Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2244180806

CHEMISTRY **0620/62**

Paper 6 Alternative to Practical **October/November 2022**

1 hour

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

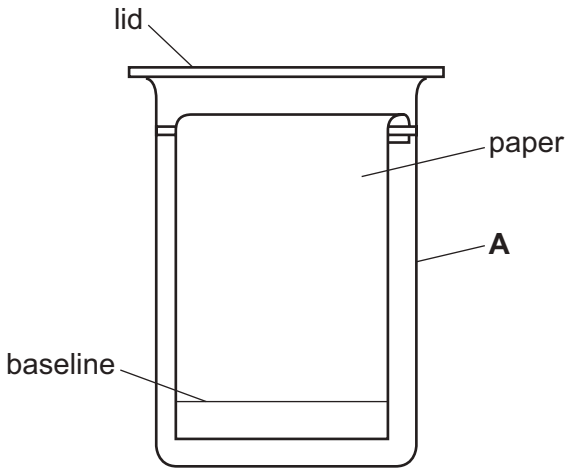
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction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

1 A mixture of three coloured compounds was separated using the apparatus shown in the diagram.



(a) Give the name of the item of apparatus labelled **A**.

..... [1]

(b) One drop of the mixture of coloured compounds was placed on the paper and some solvent was poured into **A**.

Draw **on the diagram**:

- a spot (●) to show where the drop of the mixture of coloured compounds should be placed on the paper at the start of the experiment
- a line to show the level of the solvent in **A** at the start of the experiment.

[2]

(c) Name an item of apparatus that should be used to place a drop of the mixture of coloured compounds onto the paper.

..... [1]

(d) State when the paper should be removed from the solvent in **A**.

..... [1]

(e) Name this method of separation of coloured compounds.

..... [1]

[Total: 6]

2 A student investigated the temperature change when two different aqueous solutions of sodium hydroxide, solution **G** and solution **H**, reacted with dilute hydrochloric acid.

Two experiments were done.

(a) *Experiment 1*

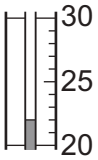
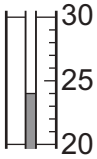
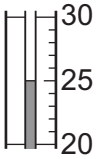
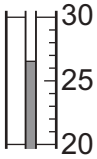
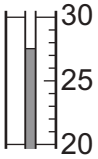
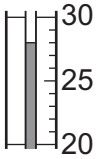
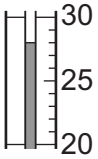
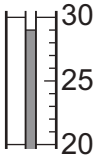
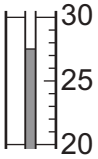
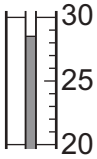
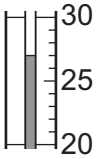
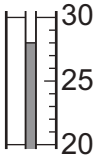
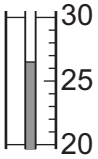
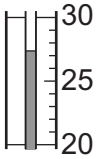
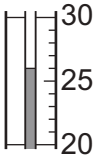
- A burette was rinsed with distilled water and then with dilute hydrochloric acid.
- The burette was filled with the dilute hydrochloric acid. The hydrochloric acid was then run out through the tap until the level was on the 0.00 cm^3 mark.
- A 50 cm^3 measuring cylinder was used to pour 20 cm^3 of solution **G** into a beaker.
- A thermometer was used to measure the initial temperature of solution **G**.
- 5 cm^3 of dilute hydrochloric acid was added from the burette into the beaker.
- The mixture in the beaker was stirred using the thermometer and the temperature of the mixture was measured.
- Another 5 cm^3 of dilute hydrochloric acid was added from the burette into the beaker.
- The mixture in the beaker was stirred using the thermometer and the temperature of the mixture was measured.
- 5 cm^3 portions of dilute hydrochloric acid continued to be added and the temperature measured until a total of 35 cm^3 of dilute hydrochloric acid had been added.

Experiment 2

- Experiment 1 was repeated using solution **H** instead of solution **G**.

