Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER					

1488084658

BIOLOGY **5090/61**

Paper 6 Alternative to Practical **October/November 2018**

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

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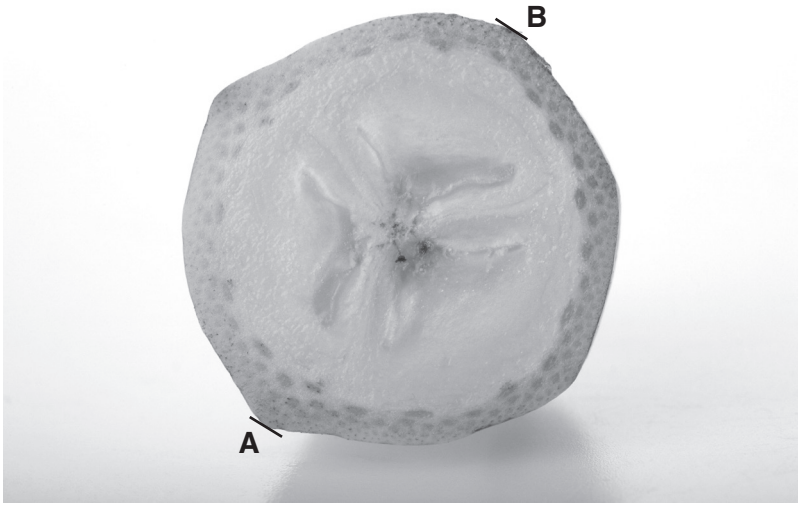
Answer **all** the questions in the spaces provided.

1 The banana is the fruit of a banana plant. As the fruit gets older, it ripens and becomes easy to eat. The photograph shows a cross-section of a ripe banana.



magnification ×1.5

(a) **(i)** Make a large drawing of the cross-section of the banana fruit as shown in the photograph.

[3]

(ii) Draw a straight line on the photograph joining the lines labelled **A** and **B** to show the diameter of the banana. Measure your line and record the measurement.

..... mm

Draw a straight line in the same position on your drawing. Measure this line on your drawing and record the measurement.

..... mm

Calculate the magnification of your drawing in comparison with the actual banana shown in the photograph. Show your working.

magnification × .....[5]

(b) In an experiment, a student cut a thin slice of banana and placed it on a white tile with the freshly cut surface facing upwards.

She covered this cut surface with iodine solution and left it for five minutes.

After five minutes she picked up the banana slice using forceps and rinsed off the excess iodine solution using water.

She observed that some of the inner parts of the banana slice were stained black.

(i) State what conclusions she could make from her observations.

.....

.....

.....[2]

(ii) Suggest why the student rinsed off the excess iodine solution before observing the banana.

.....

.....[1]

(iii) Suggest why she used forceps to hold the banana while rinsing off the excess iodine solution.

.....

.....[1]

(c) **(i)** Describe how you would test the inner part of another slice of banana to see if it contains reducing sugar.

.....

.....

.....

.....

.....[3]

(ii) State the result of the test if reducing sugar is present.

.....

.....[1]

(iii) Describe **one** way you would ensure that you carry out the reducing sugar test safely.

.....

.....[1]

[Total: 17]

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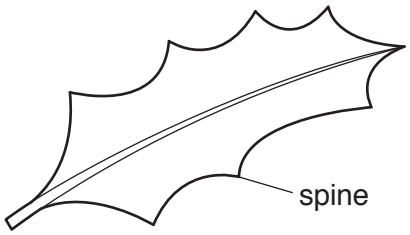
2 The European holly is a tree with leaves that can have spines on their edges. The diagram shows a holly leaf with eight spines.



Some students thought that the leaves on the lower branches of a holly tree had more spines than the leaves higher up the tree. They carried out an investigation into the number of spines on the leaves at different heights. They collected leaves from three different heights of the tree, 1 m, 2 m and 3 m above the ground, and counted the number of spines on each leaf.

