Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

COMBINED SCIENCE 0653/5

PAPER 5 Practical Test

MAY/JUNE SESSION 2002

1 hour 30 minutes

Candidates answer on the question paper.
Additional materials:
As listed in Instructions to Supervisors.

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
Chemistry practical notes for this paper are printed on page 8.

FOR EXAMINER'S USE	
1	
2	
3	
TOTAL	

This question paper consists of 8 printed pages.

[Turn over

1 Solid **P** is either potassium carbonate or potassium hydrogencarbonate.

Carry out the following tests to enable you to decide the name of solid **P**.

(a) Carry out your own experiment to decide whether **P** is soluble in cold or hot water. Briefly describe what you did and state your conclusion.

.....

.....

.....[2]

(b) Make about 15 cm^3 of a solution of **P** in the large test-tube.

(i) Add a few drops of Universal Indicator. Record the colour of the solution and suggest its pH.

colour .....

pH = ... [1]

(ii) Heat the mixture from **(i)** to boiling and maintain the boiling for about 2 minutes. Record all your observations.

observations .....

.....[2]

(c) Place a small amount of **P** in a dry hard glass test-tube. Heat strongly and test any gas with limewater.

Record your observation and conclusion below.

limewater .....

name of gas given off ..... [1]

(d) • The reaction of potassium carbonate with hydrochloric acid is exothermic.

• The reaction of potassium hydrogencarbonate with hydrochloric acid is endothermic.

Carry out a test of your own to decide whether **P** is potassium carbonate or potassium hydrogencarbonate. Briefly describe what you do, including any measurements that you make.

.....

.....

.....

.....

.....

.....[3]

(e) Name solid **P**.....[1]

[Turn over

2 You are going to investigate how the current flowing in a wire changes with its length.

The apparatus is set up for you as shown in Fig. 2.1.

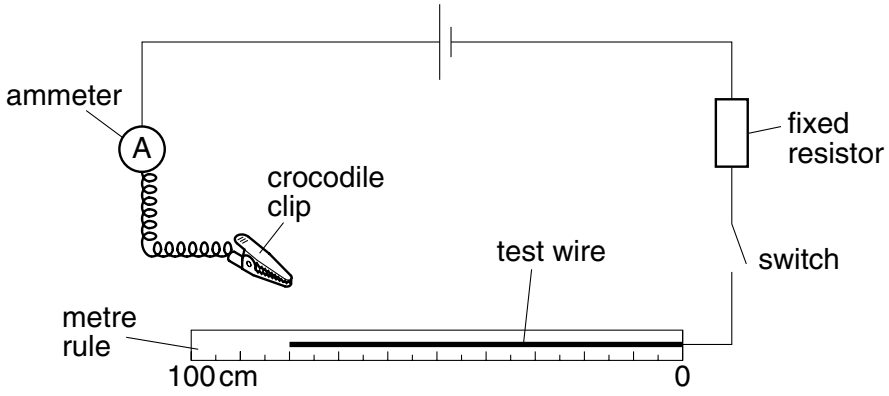


Fig. 2.1

(a) Write down the value of the voltage of the cell, provided by the supervisor.

cell voltage = ... V

(b)
- Make sure the switch is open.
- Attach the crocodile clip to the wire at the 80 mm (8 cm) mark.
- Close the switch.
- Read the current, I, and record it in the table.
- Open the switch.

