

CANDIDATE

# UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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1 hour

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CENTRE NUMBER		CANDIDATE NUMBER	
CHEMISTRY			0620/61
Paper 6 Alternat	tive to Practical		May/June 2011

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 a pencil for any diagrams, graphs or rough working. Do not use staples, paper clips, highlighters, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** questions.

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.

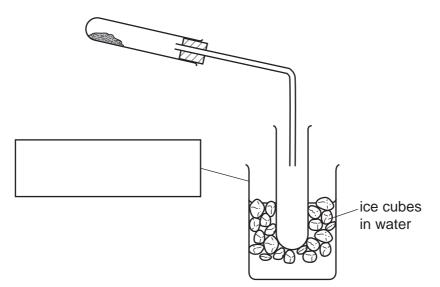
For Examiner's Use		
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Total		

This document consists of 11 printed pages and 1 blank page.



[Total: 6]

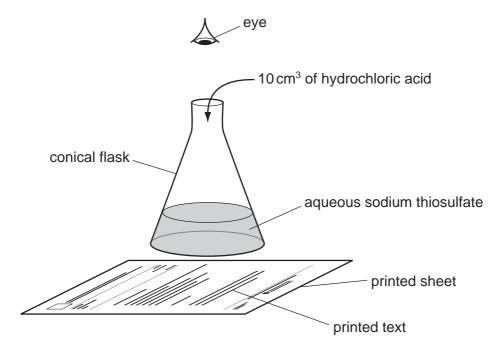
www.PapaCambridge.com A student heated hydrated zinc sulfate crystals, ZnSO<sub>4</sub>.7H<sub>2</sub>O, using the apparatus b obtain a sample of water. 1



(a)	Con	nplete the box to identify the piece of apparatus labelled.	[1]
(b)	Use	labelled arrows to indicate:	
	(i)	where the heat is applied,	
	(ii)	where the sample of water would collect.	[2]
(c)	Stat	te the purpose of the ice cubes.	
			[1]
(d)	Des	cribe a physical test for pure water.	
	test		
	resu	ılt	[2]

2 Hydrochloric acid reacts with aqueous sodium thiosulfate to form a precipitate, which the solution turn cloudy.

www.PapaCambridge.com The formation of the precipitate can be used to show how fast the reaction proceeds, using the apparatus shown below.



A student used this method to investigate the effect of changing the concentration of the sodium thiosulfate solution on the speed of the reaction.

The student used different concentrations of sodium thiosulfate solution.

All other variables were kept the same.

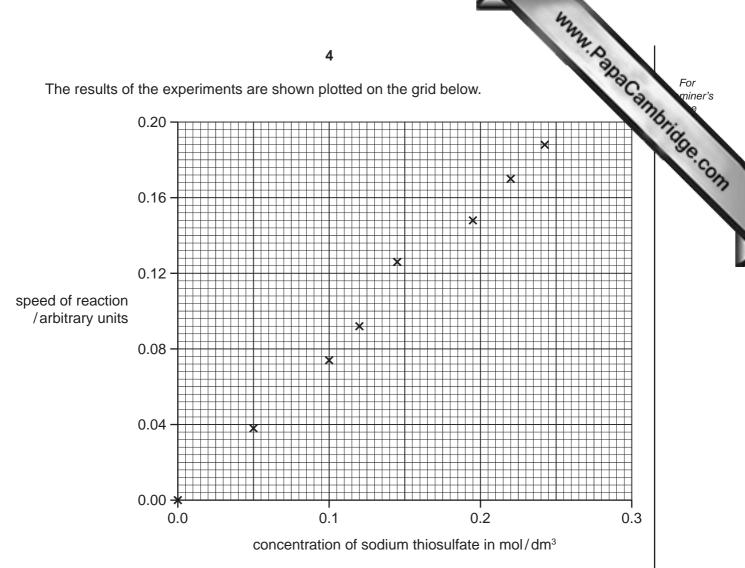
(a)	Give <b>two</b>	variables which	were kept the sa	me in the investigation.
-----	-----------------	-----------------	------------------	--------------------------

1	l	
2	<u>2</u> [	2

The results of the experiments are shown plotted on the grid below.

