UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER					

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **May/June 2012**

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 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.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
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	
3	
4	
Total	

This document consists of **11** printed pages and **1** blank page.

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1 Some students carried out an investigation into the effect of light on the development of a type of leaf.

Fig. 1.1 (opposite) shows six of these leaves that developed in sunlight and six that developed in shade.

(a) Measure the maximum width of the leaves and record your measurements in Table 1.1. Leaf 1, 'Leaves developed in sunlight', indicates where measurements should be taken.

Table 1.1

	maximum width of leaf / mm	
	leaves developed in sunlight	leaves developed in shade
1		
2		
3		
4		
5		
6		
mean		

[4]

(b) **(i)** Calculate the mean measurements and record them in the bottom row in Table 1.1. [1]

(ii) Using your measurements and Fig. 1.1 suggest how light has affected the development of these leaves.

.....

.....

.....

.....[2]

(iii) Suggest ways in which you could extend this part of the investigation.

.....

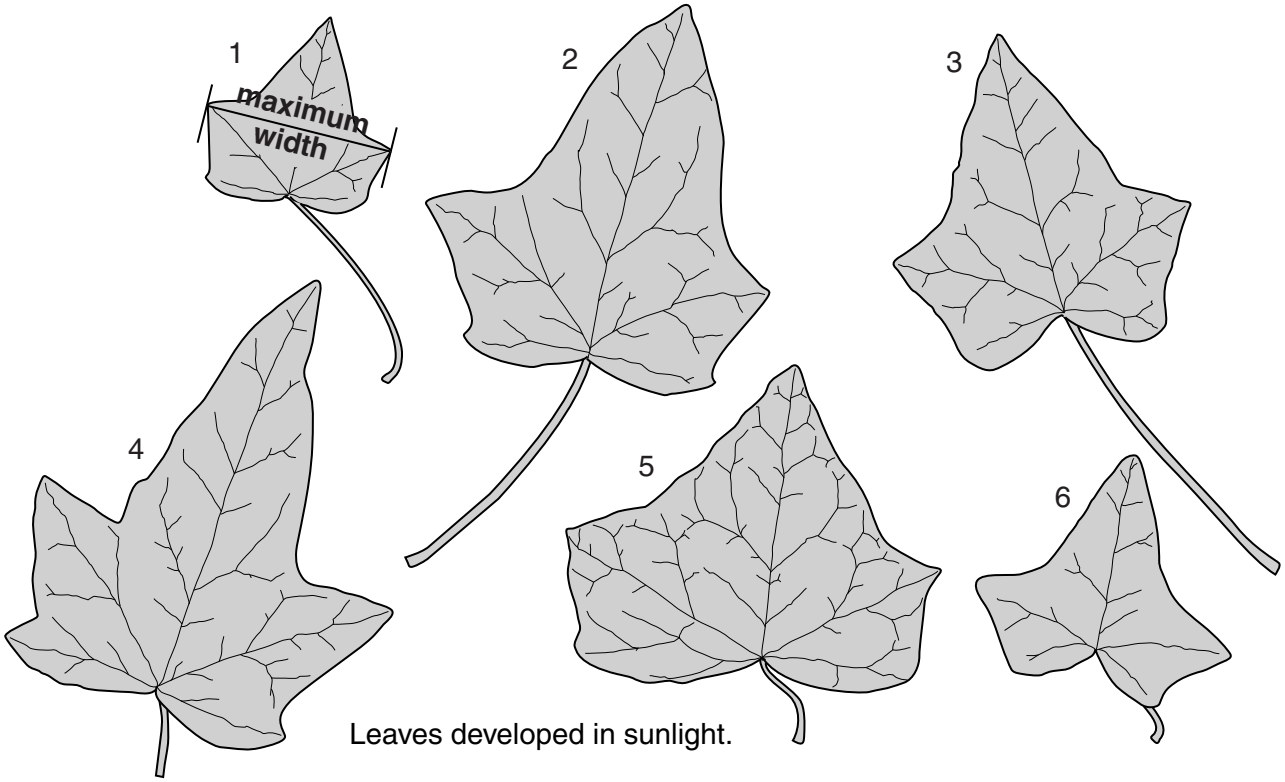
.....

.....

