Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

1587780154

CHEMISTRY **0620/62**

Paper 6 Alternative to Practical **February/March 2021**

1 hour

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

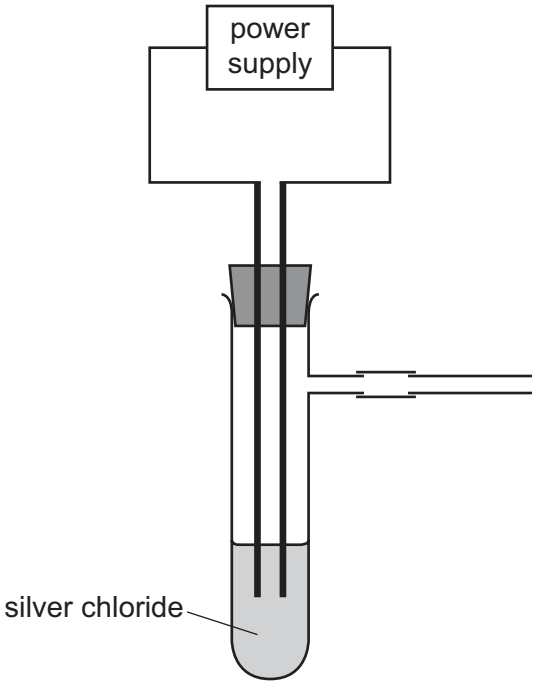
- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Any blank pages are indicated.

[Turn over

1 Silver chloride is an ionic compound and is insoluble in water. Molten silver chloride breaks down during electrolysis. The products are chlorine and silver.
Chlorine gas is soluble in water and toxic.

A student suggests using the apparatus shown to break down silver chloride.



(a) Draw an arrow on the diagram to show where heat must be applied so that the silver chloride can break down. [1]

(b) Complete the diagram to show how chlorine gas can be collected and the volume of the chlorine measured. Label any apparatus you have drawn. [2]

(c) Give **two** observations that are made as the silver chloride breaks down.

1 .....

2 .....
[2]

(d) The person doing the experiment followed all normal laboratory safety rules.

State **one** additional safety precaution that should be taken when doing this experiment. Give a reason for your answer.

safety precaution .....

reason .....
[2]

(e) Suggest **one** reason why zinc is **not** a suitable material to use as the electrodes.

.....

..... [1]

(f) The chlorine gas was bubbled into an aqueous solution of a sodium salt. The colour of the solution changed from colourless to orange.

Identify the sodium salt and explain what has happened to cause the colour change.

sodium salt .....

explanation .....

.....
[2]

[Total: 10]

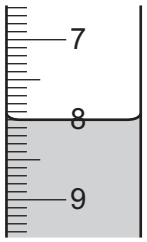
2 A student investigated the reaction between aqueous potassium hydroxide and two different aqueous solutions of hydrochloric acid labelled solution **A** and solution **B**.

Two experiments were done.

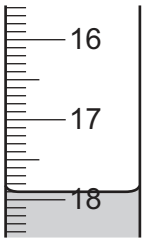
(a) *Experiment 1*

- A burette was filled with solution **A**. Some of solution **A** was run out of the burette so that the level of solution **A** was on the burette scale.
- A measuring cylinder was used to measure 25 cm^3 of the aqueous potassium hydroxide.
- The aqueous potassium hydroxide was poured into a conical flask.
- Five drops of methyl orange indicator were added to the conical flask.
- Solution **A** was added slowly from the burette to the conical flask, while the flask was swirled, until the solution just changed colour.

