Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER					

BIOLOGY **0610/61**

Paper 6 Alternative to Practical **October/November 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.

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 **10** printed pages and **2** blank pages.

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CAMBRIDGE International Examinations

[Turn over

1 During digestion, the enzyme amylase breaks down starch to maltose, a reducing sugar.

(a) Describe a test you could safely carry out to show the presence of starch in a solution.

.....

.....

.....

.....

.....

..... [3]

Some students investigated the effect of pH on the activity of amylase during the breakdown of starch. The starch test that you have described in **(a)** was carried out at intervals, until the starch was no longer present.

Their results, in Table 1.1, show the time in minutes for the breakdown of starch using solutions of different pH.

Table 1.1

pH	time / mins
3.0	4.1
4.0	0.5
5.0	0.8
6.0	1.5
7.0	3.5
8.0	4.8

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(b) **(i)** Plot the data from Table 1.1 to show the effect of pH on the time taken for amylase to break down starch.

[4]

(ii) State the optimum (best) pH for the activity of amylase.

..... [1]

(iii) Use this formula to calculate the rate of activity of amylase at the pH given in **(b)(ii)**:

$$\text{rate of enzyme activity} = \frac{1}{\text{time taken in minutes}}$$

Show your working. Give your answer to the nearest whole number.

rate .....

[1]

(iv) Describe the effect of pH on the activity of amylase.

.....

.....

.....

.....

.....

..... [3]

(c) **(i)** Name **two** variables that need to be controlled in this investigation.

1 .....

2 .....
[2]

(ii) Explain **two** ways this investigation could be improved.

.....

.....

.....

..... [2]

[Total: 16]

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2 Fig. 2.1 shows part of a yellow maize cob, *Zea mays*.

A cob is composed of many individual fruits known as grains.

Fig. 2.1

Many colours of maize grains are known. The colour is inherited.

Fig. 2.2 shows part of a cob with light and dark coloured grains.

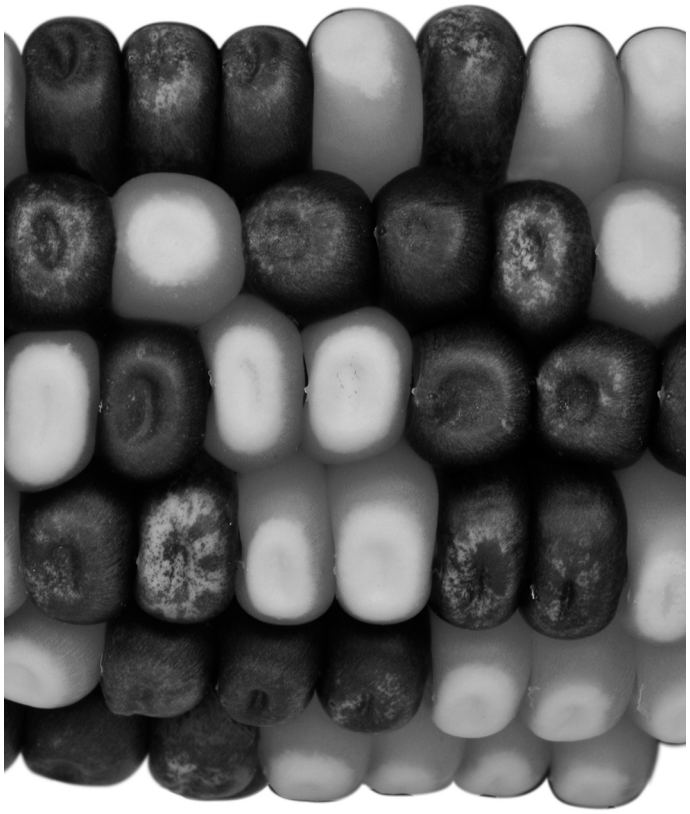

Fig. 2.2

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(a) **(i)** Complete Table 2.1 by counting the number of light and dark coloured grains.

Table 2.1

number of grains	
light	dark

[1]

(ii) Use the data in Table 2.1 to suggest the phenotypic ratio of light to dark coloured grains.

..... [1]

(iii) Describe **one** visible phenotypic difference, other than colour, between the grains shown in Fig. 2.2.

.....

..... [1]

Maize is used as a food source for humans and livestock. It contains mainly starch but also other nutrients including proteins and fat.

(b) Describe how to test maize grains for the presence of protein and fat.

protein .....

.....

.....

.....

fat .....

.....

.....

.....

[5]

Maize is a cereal. Cereals form a high proportion of the daily energy intake for many people.

The protein and fat content of maize and five other cereals is shown in Table 2.2.

Table 2.2

cereal	content per 100 g of dried cereal / g	
	protein	fat
maize	9.5	3.8
millet	10.4	5.0
oats	12.6	7.5
rice	7.1	1.8
sorghum	9.7	3.4
wheat	13.8	2.0

(c) Use Table 2.2 to identify the cereal that provides the largest energy content per 100 g.

