



Rewarding Learning

General Certificate of Secondary Education
2025

Centre Number

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Candidate Number

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Chemistry

Unit 3: Practical Skills

Booklet A

Higher Tier

[GCM33]



GCM33

TIME

2 hours.

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

Do not write with a gel pen. 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.

You may use a scientific calculator.

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

Follow all health and safety instructions. Safety glasses must be worn at all times.

You may not have access to notes, textbooks and other materials to assist you.

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

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1 You are provided with a sample of a solid mixture **A** and solutions of ethanoic acid, sulfuric acid, limewater and sodium hydroxide.

- (a)
1. Use a 10 cm³ measuring cylinder to place 3 cm³ of ethanoic acid into a conical flask.
 2. Place the conical flask on a white tile.
 3. Add 10 drops of universal indicator solution to the conical flask and swirl the flask to mix.
 4. Record the colour observed in the table below.
 5. Use the pH colour chart to determine the pH and record in the table below.
 6. Use a disposable pipette to add one drop of sodium hydroxide solution to the solution of ethanoic acid in the conical flask and swirl.
 7. Continue to add sodium hydroxide solution **dropwise** with swirling until the ethanoic acid is neutralised.
 8. Record the number of drops of sodium hydroxide required in the table below.
 9. Rinse the 10 cm³ measuring cylinder with deionised water and repeat steps 1 to 8 with sulfuric acid.

Acid	Colour with universal indicator	pH of acid	Number of drops of sodium hydroxide required
ethanoic acid			
sulfuric acid			

[6]



(b) (i) Describe the appearance of solid mixture **A**.

[1]

(ii) Add two spatula measures of solid mixture **A** into a conical flask. Rinse the 10 cm³ measuring cylinder with deionised water and place 10 cm³ of ethanoic acid into the conical flask. Record any observations over a period of three minutes.

[3]

(c) Rinse the 10 cm³ measuring cylinder with deionised water and place 5 cm³ of limewater into a test tube.

Rinse the measuring cylinder again and place 10 cm³ of sulfuric acid into a boiling tube. Add two spatula measures of solid mixture **A** to the sulfuric acid and immediately attach a delivery tube to the boiling tube. Place the open end of the delivery tube into the limewater.

Record any observations over a period of three minutes.

[4]

[Turn over



2 (a) Describe the appearance of the manganese(IV) oxide.

_____ [2]

(b) Describe the appearance of the hydrogen peroxide solution.

_____ [1]

(c) Add one spatula measure of manganese(IV) oxide into a boiling tube. Use a 10 cm³ measuring cylinder to add 10 cm³ of hydrogen peroxide solution into the boiling tube. Place a glowing splint into the boiling tube.

Record all observations.

_____ [2]

(d) (i) Place approximately 50 cm³ of sulfuric acid into a 100 cm³ beaker. Place a thermometer in the acid and record the initial temperature of the sulfuric acid in the table below.

Start a stop clock and add a spatula measure of solid **B** to the sulfuric acid and stir gently with the thermometer. Add two more spatula measures of solid **B** to the sulfuric acid and continue to stir gently with the thermometer for two minutes. Record the final temperature of the reaction mixture in the table below and calculate the temperature change for the reaction.

Initial temperature /°C	
Final temperature /°C	
Temperature change /°C	

[3]



- (ii) Using the data you recorded in the table, explain whether the reaction between solid **B** and sulfuric acid is exothermic, endothermic or neither.

[2]

- (e) You are provided with a solution labelled copper(II) sulfate solution.

All volumes in this section are approximate and should be measured using disposable pipettes.

- (i) Place 2 cm³ of the copper(II) sulfate solution into a test tube. Add 1 cm³ of barium chloride solution to the test tube. Allow the test tube to sit for three minutes. Record your observations.

[2]

- (ii) Place 2 cm³ of the copper(II) sulfate solution into another test tube. Add 2 cm³ of sodium hydroxide solution to the test tube. Record your observations. **Keep this test tube and contents for part (e)(iii).**

[2]

- (iii) In a fume cupboard, add 1 cm³ of concentrated ammonia solution to the test tube from part (e)(ii) and shake gently. Record all observations.

