Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2714953338

BIOLOGY **0610/52**

Paper 5 Practical Test **May/June 2014**

1 hour 15 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 a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, 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.

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	
Total	

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **12** printed pages.

© UCLES 2014

Read through all the questions on this paper carefully before starting work.

1 You are going to investigate the effect of surface area on the rate of digestion of food.

You will do this by observing how the total surface area of agar jelly affects the time that it takes for the colour to change when placed in dilute sulfuric acid.

You are provided with a Petri dish of agar jelly. The agar jelly contains Universal Indicator that changes colour according to the pH of its environment.

You are also provided with a beaker of dilute sulfuric acid, labelled **sulfuric acid**.

- Remove the agar jelly from the Petri dish, using forceps.
- Cut a small piece of agar jelly, less than 1 cm in length and width.
- Use the measuring cylinder to pour 5 cm^3 of dilute sulfuric acid into a large test-tube.
- Place the piece of agar jelly into the large test-tube.

(a) Describe the colour change in the piece of agar jelly when it is put into the dilute sulfuric acid.

..... [1]

- Cut **four** identical blocks of the dimensions, shown in Fig. 1.1. The agar jelly in the Petri dish is 1 cm in depth.

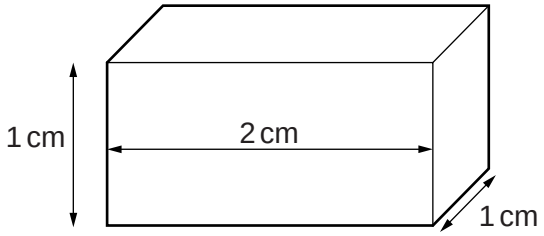


Fig. 1.1

- The four blocks should be cut accurately so that they each have the same volume.
- Place the four blocks on a white tile.
- Label the blocks, **A**, **B**, **C** and **D**, by writing on the white tile next to each block.
- Make further cuts to the blocks of agar jelly as shown in Fig. 1.2.

© UCLES 2014

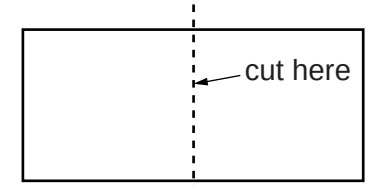
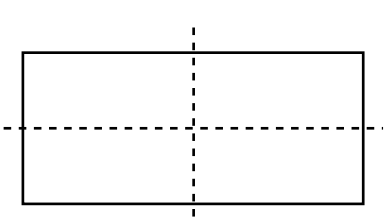
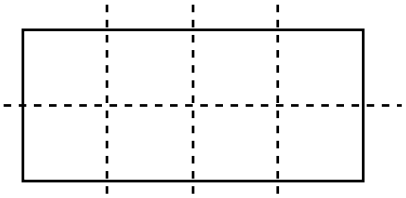
block	view of block from above showing cuts that should be made	total number of pieces after cutting	total surface area of all pieces / cm^2
A		1	
B		2	12
C		4	16
D		8	20

Fig. 1.2

- Label four large test-tubes, **A**, **B**, **C** and **D**.
- Put block **A** (not cut) into the large test-tube labelled **A**.
- Put the two pieces of agar jelly cut from Block **B** into the large test-tube labelled **B**.
- Put the four pieces of agar jelly cut from Block **C** into the large test-tube labelled **C**.
- Put the eight pieces of agar jelly cut from Block **D** into the large test-tube labelled **D**.

You are going to add dilute sulfuric acid to each large test-tube and time how long it takes for the agar jelly to change colour.

Do not add the sulfuric acid to the large test-tubes yet.

© UCLES 2014

[Turn over

(b) Prepare a table to record your results.

[5]

- Pour 20 cm^3 of dilute sulfuric acid into each large test-tube.
- Immediately make a note of the start time for each test-tube.

  .....

- Ensure that you look carefully at all of the pieces. Each piece needs to have changed colour right through to the centre.
- When all the pieces of agar jelly in one large test-tube have changed colour completely, calculate the time that it has taken for this to happen and record it in your results table.
- Repeat until results from all 4 test-tubes have been recorded.

  If it takes longer than ten minutes for the pieces of agar jelly in one large test-tube to change colour, record a result of 'more than 10 minutes'.

© UCLES 2014

(c) Fig. 1.1 (from page 2) is shown again below.

