

### **Cambridge International Examinations**

Cambridge IGCSE	Cambridge International Examinations Cambridge International General Certificate of Secondary Education
CANDIDATE NAME	
CENTRE NUMBER	CANDIDATE NUMBER

**CHEMISTRY** 0620/62

Paper 6 Alternative to Practical

February/March 2015

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.

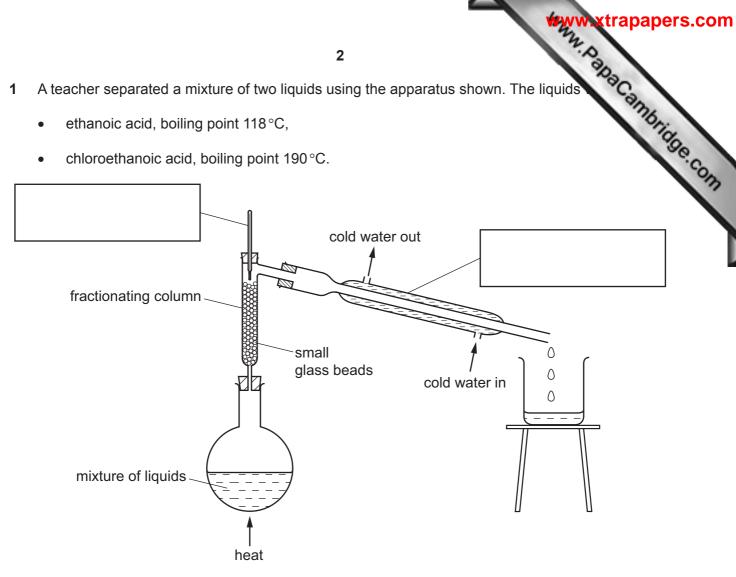
The number of marks is given in brackets [ ] at the end of each question or part question.

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 12 printed pages.



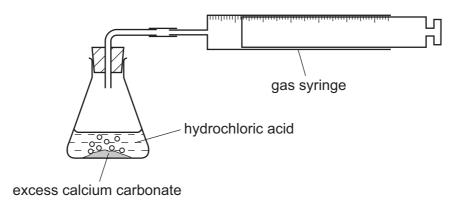
- A teacher separated a mixture of two liquids using the apparatus shown. The liquids
  - ethanoic acid, boiling point 118°C,
  - chloroethanoic acid, boiling point 190°C.



(a)	Con	mplete the boxes to label the pieces of apparatus used.	[2]
(b)	(i)	Which liquid would be collected first? Explain why.	
			[2]
	(ii)	How would the teacher know when all of this liquid had been collected?	
			[1]
(c)	Sug bea	ggest why small glass beads are used in the fractionating column instead of large glands.	ass
			[1]
(d)	Give	e a test to show that the liquids are acidic.	

[Total: 8]

2 The rate of reaction between excess calcium carbonate and dilute hydrochloric acid was using the apparatus shown below. The temperature of the hydrochloric acid was 25 °C

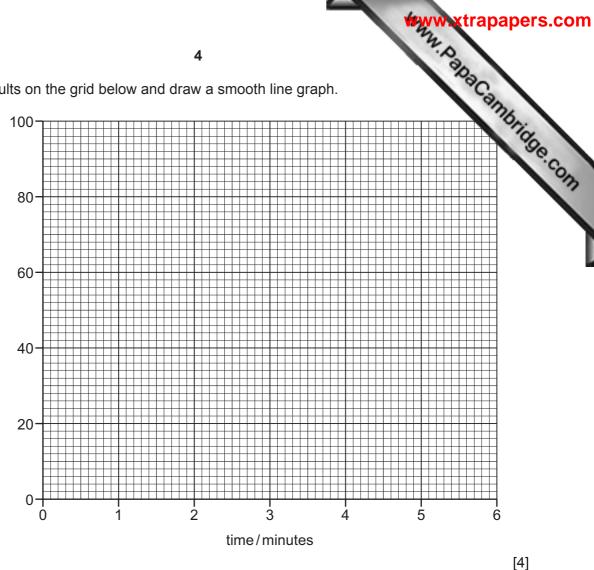


The volume of carbon dioxide evolved was measured every minute for six minutes.