Use the burette diagrams to complete the table for Experiment 1.



initial reading



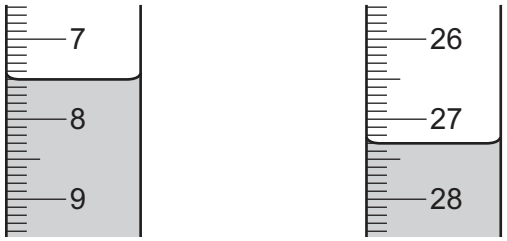
final reading

	Experiment 1
final burette reading / cm^3	
initial burette reading / cm^3	
volume of solution **A** added / cm^3	

Experiment 2

- The conical flask was emptied and rinsed with distilled water.
- The burette was emptied and rinsed with distilled water.
- The burette was rinsed with solution **B**.
- The burette was filled with solution **B**. Some of solution **B** was run out of the burette so that the level of solution **B** was on the burette scale.
- A measuring cylinder was used to measure 25 cm^3 of the aqueous potassium hydroxide.
- The aqueous potassium hydroxide was poured into the conical flask.
- Five drops of methyl orange indicator were added to the conical flask.
- Solution **B** was added slowly from the burette to the conical flask, while the flask was swirled, until the solution just changed colour.

Use the burette diagrams to complete the table for Experiment 2.



initial reading final reading

	Experiment 2
final burette reading / cm^3	
initial burette reading / cm^3	
volume of solution **B** added / cm^3	

[4]

(b) State the colour change observed in the conical flask at the end-point in Experiment 2.

from ..... to ..... [1]

(c) Before starting the titration in Experiment 2 the conical flask was rinsed with water.

(i) Explain why the conical flask was rinsed with water.

..... [1]

(ii) The conical flask was **not** then rinsed with aqueous potassium hydroxide.

State how rinsing the conical flask with aqueous potassium hydroxide would change the volume of solution **B** needed. Explain your answer.

.....

..... [2]

(d) (i) Deduce which aqueous solution of hydrochloric acid, **A** or **B**, was more concentrated. Explain your answer.

.....

..... [1]

(ii) Deduce how many times more concentrated this solution of hydrochloric acid was than the other solution of hydrochloric acid.

..... [1]

[Turn over

(e) Explain why Experiment 1 and Experiment 2 should be repeated.

.....

..... [1]

(f) Deduce the volume of solution **B** required if Experiment 2 is carried out with 50 cm^3 of aqueous potassium hydroxide.

.....

..... [2]

(g) Describe **one** change that could be made to the apparatus to improve the accuracy of the results.

.....

..... [1]

(h) Describe what effect using a larger conical flask would have on the results obtained.

..... [1]

[Total: 15]

3 Two solids, solid **C** and solid **D**, were analysed.
Tests were done on each solid.

tests on solid C

Tests were carried out and the following observations were made.

tests	observations
test 1 A flame test was carried out on solid **C**.	a red flame was seen
Solid **C** was dissolved in distilled water to produce solution **C**. **test 2** About 5 cm^3 of aqueous sodium hydroxide was added to solution **C**.	no change
test 3 A piece of aluminium foil was added to the mixture formed in **test 2**.The mixture was warmed gently and any gas produced was tested.	effervescence was seen; damp red litmus paper turned blue

(a) Name the gas that turned the damp red litmus paper blue in **test 3**.

..... [1]

(b) Identify solid **C**.

.....

..... [2]

tests on solid D

Solid **D** was aluminium sulfate.

Complete the expected observations.

Solid **D** was dissolved in water to form solution **D**. Solution **D** was divided into four approximately equal portions in four test-tubes.

(c) Aqueous sodium hydroxide was added dropwise and then in excess to the first portion of solution **D**.

observations .....

..... [2]

(d) Aqueous ammonia was added dropwise and then in excess to the second portion of solution **D**.

observations .....

..... [2]

(e) About 1 cm^3 of dilute nitric acid and a few drops of aqueous silver nitrate were added to the third portion of solution **D**.

observations ..... [1]

(f) About 1 cm^3 of dilute nitric acid and a few drops of aqueous barium nitrate were added to the fourth portion of solution **D**.

observations ..... [1]

[Total: 9]

4 Old concrete contains calcium carbonate. Calcium carbonate reacts with dilute hydrochloric acid.

$$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)$$

Plan an investigation to find which of two lumps of concrete contains the larger percentage of calcium carbonate. Your plan should include how you will use your results to determine which one of the two lumps has the larger percentage of calcium carbonate.

You have access to all common laboratory materials and a supply of dilute hydrochloric acid.

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..... [6]

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