) Using your answers to (a)(ii) and (iii), determine the value of x in $\text{CuSO}_4 \cdot x\text{H}_2\text{O}$.

x = _____ [1]

(b) What colour is anhydrous copper(II) sulfate?

_____ [1]

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	

Total Marks	
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Examiner Number

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