(a) Use the gas syringe diagrams to complete the table of results.

time /minutes	gas syringe diagram	total volume of carbon dioxide evolved/cm <sup>3</sup>
0	0 10 20 30 40 50 60	
1	0 10 20 30 40 50 60	
2	0 10 20 30 40 50 60	
3	30 40 50 60 70 80 90	
4	30 40 50 60 70 80 90	
5	30 40 50 60 70 80 90	
6	30 40 50 60 70 80 90	

**(b)** Plot the results on the grid below and draw a smooth line graph.



c)	(i)	Which point appears to be inaccurate? Explain wh	٦v.

	[2]

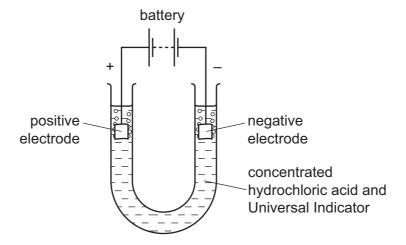
(ii) Use your graph to work out the volume of gas expected at that time. Show clearly on the grid how you worked out your answer.

(d) Sketch, on the grid, the graph you would expect if the experiment was repeated using hydrochloric acid at a temperature of 50 °C. [2]

[Total: 13]

volume of carbon dioxide evolved/cm3

3 Electricity was passed through concentrated hydrochloric acid using the apparatus si



Effervescence was observed at both electrodes.

(a)		ne this process used to break down concentrated hydrochloric acid.	[1]
(b)	Sug	ggest why the electrodes are made of platinum and not aluminium.	
(c)	(i)	Name the gas given off at the positive electrode.	. 13
	(ii)	What would be the colour of the Universal Indicator around the positive electrode at the end of the experiment?	he
			 [2]

[Total: 4]

**4** A student investigated the solubility of salt **D** in water at various temperatures.

Four experiments were carried out.

### (a) Experiment 1

4g of salt **D** was added to a boiling tube. A burette was filled with distilled water and 10.0 cm³ of water added to the boiling tube. The mixture of salt **D** and water was heated carefully until all of the solid had dissolved. The boiling tube was removed from the heat and the solution allowed to cool. The solution was stirred gently with a thermometer.

The temperature at which crystals first appeared was noted.

The boiling tube and its contents were kept for the remaining three experiments.

#### (b) Experiment 2

From the burette another 2.0 cm³ of water was added to the boiling tube and contents from Experiment 1.

The mixture was heated to dissolve the crystals and allowed to cool as in Experiment 1. The temperature at which crystals first appeared was noted.

Record, in the table, the total volume of water in the boiling tube.

# (c) Experiment 3

From the burette another 2.0 cm<sup>3</sup> of water was added to the boiling tube and contents from Experiment 2. The experiment was repeated exactly as before.

Record, in the table, the total volume of water in the boiling tube.