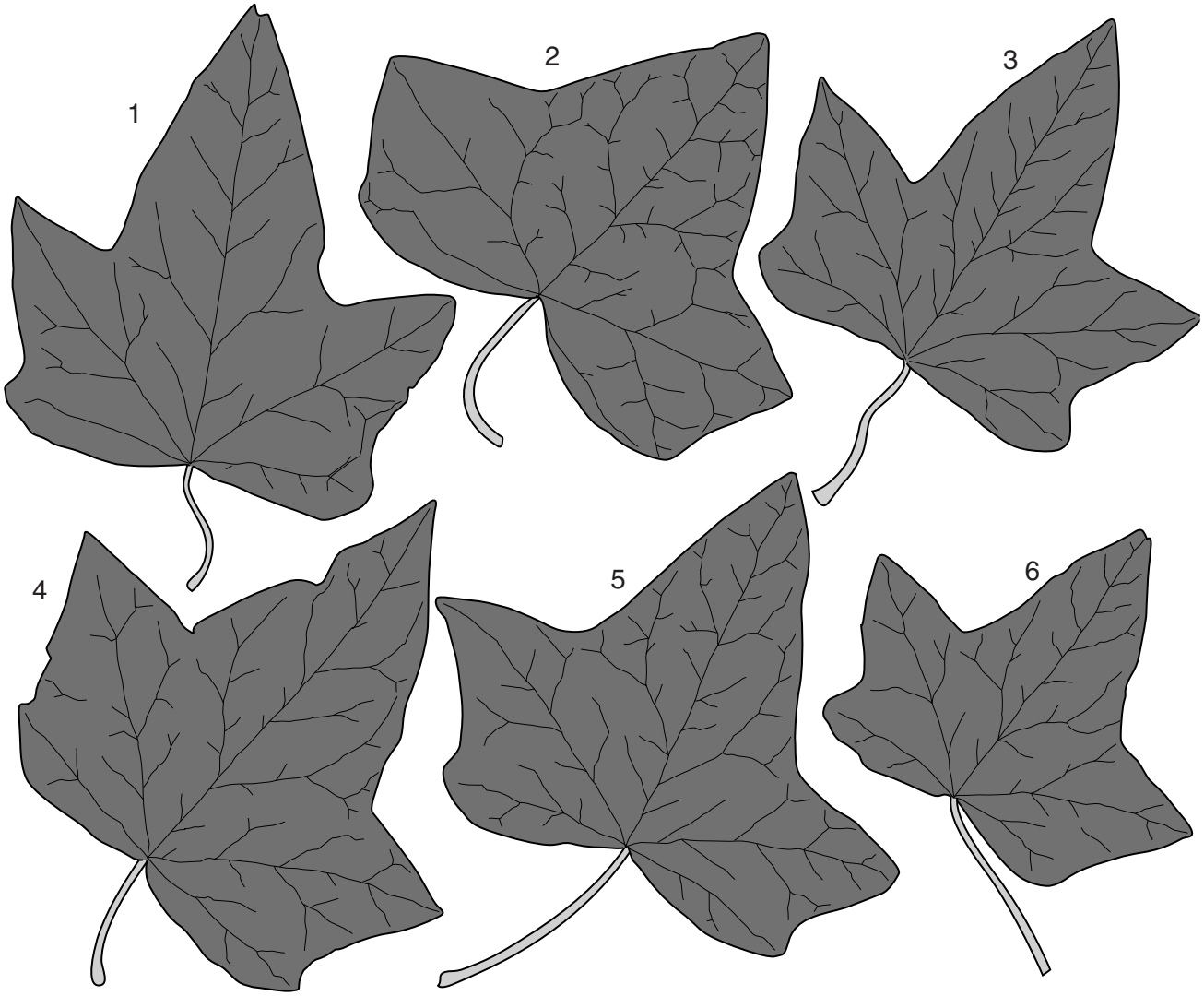
.....

.....

.....[3]



Leaves developed in sunlight.



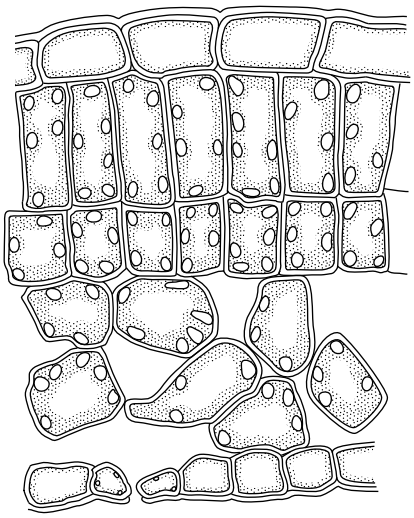
Leaves developed in shade.

