



Rewarding Learning

General Certificate of Secondary Education
2022

Centre Number

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Candidate Number

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Double Award Science Chemistry

Unit 7: Practical Skills

Booklet A

Foundation Tier

[GDW71]



GDW71

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

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

Write your answers in the spaces provided in this question paper.

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **15**.

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

Follow all health and safety instructions.

You may use a ruler and calculator if required.

The apparatus and materials required to complete the task(s) are provided.

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

For Examiner's
use only

Question Number	Marks
1	
2	

Total
Marks

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- 1 The reactivity of metals varies from one metal to another. A reactivity series for metals can be determined by carrying out displacement reactions.

In order to determine the reactivity series of four metals, **W**, **X**, **Y** and **Z**, you will carry out a series of experiments.

- Each metal will be added to a metal sulfate solution containing a different metal ion.
- If the metal is more reactive than the metal in the metal sulfate solution, it will displace the metal from the metal sulfate solution and you will observe a change in the reaction mixture.

- (a) Use **Table 1** below to record the results of experiments **B**, **C** and **D**. Experiment **A** has been done for you and the results are recorded in the table.

In each box, if a displacement reaction occurred write “yes” and if there was no reaction write “no”.

Table 1

	Displacement reaction occurred yes / no			
	Experiment A with metal W	Experiment B with metal X	Experiment C with metal Y	Experiment D with metal Z
W sulfate solution				
X sulfate solution	yes			
Y sulfate solution	yes			
Z sulfate solution	no			

[4]

Examiner Only

Marks Remark

Examiner Only	
Marks	Remark

1. Label three test tubes '**W**', '**Y**' and '**Z**'.
2. Use measuring cylinder **W** to measure 5 cm^3 of **W** sulfate solution into test tube **W**. Then use measuring cylinder **Y** to measure 5 cm^3 of **Y** sulfate solution into test tube **Y**. Finally, use measuring cylinder **Z** to measure 5 cm^3 of **Z** sulfate solution into test tube **Z**.
3. Add half a spatula of metal **X** into each of the test tubes and gently shake each test tube.
4. Leave for 3 minutes and, for each of the three solutions, record whether a displacement reaction occurred (yes or no) in the correct box in **Table 1**.

1. Label three test tubes '**W**', '**X**' and '**Z**'.
2. Use measuring cylinder **W** to measure 5 cm^3 of **W** sulfate solution into test tube **W**. Then use measuring cylinder **X** to measure 5 cm^3 of **X** sulfate solution into test tube **X**. Finally, use measuring cylinder **Z** to measure 5 cm^3 of **Z** sulfate solution into test tube **Z**.
3. Add half a spatula of metal **Y** into each of the test tubes and gently shake each test tube.
4. Leave for 3 minutes and, for each of the three solutions, record whether a displacement reaction occurred (yes or no) in the correct box in **Table 1**.

1. Label three test tubes '**W**', '**X**' and '**Y**'.
2. Use measuring cylinder **W** to measure 5 cm^3 of **W** sulfate solution into test tube **W**. Then use measuring cylinder **X** to measure 5 cm^3 of **X** sulfate solution into test tube **X**. Finally, use measuring cylinder **Y** to measure 5 cm^3 of **Y** sulfate solution into test tube **Y**.
3. Add half a spatula of metal **Z** into each of the test tubes and gently shake each test tube.
4. Leave for 3 minutes and, for each of the three solutions, record whether a displacement reaction occurred (yes or no) in the correct box in **Table 1**.

Table 2

Metal sulfate	Initial temperature / °C	Highest temperature reached / °C	Temperature change / °C
X sulfate solution			
Y sulfate solution			
Z sulfate solution			

[2]

(ii) Which reaction gave the biggest temperature change?

Place a tick (✓) in the correct box.

