Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

4237593466

COMBINED SCIENCE **0653/52**

Paper 5 Practical Test **October/November 2014**

1 hour 30 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.
Notes for Use in Qualitative Analysis 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.

CAMBRIDGE International Examinations

1 You are going to investigate the action of the enzyme amylase on starch.

- Label two test-tubes **A** and **B**.
- Measure 10 cm^3 starch solution into each of tubes **A** and **B** and place them in a water-bath at 30 °C.
- Place tube **C**, which contains amylase solution, into the water-bath.
- Place tube **D**, which contains boiled amylase solution, into the water-bath.
- Start the stopclock.
- Wait five minutes. During this time, add two drops of iodine solution to each of **ten** wells in the spotting tile. Label five of the wells '**A**' and five of the wells '**B**' as shown in Fig. 1.1.

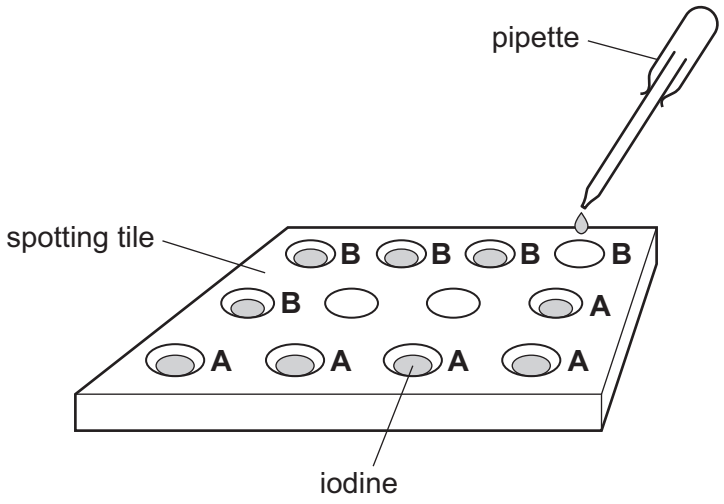


Fig. 1.1

- When at least five minutes have elapsed on your stopclock, stop and zero the stopclock.
- Pour the contents of tube **C** into tube **A**.
- Pour the contents of tube **D** into tube **B**.
- Start the stopclock.

(a) Immediately, using a clean dropping pipette, place two drops from tube **A** into one of the wells containing iodine solution labelled **A** in the spotting tile. Record in Table 1.1 the colour obtained.

Using a second clean dropping pipette, repeat with tube **B** into one of the wells containing iodine solution labelled **B** in the spotting tile. Record in Table 1.1 the colour obtained.

Repeat this procedure for tube **A** and tube **B** at one minute intervals for a further four minutes. Continue to keep the samples from tube **A** and tube **B** separate. [4]

Table 1.1

time / minutes	colour of solution from tube **A** when added to iodine solution	colour of solution from tube **B** when added to iodine solution
0		
1		
2		
3		
4		

(b) By referring to the colours recorded in Table 1.1, state and explain what happens to the starch in tube **A** during the experiment and what can be concluded about the action of the amylase on the starch in tube **A** by the end of the experiment.

.....

.....

.....

..... [3]

(c) (i) State what can be concluded about the presence of starch in tube **B** at the end of the experiment.

.....

..... [1]

(ii) Explain your answer to **(i)**.

.....

.....

..... [2]

[Turn over

2 You are provided with 1 g of each of two salts **P** and **Q**.

You are going to investigate the temperature changes when these salts are dissolved in water. You will also identify some of the ions in salts **P** and **Q**.

(a) (i) Measure 25 cm^3 distilled water into a beaker. Use a thermometer to measure the initial temperature of the distilled water.

Record this value as the initial temperature for salt **P**, to the nearest 0.5 °C, in the appropriate space in Table 2.1. [1]

(ii) Add the sample of salt **P** to the distilled water in the beaker and stir well. Observe the highest temperature if the temperature rises or the lowest temperature if the temperature falls.

Record this temperature, to the nearest 0.5 °C, in the appropriate space in Table 2.1. Transfer the resulting solution of **P** to a labelled test-tube for use in **(c)(i)**. [1]

(iii) Wash out the beaker thoroughly.

Repeat **(a)(i)** and **(a)(ii)** using salt **Q** instead of salt **P**. Transfer the resulting solution of **Q** to a labelled test-tube for use in **(c)(ii)**. [1]

Table 2.1

	salt **P**	salt **Q**
initial temperature / °C		
final temperature / °C		
change in temperature / °C		

(b) Using the initial and final temperatures in Table 2.1, calculate any temperature change for each of salts **P** and **Q** dissolving in water.

Record any changes in Table 2.1. Place a plus (+) sign in front of a temperature rise and a minus (-) sign in front of a temperature fall. [2]

(c) (i) Pour about 5 cm^3 of the solution of salt **P** into a clean test-tube. Add ammonia solution until there is no further change.

Record your observations below and identify the cation in salt **P**.

observations .....

.....

identity of the cation in **P** ..... [3]

(ii) Describe another test and the positive result that will confirm that the cation in **P** is as you have stated in **(c)(i)**.

Do not carry out this test.

test .....

result ..... [1]

(iii) Pour about 5 cm^3 of the solution of salt **Q** into a clean test-tube. Add aqueous silver nitrate.

Record your observations below and identify the anion in salt **Q**.

observations .....

