UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

5942113768

CHEMISTRY **0620/05**

Paper 5 Practical Test **October/November 2008**

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 BARCODES

Answer **all** questions.
Practical notes are provided on page 8.

At the end of the examination, fasten all you 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 the addition of four different solids, **A**, **B**, **C** and **D**, to water. 4 g of each solid will be used.

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

Instructions

Experiment 1

By using a measuring cylinder, pour 30 cm^3 of distilled water into one of the polystyrene cups provided. Measure the initial temperature of the water and record it in the table below. Add solid **A** to the water in the cup and stir the mixture with the thermometer. Record the temperature reached after 2 minutes.
Remove the thermometer and rinse with water.

Experiment 2

Repeat Experiment 1 using solid **B** instead of solid **A** and a clean polystyrene cup. Record the initial and final temperatures in the table.
Keep the solution for Experiment 5.

Experiment 3

Repeat Experiment 1, using solid **C** and a clean polystyrene cup. Record the temperatures in the table.

Experiment 4

Repeat Experiment 1 using solid **D** and a clean polystyrene cup. Record the temperatures in the table.

Experiment 5

Pour about 2 cm^3 of the solution from Experiment 2 into a test-tube. By using a teat pipette add a little of the solution from Experiment 4 to the test-tube. Record your observations.

.....

..... [2]

Table of results

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

[5]

(a) Draw a labelled bar chart of the results to Experiments 1, 2, 3 and 4 on the grid below.

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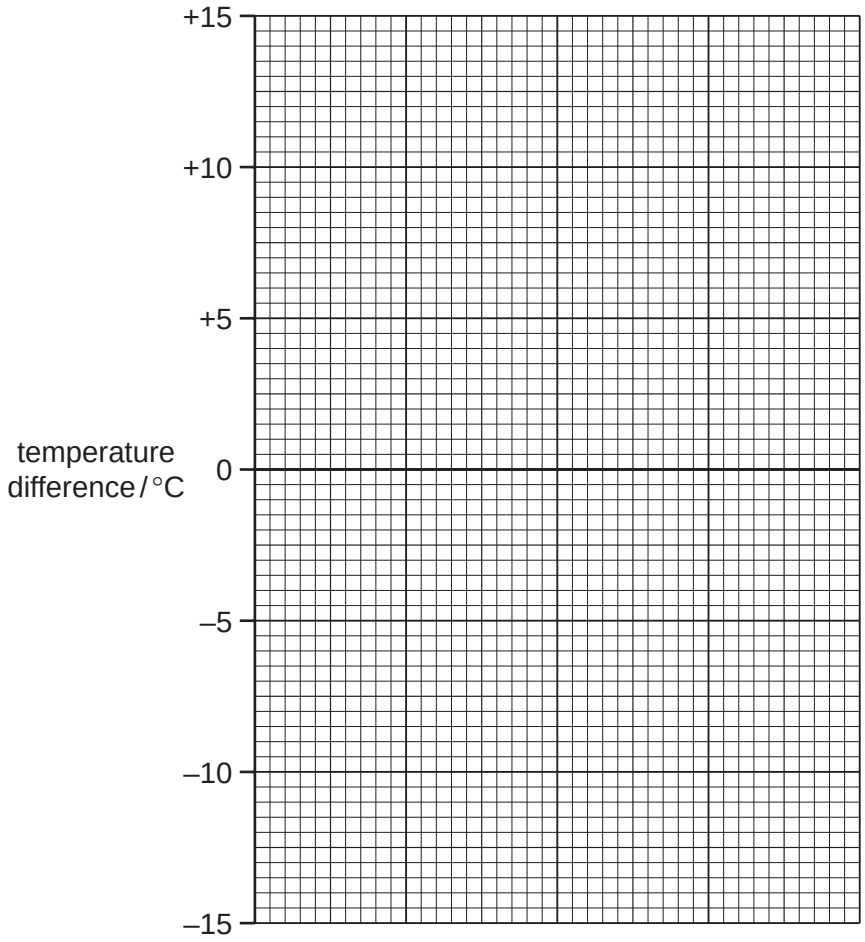

[4]

Use your results and observations to answer the following questions.

(b) (i) Which solid dissolves in water to produce an exothermic reaction?

..... [1]

(ii) Give a reason why you chose this solid.

..... [1]

(c) Which Experiment produced the largest temperature change?

..... [1]

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(d) Predict the temperature change that would happen if

(i) 8 g of solid **B** were used in Experiment 2,

..... [1]

(ii) 60 cm^3 of water was used in Experiment 4.

..... [1]

(iii) Explain your answer to **(d)(ii)**.

.....

..... [2]

(e) Suggest an explanation for the observations to Experiment 5.

.....

..... [2]

[Total: 20]

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2 You are provided with two solutions **K** and **L**, each containing the same anion but different metal cations.
Carry out the following tests on the solutions, recording all of your observations in the table.
Do not write any conclusions in the table.

tests	observations
(a) Describe the appearance of the solutions. solution **K** solution **L**	....[1]
(b) Using Universal Indicator paper test the pH of each solution. solution **K** solution **L**	pH ..... pH .....[1]
<u>tests on solution **K**</u> **(c)** **(i)** By using a teat pipette add drops of aqueous sodium hydroxide to about 3 cm^3 of solution **K**. Now add excess aqueous sodium hydroxide to the test-tube. **(ii)** Repeat experiment **(c)(i)** using aqueous ammonia instead of aqueous sodium hydroxide. **(iii)** To about 3 cm^3 of solution **K** add a few drops of hydrochloric acid and about 1 cm^3 of barium chloride solution.	....[2] ....[2] .....[1]

tests	observations
(iv) To about 3 cm^3 of solution **K** add a few drops of nitric acid and about 1 cm^3 of silver nitrate solution.	.....[2]
<u>tests on solution **L**</u> **(d)** **(i)** Repeat experiment **(c)(i)** using about 3 cm^3 of solution **L**.	.....[2]
(ii) Repeat experiment **(c)(ii)** using about 3 cm^3 of solution **L**.	.....[1]
(iii) Repeat experiment **(c)(iii)** using about 3 cm^3 of solution **L**.	.....[1]
(iv) Repeat experiment **(c)(iv)** using about 3 cm^3 of solution **L**.	.....[2]

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(e) What does test **(b)** indicate?

.....[1]

(f) Identify the anion present in solutions **K** and **L**.

.....[1]

(g) Identify the metal cation present in

(i) solution **K**,

.....[1]

(ii) solution **L**.

.....[2]

[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