| Centre Number | Candidate Number | Name |
|---|---|---|
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

**COMBINED SCIENCE** **0653/05**

Paper 5 Practical Test

October/November 2005

**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 in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
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 12.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

| For Examiner's Use | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| Total | |

**1 (a) (i)** You are going to do tests on seeds at two different stages of germination.

The seeds labelled **A** have been soaking for a few hours. Crush them with a little water on a white tile using the end of a glass rod.

Move a small quantity of the crushed seeds towards one corner of the white tile and test them with a few drops of iodine solution, making sure that the iodine does not touch the rest of the crushed seeds.

colour observed with iodine solution .....

conclusion .....

..... [2]

**(ii)** Transfer the remainder of the crushed seeds into a test-tube. Add an equal volume of Benedict's solution to test for reducing sugar and heat in a water bath for 5 minutes. Wash the white tile while you wait.

colour observed with Benedict's solution .....

conclusion .....

..... [2]

**(b) (i)** The seeds labelled **B** have been germinating for a few days.

Remove the roots and shoots (coleoptiles) from the seeds. Crush the seeds on the white tile and test them with Benedict's solution as described in **a(ii)** above.

colour observed with Benedict's solution .....

conclusion .....

..... [2]

**(ii)** Compare the results in **(a)(ii)** and **(b)(i)**. Explain any difference that you obse

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.....

..... [4]

**2** You are going to investigate whether the mass of a pendulum has any effect on the swing. A pendulum consists of a weight on a piece of string that can swing from side to

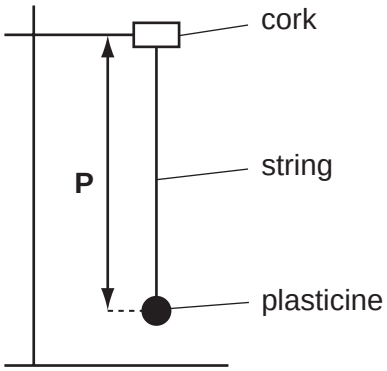



**Fig. 2.1**

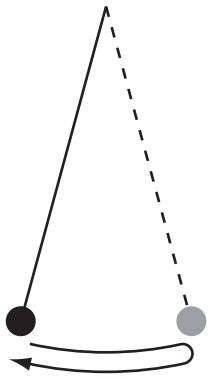
**(a)** Attach the string to the plasticine. Weigh the string and plasticine to the nearest gram and record its mass in the table Fig. 2.3.

Adjust the length of the string to between 450 and 550 mm and set up the apparatus as shown in Fig. 2.1.

**(b)** Measure and record the length **P** of the pendulum, in millimetres, from the clamp to the centre of the plasticine.

**P** = .....mm [1]

You are now going to time to the nearest second, 20 continuous swings of the pendulum. One complete swing is shown in Fig. 2.2.



1 complete swing

**Fig. 2.2**

**(c)** Pull the plasticine about 5 cm to one side and release it. At the same time start th and measure the time for 20 complete swings. Record the time to the nearest seco Fig. 2.3.

**(d) (i)** Remove about 10 g of plasticine and weigh the string and plasticine again to the nearest gram. Record this mass in Fig. 2.3.

**(ii)** Set up the pendulum again, making sure that the length **P** is the same as that used in **(b)**. Start the pendulum as in part **(c)** and measure the time for 20 complete swings. Record this time in Fig. 2.3.

**(e) (i)** Repeat **(d)(i)** and **(ii)** until you have 5 sets of readings. Remember to weigh the string and plasticine to the nearest gram and record the time to the nearest second.