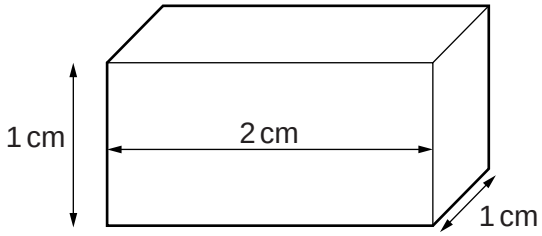


Fig. 1.1

(i) Calculate the volume of the block in Fig. 1.1.

Show your working and include the units.

volume of block ..... [2]

(ii) Calculate the surface area of the block in Fig. 1.1.

Show your working.

surface area of block ..... cm^2 [2]

(iii) Explain why it was important for blocks **A**, **B**, **C** and **D** to have the same volume at the start, before they were cut into pieces.

.....

..... [1]

(d) Describe **and** explain your results.

.....

.....

.....

.....

.....

.....

..... [4]

(e) Suggest **two** sources of error in this investigation.

For each error, describe one way that you could improve this investigation.

error 1 .....

.....

improvement 1 .....

.....

error 2 .....

.....

improvement 2 .....

.....[4]

(f) The surface area of food particles affects the rate of their break down.

A student carried out an experiment to investigate the rate of the break down of fat.

Two test-tubes were set up as shown in Table 1.1.

Each test-tube contained the same volumes and concentration of enzyme.

Table 1.1

test-tube	contents of test-tube	time taken for break down of fat / min
E	fat + enzyme + water	8
F	fat + enzyme + bile	3

(i) Suggest a reason for the difference in results recorded in Table 1.1.

.....

.....

.....

.....[2]

© UCLES 2014

(ii) Another student carried out a similar experiment but also included a test-tube that contained fat and water only.

Suggest a reason for this additional test-tube.

.....

.....[1]

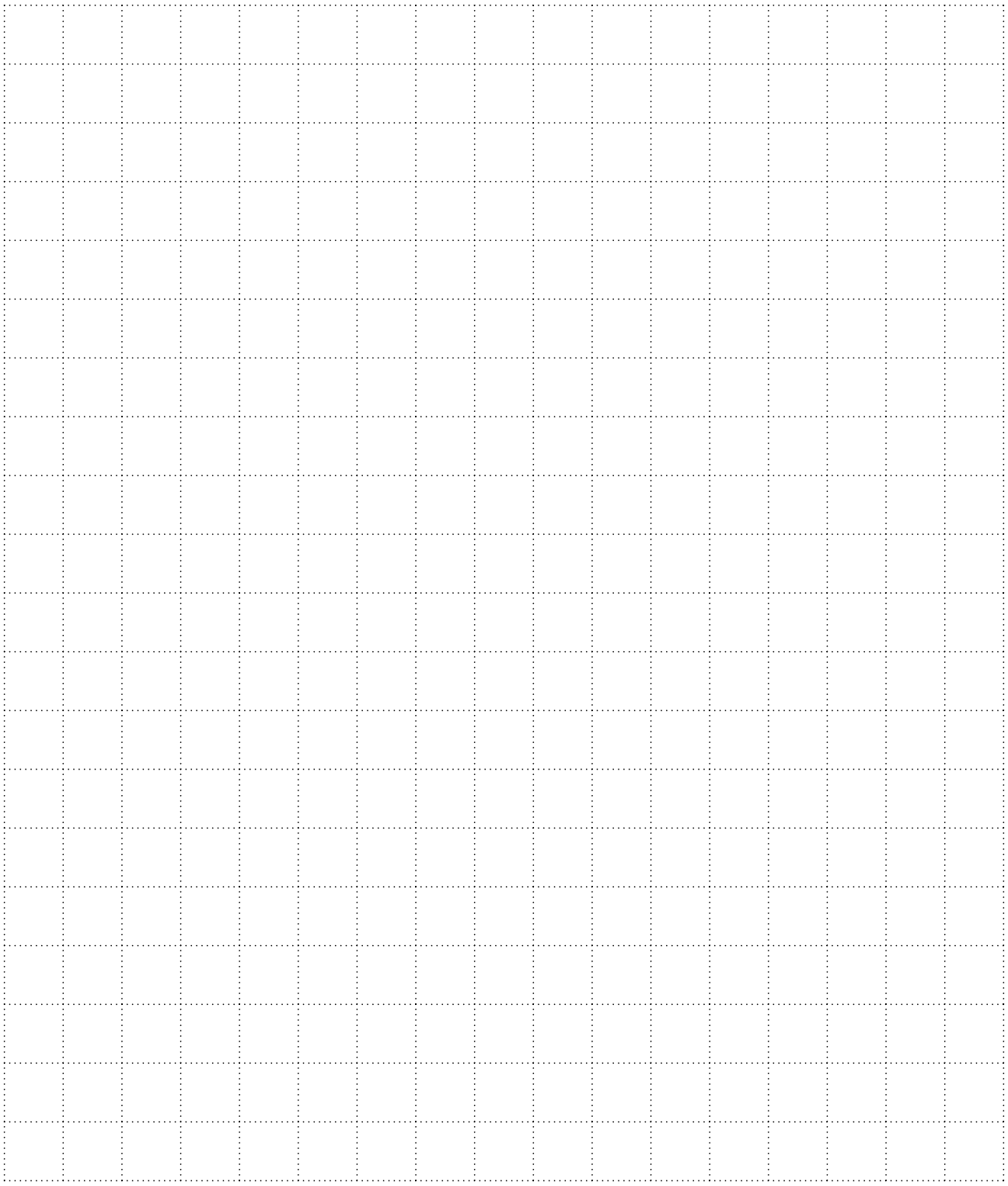
[Total: 22]