[Turn over

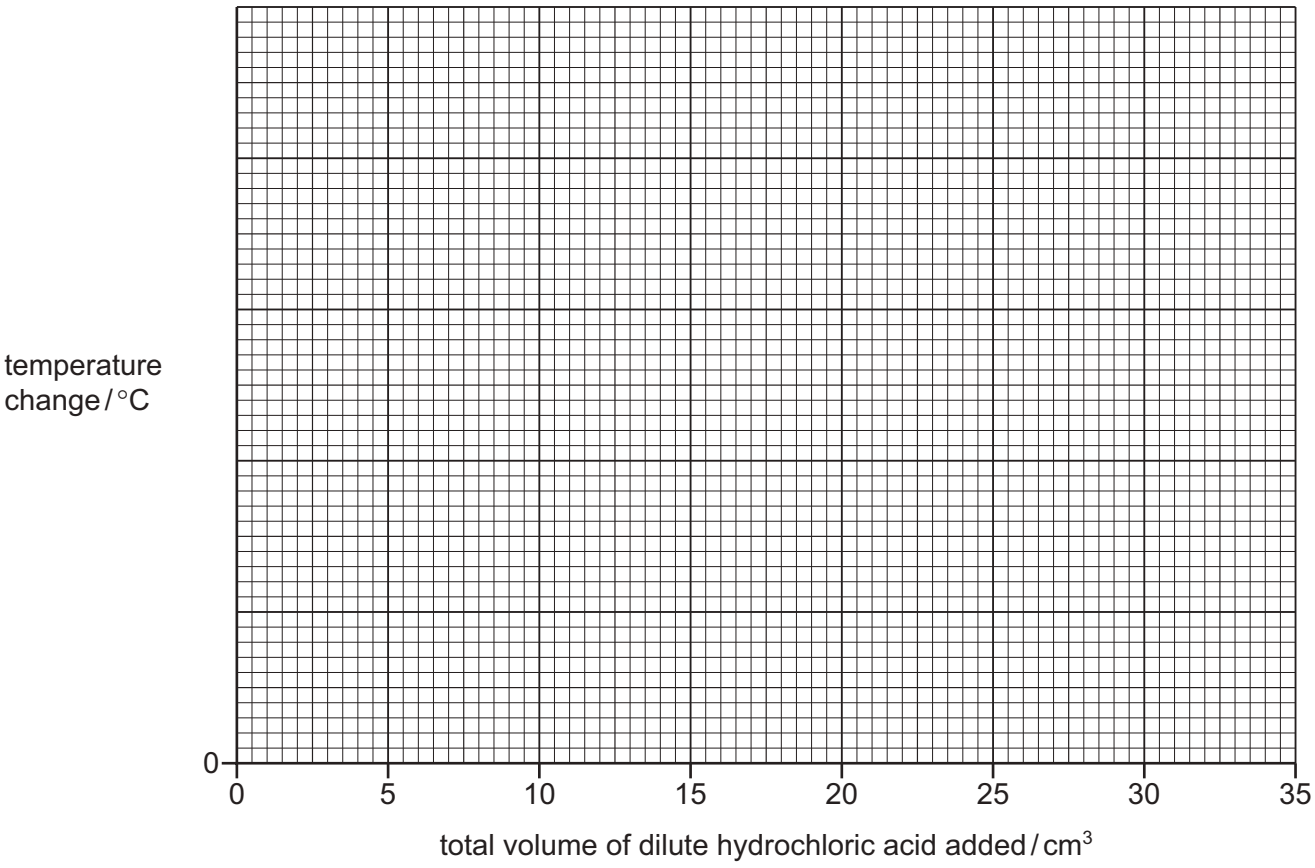
Use the thermometer diagrams to complete the table.

	Experiment 1 using solution **G**			Experiment 2 using solution **H**		
total volume of dilute hydrochloric acid added / cm^3	thermometer diagram	temperature / °C	temperature change since start / °C	thermometer diagram	temperature / °C	temperature change since start / °C
0						
5						
10						
15						
20						
25						
30						
35						

[5]

(b) Complete a suitable scale on the *y*-axis and plot the results from Experiments 1 and 2 on the grid.

Draw two smooth line graphs. Both curves must start at (0,0). Clearly label your lines.



[5]

(c) **From your graph**, deduce the temperature change obtained when a total volume of 13 cm^3 of dilute hydrochloric acid is added in Experiment 1.

Show clearly **on the grid** how you worked out your answer.

temperature change = ... °C [2]

(d) Explain why the temperature change decreases towards the end of each experiment.

.....

..... [1]

[Turn over

(e) Explain what conclusion about the concentrations of solution **G** and solution **H** can be made from the results of Experiments 1 and 2.

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..... [2]

(f) Explain how the results obtained would be different if a polystyrene cup is used instead of the beaker.

.....

.....

.....

..... [2]

(g) Give an advantage and a disadvantage of using a burette rather than a measuring cylinder to add the dilute hydrochloric acid to solution **G** and solution **H**.

advantage .....

.....

disadvantage .....

.....

[2]

[Total: 19]

3 Solid **I** and solid **J** were analysed.
Tests were done on each substance.

tests on solid I

tests	observations
test 1 Dilute hydrochloric acid was added to a boiling tube containing solid **I**. Any gas produced was tested.	effervescence was seen, the solid dissolved to form a colourless solution the gas turned limewater milky
test 2 A flame test was carried out on the solution formed in **test 1**.	a red flame was seen

(a) Identify the gas made in **test 1**.

..... [1]

(b) Identify solid **I**.

.....

..... [2]

tests on solid J

Solid **J** was aluminium chloride.

Solid **J** was dissolved in water to form solution **J**. Solution **J** 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 **J**.

observations .....

..... [2]

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

observations .....

..... [2]

(e) About 1 cm depth of dilute nitric acid followed by a few drops of aqueous barium nitrate were added to the third portion of solution **J**.

observations ..... [1]

(f) About 1 cm depth of dilute nitric acid followed by a few drops of aqueous silver nitrate were added to the fourth portion of solution **J**.

observations ..... [1]

[Total: 9]

4 Hydrogels are powders that absorb water to form hydrated solids. Hydrogels and the hydrated solids formed are insoluble in water.

Plan an investigation to find which hydrogel, **hydrogel A** or **hydrogel B**, is able to absorb the greater mass of water.

You are provided with samples of **hydrogel A**, **hydrogel B**, water and common laboratory apparatus.

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