UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

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	
Total	

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

For Examiner's Use

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

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 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]

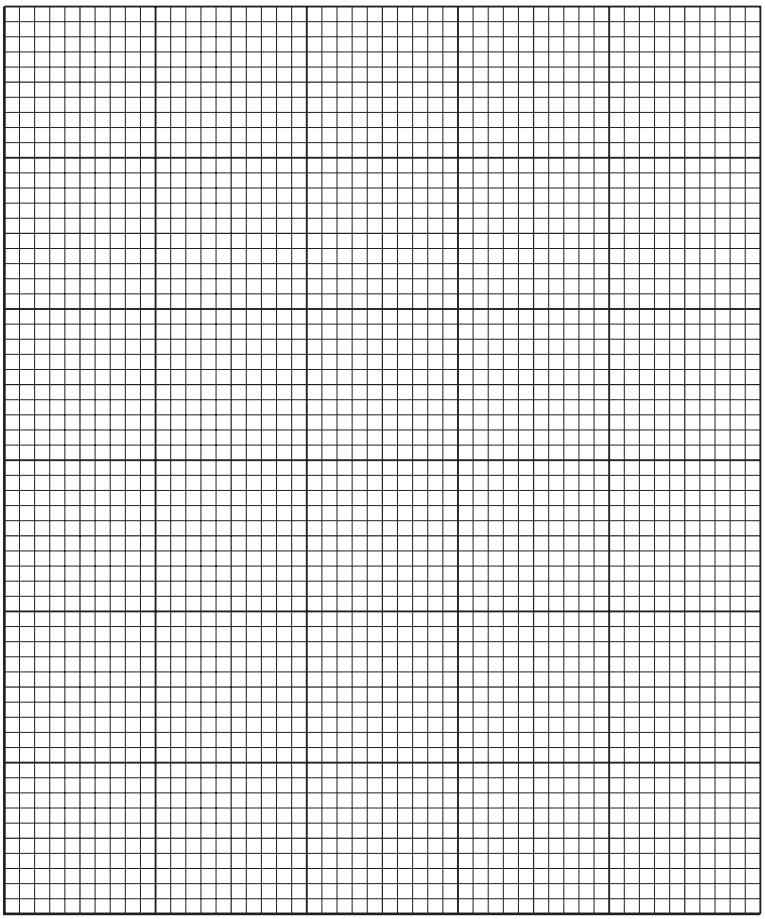
(a) What did you observe in Experiment 2?

.....

[2]

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

temperature difference / °C



experiment number

[3]

(c) Which experiment produced

(i) the smallest temperature change,

.....

[1]

(ii) the largest temperature change?

.....

[1]

[Turn over

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(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^3 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.

For Examiner's Use

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

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

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(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

anion	*test*	*test result*
carbonate (CO_3^{2-})	add dilute acid	effervescence, carbon dioxide produced
chloride (Cl^-) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	white ppt.
iodide (I^-) [in solution]	acidify with dilute nitric acid, then aqueous lead(II) nitrate	yellow ppt.
nitrate (NO_3^-) [in solution]	add aqueous sodium hydroxide then aluminium foil; warm carefully	ammonia produced
sulphate (SO_4^{2-}) [in solution]	acidify with dilute nitric acid, then aqueous barium nitrate	white ppt.

Test for aqueous cations

cation	*effect of aqueous sodium hydroxide*	*effect of aqueous ammonia*
aluminium (Al^{3+})	white ppt., soluble in excess giving a colourless solution	white ppt., insoluble in excess
ammonium (NH_4^+)	ammonia produced on warming	-
calcium (Ca^{2+})	white., insoluble in excess	no ppt., or very slight white ppt.
copper(Cu^{2+})	light blue ppt., insoluble in excess	light blue ppt., soluble in excess giving a dark blue solution
iron(II) (Fe^{2+})	green ppt., insoluble in excess	green ppt., insoluble in excess
iron(III) (Fe^{3+})	red-brown ppt., insoluble in excess	red-brown ppt., insoluble in excess
zinc (Zn^{2+})	white ppt., soluble in excess giving a colourless solution	white ppt., soluble in excess giving a colourless solution

Test for gases

gas	*test and test results*
ammonia (NH_3)	turns damp red litmus paper blue
carbon dioxide (CO_2)	turns limewater milky
chlorine (Cl_2)	bleaches damp litmus paper
hydrogen (H_2)	“pops” with a lighted splint
oxygen (O_2)	relights a glowing splint