UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

2408002 91

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **May/June 2013**

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 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.

This document consists of **15** printed pages and **1** blank page.

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1 Fig. 1.1 shows two similar cut shoots in test-tubes that contained 20 cm^3 of water at the start.

One shoot has its leaves attached and the other shoot has had its leaves removed.
The shoots were placed in the water immediately after being cut.
A small quantity of oil was added to cover the water in these test-tubes.
The two test-tubes with the shoots were left in the light for two days.

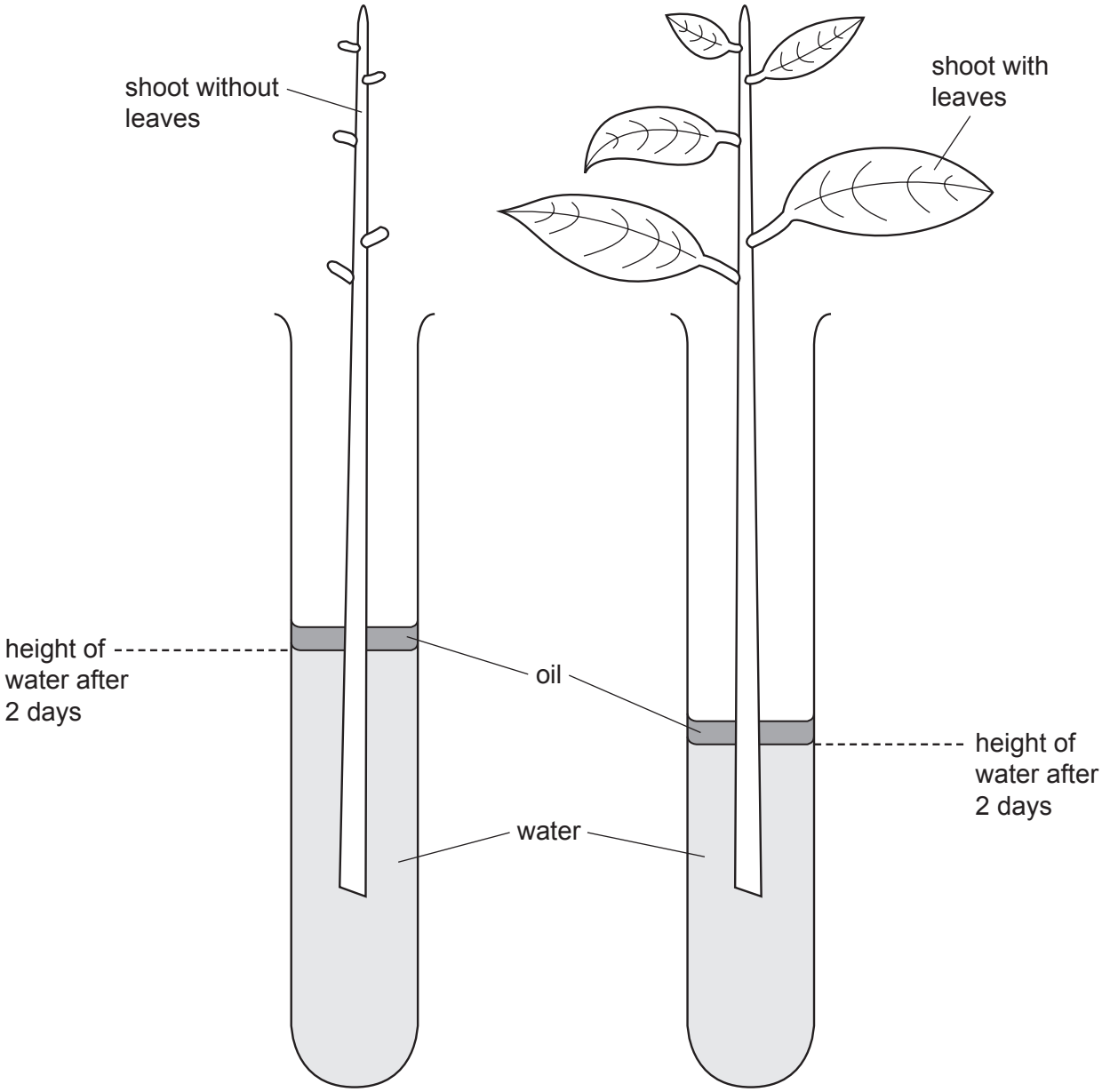

Fig. 1.1

(a) (i) Identify the variable that was changed (independent variable) in this investigation.