© UCLES 2015

# (d) Experiment 4

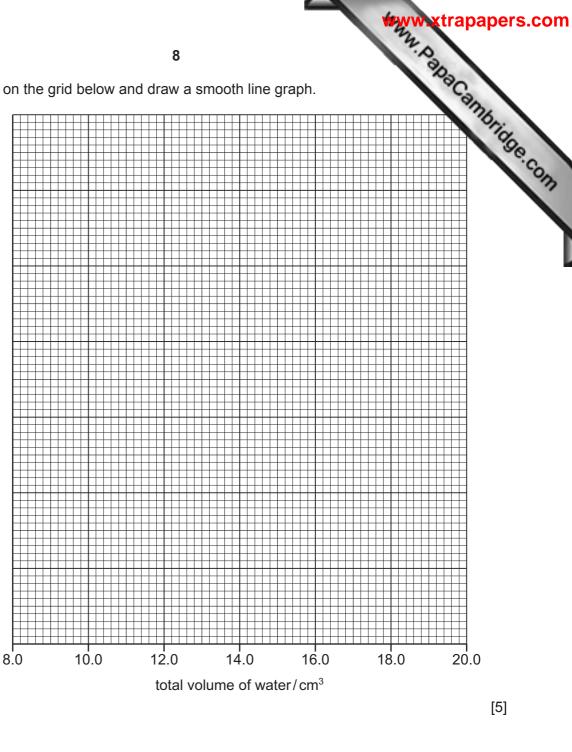
e and content to the content to the crystals first From the burette another 4.0 cm<sup>3</sup> of water was added to the boiling tube and conte Experiment 3. The experiment was repeated exactly as before. Record in the table the total volume of water in the boiling tube.

Use the thermometer diagrams in the table to record the temperatures at which crystals first appeared in the four experiments.

Experiment number	total volume of water/cm³	thermometer diagram	temperature at which crystals first appeared/°C
1	10.0	95	
2		-   80     -   75       -   70	
3		65 60	
4		55	

[3]

(e) Plot the results on the grid below and draw a smooth line graph.



(f) From your graph, find the temperature at which crystals of **D** would first appear if the total volume of water in the solution was 20.0 cm<sup>3</sup>. Show clearly on the grid how you worked out your answer.

[3]

(g) How would the student know when salt **D** was completely dissolved in the water?

temperature at which crystals first appeared/°C

(h)	The solubility of salt <b>D</b> at 100 °C is 57 g in 100 cm³ of water.  Suggest, with a reason, the effect of using 8 g of salt <b>D</b> instead of 4 g in these expendent.
	[2]
(i)	Salt <b>C</b> is less soluble in water than salt <b>D</b> .
	Sketch on the grid the graph you would expect for salt <b>C</b> . Label this graph. [2]
(j)	Describe and explain <b>one</b> improvement that could be made to the experimental method to obtain more reliable results in this investigation.
	improvement
	explanation
	[2]
	[Total: 18]

[Turn over

	www.xtrapapers.cor
10	1. Day
Two metal salt solutions, <b>E</b> and <b>F</b> , were analysed. <b>E</b> was a mixture of iron(II) sulfate and ammonium. The tests on the solutions and some of the observations in the table.	n sulfate.
tests	observations
tests on solution <b>E</b>	
(a) Appearance of solution E.	[1]
The solution was divided into three equal portions in separate test-tubes.	
(b) Dilute nitric acid and aqueous barium nitrate were added to the first portion of the solution.	[1]
(c) (i) Excess aqueous sodium hydroxide was added to the second portion of the solution.	[2]
<ul><li>(ii) The mixture was filtered and the filtrate heated.</li><li>The gas given off was tested with damp litmus paper.</li></ul>	[2]
(d) Dilute sulfuric acid and aqueous potassium manganate(VII), an oxidising agent, were added to the third portion of the solution. Aqueous sodium hydroxide was then added to the mixture.	[1]
tests on solution <b>F</b>	
(e) Appearance of solution F.	yellow liquid
(f) Zinc powder was added to solution F.	rapid effervescence
The solution was observed for five minutes.  The gas given off was tested with a splint.	turned blue, then green and finally light purple lighted splint popped

(g)	Identify the gas given off in test (f).	S. Cany
(h)	What conclusions can you draw about solution <b>F</b> ?	198
		[2]
		[Total: 10]

© UCLES 2015 [Turn over

#### **Rhubarb Leaves**



Ethanedioic acid dihydrate,  $H_2C_2O_4.2H_2O$ , is a white crystalline solid. This acid is water-soluble and is found in rhubarb leaves.

Plan an investigation to obtain crystals of ethanedioic acid dihydrate from some rhubarb leaves. You are provided with common laboratory apparatus, water and sand.
[7]
[Total: 7]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.