UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2891058802

PHYSICAL SCIENCE **0652/05**

Paper 5 Practical Test **October/November 2010**

1 hour 30 minutes

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.

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1	
2	
Total	

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1 A student made the following statement.

> "When two lamps are connected in series, the total power output is half that for a single lamp."

You are going to test the correctness of this statement by carrying out the following experiment.

Set up the circuit as shown in Fig. 1.1.

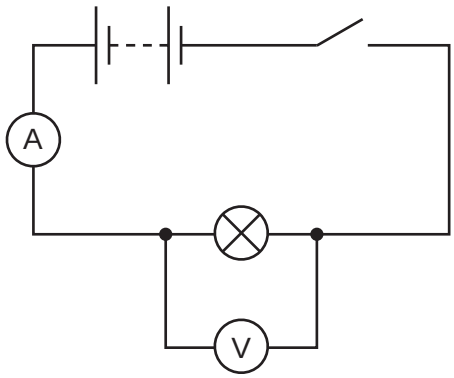

Fig. 1.1

(a) Close the switch. Measure and record in Table 1.1 the current and the potential difference with their units. Open the switch. [3]

(b) Disconnect the voltmeter. Connect the second lamp in series with the first as shown in Fig. 1.2.

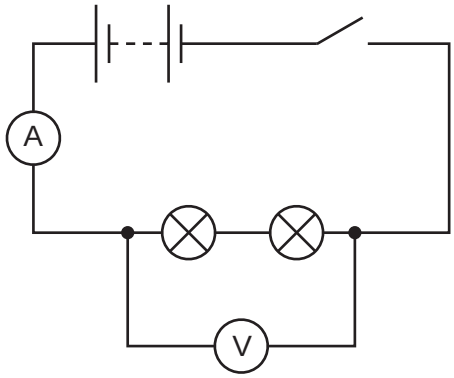

Fig. 1.2

Connect the voltmeter across both lamps. Close the switch.

(i) Measure the current and potential difference in the circuit.

Record these values in Table 1.1.

Open the switch.

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Table 1.1

	current unit = ...	potential difference unit = ...	power = current value x p.d. value unit = ...
single lamp			
2 lamps in series			

[2]

(ii) Power is the product of the voltage and current. Complete Table 1.1 by calculating the values of power. [1]

(c) Use the values from **(b)(ii)** to make your comment on the statement "When two lamps are connected in series, the total power output is half that for a single lamp," made by the student.

.....

..... [2]

A second student made the following statement.

"When two lamps are connected in parallel, the total power output is double that for a single lamp."

You are going to test the correctness of this statement.

(d) (i) In the space below, draw a circuit similar to Fig. 1.2 but with the two lamps in parallel. Draw the circuit you intend to use including both the voltmeter and the ammeter.

[1]

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(ii) In the space below, construct a table similar to Table 1.1 showing the results for a single lamp and for two lamps in parallel.

[1]

(e) (i) Connect the circuit you have drawn in **(d)(i)**. Close the switch and measure the current and potential difference.

Record these values in the table you have drawn in **(d)(ii)**. [2]

Open the switch.

(ii) Complete the table by calculating the power. Remember that you have already found the potential difference and the current for a single lamp. [1]

(f) Using the values you have calculated in your table in **(d)(ii)**, comment on the statement "When two lamps are connected in parallel, the total power output is double that for a single lamp," made by the second student.

.....

..... [2]

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2 Compound **X** dissolves in water to give a solution containing three different ions.

Carry out the following tests to identify these three ions.

Divide compound **X** into three portions.

(a) Heat strongly one portion of **X** in a hard glass test-tube for several minutes. After the water vapour has been given off, continue heating and test any gas with litmus paper. Allow to cool.

Record your observations.

litmus paper .....

name of gas .....

other observations .....

.....

..... [5]

(b) To a second portion of **X**, add about 2 cm^3 of aqueous sodium hydroxide and warm gently.

Test any gas with litmus paper.

Record your observations.

litmus paper .....

name of gas ..... [2]

(c) Dissolve the third portion of **X** in 10 cm^3 water and divide the solution into three parts.

(i) To the first part of the solution of **X**, add dilute hydrochloric acid, followed by aqueous barium chloride.

Record your observations.

..... [1]

(ii) To the second part of the solution of **X**, add a few drops of dilute nitric acid, followed by about 1 cm^3 aqueous silver nitrate.

Record your observations.

..... [1]

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(d) (i) To the third part of the solution of **X**, add about 3 cm^3 aqueous sodium hydroxide and filter the mixture, collecting the filtrate for test in part **(ii)**.

Record the colour of the precipitate in the test-tube and after a few minutes, the colour of the residue in the filter paper.

colour of precipitate in test-tube .....

colour of residue in filter paper after a few minutes ..... [2]

(ii) To 2 cm^3 portion of filtrate from **(i)**, add about 2 cm^3 aqueous copper sulfate.

Record your observations.

..... [1]

(e) Name the three ions in the compound **X**.

1 .....

2 .....

3 ..... [3]

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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
sulfate (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 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

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