



Rewarding Learning

General Certificate of Secondary Education
2023

Centre Number

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Candidate Number

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Chemistry

Unit 3: Practical Skills

Booklet A

Foundation Tier



GCM31

[GCM31]

TIME

2 hours.

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 **30**.

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 the Elements, is included in this question paper.

For Examiner's use only	
Question Number	Marks
1	
2	

Total Marks	
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1 You are provided with four solutions labelled **A**, **B**, **C** and **D**. Each solution contains a different ionic compound.

(a) (i) Describe the colour of solutions **C** and **D**.

C _____

D _____ [2]

(ii) You will carry out the following procedure for each solution. Record your measurements in the table below.

1. Using a disposable pipette, place approximately 5 cm³ of solution **A** in a test tube.
2. Place a thermometer in the test tube and record the initial temperature of the solution to the **nearest whole number**.
3. Add one 3 cm piece of magnesium ribbon to the solution and stir using the thermometer.
4. Monitor the temperature and record the highest temperature achieved to the **nearest whole number**.
5. Rinse the thermometer with deionised water.
6. Repeat steps 1 to 5 with solutions **B**, **C** and **D**.
7. Calculate the temperature change for each solution and record in the table below.

Solution	Initial temperature / °C	Highest temperature / °C	Temperature change / °C
A			
B			
C			
D			

[8]

(iii) Using the temperature changes recorded in your results table, state which solution gave the most exothermic reaction.

_____ [1]

(iv) Using the temperature changes recorded in your results table, state which solution did not react with magnesium metal.

_____ [1]

Examiner Only

Marks Remark

(b) Using solutions **A**, **B** and **C**, carry out the following procedure.

1. Using a disposable pipette, place approximately 1 cm³ of solution **A** in a test tube.
2. Add drops of sodium hydroxide solution until a precipitate forms.
3. Record the colour of the precipitate formed.
4. Repeat with solutions **B** and **C**.

Colour of precipitate in **A** _____

Colour of precipitate in **B** _____

Colour of precipitate in **C** _____ [3]

(c) Using solutions **A**, **B**, **C**, **D** and sodium hydroxide solution, carry out the following procedure.

1. Place a piece of Universal Indicator paper on a white tile.
2. Dip a glass rod into solution **A** and touch on the Universal Indicator paper.
3. Record the colour of the Universal Indicator paper.
4. Compare the colour obtained to the pH colour chart and record the pH in the table below.
5. Rinse the glass rod with deionised water and repeat for solutions **B**, **C**, **D** and sodium hydroxide solution.

Solution	Colour of Universal Indicator paper	pH
A		
B		
C		
D		
Sodium hydroxide		

[5]

Examiner Only	
Marks	Remark

2 Vinegar is a dilute solution of ethanoic acid.

You are provided with solutions labelled **sodium hydroxide solution for use in question 2** and **vinegar**.

Carry out the following procedure using the solutions.

1. Using the 25.0 cm³ pipette and safety pipette filler, place 25.0 cm³ of **vinegar** into a conical flask.
2. Add 5 drops of phenolphthalein indicator to the conical flask.
3. Fill the burette with **sodium hydroxide solution for use in question 2**.
4. Carry out a rough titration and two accurate titrations.

(a) Record your titration results to **1 decimal place** in the table below.

	Rough titration	First accurate titration	Second accurate titration
Initial burette reading / cm ³			
Final burette reading / cm ³			
Titre / cm ³			

[6]

(b) Calculate the average titre using the results of the two accurate titrations.

_____ [2]

(c) State the colour change at the end point.

From _____ to _____ [2]

Examiner Only

Marks

Remark

THIS IS THE END OF THE QUESTION PAPER

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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.

It is the responsibility of the centre to ensure that a suitable risk assessment is carried out and all suitable safety precautions are in place. Candidates should wear safety glasses throughout all practical activities.

CCEA will not provide chemicals or apparatus for the practical assessment.

Foundation tier

Question 1

- 8 × disposable pipettes
- 7 × test tubes
- 1 × test tube rack
- 1 × thermometer (−10 to 110 °C with 1 °C divisions)
- 1 × wash bottle of deionised water
- 5 × pieces of universal indicator paper
- 1 × white tile
- 1 × 250 cm³ beaker for used disposable pipettes
- 1 × glass rod
- 1 × pH colour chart for universal indicator paper
- 4 × 3 cm pieces of magnesium ribbon labelled **magnesium ribbon** and with the hazard symbol for **flammable**
- Approximately 20 cm³ of 0.5 mol/dm³ ammonium iron(II) sulfate solution labelled **A** and with the hazard symbol for **caution**.
- Approximately 20 cm³ of 0.5 mol/dm³ zinc chloride solution labelled **B** and with the hazard symbol for **corrosive** and **caution**.
- Approximately 20 cm³ of 0.5 mol/dm³ copper(II) sulfate solution labelled **C** and with the hazard symbol for **corrosive** and **caution**.
- Approximately 20 cm³ of deionised water labelled **D**.
- Approximately 50 cm³ of 0.49 mol/dm³ sodium hydroxide solution labelled **sodium hydroxide solution** and with the hazard symbol for **caution**.

Question 2

- 1 × 50 cm³ burette
- 1 × 25 cm³ bulb pipette
- 1 × safety pipette filler
- 1 × white tile
- 3 × 250 cm³ conical flasks
- waste beaker (100 cm³ or 250 cm³)
- retort stand and suitable burette clamp
- approximately 150 cm³ of sodium hydroxide solution (0.125 mol/dm³) in a beaker labelled **sodium hydroxide solution for use in question 2** and **irritant**
- approximately 150 cm³ of ethanoic acid (0.1 mol/dm³) in a beaker labelled **vinegar**.
- 1 × dropper bottle containing phenolphthalein labelled **phenolphthalein** and **flammable**
- 1 × small filter funnel for filling the burette
- 1 × wash bottle of deionised water