Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

5930765143

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **May/June 2014**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

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.

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.

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.

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1 A student investigated the effect of surface area on the rate of digestion of food by observing the colour change in agar jelly pieces placed in dilute sulfuric acid.

The student was provided with a Petri dish of agar jelly. The agar jelly contained Universal Indicator that changed colour according to the pH of its environment.

RED pH1	ORANGE	BLUE pH10

The student was also provided with a beaker of sulfuric acid.

When a small piece of agar jelly was put into the beaker of dilute sulfuric acid, it gradually changed colour.

(a) Suggest what colour the agar jelly became after it changed colour in the dilute sulfuric acid.

It started orange and changed to ..... [1]

The student cut four identical blocks of agar jelly, each 2 cm × 1 cm × 1 cm, as shown in Fig. 1.1.

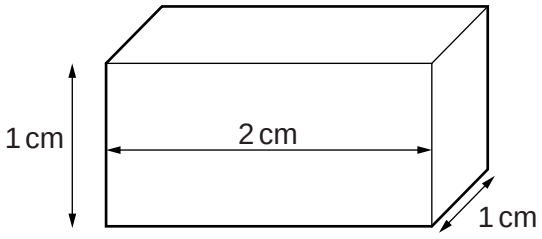


Fig. 1.1

The student labelled the agar blocks **A**, **B**, **C** and **D**.

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The blocks of agar jelly were then cut up as shown in Fig 1.2.

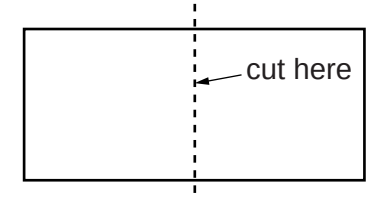
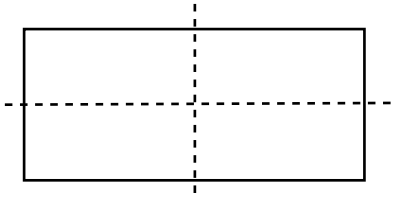
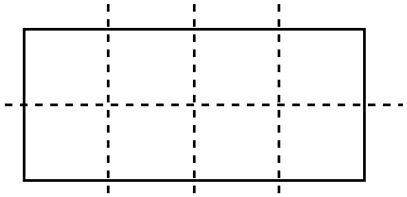
block	view of block from above showing cuts that were made	total number of pieces after cutting	total surface area of all pieces / cm^2
A		1	.....
B		2	12
C		4	16
D		8	20

Fig. 1.2

The student calculated the total surface area of all the pieces cut from each block.

(b) (i) Calculate the surface area of block **A**.

Show your working.

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

(ii) Calculate the volume of block **A**.

Show your working and include the units.

volume of block **A** ..... [2]

The student labelled four large test-tubes, **A**, **B**, **C** and **D**.

The student put all the agar pieces that had been cut from each agar block, **A**, **B**, **C** and **D**, into the large test-tube that was labelled with the same letter as the agar block.

This is shown in Fig. 1.3.

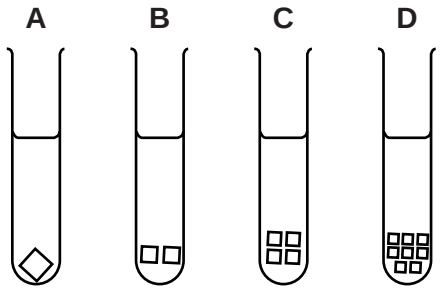


Fig. 1.3

The student poured sulfuric acid into each large test-tube and timed how long it took for all the pieces of agar jelly in each large test-tube to change colour.

The student wrote down their results.

Block **A** took 12 minutes to change.

Block **B** took 6 minutes 25 seconds.

Block **C** took 2 minutes 40 seconds.

Block **D** took 4 minutes 10 seconds.

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(c) **(i)** State **two** pieces of apparatus, not shown in Fig. 1.3, that the student needed to use for this investigation.

.....[1]

(ii) Use the space below to draw a suitable results table for this investigation.

[5]

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

.....

.....

.....

.....

.....

.....

..... [4]

(e) 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]

(f) Suggest **two** possible sources of errors in the investigation.

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

error 1 .....

.....

improvement 1 .....

.....

error 2 .....

.....

improvement 2 .....

..... [4]

(g) 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 concentrations 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

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

.....

.....

.....