.....

..... [1]

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(ii) Suggest why oil was placed on top of the water in both test-tubes.

.....

..... [1]

(iii) Use a ruler to measure the height of the water in the two test-tubes, shown in Fig. 1.1.

test-tube containing shoot without leaves ..... mm

test-tube containing shoot with leaves ..... mm [1]

(iv) Describe **and** explain your observations.

.....

.....

.....

..... [2]

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(b) The two shoots were removed from the test-tubes.
Both shoots were immediately placed in a beaker of coloured water and left for 10 minutes.
After 10 minutes the shoots were removed from the coloured water.
The shoots were cut in half, as shown in Fig. 1.2, to see how far up the stem the coloured water had moved.

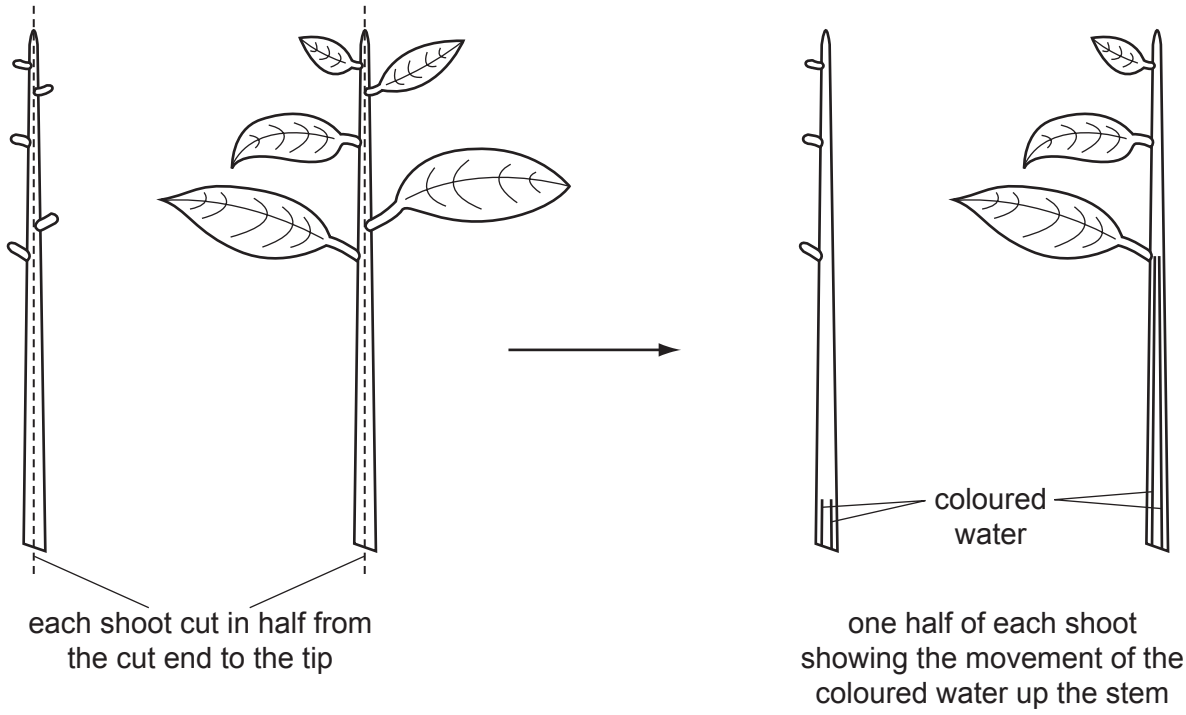

Fig. 1.2

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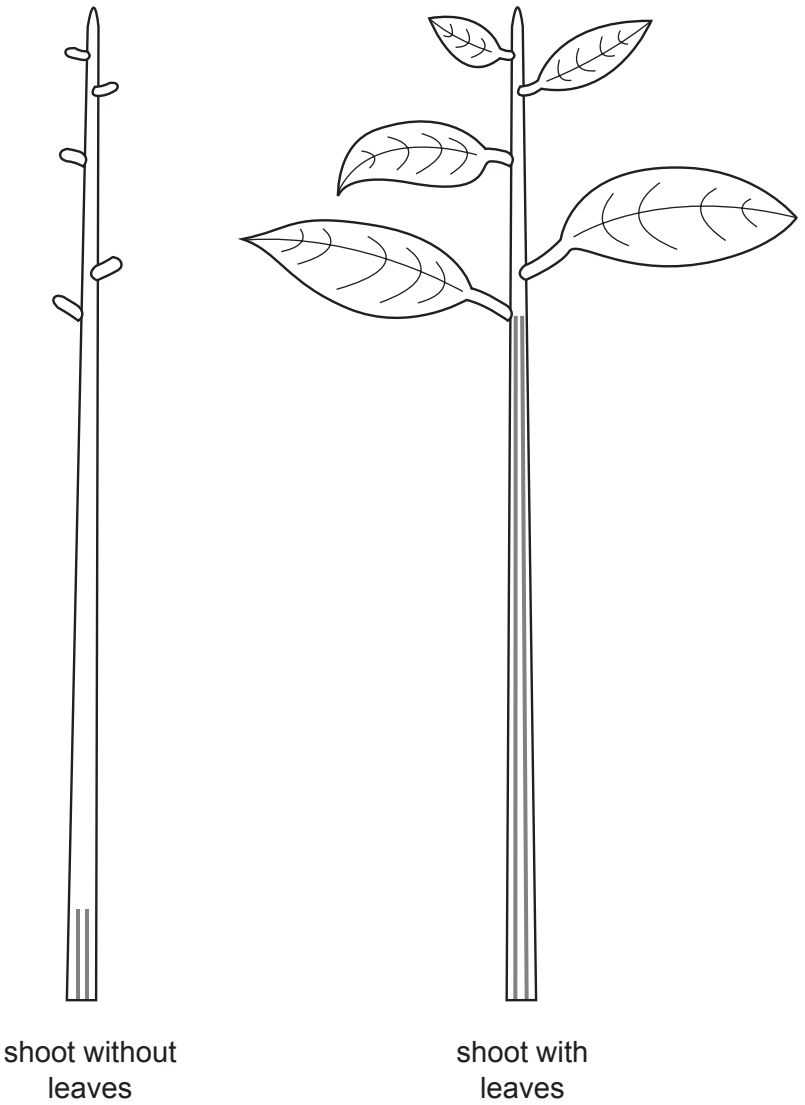

Fig. 1.3

(i) Use a ruler to measure the distance moved by the coloured water, shown in Fig. 1.3.