2 You are provided with a leaf.

(a) Place the leaf on the grid below.

Draw round the leaf, to show an outline of the leaf on the grid.

On your outline, draw and label **two** features of the leaf.



[3]

(b) (i) Use the grid to estimate the area of one surface of the leaf.

Each square of the grid has an area of 1 cm^2.

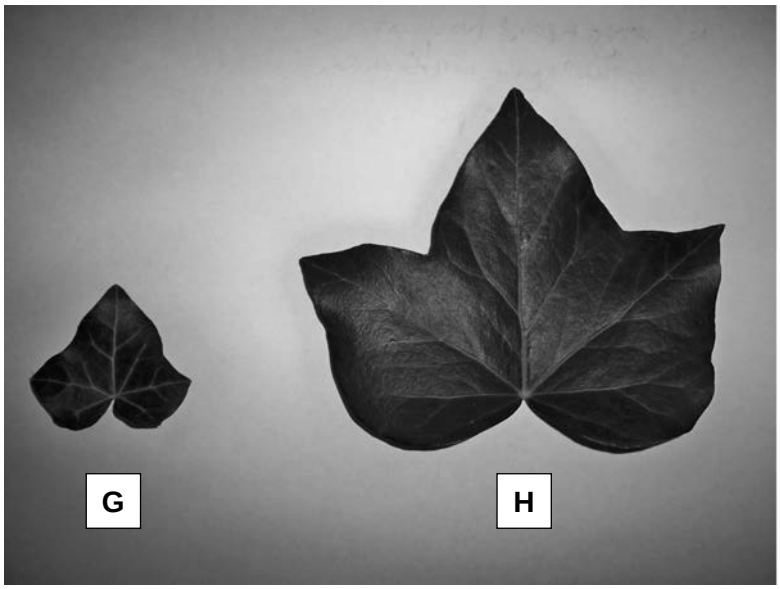
..... cm^2 [1]

(ii) Suggest **one** way to improve the accuracy of this method of calculating the surface area of a leaf.

.....

..... [1]

(c) The two leaves, **G** and **H**, shown in Fig. 2.1 are from the same plant.



× 1

Fig. 2.1

One of the leaves was from higher up the plant, in full sunlight.

The other leaf was from lower down the plant, in the shade.

Suggest **and** explain which leaf is from lower down the plant, in the shade.

.....

.....

.....

