UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER		CANDIDATE NUMBER	

5258007914

CHEMISTRY **0620/51**

Paper 5 Practical Test **May/June 2011**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the 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 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 **6** printed pages and **2** blank pages.

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UNIVERSITY *of* CAMBRIDGE International Examinations

[Turn over

1 You are going to investigate the reaction between two different solutions of potassium manganate(VII), **A** and **B**, and an acidic solution of substance **C**.

Read all the instructions below carefully before starting the experiments.

Instructions
You are going to carry out three experiments.

(a) *Experiment 1*

Fill the burette with the solution **A** of potassium manganate(VII) to the 0.0 cm^3 mark. Using a measuring cylinder, pour 25 cm^3 of solution **C** into the conical flask.

Add 1 cm^3 of the solution **A** to the flask, with shaking. Continue to add solution **A** to the flask until the mixture just turns permanently pink. Record the burette readings in the table and complete the table.

Pour away the contents of the conical flask and rinse the flask with distilled water.

final burette reading / cm^3	
initial burette reading / cm^3	
difference / cm^3	

[3]

(b) *Experiment 2*

Empty the burette and rinse it first with distilled water, and then with a little of solution **B**. Fill the burette with the solution **B** of potassium manganate(VII) solution to the 0.0 cm^3 mark.

Repeat Experiment 1.

Record the burette readings in the table and complete the table.

final burette reading / cm^3	
initial burette reading / cm^3	
difference / cm^3	

[3]

(c) *Experiment 3*

To about 2 cm^3 of solution **C** in a test-tube, add one spatula measure of manganese(IV) oxide. Note any observations and test the gas given off.

....

....

.... [3]

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(d) Identify the gas given off in Experiment 3.

.... [1]

(e) **(i)** What colour change was observed when potassium manganate(VII) solution was added to the flask in Experiment 1.

from .... to .... [1]

(ii) Why is an indicator **not** added to the flask?

.... [1]

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

.... [1]

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

.... [1]

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

....

....

.... [2]

(g) If Experiment 2 was repeated using 12.5 cm^3 of solution **C**, what volume of potassium manganate(VII) solution would be used? Explain your answer.

....

....

.... [3]

(h) Give **one** advantage and **one** disadvantage of using a measuring cylinder for solution **C**.

advantage ....

disadvantage .... [2]

[Total: 21]

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2 You are provided with two different liquids, **M** and **N**.
Carry out the following tests on each liquid, recording all of your observations in the table.
Conclusions must **not** be written in the table.

tests	**observations**
(a) (i) Place a little of liquid **M** in a test-tube and describe its smell and colour.	.... [2]
(ii) Place a little of liquid **N** in a test-tube and describe its smell and colour.	.... [1]
(b) (i) Using a teat pipette, transfer a few drops of **M** to a dry watch glass. Touch the liquid with a lighted splint.	.... [2]
(ii) Repeat **(b)(i)** using liquid **N**.	.... [1]
(c) (i) Using a teat pipette, add about 1 cm^3 of liquid **M** to a crystal of iodine provided in a test-tube. Stopper and shake the test-tube.	.... [2]
(ii) Add about 1 cm^3 of **N** to the other crystal of iodine provided. Stopper and shake the test-tube.	.... [1]
(iii) Add a few drops of liquid **T** to the mixture. Stopper and shake the test-tube.	.... [2]
(d) (i) To about 1 cm^3 of liquid **M**, add a few drops of dilute nitric acid and then aqueous silver nitrate.	.... [1]
(ii) Repeat **(d)(i)** using liquid **N**.	.... [2]
(e) To about 2 cm^3 of liquid **N**, add about 2 cm^3 of aqueous copper sulfate. Shake and leave to stand for five minutes.	.... [2]

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(f) What type of substance is liquid **M**?

....

.... [2]

(g) Identify **one** ion present in liquid **N**.

.... [1]

[Total: 19]

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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 add aqueous silver nitrate	yellow ppt.
nitrate (NO_3^-) [in solution]	add aqueous sodium hydroxide then aluminium foil; warm carefully	ammonia produced
sulfate (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 ppt., 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