**(b)** Draw a line of best fit on the grid.

temperature.



(c)	Suggest <b>two</b> reasons why not all of the points lie on the line of best fit.
	1
	2
(d)	From your graph, deduce the speed of reaction when the concentration of sodium thiosulfate is 0.075 mol/dm³. Show clearly <b>on the graph</b> how you worked out your answer.
	[2]
(e)	Explain why the speed of reaction increases when the concentration of sodium thiosulfate is increased.

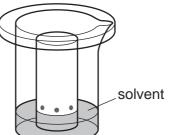
(f) Sketch on the grid the line you would expect if the experiments were repeated at a higher

[Total: 10]

[1]

[Total: 6]

www.PapaCambridge.com The colours present in some fruit sweets can be separated using the apparatus below 3 colours are water-soluble dyes.



(a)	Name the process used to	separate	the colo	
(b)	Name the solvent used.			[1]
				[1]
The	results obtained for the col-	ours in tv	vo differe	nt sweets, <b>C</b> and <b>D</b> , are shown below.
		٨	٨	
		•	•	
		•	•	
		•		В
		sweet	sweet	
		C	D	
(c)	What is the name for the lin	ne at pos	ition <b>B</b> ?	
				[1]
(d)	What conclusions can you	draw abo	out the co	olours present in sweets <b>C</b> and <b>D</b> ?
				[3]

www.papaCambridge.com A student investigated the reaction between two different solutions of deep purple po 4 manganate(VII), **A** and **B**, and an acidic solution of hydrogen peroxide.

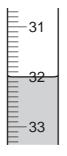
Three experiments were carried out.

#### Experiment 1

A burette was filled with the solution **A** of potassium manganate(VII) up to the 0.0 cm<sup>3</sup> mark. Using a measuring cylinder, 25 cm<sup>3</sup> of colourless hydrogen peroxide solution was poured into the conical flask.

The potassium manganate(VII) solution **A** was added slowly to the flask, and shaken to mix thoroughly. Addition of potassium manganate(VII) solution was continued until there was a permanent pink colour in the contents of the flask.

(a) Use the burette diagram to record the volume in the table of results and complete the column.

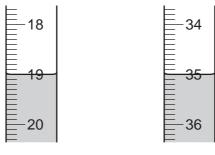


final reading

#### Experiment 2

Experiment 1 was repeated using the solution B of potassium manganate(VII) instead of solution A.

**(b)** Use the burette diagrams to record the volumes in the table of results and complete the table. [2]



initial reading

final reading

	experiment 1	experiment 2
final reading/cm <sup>3</sup>		
initial reading/cm <sup>3</sup>		
difference/cm <sup>3</sup>		

## Experiment 3

www.PapaCambridge.com To a little of the hydrogen peroxide solution in a test-tube, manganese(IV) oxide was added Rapid effervescence was observed and a glowing splint relit.

(c)	Ide	ntify the gas given off in Experiment 3.	
		[1	]
(d)	(i)	What colour change was observed when potassium manganate(VII) solution was added to the flask?	S
		from to	]
	(ii)	Why was an indicator <b>not</b> added to the flask?	
(e)	(i)	In which experiment was the greatest volume of potassium manganate(VII) solutioused?	-
	(ii)	Compare the volumes of potassium manganate(VII) used in Experiments 1 and 2.	•
	(iii)	Suggest an explanation for the difference in volumes.	]
		[2	
(f)	volu	experiment 2 was repeated using 12.5 cm <sup>3</sup> of the hydrogen peroxide solution, what ume of potassium manganate(VII) solution would be needed to react completely blain your answer.	
		[3	 3]
(g)		re <b>one</b> advantage and <b>one</b> disadvantage of using a measuring cylinder for the drogen peroxide solution.	е
	adv	/antage	
	disa	advantage[2	<u>?]</u>
		[Total: 16	5]

