UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER		CANDIDATE NUMBER	

6675285245

CO-ORDINATED SCIENCES **0654/05**

Paper 5 Practical Test **October/November 2007**

2 hours

Candidates answer on the Question Paper.

Additional Materials: As listed in Instructions to Supervisors.

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.
Chemistry practical notes for this paper are printed 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	
3	
Total	

This document consists of **8** printed pages.

UNIVERSITY of CAMBRIDGE International Examinations

1 **(a)** The beaker labelled **A** contains raisins that have been immersed in a dilute sugar solution overnight. Beaker **B** contains unsoaked raisins.

(i) Remove one raisin from each beaker. Place them on the white tile. Draw the raisins in the spaces below.

raisin **A** raisin **B**

[2]

(ii) Compare the appearance of the raisins. Describe what happened to the shape and size of raisin **A** while it was in the solution. Suggest why this change has occurred.

....

....

.... [2]

(iii) Explain the changes to raisin **A** by referring to the concentrations (water potentials) of the raisin cells and the solution in which raisin **A** was immersed.

....

....

....

.... [3]

(b) The kidneys of animals can regulate the level of water and salts in their bodies by excreting urine. Healthy urine does not contain protein or sugar, but it does contain chloride ions.

The four solutions, **D**, **E**, **F** and **G** have been made in the laboratory so that they are chemically similar to urine samples from different people.

The four samples are

- urine containing reducing sugar, from a diabetic patient,
- urine containing protein, from a patient with kidney failure,
- urine from a healthy person,
- a sample that is not genuine urine (fake sample).

You are going to identify the samples. For each test use 2 cm depth of sample in a test-tube.

(i) Test each solution with Benedict's reagent. Record the colour of each sample after testing, in Fig. 1.1.

(ii) Test each solution with biuret reagent. Record the colour of each sample after testing in Fig. 1.1.

test on urine	sample **D**	sample **E**	sample **F**	sample **G**
Benedict's test				
protein test				

Fig. 1.1

[4]

(iii) Use the results from Fig. 1.1 to identify the sample from the patient with

diabetes, ...

kidney failure. .... [2]

(iv) Test the remaining two urine samples for the presence of chloride ions. The healthy person's urine contains chloride ions.

Describe the test and the expected result for the presence of chloride ions.

....

.... [1]

Which was the real urine sample?

.... [1]

2 You are going to find out how the current through a piece of wire varies with its length. The circuit has been set up for you and is shown in Fig. 2.1.

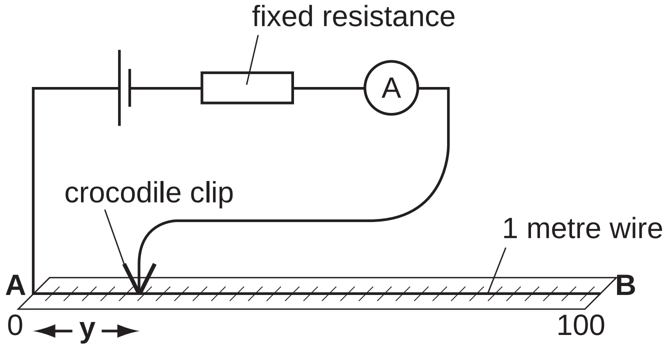

Fig. 2.1

(a) **S**, the value of the resistance of one metre of the wire **AB**, has been given to you. State this value.

S = ... ohms [1]

(b) Using the crocodile clip, complete the circuit by touching the wire at the 10.0 cm (**y** = 10 cm) mark on the ruler. Read the current I and record this value in Fig. 2.2.

(c) Repeat this measurement of current for four further values of **y** between 20.0 and 90.0 cm. Record your measurements in Fig. 2.2.

length **y** / cm	resistance **R** / ohms	current I / amps	current x resistance I**R** / volts
10.0			

Fig. 2.2 [3]

(d) **(i)** Calculate **R** the resistance of the wire for each length of **y** using the formula

$$\mathbf{R} = \frac{\mathbf{S} \times \mathbf{y}}{100} .$$

S is the value recorded above in **(a)**.
Write these values in the appropriate column of the table. [1]

(ii) Complete Fig. 2.2 by calculating I**R**, the potential drop, for each value of **y**, to three significant figures. [2]

(e) Plot a graph of the potential drop, I**R**, against length **y** (horizontal axis). Both axes should start at zero.
Draw a smooth curve through your points including the origin.
Label the curve 'experimental'. [5]

(f) Use the graph to find the value of **y** when I**R** = 1.00 V

y = ... cm [1]

(g) The experiment is repeated using a cell with a larger voltage but the same wire.
Draw a second curve on your graph to show the expected result.
Explain how you decided this.
Label this curve 'expected result'.

....

.... [2]

For Examiner's Use

3 **X**, **Y** and **Z** are three colourless solutions. Carry out the following tests which will enable you to suggest a name for each of these solutions.

Solution **P** is an indicator. It is colourless in acid solution and pink in alkaline solution.

(a) Place about 1 cm^3 of each solution **X**, **Y** and **Z** in separate test-tubes. Add two drops of solution **P** to each. Record your observations in the table.

solution **X**	solution **Y**	solution **Z**

[1]

State your conclusion about each solution.

solution **X** ....

solution **Y** ....

solution **Z** .... [2]

(b) The acid is known to be either hydrochloric acid or sulphuric acid.
Carry out the tests for a chloride and a sulphate as described on page 8 to decide the name of the acid. Describe the test and result that enables you to decide. Only one test need be described.

....

....

....

....

name of acid .... [3]

(c) **(i)** Place about 1 cm^3 of solution **Y** in a test-tube. Add 1 drop of the indicator **P**. Add drops of solution **X** until there is no further change.
Record your observations.

observations ....

.... [1]

(ii) Repeat **(c)(i)** using solution **Z** in place of solution **Y**. Record your observations.

observations ....

.... [2]

For Examiner's Use

(d) **(i)** Place about 1 cm^3 of zinc sulphate solution in a test-tube.
Add solution **Y** a little at a time until there is no further change.
Record your observations.

observations ....

.... [2]

(ii) Repeat **(d)(i)** using solution **Z** in place of solution **Y**.

observations ....

.... [2]

(e) Suggest a name for

solution **Y** ....

solution **Z** .... [2]

CHEMISTRY PRACTICAL NOTES

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.
nitrate (NO_3^-) [in solution]	add aqueous sodium hydroxide then aluminium foil; warm carefully	ammonia produced
sulphate (SO_4^{2-}) [in solution]	acidify then add aqueous barium chloride *or* aqueous barium nitrate	white ppt.

Test for aqueous cations

cation	*effect of aqueous sodium hydroxide*	*effect of aqueous ammonia*
ammonium (NH_4^+)	ammonia produced on warming	-
copper(II) (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 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