shoot without leaves .....mm

shoot with leaves .....mm [1]

(ii) Do the measurements in **(b)(i)** support the measurements in **(a)(iii)**? Explain your answer.

.....

.....

.....

..... [2]

(iii) Describe how you could carry out a similar investigation to determine whether **temperature** affects the rate of water uptake of shoots with leaves.

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.....

.....

.....

.....

.....

..... [3]

Question 1 continues on page 8.

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(c) A group of students measured the mass lost from a flask containing a shoot with leaves.
The shoot was placed in water, on a balance as shown in Fig. 1.4.
An automatic data logger recorded the mass every six hours for two days.

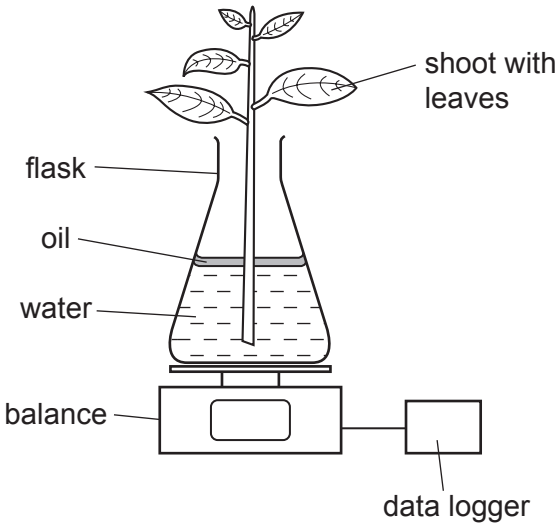

Fig. 1.4

Only natural light from the sun was allowed to fall on the shoot.

The students calculated the mass lost every six hours. The data is shown in Table 1.1.