Fig. 1.1

Leaves were collected and sections produced.

Fig. 1.2 shows drawings of sections through two leaves, one developed in sunlight and one in shade. Both sections have been drawn to the same scale.

Section through leaf developed in sunlight.



Section through leaf developed in shade.

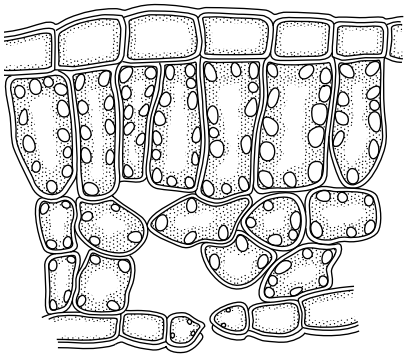


Fig. 1.2

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(c) **(i)** Using Fig. 1.2, complete Table 1.2 by stating one observable difference between leaves developed in sunlight and shade for each of the features listed.

Table 1.2

feature	leaves in sunlight	leaves in shade
palisade cells	....	....
thickness of leaf	....	....
chloroplasts	....	....
air spaces	....	....

[4]

(ii) Suggest how these differences enable the leaves to function in their environment.

.....

.....

.....

.....[2]

[Total: 16]

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2 Some students carried out an investigation into the skin's sensitivity to touch. They used pins mounted in a cork as shown in Fig. 2.1.

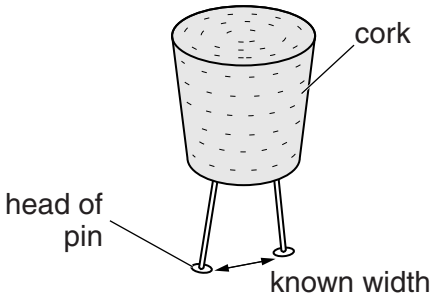

Fig. 2.1

Skin in different parts of the body was touched ten times, either by one pin or two. The student being tested was blindfolded so that the number of pin heads being tested could not be seen. If the student identified the number correctly, that was recorded as a correct response.

Four students were tested in this way and the number of correct responses they made is shown in Table 2.1.

Table 2.1

student	number of correct responses			
	finger tip	back of hand	palm of hand	forearm
1	10	8	9	6
2	9		7	6
3	10	7	8	6
4	10	8	9	7
mean		7		

(a) **(i)** Complete Table 2.1. [2]

(ii) Explain why each part of the skin was touched ten times.

.....

..... [1]

(iii) Using the information in Table 2.1, name the part of body which is

1. most sensitive to touch .....

2. least sensitive to touch ..... [2]

(iv) Suggest an explanation for the difference in sensitivity between the two areas named in **(a)(iii)**.

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.....

.....

.....[1]

[Total: 6]

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3 The Irish potato *Solanum tuberosum* is an important crop in some parts of the world.

The potato plant produces many edible stem tubers.

Fig. 3.1 shows some storage granules found in cells from the middle of a potato tuber, as seen under a microscope.

