Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER		CANDIDATE NUMBER	

3872978216

CHEMISTRY **0620/53**

Paper 5 Practical Test **October/November 2015**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.
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	
Total	

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **6** printed pages and **2** blank pages.

CAMBRIDGE International Examinations

1 You are going to investigate the reaction between an acidic solution of iron(II) sulfate, solution **L**, and two different solutions of aqueous potassium manganate(VII), solutions **M** and **N**.

Read all the instructions below carefully before starting the experiments.

Instructions
You are going to carry out two experiments.

(a) *Experiment 1*

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

Add 1 cm^3 of the solution **M** to the flask, with swirling. Continue to add solution **M** 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 thoroughly with distilled water. Add a small volume of the solution **N** of aqueous potassium manganate(VII) to the burette and swirl. Discard this solution. Now fill the burette with the solution **N** of potassium manganate(VII) to the 0.0 cm^3 mark.

Repeat Experiment 1 using solution **N** instead of solution **M**.
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) Why is the burette washed with

(i) distilled water,

....

(ii) solution **N**, before starting Experiment 2?

....

[2]

(d) **(i)** What colour change was observed in the flask during the addition of potassium manganate(VII) solution to solution **L** in both experiments?

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

(ii) Explain why an indicator is not needed.

.... [1]

(e) **(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 volumes.

....

....

.... [2]

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

....

....

.... [2]

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

advantage ....

disadvantage ....
[2]

[Total: 18]

[Turn over

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

tests	**observations**
<u>tests on solid **P**</u> **(a)** Describe the appearance of solid **P**.	....
(b) Use a spatula to place a little of solid **P** in to a dry test-tube. Heat the solid gently.	.... [2]
Add about 10 cm^3 of distilled water to the rest of solid **P** and shake to dissolve. Divide the solution into four equal portions in test-tubes. Carry out the following tests. **(c)** Test the pH of the first portion of the solution.	.... [1]
(d) Use a thermometer to measure the temperature of the second portion of solution **P** and record the temperature. Now add a spatula measure of sodium hydrogen carbonate to the solution and stir with the thermometer. Measure and record the temperature of the mixture after one minute.	initial temperature = ... °C final temperature = ... °C other observations = ... [3]
(e) Pour the third portion of the solution into a boiling tube. Add a spatula measure of copper(II) oxide. Heat the mixture to boiling. Leave the mixture to stand for one minute.	.... [1]
(f) To the fourth portion of the solution add a small measure of magnesium powder. Shake the mixture and test the gas evolved.	.... [3]

tests	observations
<u>tests on solid **Q**</u> **(g)** Describe the appearance of solid **Q**.	.... [1]
(h) Add about 5 cm^3 of distilled water into a test-tube. Measure and record the initial temperature of the water. Now add all of solid **Q** to the water and stir with the thermometer. Measure and record the temperature of the mixture after one minute. Describe the mixture.	initial temperature = ... °C final temperature = ... °C .... [3]
Decant the solution and divide into two equal portions in test-tubes. **(i)** To the first portion of the solution add an equal volume of aqueous sodium hydroxide.	.... [2]
(j) To the second portion of the solution add drops of aqueous ammonia with shaking. Now add excess aqueous ammonia.	.... [3]

(k) What conclusions can you draw about solid **P**?

....

.... [2]

(l) What conclusion can you draw about solid **Q**?

.... [1]

[Total: 22]

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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