Metal W and X sulfate solution	
Metal W and Y sulfate solution	
Metal W and Z sulfate solution	

[1]

Examiner Only

Marks Remark

2 Different metal ions produce different flame colours when they are heated strongly.

You are provided with a sample of an ionic compound labelled **V**.

(a) Describe the appearance of compound **V**.

[2]

(b) Carry out a flame test by following steps 1–4 below:

1. Dip the loop of the clean nichrome wire in concentrated hydrochloric acid.
2. Place the loop in a sample of the solid compound **V**.
3. Hold the nichrome wire so that the loop is touching the edge of the blue Bunsen burner flame and observe the flame colour.
4. Record your observations in the box in the table below and identify the metal ion in compound **V**.

Compound	Observed flame colour	Identity of metal ion
V		

[2]

(c) Chemicals in a laboratory are labelled with symbols to let people know the risks associated with them. What are these symbols called?

Circle the correct answer.

chemical
symbols

danger
symbols

hazard symbols

[1]

Examiner Only	
Marks	Remark

(d) What does the symbol shown below tell you about compound **V**?



Circle the correct answer.

flammable

explosive

caution

toxic

[1]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

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Chemistry**

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**APPARATUS AND MATERIALS LIST
AND
CONFIDENTIAL INSTRUCTIONS**

To be accessed by Head of Department only

It is the responsibility of the centre to ensure that appropriate risk assessments are carried out for all practical skills assessments.

Advice for centres

- All chemicals used should be at least laboratory reagent specification and labelled with appropriate hazard symbols, e.g. flammable
- For centres running multiple sessions – candidates for the later session should be supplied with clean, dry glassware. If it is not possible, then glassware from the first session should be thoroughly washed, rinsed with deionised water and allowed to drain
- **Ensure all chemicals are in date**
- **For this particular examination it is recommended that candidates carry out the practical tasks in pairs where possible and where resources are available**
- **All candidates must be provided with safety glasses**

Question 1

Each group of candidates will require:

- 12 × test tubes
 - test tube racks to hold 12 test tubes
 - 3 × boiling tubes
 - 1 × boiling tube rack
 - 4 × measuring cylinders* labelled '**W**', '**X**', '**Y**' and '**Z**' (suitable for measuring 5 cm³ and 10 cm³)
- *NB if measuring cylinders are not available then plastic syringes may be used
- 1 × spatula
 - 1 × thermometer (–10 to 110°C)
 - Stop clock
 - Zinc powder (4 spatula measures) in a suitable container labelled '**Metal W**' with flammable and harmful to environment hazard symbols
 - Copper powder (3 spatula measures) in a suitable container labelled '**Metal X**'
 - Iron powder (3 spatula measures) in a suitable container labelled '**Metal Y**' with flammable hazard symbol
 - Magnesium powder (3 spatula measures) in a suitable container labelled '**Metal Z**' with the flammable hazard symbol
 - Zinc sulfate solution (50 cm³) (0.5 mol/dm³) in a suitable container labelled '**W Sulfate**' with corrosive and irritant hazard symbols
 - Copper(II) sulfate solution (50 cm³) (0.5 mol/dm³) in a suitable container labelled '**X Sulfate**' with corrosive and irritant hazard symbols
 - Iron(II) sulfate solution (50 cm³) (0.5 mol/dm³) labelled '**Y Sulfate**' with irritant hazard symbol
 - Magnesium sulfate solution (50 cm³) (0.5 mol/dm³) labelled '**Z Sulfate**'

Question 2

Each group of candidates will require:

- 1 × nichrome wire, clean, with loop
- 1 × Bunsen burner
- 1 × heatproof mat
- 2.0 mol/dm³ hydrochloric acid (approx. 5 cm³) in a suitable container labelled **concentrated hydrochloric acid** with corrosive and irritant hazard symbols.
- Copper(II) sulfate (2 spatulas) in a suitable reagent bottle labelled '**Compound V**'. The container should be labelled with irritant, corrosive and harmful to environment hazard symbols.
- Access to a fume cupboard