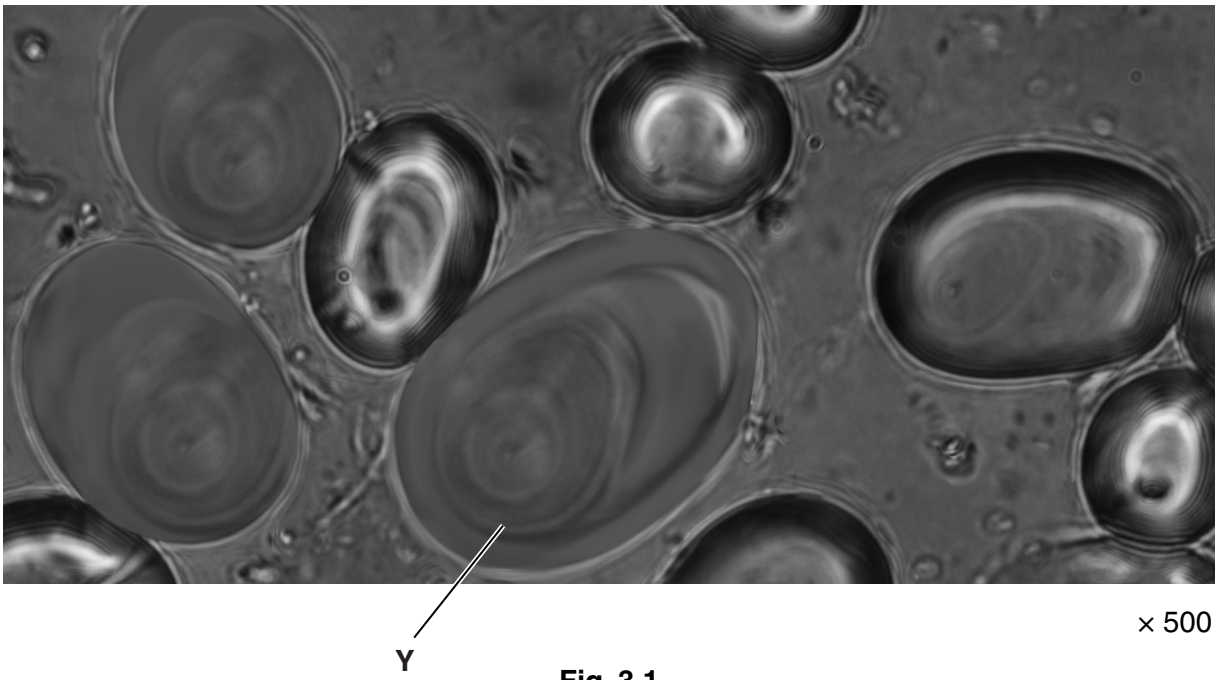

Fig. 3.1

(a) **(i)** Make a large drawing of the storage granule marked **Y**.

[2]

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(ii) Calculate the magnification of your drawing compared to the actual size of storage granule **Y** in Fig. 3.1.

Rule a line on storage granule **Y** in Fig. 3.1 to show the maximum length and measure this line.

.....

Rule a line on your drawing to show the maximum length of storage granule and measure this line.

.....

Show your working.

magnification .....[4]

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(b) Food tests were carried out on some of the cells containing storage granules as shown in Fig. 3.2.