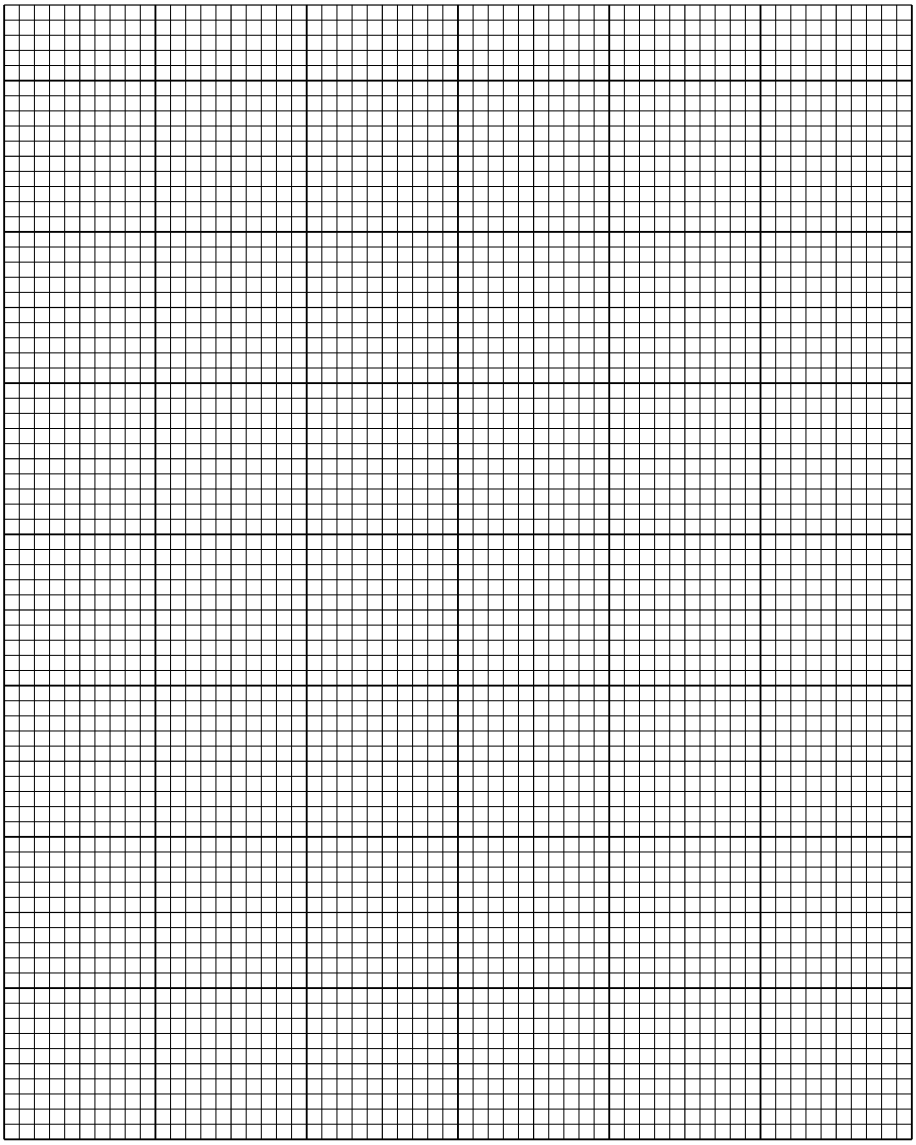
..... [2]

(d) Table 2.1 shows the results of an investigation into the relationship between the total surface area of leaves on a plant and the volume of water lost from the plant.

Table 2.1

total surface area of leaves / m^2	volume of water lost from plant per day / dm^3
0.05	4.5
0.10	6.5
0.15	8.0
0.20	10.0
0.25	12.5

(i) Plot a graph of the data in Table 2.1 on the grid below. Draw a straight line of best-fit.



[4]

© UCLES 2014

(ii) Describe the trend shown by the results.

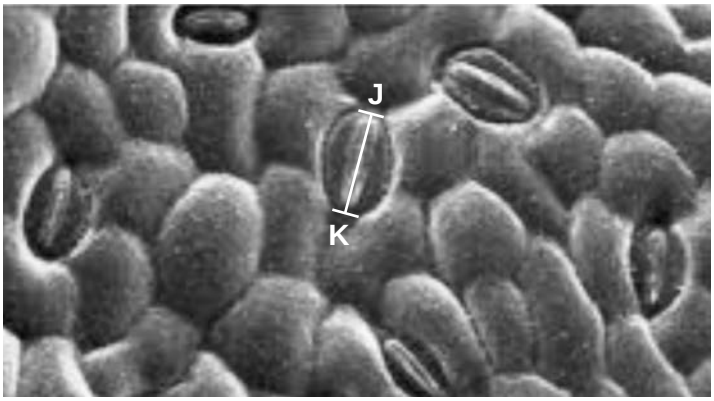
.....

.....

.....

..... [2]

(e) Fig. 2.2 shows the lower surface of a leaf as seen under a microscope.



× 400

Fig. 2.2

JK shows the length of a stoma in Fig. 2.2.

Measure the length of **JK**.

length of **JK** ..... mm

Calculate the actual length of the stoma.

Show your working.

actual length of stoma ..... mm

[3]

(f) A student investigated how light intensity affected the rate of water loss from a leaf.

Suggest **two** variables that the student would control in their investigation.

1 .....

.....

2 .....

.....[2]

[Total: 18]

Copyright Acknowledgements:

Question 2c E.S.Masters © UCLES
Question 2e © http://biology-aasharifah.blogspot.co.uk/2012/06/question-and-answer-about-stomata.html.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.