Table 1.1

time of day	mass lost / g
10:00	0.0
16:00	3.0
22:00	5.0
04:00	5.0
10:00	7.0
16:00	10.0
22.00	11.5
04.00	11.5
10.00	13.5

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(c) (i) Plot the data from Table 1.1 on Fig. 1.5.

Fig. 1.5

[4]

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

description .....

.....

explanation .....

.....

.....

..... [3]

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Fig. 1.6 shows part of the lower surface of a leaf as viewed under a microscope.

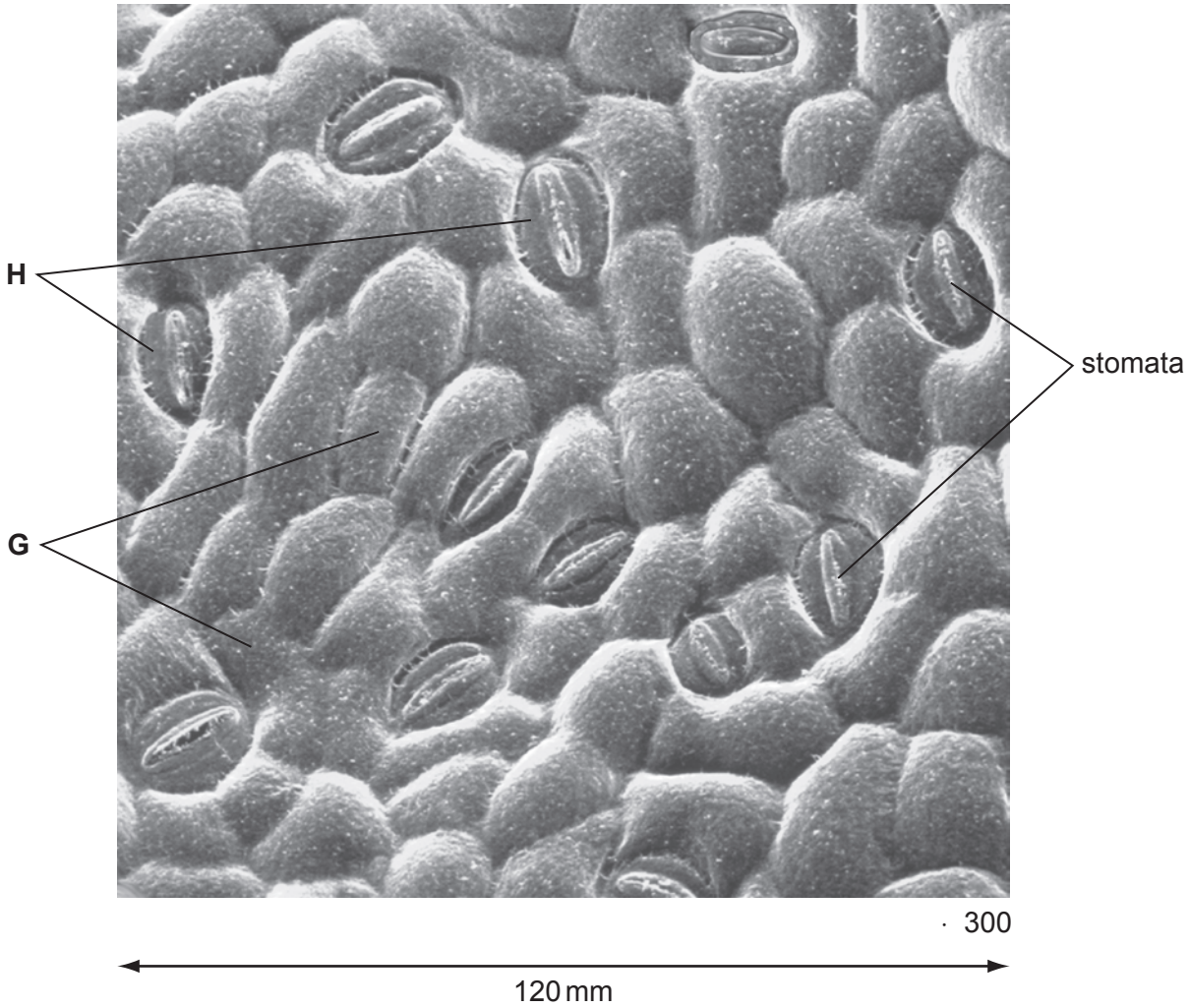

Fig. 1.6

(d) Name the structures labelled **G** and **H**.