.....

identity of the anion in **Q** ..... [1]

[Turn over

3 You are going to measure the extension of a spring when different masses *m* are added to it.

A spring has been set up in a clamp for you, as shown in Fig. 3.1.

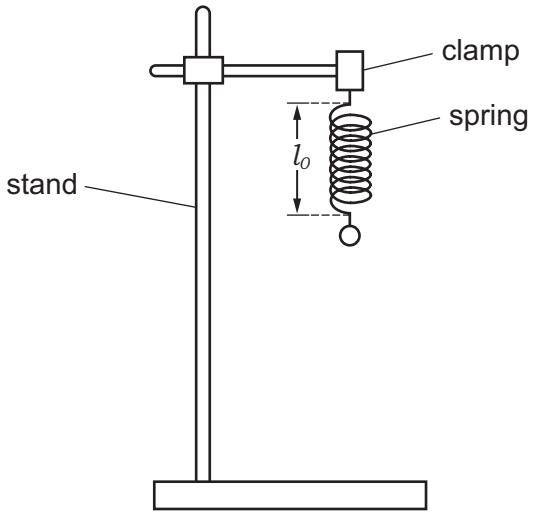


Fig 3.1

(a) (i) Measure and record the length l_0 of the unstretched spring to the nearest millimetre.

l_0 = ... mm [1]

(ii) Hang a mass *m* of 100 g on the spring. Measure the new length l of the spring to the nearest millimetre.

Record the mass *m* and the length l in Table 3.1. [1]

(iii) Calculate the extension *e* of the spring, using the equation

$$e = l - l_0$$

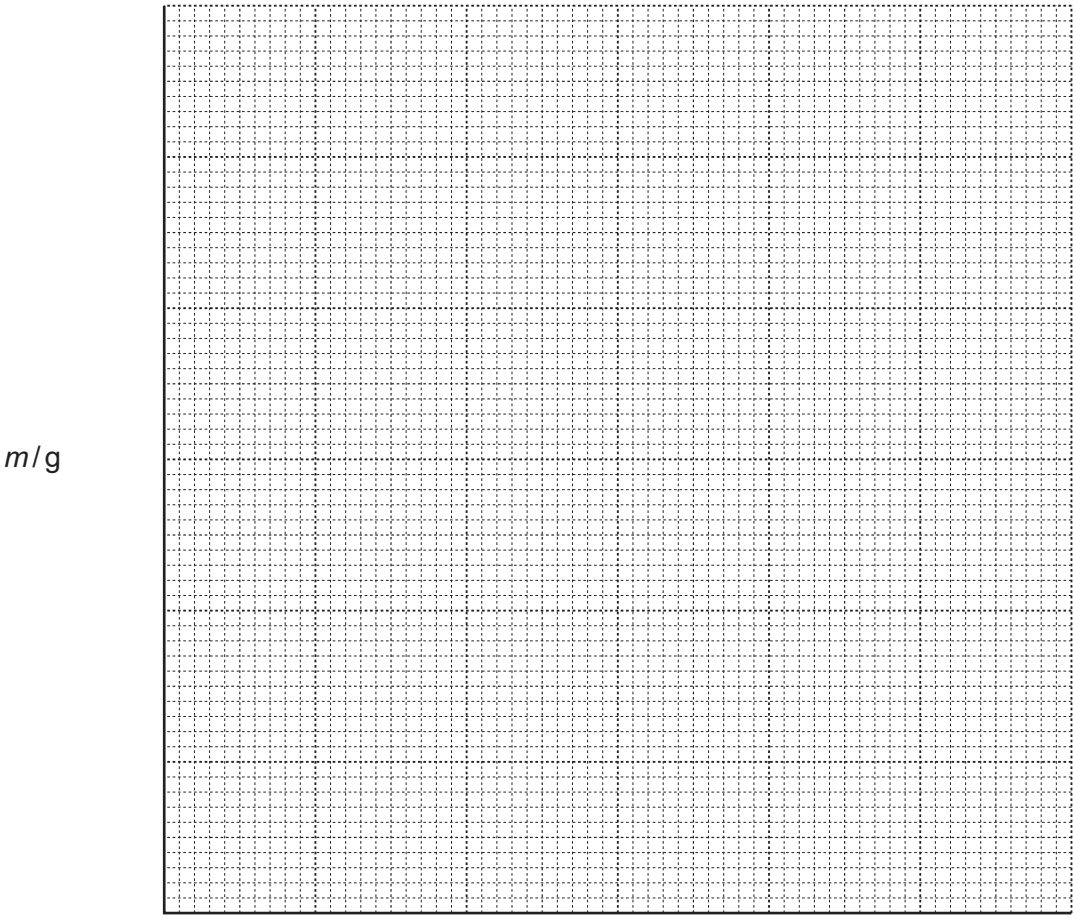
Record the value of *e* in Table 3.1. [1]

(iv) Repeat steps **(ii)** and **(iii)** using masses of 200 g, 300 g, 400 g and 500 g and complete Table 3.1. [3]

Table 3.1

mass *m* / g	spring length l / mm	extension *e* / mm

(b) On the grid provided, plot a graph of *m* against *e*. Start both axes from the origin (0,0). Draw the best fit straight line. [3]



(c) Use your graph to suggest the relationship between the mass *m* and the extension *e*.

..... [1]

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.
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