Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

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CHEMISTRY **0620/62**

Paper 6 Alternative to Practical **February/March 2018**

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.

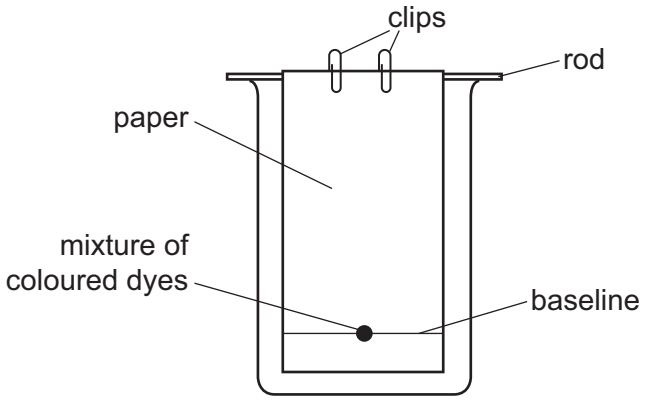
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved 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.

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1 A student used paper chromatography to separate a mixture of coloured dyes. The diagram shows the apparatus used.



(a) (i) Draw a line on the diagram to show the level of the solvent. [1]

(ii) Suggest a suitable solvent that could be used.

..... [1]

(b) What could be used to put the mixture of coloured dyes onto the paper?

..... [1]

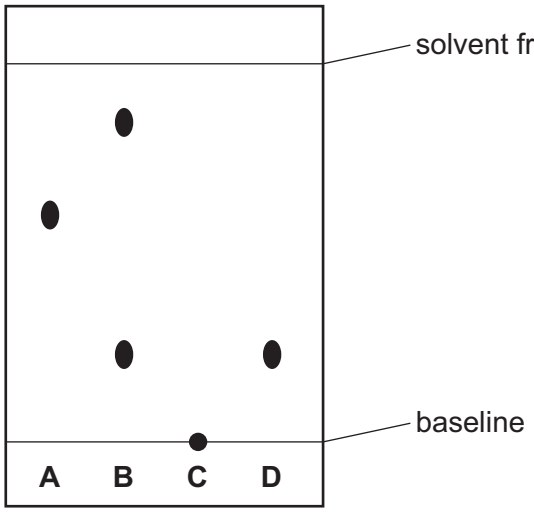
(c) The clips hold the paper in position.

Why is this important for the chromatography experiment?

..... [1]

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The diagram shows the chromatogram obtained from four dyes, **A**, **B**, **C** and **D**.



(d) Give **one** conclusion that can be drawn about dye **B**.

..... [1]

(e) Suggest why dye **C** remained on the baseline.

.....

..... [1]

(f) R_f values are used to identify compounds.

$$R_f = \frac{\text{distance travelled by the compound}}{\text{distance travelled by the solvent}}$$

Calculate the R_f value of dye **A**.

R_f = ... [2]

[Total: 8]

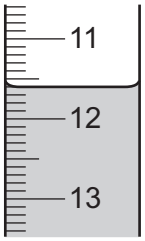
2 A student investigated the reaction between dilute hydrochloric acid and an aqueous solution of sodium carbonate labelled solution **L**.

Three experiments were done.

Experiment 1

- A measuring cylinder was used to pour 25 cm^3 of solution **L** into a conical flask.
- Ten drops of thymolphthalein indicator were added to the conical flask.
- A burette was filled up to the 0.0 cm^3 mark with dilute hydrochloric acid.
- Dilute hydrochloric acid was added from the burette to the conical flask until the solution just changed to colourless at the end-point of the titration.

(a) Use the burette diagram to record the final burette reading in the table and complete the table.



final burette reading

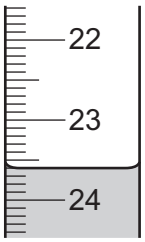
	Experiment 1
final burette reading / cm^3	
initial burette reading / cm^3	0.0
difference / cm^3	

[1]

Experiment 2

- Ten drops of methyl orange indicator were added to the solution in the conical flask from Experiment 1.
- Dilute hydrochloric acid was added from the burette to the conical flask until the solution just changed colour.

(b) Use the burette diagram to record the final burette reading in the table and complete the table.



final burette reading

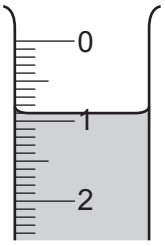
	Experiment 2
final burette reading / cm^3	
initial burette reading / cm^3	12.0
difference / cm^3	

[1]

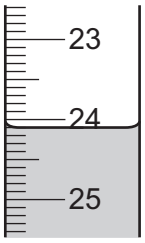
Experiment 3

- The conical flask was emptied and rinsed with distilled water.
- Experiment 1 was repeated using methyl orange indicator instead of thymolphthalein indicator and adding dilute hydrochloric acid from the burette to the conical flask until the solution just changed colour.

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



initial burette reading



final burette reading

	Experiment 3
final burette reading / cm^3	
initial burette reading / cm^3	
difference / cm^3	

[3]

(d) What colour change was observed in the conical flask in Experiment 3?

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

(e) Why was the conical flask emptied and rinsed with distilled water at the start of Experiment 3?

..... [1]

(f) Complete the sentence.

Experiment ..... needed the largest volume of dilute hydrochloric acid to change the colour of the indicator. [1]

(g) Give the name of a more accurate piece of apparatus for measuring the volume of solution **L**.

..... [1]

(h) What would be the effect on the results if solution **L** were warmed before adding the dilute hydrochloric acid? Give a reason for your answer.

effect on the results .....

reason .....
[2]

(i) **(i)** Determine the simplest whole number ratio of volumes of dilute hydrochloric acid used in Experiments 1 and 3.

..... [1]

(ii) Suggest why the volumes of dilute hydrochloric acid used in Experiments 1 and 3 are different.

..... [1]

(j) Suggest why Universal Indicator **cannot** be used in these experiments.

.....

..... [1]

(k) Suggest how the reliability of the results could be checked.

.....

..... [2]

[Total: 16]

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3 Two substances, solution **M** and solid **N**, were analysed. Solution **M** was aqueous iron(III) chloride. Tests were done on the substances.

Complete the expected observations.

tests on solution M

(a) Describe the appearance of solution **M**.

..... [1]

Solution **M** was divided into three equal portions in three test-tubes.

(b) Dilute nitric acid and aqueous silver nitrate were added to the first portion of solution **M**.

observations ..... [2]

(c) Dilute nitric acid and aqueous barium nitrate were added to the second portion of solution **M**.

observations ..... [1]

(d) (i) Drops of aqueous sodium hydroxide were added to the third portion of solution **M** until a change was seen.

observations ..... [2]

(ii) An excess of aqueous sodium hydroxide was then added to the mixture.

observations ..... [1]

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[Turn over

tests on solid N

Some of the tests and observations are shown.

tests on solid **N**	observations
The appearance of solid **N** was studied.	green powder
test 1 Solid **N** was heated. The gas produced was tested.	 solid turned black limewater turned milky
test 2 A flame test was done on solid **N**.	 blue-green colour

(e) Name the gas produced in **test 1**.

..... [1]

(f) Identify solid **N**.

..... [2]

[Total: 10]

4 Magnesium reacts with dilute sulfuric acid at room temperature to form hydrogen gas.

Plan an experiment to find the rate of reaction between magnesium ribbon and dilute sulfuric acid.

In your answer:
- include a diagram
- indicate how you could use the results obtained to find the rate of reaction.

You are provided with common laboratory apparatus, magnesium ribbon and dilute sulfuric acid.

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 6]

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