..... [2]

(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: 23]

2 The outline of a leaf has been drawn on the grid in Fig. 2.1.

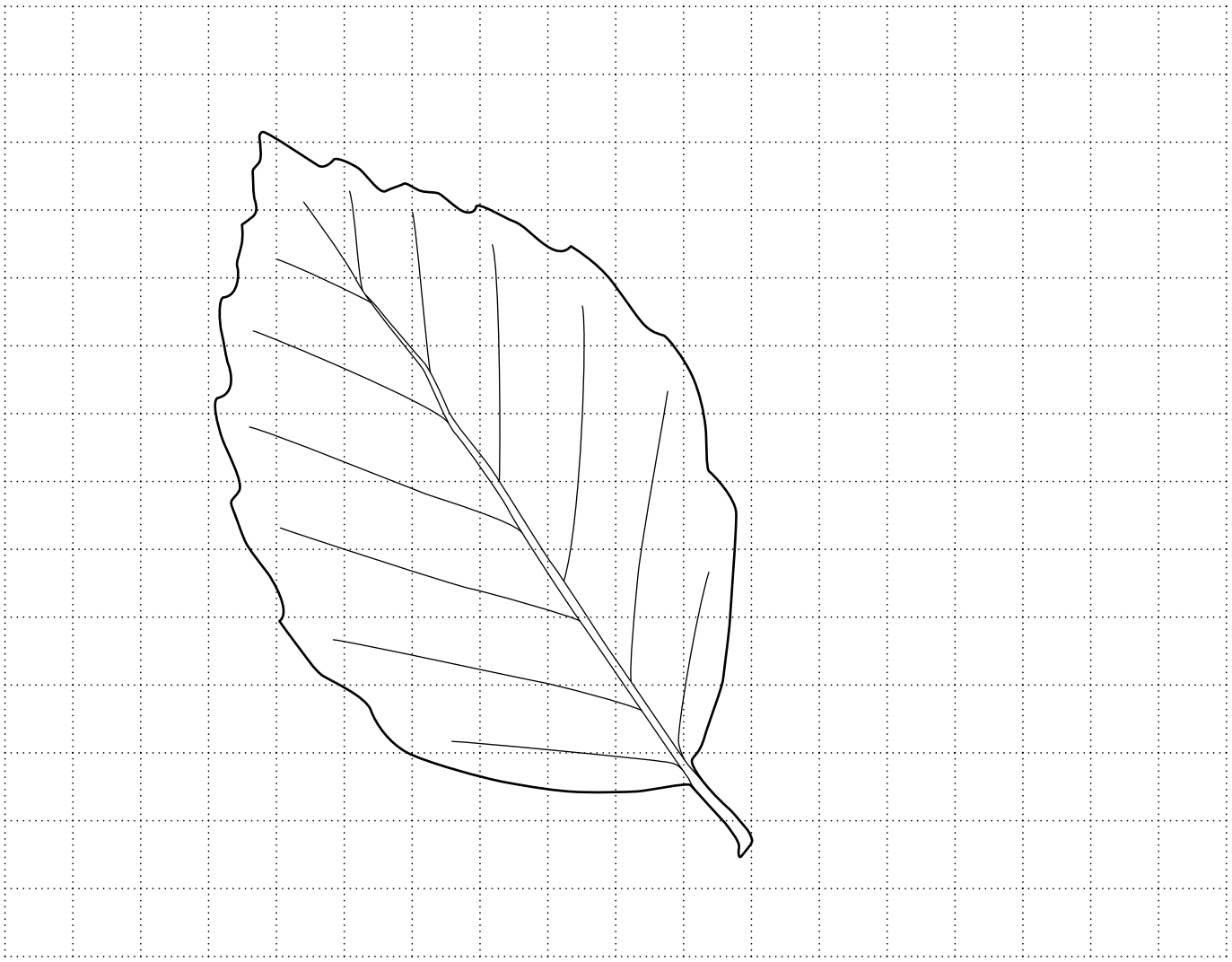


Fig 2.1

(a) Label **two** features of the leaf shown in Fig. 2.1. [2]

(b) (i) Use the grid to estimate the area of the surface of the leaf shown in Fig. 2.1.

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

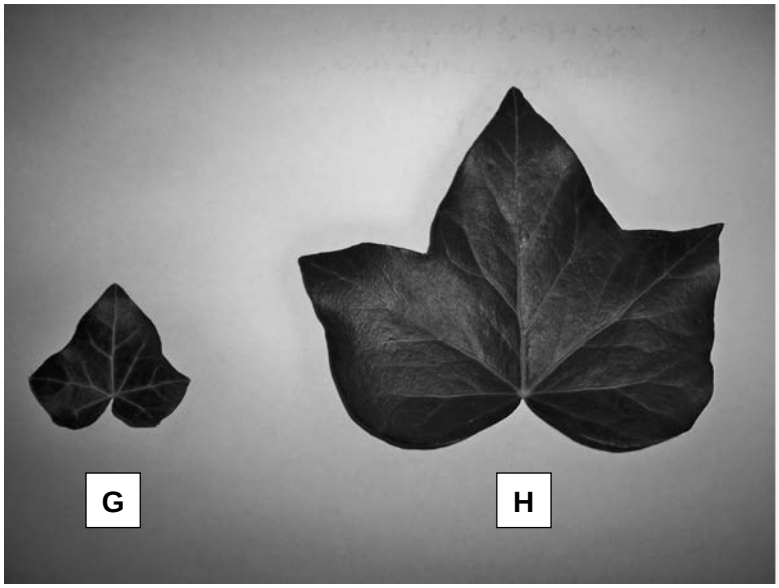
..... cm^2 [1]

(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. 2.2 are from the same plant.



