Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

6872523044

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **May/June 2015**

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.
Write your answers in the spaces provided on the Question Paper.

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 **11** printed pages and **1** blank page.

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CAMBRIDGE International Examinations

Answer **all** the questions in the spaces provided.

1 Some species of trees produce winged fruits that are dispersed by wind.

When these fruits fall from the tree, they spin round as they fall to the ground. This increases the time taken for the fruits to fall.

Fig. 1.1 shows a photograph of four winged fruits from a sycamore tree. The fruits are shown larger than their actual size.



Fig. 1.1

(a) (i) Measure and record the maximum length of the fruit labelled **A** in Fig. 1.1.

length = ...[1]

(ii) The actual maximum length of this fruit is 25 mm.

Using your measurement in **(i)**, calculate the magnification of the fruit **A** in Fig. 1.1.

Show your working.

magnification = ...[2]

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Question 1 continues on page 4

(b) A student carried out an investigation into the relationship between the length of sycamore fruits and the time they took to reach the ground when dropped from a height of 3 metres.

He collected 6 fruits and measured the length of each. He then dropped each fruit from a height of 3 metres and recorded the time each one took to reach the ground.

His results are shown below.

fruit 1 length = 27 mm, time to reach ground = 2.2 seconds; fruit 2 length = 32 mm, time to reach ground = 2.7 seconds; fruit 3 length = 33 mm, time to reach ground = 2.9 seconds; fruit 4 length = 35 mm, time to reach ground = 3.8 seconds; fruit 5 length = 36 mm, time to reach ground = 4.2 seconds; fruit 6 length = 41 mm, time to reach ground = 3.3 seconds

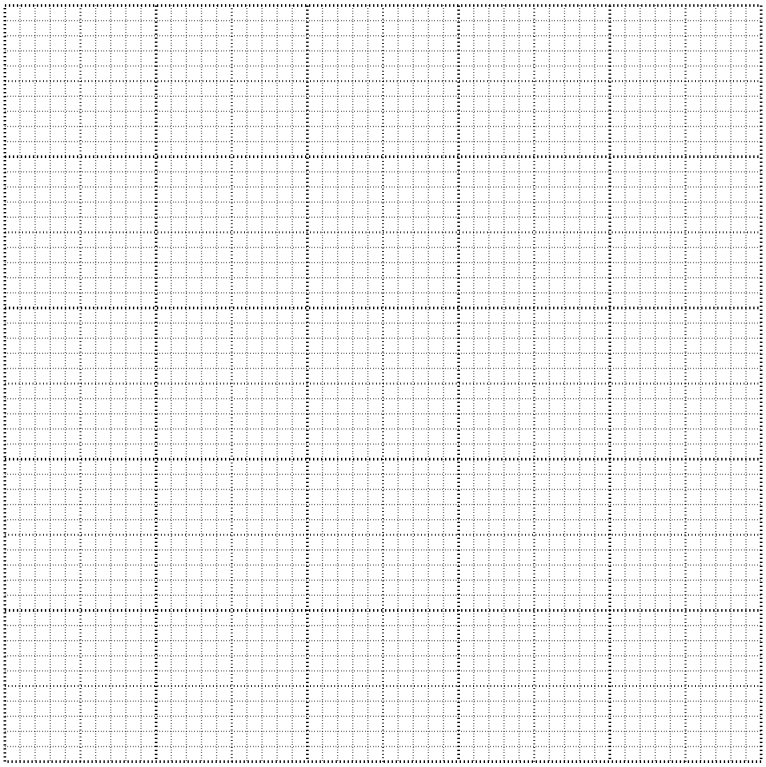
(i) Use these results to complete Table 1.1.

Table 1.1

length of fruit/mm	time taken to reach the ground/s

[2]

(ii) On the grid below, construct a line graph of the data in Table 1.1. Join your plotted points with ruled, straight lines.



[5]

(iii) Use your graph to find the time it would take for a fruit with a length of 30 mm to reach the ground.

..... seconds [1]

(iv) Describe the relationship between the length of these sycamore fruits and the time taken for them to reach the ground.

.....

.....

.....

.....[2]

(v) Suggest **one** way in which this investigation could be improved to increase the reliability of the results.

