



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

CANDIDATE  
NAME

CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**CHEMISTRY**

**0620/05**

Paper 5 Practical Test

**October/November 2007**

**1 hour 15 minutes**

Candidates answer on the Question Paper.

Additional Materials: As listed in Confidential Instructions

**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 BARCODE.

Answer **all** questions.

Practical notes are provided on page 8.

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	
1	
2	
<b>Total</b>	

This document consists of 7 printed pages and 1 blank page.



- 1 You are going to investigate what happens when dilute hydrochloric acid reacts with two different solids, calcium carbonate (marble) and calcium oxide.

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Read **all** the instructions below carefully **before** starting the two experiments.

### Instructions

#### Experiment 1

Place a polystyrene cup in the beaker provided.

By using a measuring cylinder, pour  $50 \text{ cm}^3$  of dilute hydrochloric acid into the polystyrene cup and record the temperature of the acid in the table.

Add the 2.5 g of small marble chips provided to the cup and stir the mixture with the thermometer. Measure and record the temperature of the mixture after 2 minutes. Pour the mixture away and rinse the polystyrene cup.

#### Experiment 2

Repeat Experiment 1 using 2.5 g of the powdered calcium carbonate provided. Record your results in the table.

#### Experiment 3

Repeat Experiment 1 using 1.5 g of the lumps of calcium oxide provided. Record your results in the table.

#### Experiment 4

Repeat Experiment 1 using the 1.5 g of the powdered calcium oxide provided. Record your results in the table.

#### Table of results

Experiment	temperature / °C		
	initial	final	difference
1			
2			
3			
4			

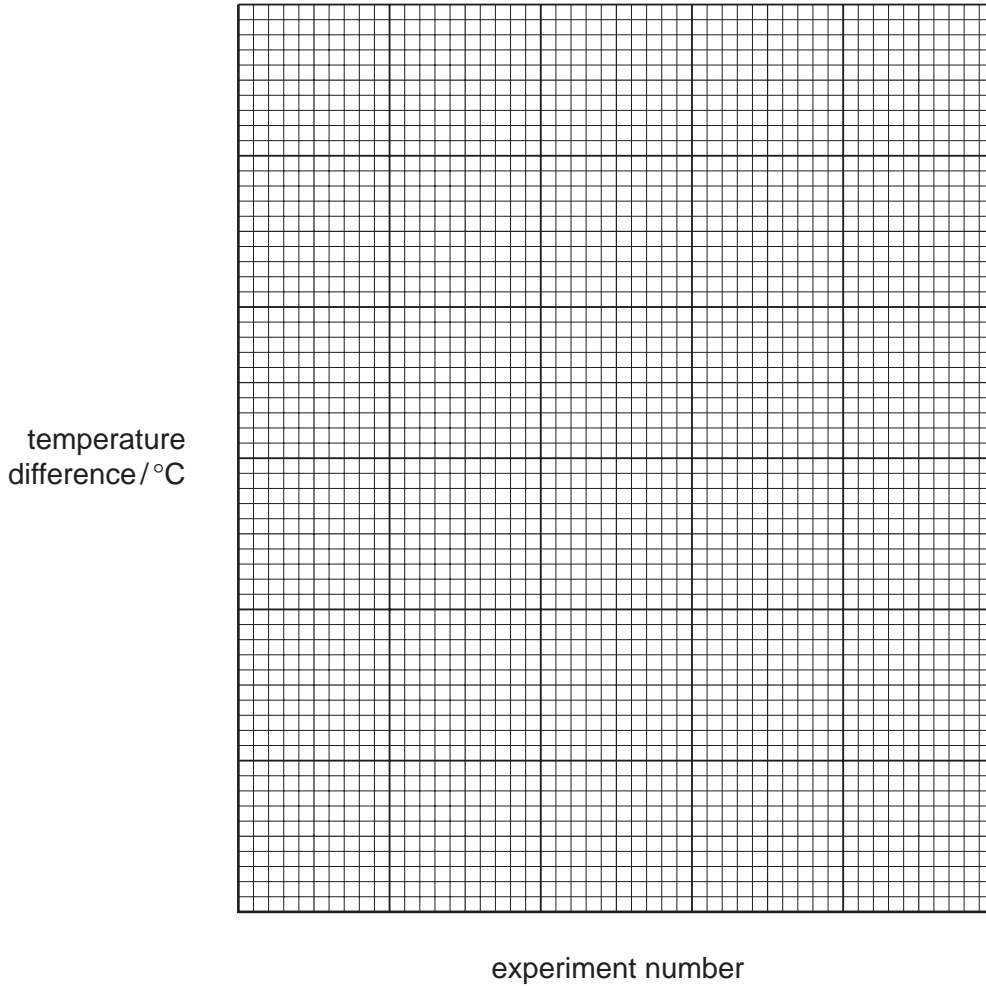
[7]

(a) What did you observe in Experiment 2?

..... [2]

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(b) Draw a bar chart of the results of the experiments on the grid below.