	d. <b>N</b> was aqueous potassium iodide. ervations are in the following table.  observations
tests	observations
(i) Appearance of liquid M.	colourless liquid with an antiseptic smell
(ii) Appearance of liquid N.	[2]
(i) A few drops of <b>M</b> were transferred to a dry watch glass. The liquid was touched with a lighted splint.	burns with a yellow flame
(ii) Test (b)(i) was repeated using liquid N.	[1]
A little of liquid <b>M</b> was added to a crystal of iodine in a test-tube. The test-tube was shaken.	orange-brown solution
To a little of liquid N, a few drops of dilute nitric acid was added, followed by silver nitrate solution.	[2]

[Total: 7]

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6 The reaction between aqueous barium chloride and aqueous sodium sulfate production white precipitate.

www.PapaCambridge.com Six experiments were carried out to find the mass of precipitate produced using solution and solution Q.

Solution **P** was aqueous barium chloride.

Solution **Q** was aqueous sodium sulfate.

Both solutions were of the same concentration.

5 cm<sup>3</sup> of solution **P** was put into each of six test-tubes. Increasing volumes of solution **Q** were added to each test-tube. The mixtures were filtered to obtain the precipitates, which were washed, dried and then weighed in a suitable container.

(a) Draw a labelled diagram to show how the mixture was filtered.

[2]

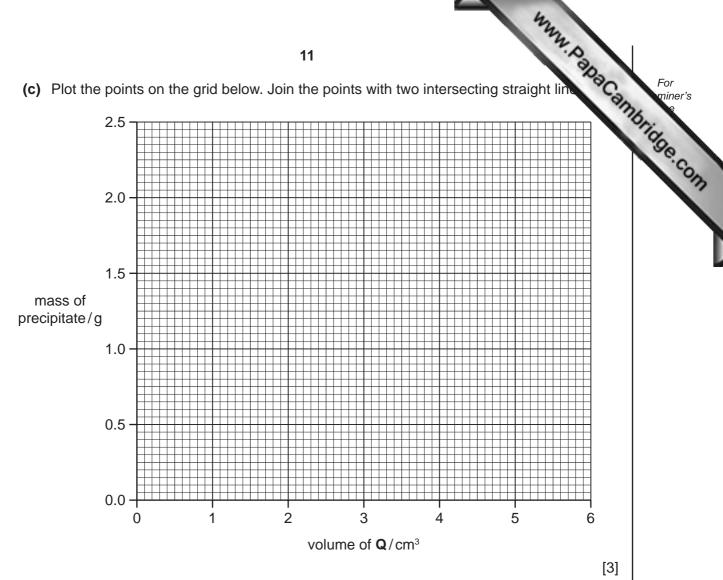
The results are shown in the table below.

### **(b)** Complete the table.

volume of P/cm³	volume of <b>Q</b> /cm <sup>3</sup>	mass of container/g	mass of container and precipitate/g	mass of precipitate/g
5	1	4.50	4.95	
5	2	4.50	5.45	
5	3	4.50	5.90	
5	4	4.50	6.40	
5	5	4.50	6.85	
5	6	4.50	6.85	

(c) Plot the points on the grid below. Join the points with two intersecting straight line





(d) What is the minimum volume of **Q** required to completely react with 5 cm<sup>3</sup> of **P**?

[Total: 8]

7 The label shows some information on a bottle of liquid sink and drain cleaner.

4				
	m.		ı	
7	.0		_ ا	
r.		aC3	Brid	or iner's
	·	13	16,	P
			0	

<ul> <li>Contains:         sodium hydroxide, sodium         hypochlorite</li> <li>contact with acids liberates         chlorine</li> <li>rinse container with water         before throwing out</li> </ul>

(a)	Give a chemical test for the presence of sodium hydroxide.
	test
	result[2]
(b)	Suggest why it could be dangerous to pour fizzy drinks into a sink containing this liquid cleaner.
	[2]
(c)	Why should the container be rinsed with water before throwing out?
	[1]
(d)	Give a chemical test for chlorine.
	test
	result[2]
	[Total: 7]

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