.....

.....[1]

(vi) Suggest **two** factors, other than length, that could affect the time taken for sycamore fruits to reach the ground when falling from a tree.

1 .....

2 .....[2]

[Total: 16]

2 **(a)** Fig. 2.1 shows a section through part of a dicotyledonous leaf, as seen using a microscope.

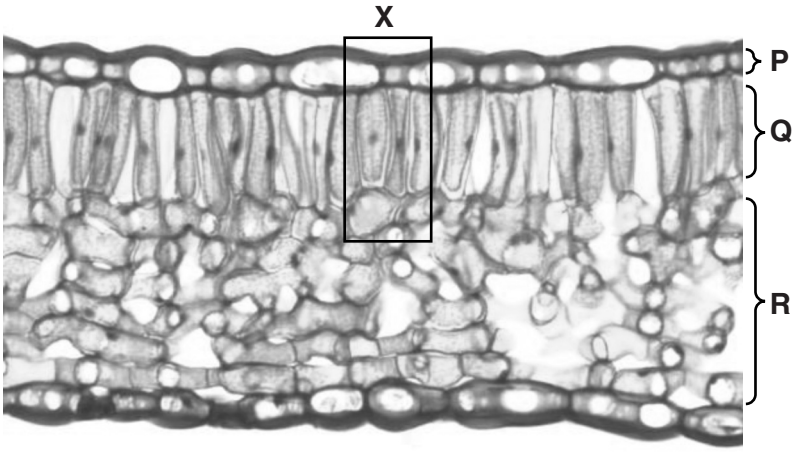


Fig. 2.1

(i) Identify the tissue layers **P**, **Q** and **R**.

P .....

Q .....

R .....[3]

(ii) In the space below, make a large drawing of the cells in the box labelled **X** in Fig. 2.1. You do not need to label your drawing.

[3]

(b) An investigation was carried out to find the numbers of stomata on the upper and lower surfaces of leaves from three species of plant.

The species used were sunflower, tobacco and broad bean.

The results are shown in Table 2.1.

Table 2.1

species of plant	mean number of stomata per mm^2	
	upper surface	lower surface
sunflower	120	175
tobacco	50	190
broad bean	65	75

(i) Using the data in Table 2.1, compare the numbers of stomata on the upper surface with the numbers of stomata on the lower surface of these three species of plant.

.....

.....

.....

.....[2]

(ii) Suggest which species of plant in Table 2.1 would be the least likely to survive in dry conditions. Give an explanation for your answer.

species .....

explanation .....

.....

.....

.....

.....[3]

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(c) Cobalt chloride paper is blue when it is dry, but turns pink in the presence of water.

Describe an investigation using cobalt chloride paper that you could carry out to compare the rates of transpiration from the upper and lower surfaces of a leaf.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[4]

[Total: 15]

3 Phosphorylase is an enzyme found in potatoes. Phosphorylase is involved in the synthesis of starch from glucose, as shown in Fig. 3.1.

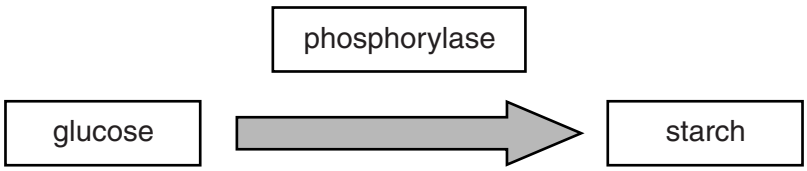


Fig. 3.1

An extract containing phosphorylase can be prepared by grinding small cubes of potato tissue with distilled water, using a mortar and pestle. The resulting mixture is then filtered. The filtrate contains phosphorylase.

(a) Suggest a reason for grinding the potato tissue.

.....

.....[1]

(b) Explain how you would show that the initial filtrate did not contain starch.

.....

.....

.....

.....

.....[2]

(c) A student carried out an investigation into the effect of temperature on the rate of starch production. She used phosphorylase from potato tissue and a solution of glucose.

State **three** factors that the student should have kept constant during this investigation.

1 .....

2 .....

3 .....[3]

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(d) In the space below, draw a table ready to record the results of this investigation.

[3]

[Total: 9]

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