G .....

H ..... [2]

(e) The number of stomata on the lower surface of the leaf can be calculated by using Fig. 1.6.

(i) Count the number of stomata visible in Fig. 1.6.

number of stomata ..... [1]

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(ii) The magnification of the image in Fig. 1.6 is × 300.

The length of one side of the image is 120 mm. The image is a square.

You can calculate the actual length of one side of the square of leaf surface shown in Fig. 1.6 by dividing the length of one side of the image by the magnification.

Calculate the actual length of one side of the square of leaf surface shown in Fig. 1.6.
Show your working.

actual length of one side of the square of leaf surface ..... mm [1]

(iii) Calculate the actual total area of the square of leaf surface shown in Fig. 1.6.
Show your working.

actual total area of the square of leaf surface ..... mm^2 [2]

(iv) The number of stomata per mm^2 can be calculated from the number of stomata and the actual total area of the square of leaf surface shown in Fig. 1.6.

Calculate the number of stomata per mm^2 of this leaf.
Show your working.

number of stomata per mm^2 ..... [2]

(v) The total area of the lower surface of this leaf was measured and found to be 9000 mm^2.

Calculate the total number of stomata on the lower surface of this leaf.
Show your working.

total number of stomata ..... [1]

[Total: 27]

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2 You are going to observe and draw one of your fingers.

(a) Place the palm of your hand on the paper.
Examine one finger.

Make a large, labelled drawing of this finger.

[4]

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(b) Fig. 2.1 shows the European mole, *Talpa europa*.

0.8

Fig. 2.1

(i) State **one similarity**, **visible** in Fig. 2.1, between the structure of the mole's hand and your hand.

.....

..... [1]

(ii) Complete Table 2.1 to state **two differences**, **visible** in Fig. 2.1 between the shape and size of the mole's hand and your hand.

feature	mole's hand	your hand
shape		
size		

[2]

(c) **(i)** Name the group of vertebrates to which the mole belongs.

..... [1]

(ii) State **one** feature, **visible** in Fig. 2.1, that supports your answer to **(c)(i)**.

.....

..... [1]

[Total: 9]

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3 Arum lilies, such as *Arum maculatum*, are plants that have a smell like rotting meat.
The smell attracts flies so that the flowers can be pollinated.
Some arum lilies have a purple coloured sheath and some have a light green coloured sheath.

Fig. 3.1 shows an arum lily with part of the sheath cut away to show the inside.

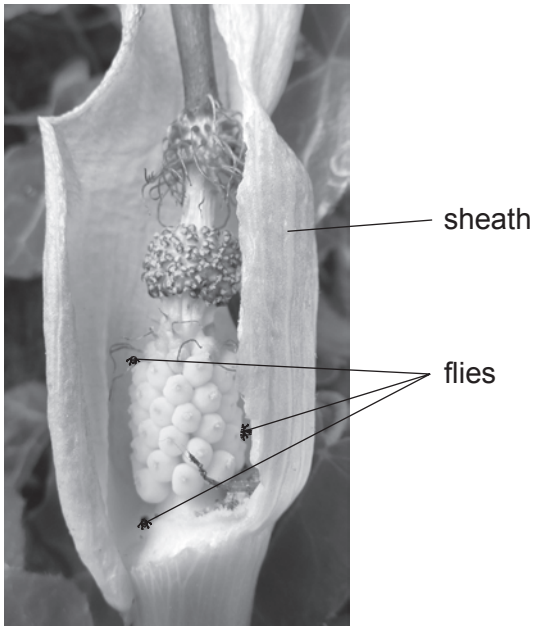

Fig. 3.1

A group of students collected arum lilies from the same habitat, **two** with purple coloured sheaths and **three** with light green coloured sheaths.
They opened the sheaths of each lily and counted the number of flies inside.

The results are shown in Table 3.1.

Table 3.1

colour of sheath	number of flies	total number of flies	mean number of flies
purple	3		
purple	5		
light green	5		
light green	6		
light green	4		

(a) Calculate the total **and** mean number of flies found in each colour of sheath.

Write your answers in Table 3.1. [2]

(b) Suggest **two** ways in which this investigation could be improved.

1 .....

.....

2 .....

..... [2]

[Total: 4]

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