length l/mm	current I/mA
80	

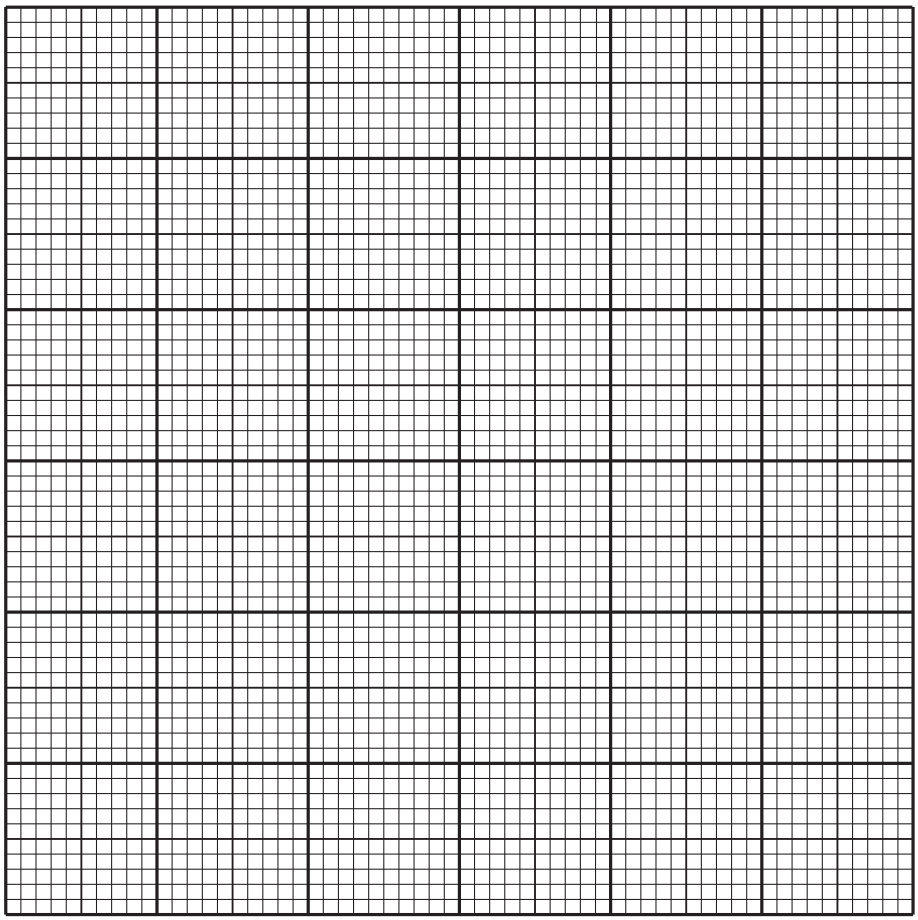
[3]

(c) Repeat the procedure for **five** further lengths, l, of wire.

Record the lengths and currents in the table. [2]

(d) Plot a graph of current, I, (vertical axis) against length, l and draw a suitable curve through your points.

current, I/mA



length, l/mm

[3]

(e) Using your graph, determine the current flowing through an identical piece of wire of length 1000 mm.

current = ... mA [1]

[Turn over

(f) Using the answer from **(e)**, calculate the total resistance of the circuit using the formula

$$R = \frac{E \times 1000}{I}$$

E is the value of the voltage given to you by the supervisor.

resistance = ... ohms [1]

3 This experiment is to investigate the effect of acid rain on the germination of seeds, and on the early growth of the seedlings.

The three dishes of seeds have all been kept in exactly the same conditions. However, they have been watered using the following solutions:

dish **A**	distilled (pure) water
dish **B**	dilute acid rain
dish **C**	concentrated acid rain

(a) Name **one** of the conditions that was the same for all three dishes while the seeds were grown.

.....[1]

(b) **(i)** Construct a table in the space below and use it to describe the **germination** and **growth** of the seeds in each dish.

[4]

(ii) Using your observations, what conclusions can you make about the effect of acid rain on the seeds?

.....

.....

.....[2]

(c) Carefully remove one of the seedlings from dish **A** and make a **large**, labelled drawing of it in the space below.

[3]

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 result*
ammonia (NH_3)	turns damp litmus paper blue
carbon dioxide (CO_2)	turns lime water milky
chlorine (Cl_2)	bleaches damp litmus paper
hydrogen (H_2)	‘pops’ with a lighted splint
oxygen (O_2)	relights a glowing splint