Explain your choice of cereal.

.....

.....

.....

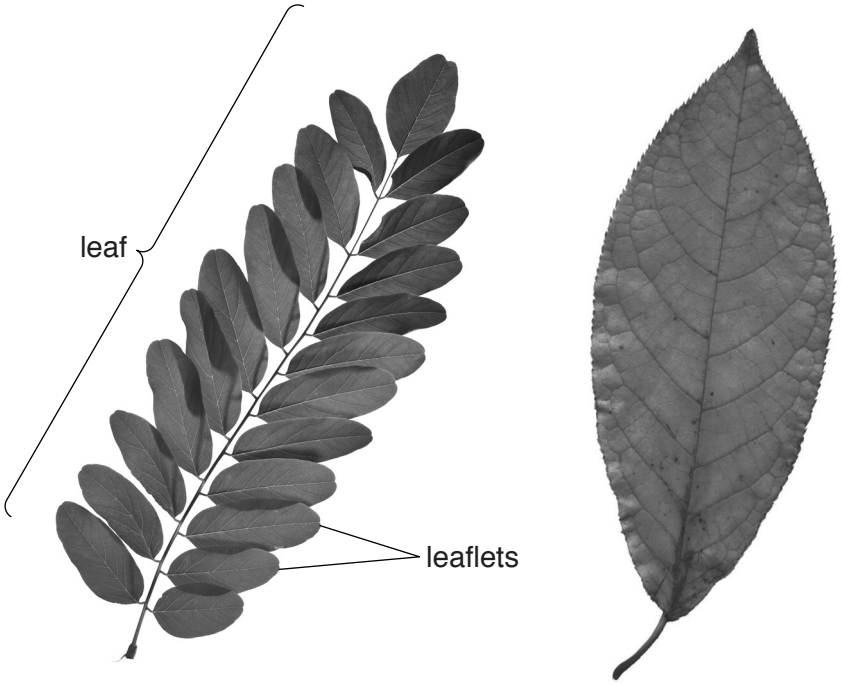
.....

.....

..... [3]

[Total: 11]

3 Fig 3.1 shows one complete leaf from two different species of plant, **P** and **Q**.



leaf **P** leaf **Q**

Fig. 3.1

(a) **(i)** State **two** features which are visible in **both** leaf **P** and leaf **Q**.

1 .....

2 .....
[2]

(ii) State **two** ways, other than size, in which leaf **P** differs from leaf **Q**.

1 .....

2 .....
[2]

(b) Fig. 3.2 shows part of a climbing plant.

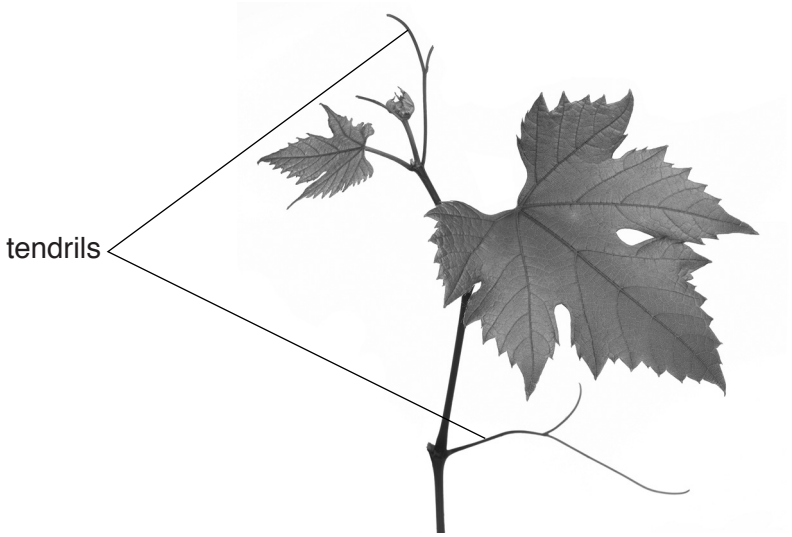


Fig. 3.2

(i) In the space below make a large drawing of the part of the climbing plant shown in Fig. 3.2.

[4]

(ii) Suggest **one** advantage and **one** disadvantage to the plant of having tendrils, as shown in Fig. 3.2.

advantage .....

.....

disadvantage .....

.....

[2]

(c) Fig. 3.3 shows a leaf of a monocotyledonous plant.

Fig. 3.3

The leaves shown in Fig 3.1 and Fig. 3.2 are all from eudicotyledonous (dicotyledonous) plants.

Complete Table 3.1 by stating **two** ways in which the leaves shown in Fig. 3.1 and Fig. 3.2 differ from the leaf of a monocotyledonous plant, shown in Fig. 3.3.

Table 3.1.

feature	eudicotyledonous	monocotyledonous

[3]

[Total: 13]

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