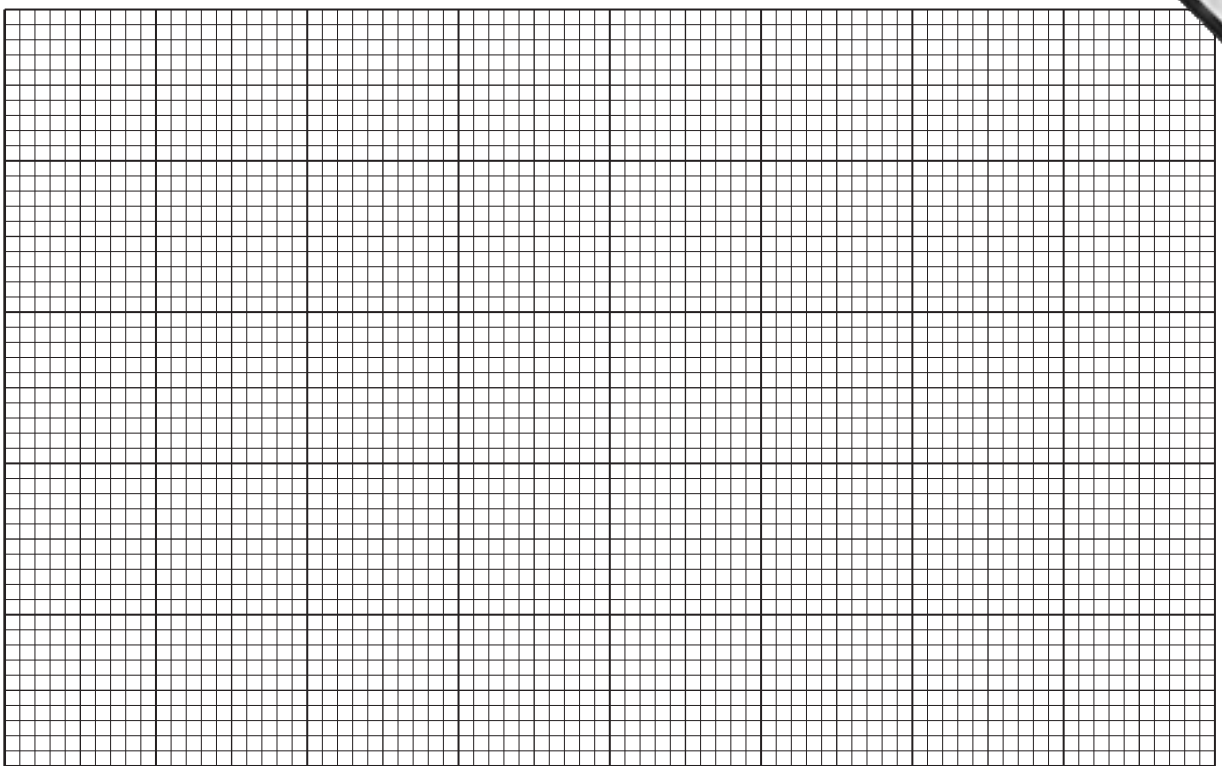
**(ii)** Calculate the time for 1 complete swing for each of the five masses and record the times in Fig. 2.3. [1]

| mass of plasticine/g | time for 20 complete swings/s | time for 1 complete swing/s |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

[3]

**Fig. 2.3**

**(f)** Plot a graph of time for 1 swing (vertical axis) against mass of pendulum and suitable line through your points.



**(g)** What do your results show about the effect of changing the mass of the pendulum on the time of swing? Explain your answer.

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.....

..... [1]

**3** You are provided with two solids, **A** and **B**, both of which decompose when heated. Carry out the following tests, which include testing for gases.
Chemistry practical notes are provided on page 12.

**(a)** Place about half the sample of **A** provided into a dry hard glass test-tube and heat until a change is visible. Whilst continuing to heat, test any gas given off with limewater. Allow the remaining solid to cool and include its colour in the space below.

**(i)** Describe any visible change in the appearance of solid **A**.

.....

..... [1]

**(ii)** What is the appearance of the residue when cold?

..... [1]

**(iii)** What change, if any, did you see in the limewater.

..... [1]

**(iv)** Name any gas given off.

..... [1]

**(v)** What can you deduce about the solid **A**?

..... [1]

**(c)** Place solid **B** provided into a hard glass test-tube and heat gently at first and then strongly. Whilst heating strongly, note any visible changes taking place and test any gas given off with moist blue litmus paper.

What did you observe when

**(i)** solid **B** was heated,

.....

.....

..... [2]

**(ii)** moist blue litmus paper was used?

..... [1]

**(d)** Solid **B** is known to be a compound of iron. Carry out a test of your own to decide whether **B** is an iron(II) or an iron(III) compound.
Describe the test. State the result and your conclusion.

.....

.....

..... [2]

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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 |
| 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 limewater milky |
| chlorine ($Cl_2$) | bleaches damp litmus paper |
| hydrogen ($H_2$) | ‘pops’ with a lighted splint |
| oxygen ($O_2$) | relights a glowing splint |