UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

6928316447

CHEMISTRY **0620/05**

Paper 5 Practical Test **May/June 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 **6** printed pages and **2** blank pages.

UNIVERSITY of CAMBRIDGE International Examinations

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For Examiner's Use

1 You are going to investigate the reaction between potassium manganate(VII) and a metallic salt solution.

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

Experiment 1

(a) Pour a little of the metal salt solution **A** into a test-tube. Add about 1 cm^3 of aqueous sodium hydroxide and note your observation.

observation ..... [1]

(b) Fill the burette provided up to the 0.0 cm^3 mark with the potassium manganate(VII) solution. Using a measuring cylinder, pour 25 cm^3 of solution **A** of the salt solution into the conical flask provided. Shake the flask to mix the contents.

From the burette add 1 cm^3 of the potassium manganate(VII) solution to the flask, and shake to mix thoroughly. Continue to add potassium manganate(VII) solution to the flask until there is a pale pink colour in the contents of the flask. Record the burette readings in the table.

Experiment 2

(c) Pour away the contents of the flask and rinse with distilled water. Fill the burette up to the 0.0 cm^3 mark with the potassium manganate(VII) solution. Repeat Experiment **1(b)** exactly using solution **B** instead of solution **A**. Record your burette readings in the table and complete the table.

(d) Pour a little of the solution in the flask into a test-tube. Add about 1 cm^3 of aqueous sodium hydroxide and note your observation.

observation ..... [1]

Table of results

Burette readings / cm^3

	Experiment 1	**Experiment 2**
final reading		
initial reading		
difference		

[6]

(e) Describe the appearance of the solution in the conical flask before adding the potassium manganate(VII) solution.

.....

[1]

(f) What happens to the colour of the solution in the flask as the potassium manganate(VII) solution is added?

.....

[1]

(g) **(i)** In which Experiment was the greatest volume of potassium manganate(VII) solution used?

.....

[1]

(ii) Compare the volumes of potassium manganate(VII) solution used in Experiments 1 and 2.

.....

.....

[1]

(iii) Suggest an explanation for the difference in the volumes.

.....

.....

[2]

(h) Predict the volume of potassium manganate solution which would be needed to react completely with 50 cm^3 of solution **B**.

.....

.....

[2]

(i) Explain one change that could be made to the experimental method to obtain more accurate results.

change .....

explanation .....

[2]

(j) What conclusion can you draw about the salt solution from

(i) Experiment **1(a)**, ... [1]

(ii) Experiment **2(d)**? ..... [1]

[Total: 20]

2 You are provided with two solids, solid **T** and solid **V**.
Carry out the following tests on **T** and **V**, recording all of your observations in the table.
Conclusions must not be written in the table.

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tests	observations
<u>tests on solid **T**</u> **(a)** Describe the appearance of solid **T**.	..... [1]
(b) Place a little of solid **T** in a test-tube. Heat the solid gently, then more strongly. Test the gas given off with a lighted splint.	....[2]
(c) Dissolve one spatula measure of solid **T** in about 3 cm^3 of distilled water and shake to dissolve. Leave to stand for 1 minute. Decant the liquid into another test-tube. Divide the solution into 3 equal portions in test-tubes. **(i)** Test the pH of the solution using Universal Indicator solution. **(ii)** To the second portion add aqueous sodium hydroxide in drops, then add excess sodium hydroxide solution. **(iii)** To the third portion of solution add about 1 cm^3 of iron(III) chloride solution. Note the colour. Heat the solution.	colour ..... pH .....[2] ....[2] .....[1] .....[1]

tests	observations
<u>tests on solid **V**</u>	
(d) Describe the appearance of solid **V**.	.....[1]
(e) Place a little of solid **V** in a test-tube. Heat the solid gently, then more strongly.	.....[1]
(f) Dissolve one spatula measure of solid **V** in about 3 cm^3 of distilled water in a test-tube and shake to dissolve. Divide the solution into 3 equal portions in test-tubes. Note the smell of the solution.	.....[1]
(i) Repeat (c)(i) using the first portion of the solution.	colour ..... pH .....[2]
(ii) Repeat (c)(ii) using the second portion of the solution.	....[2]
(iii) Repeat (c)(iii) using the third portion of the solution. Do not heat the solution.	.....[1]

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(g) What conclusion can you draw about solid **T**?

..... [1]

(h) What conclusions can you draw about solid **V**?

.....

..... [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