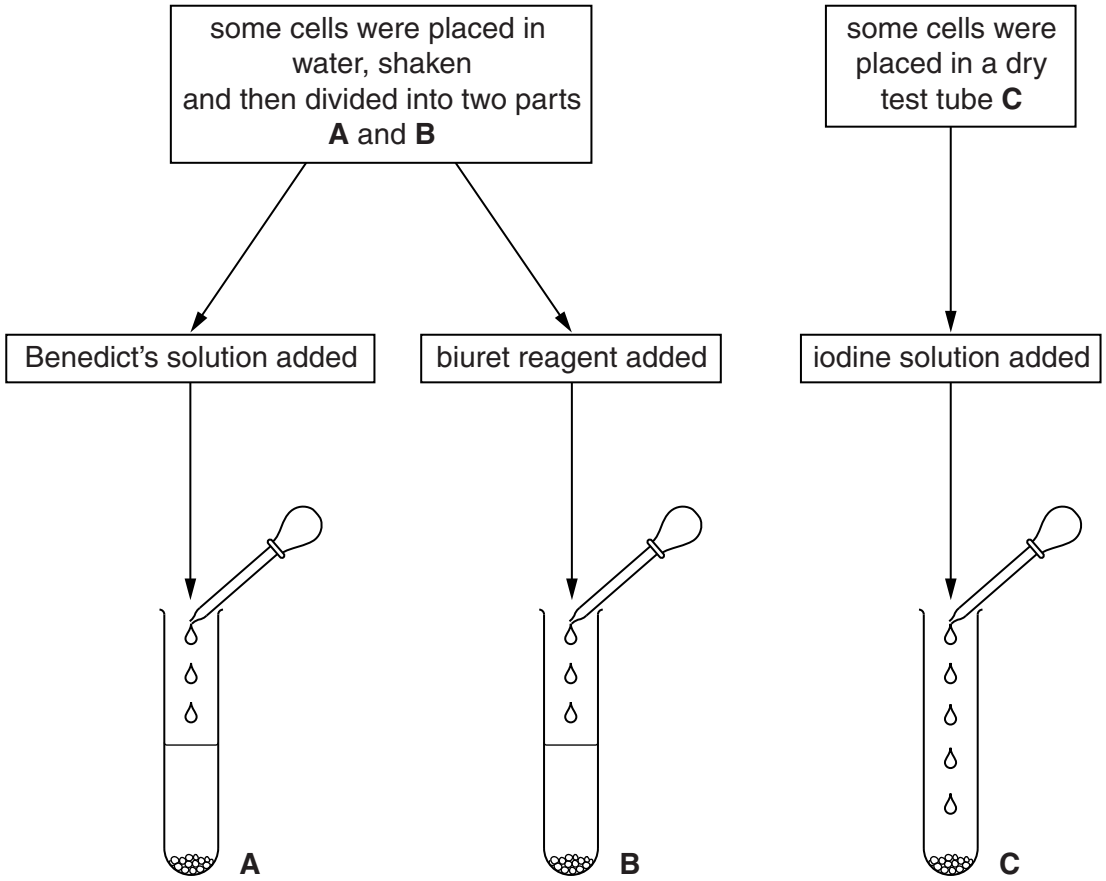

Fig. 3.2

(i) State the colour of the drops of liquid being added to each of the test tubes.

A .....

B .....

C ..... [3]

Table 3.1 shows the results after the tests were completed.

Table 3.1

	A	**B**	**C**
observation	green solution	pale purple solution	blue-black solution
conclusion			

(ii) Complete Table 3.1. [4]

[Total: 13]

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4 Fig. 4.1 shows cells dividing to form gametes.

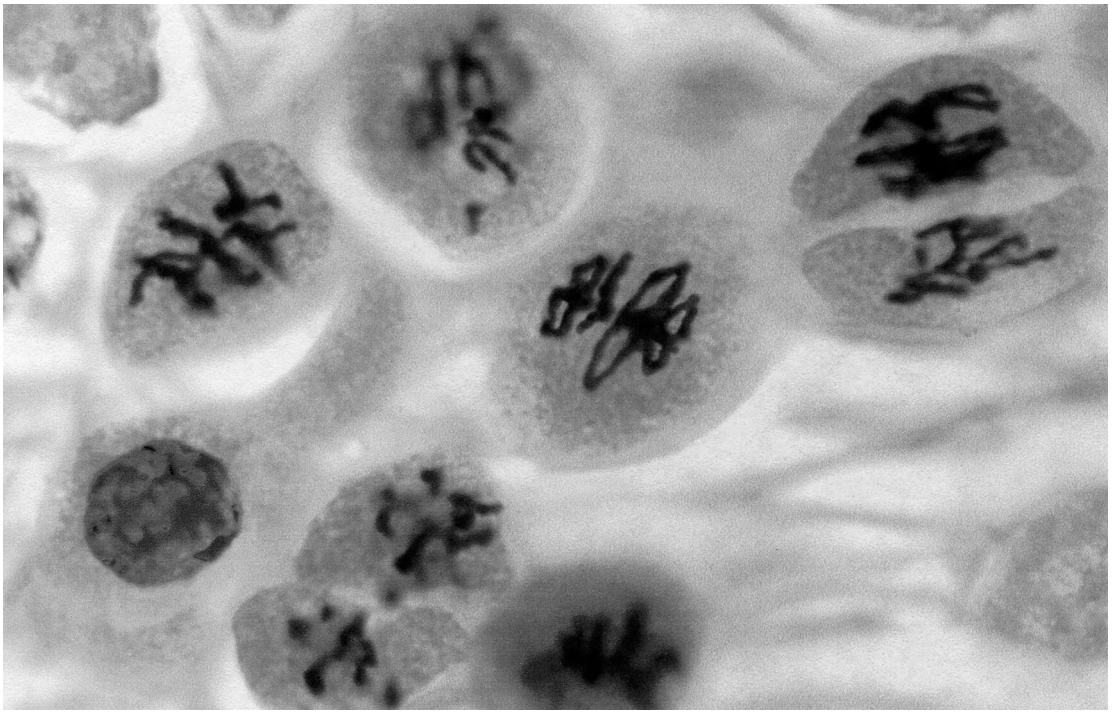

Fig. 4.1

(a) On Fig. 4.1, label and name

(i) a chromosome [1]

(ii) cytoplasm. [1]

(b) **(i)** State the type of cell division that is involved in the formation of gametes.

.....[1]

(ii) State the importance of this type of division in the formation of gametes.

.....

.....[1]

(c) Name where such dividing cells can be found in a plant.

.....[1]

[Total: 5]

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