[3]

(c) Which experiment produced

(i) the smallest temperature change,

..... [1]

(ii) the largest temperature change?

..... [1]

(d) Give two reasons why the temperature changes in (c) are different.

- 1. ....  
.....
  - 2. ....  
.....
- [2]

(e) In Experiment 2 which reactant is in excess? Explain your answer.

.....  
.....  
.....

[2]

(f) Explain how the temperature changes would differ in the experiments if 100 cm<sup>3</sup> of hydrochloric acid were used.

.....  
.....  
.....

[2]

[Total: 20]

- 2 You are provided with four different liquids **P**, **Q**, **R** and **S**.  
Carry out the following tests on the liquids, recording all of your observations and deductions in the table. Do not write any conclusions in the table.

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tests	observations and deductions
<p><b>(a)</b> Test the pH of the liquids using indicator paper. Note the colour of the paper.</p>	<p><b>P</b> colour .....</p> <p>pH .....</p> <p><b>Q</b> colour .....</p> <p>pH .....</p> <p><b>R</b> colour .....</p> <p>pH .....</p> <p><b>S</b> colour .....</p> <p>pH ..... [2]</p>
<p><b>(b) (i)</b> Add a 5 cm piece of magnesium to about 3 cm<sup>3</sup> of liquid <b>P</b> in a test-tube. Test the gas given off.</p> <p><b>(ii)</b> Repeat <b>(b)(i)</b> using liquids <b>Q</b>, <b>R</b> and <b>S</b>. Do <b>not</b> test for any gases.</p>	<p>.....</p> <p>.....</p> <p>..... [3]</p> <p><b>Q</b> .....</p> <p><b>R</b> .....</p> <p><b>S</b> ..... [2]</p>

tests	observations and deductions
<p><b>(c)</b> To about 2 cm<sup>3</sup> of liquid <b>S</b> add 1 spatula measure of sodium carbonate. Test the gas given off.</p>	<p>.....</p> <p>.....</p> <p>..... [3]</p>
<p><b>(d)</b> By using a teat pipette add aqueous silver nitrate to about 1 cm<sup>3</sup> of liquid <b>P</b>.</p>	<p>..... [2]</p>
<p><b>(e)</b> By using a teat pipette add liquid <b>Q</b> to about 1 cm<sup>3</sup> of aqueous iron(II) sulphate.</p>	<p>..... [2]</p>

**(f)** Name the gas given off in test **(b)(i)**.

..... [1]

**(g)** Name the gas given off in test **(c)**.

..... [1]

**(h)** Identify liquid **P**.

..... [1]

**(i)** What conclusions can you draw about liquid **Q**?

.....

..... [2]

**(j)** What conclusion can you draw about liquid **R**?

..... [1]

[Total: 20]

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## NOTES FOR USE IN QUALITATIVE ANALYSIS

### Test for anions

<i>anion</i>	<i>test</i>	<i>test result</i>
carbonate ( $\text{CO}_3^{2-}$ )	add dilute acid	effervescence, carbon dioxide produced
chloride ( $\text{Cl}^-$ ) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	white ppt.
iodide ( $\text{I}^-$ ) [in solution]	acidify with dilute nitric acid, then aqueous lead(II) nitrate	yellow ppt.
nitrate ( $\text{NO}_3^-$ ) [in solution]	add aqueous sodium hydroxide then aluminium foil; warm carefully	ammonia produced
sulphate ( $\text{SO}_4^{2-}$ ) [in solution]	acidify with dilute nitric acid, then aqueous barium nitrate	white ppt.

### Test for aqueous cations

<i>cation</i>	<i>effect of aqueous sodium hydroxide</i>	<i>effect of aqueous ammonia</i>
aluminium ( $\text{Al}^{3+}$ )	white ppt., soluble in excess giving a colourless solution	white ppt., insoluble in excess
ammonium ( $\text{NH}_4^+$ )	ammonia produced on warming	-
calcium ( $\text{Ca}^{2+}$ )	white., insoluble in excess	no ppt., or very slight white ppt.
copper ( $\text{Cu}^{2+}$ )	light blue ppt., insoluble in excess	light blue ppt., soluble in excess giving a dark blue solution
iron(II) ( $\text{Fe}^{2+}$ )	green ppt., insoluble in excess	green ppt., insoluble in excess
iron(III) ( $\text{Fe}^{3+}$ )	red-brown ppt., insoluble in excess	red-brown ppt., insoluble in excess
zinc ( $\text{Zn}^{2+}$ )	white ppt., soluble in excess giving a colourless solution	white ppt., soluble in excess giving a colourless solution

### Test for gases

<i>gas</i>	<i>test and test results</i>
ammonia ( $\text{NH}_3$ )	turns damp red litmus paper blue
carbon dioxide ( $\text{CO}_2$ )	turns limewater milky
chlorine ( $\text{Cl}_2$ )	bleaches damp litmus paper
hydrogen ( $\text{H}_2$ )	"pops" with a lighted splint
oxygen ( $\text{O}_2$ )	relights a glowing splint

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