Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

3798431157

CHEMISTRY **0620/62**

Paper 6 Alternative to Practical **February/March 2019**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

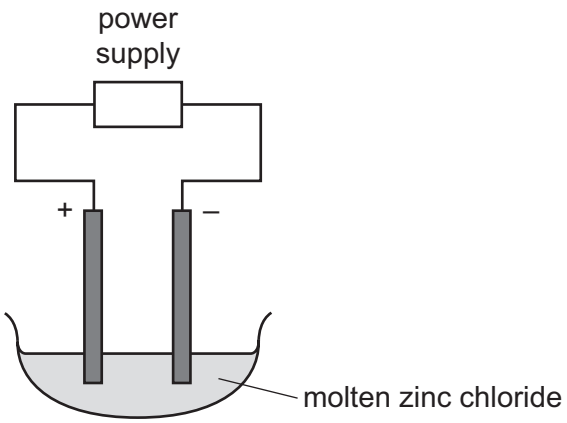
Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **9** printed pages and **3** blank pages.

1 A chemist heated solid zinc chloride until it became molten. The apparatus shown was then used to pass electricity through the molten zinc chloride using inert electrodes.



A silver-coloured solid was formed at the negative electrode (cathode).

(a) Name the process of breaking down a substance using electricity.

..... [1]

(b) A Bunsen burner was used to heat the zinc chloride.

Describe how a Bunsen burner is adjusted to give a very hot flame.

.....

..... [1]

(c) Suggest and explain the expected observation at the positive electrode (anode).

.....

..... [2]

(d) Suggest why iron electrodes **cannot** be used in this experiment.

..... [1]

(e) (i) What difference would the chemist observe at the negative electrode if aqueous zinc chloride were used, rather than molten zinc chloride?
Explain you answer.

difference .....

explanation .....

.....
[2]

(ii) When electricity is used to break down concentrated aqueous zinc chloride, chlorine is produced at the positive electrode.

Describe a test for chlorine.

test .....

observations .....
[2]

(f) The bottle of zinc chloride is labelled *corrosive*.

State **one** safety precaution that should be taken when using zinc chloride.

..... [1]

[Total: 10]

2 A student investigated the reaction between two different solutions, **A** and **B**, of aqueous potassium manganate(VII) and solution **C**.

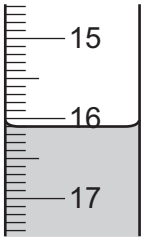
Three experiments were done.

Experiment 1

- A burette was filled with solution **A**. The initial burette reading was recorded.
- A measuring cylinder was used to pour 25 cm^3 of solution **C** into a conical flask.
- Solution **A** was added to the conical flask until the mixture just turned pink. The final burette reading was recorded.
- About 2 cm^3 of the contents of the conical flask was poured into a test-tube to use in Experiment 3.
- The rest of the contents of the conical flask was poured away. The conical flask was rinsed with distilled water.

(a) Use the burette diagrams to record the burette readings in the table and complete the table.

initial burette reading



final burette reading

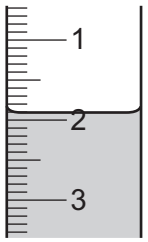
	Experiment 1
final burette reading / cm^3	
initial burette reading / cm^3	
volume used / cm^3	

[2]

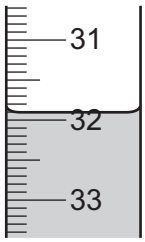
Experiment 2

- The contents of the burette used in Experiment 1 were poured away and the burette was rinsed with distilled water.
- The burette was then rinsed with solution **B**.
- Experiment 1 was repeated using solution **B** instead of solution **A**.

(b) Use the burette diagrams to record the burette readings in the table and complete the table.



initial burette reading



final burette reading

	Experiment 2
final burette reading / cm^3	
initial burette reading / cm^3	
volume used / cm^3	

[2]

(c) (i) Which solution of potassium manganate(VII), solution **A** or solution **B**, is the more concentrated?
Explain your answer.

.....

..... [2]

(ii) How many times more concentrated is this solution of potassium manganate(VII)?

..... [1]

(d) (i) Predict the volume of solution **B** that would be used if Experiment 2 were repeated using 50 cm^3 of solution **C**.
Explain your answer.

.....

..... [2]

(ii) Suggest a practical problem that using 50 cm^3 of solution **C** could cause. How could this problem be solved?

.....

..... [2]

(e) Give **one** advantage and **one** disadvantage of using a measuring cylinder rather than a pipette for solution **C**.

advantage of using a measuring cylinder .....

.....

disadvantage of using a measuring cylinder .....

.....
[2]

Experiment 3

The results from Experiment 3 are shown in the table.

tests	observations
Aqueous sodium hydroxide was added to about 2 cm^3 of solution **C**.	green precipitate formed
Aqueous sodium hydroxide was added to the reaction mixture saved from Experiment 1.	red-brown precipitate formed

(f) What conclusions can be drawn about solution **C** from Experiment 3?

.....

..... [2]

[Total: 15]

3 Two substances, solution **D** and solid **E**, were analysed. Solution **D** was dilute sulfuric acid. Tests were done on the substances.

tests on solution D

Complete the expected observations.

Solution **D** was divided into four equal portions in four test-tubes.

(a) The pH of the first portion of solution **D** was tested.

pH = ... [1]

(b) A strip of magnesium ribbon was added to the second portion of solution **D**. The gas produced was tested.

observations .....

.....

..... [3]

(c) Dilute nitric acid and aqueous silver nitrate were added to the third portion of solution **D**.

observations ..... [1]

(d) Dilute nitric acid and aqueous barium nitrate were added to the fourth portion of solution **D**.

observations ..... [1]

[Turn over

tests on solid E

Some of the tests and observations are shown.

tests on solid **E**	observations
The appearance of solid **E** was studied.	white solid
test 1 Solid **E** was heated gently and then more strongly. Distilled water was added to the residue and the pH of the mixture was tested.	white solid residue pH = 10
test 2 Dilute hydrochloric acid was added to solid **E**. The gas produced was tested. Distilled water was added to the solution and the mixture was shaken. An excess of aqueous sodium hydroxide was added to the mixture.	rapid effervescence limewater turned milky white precipitate formed which was insoluble in excess

(e) Identify the gas produced in **test 2**.

..... [1]

(f) What conclusions can you draw about solid **E**?

..... [2]

[Total: 9]

4 The rate of reaction between magnesium and dilute hydrochloric acid can be followed by measuring the volume of hydrogen produced.

Plan an experiment to investigate the effect of decreasing the temperature on the rate of this reaction by measuring the volume of hydrogen produced.

You are provided with magnesium ribbon, dilute hydrochloric acid and common laboratory apparatus.
You are advised to draw a labelled diagram of the apparatus you would use in the space provided.

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..... [6]

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