[2]

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Question Number	Marks
1	
2	
Total Marks	

Examiner Number

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Chemistry

Unit 3: Practical Skills

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Higher Tier

[GCM33]

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 safety symbols, e.g. flammable.
- Ensure all chemicals are in date, otherwise expected observations may not be seen.
- Candidates should wear safety glasses throughout all practical activities.

It is the responsibility of the centre to be cognisant of all health and safety issues and to carry out a thorough risk assessment **including a check of hazard labelling advice**. Up to date information can be obtained at www.cleapss.org.uk

Question 1

- 1 × 10 cm³ measuring cylinder
- pH colour chart for universal indicator solution
- 3 × 100 cm³ conical flasks
- 1 × spatula
- several disposable pipettes (3 cm³ graduated) (minimum 4)
- white tile
- 1 × test tube
- 1 × test tube rack
- 1 × boiling tube rack
- 1 × stop clock
- 1 × boiling tube
- delivery tube with bung to fit boiling tube
- approximately 2 g of a 50:50 by mass mixture of copper(II) carbonate and sodium hydrogencarbonate in a suitable container labelled **solid mixture A** and also with the hazard symbols for **health hazard (exclamation mark label)** and **harmful to the environment**
- 20 cm³ of approximately 1.0 mol/dm³ sulfuric acid labelled **sulfuric acid** and with the hazard symbol for **health hazard (exclamation mark label)**
- 20 cm³ of approximately 1.0 mol/dm³ ethanoic acid labelled **ethanoic acid**
- 1 × dropper bottle containing universal indicator solution labelled **universal indicator** and with the hazard symbol for **flammable (Check manufacturer's labelling)**
- 20 cm³ of 1.0 mol/dm³ sodium hydroxide solution in a beaker labelled **sodium hydroxide solution** and with the hazard symbol for **corrosive**
- limewater labelled **limewater** and with the hazard symbols for **corrosive** and **health hazard (exclamation mark symbol)** (minimum 5 cm³ required)
- access to wash bottle containing deionised water

Question 2

- 1 × 100 cm³ beaker
- 1 × boiling tube
- 2 × test tubes
- 1 × test tube rack
- 1 × boiling tube rack
- 1 × wooden splint
- 1 × Bunsen burner
- 1 × thermometer (for example –10/–20 to 100/110°C) (minimum interval 1°C)
- 1 × heat proof mat
- 1 × spatula
- 1 × 10 cm³ measuring cylinder
- 1 × stop clock
- several disposable pipettes (3 cm³ graduated) (minimum 5)
- 5 cm³ of 1.0 mol/dm³ sodium hydroxide solution in a beaker labelled **sodium hydroxide solution** and with the hazard symbol for **corrosive**
- 15 cm³ of '10 volume' hydrogen peroxide solution labelled **hydrogen peroxide**. This should be prepared as close to the practical examination as possible. (10 volume can be prepared 50:50 by volume of 20 volume hydrogen peroxide and water)
- Access to manganese(IV) oxide in a suitable container labelled **manganese(IV) oxide** and with the hazard symbol for **health hazard (exclamation mark label)**. One spatula measure required
- Access to potassium hydrogencarbonate in a suitable container labelled **solid B**
- 70 cm³ of approximately 1.0 mol/dm³ sulfuric acid labelled **sulfuric acid** and with the hazard symbol for **health hazard (exclamation mark label)**
- 5 cm³ of 0.1 mol/dm³ barium chloride solution in a suitable container and labelled **barium chloride solution**
- Access to concentrated ammonia solution in a fume cupboard labelled **concentrated ammonia solution** and with the hazard symbols for **corrosive** and **health hazard (exclamation mark label)**
- 5 cm³ of 0.1 mol/dm³ copper(II) sulfate solution labelled **copper(II) sulfate solution** and with the hazard symbol for **health hazard (exclamation mark label)**