× 1

Fig. 2.2

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.

.....

.....

.....

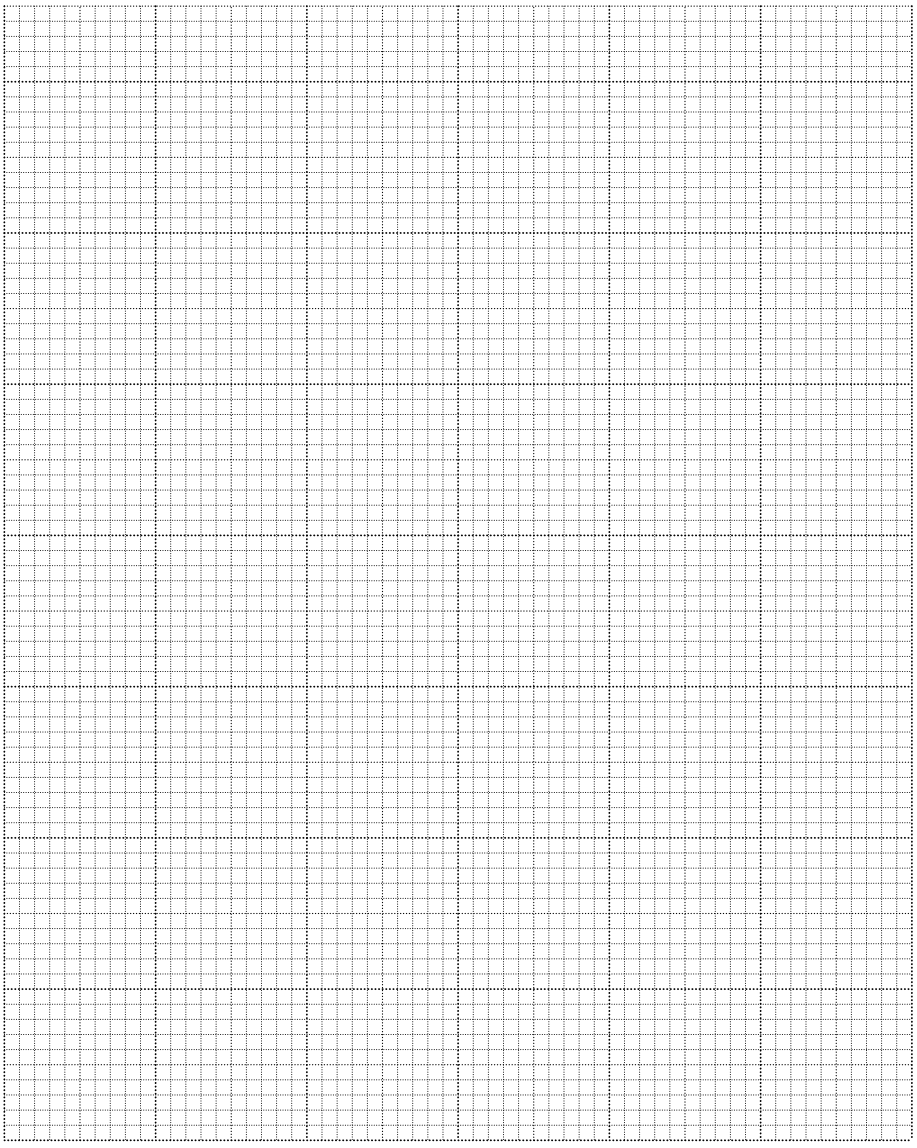
..... [2]

(d) Table 2.1 shows the results of an investigation into the relationship between the total surface area of the 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]

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(ii) Describe the trend shown by the results.

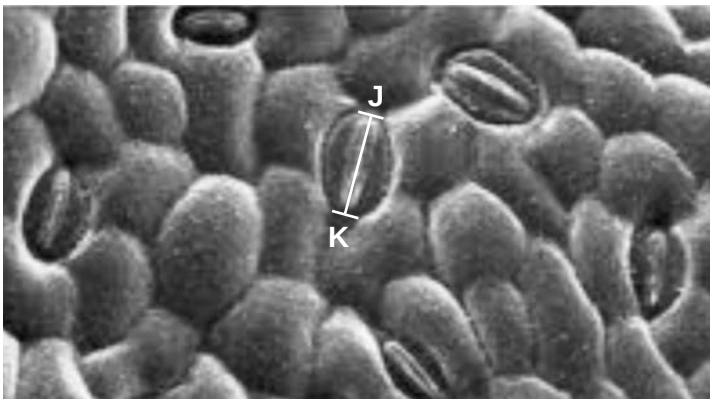
.....

.....

.....

..... [2]

(e) Fig. 2.3 shows the lower surface of a leaf as seen under a microscope.



× 400

Fig. 2.3

JK shows the length of a stoma in Fig. 2.3.

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: 17]

Copyright Acknowledgements:

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

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