Some of the data they collected is shown in the table on page 6.

key

I = 1 leaf, II = 2 leaves etc.

number of spines per leaf	height above ground level/m		
	1	**2**	**3**
16	I		
15	III		
14	III		
13	III	I	
12	II		
11	II	I	
10	I		
9		I	
8		I	I
7			
6		I	II
5			I
4			II
3		II	I
2		III	IIII
1			IIII
number of leaves counted	15	.....	15
total number of spines	198	.....	48
mean number of spines per leaf	13.2	.....	3.2

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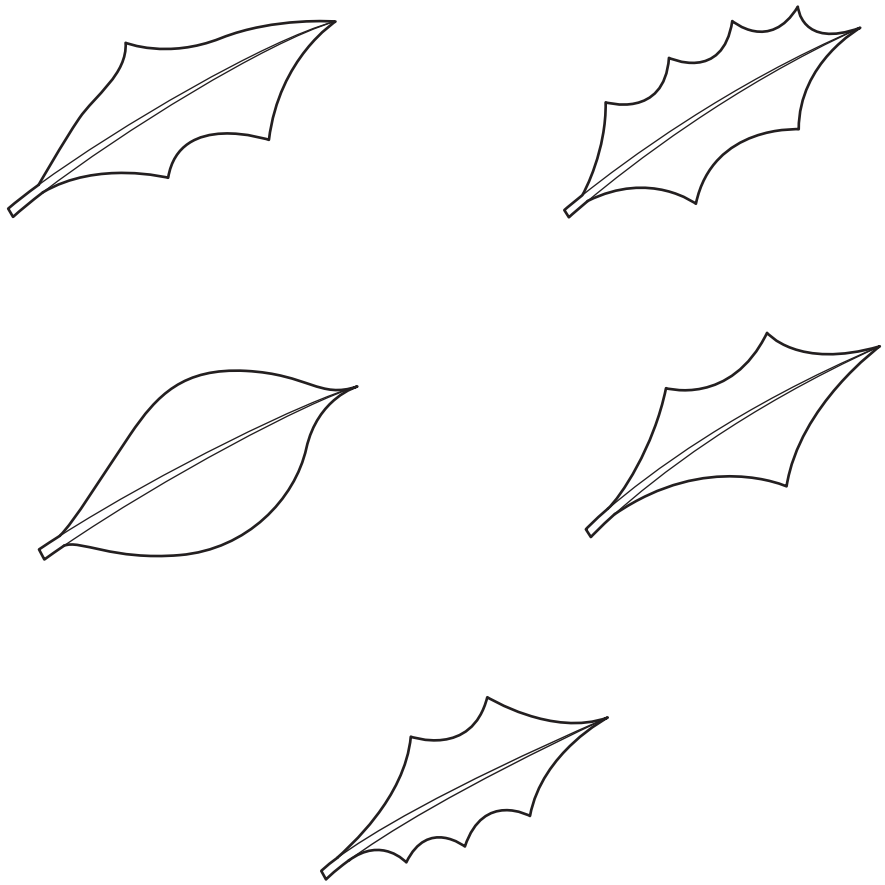
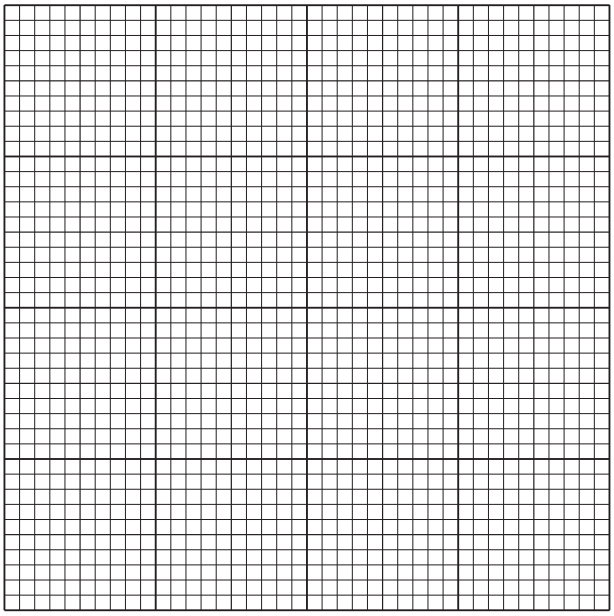
Data for five leaves collected at a height of 2 m has not yet been added to the table. The five leaves are shown in the diagram.



(a) **(i)** Count the spines on the five leaves in the diagram and enter the data in the table on page 6. [2]

(ii) Complete the table by calculating the number of leaves counted, the total number of spines and the mean number of spines per leaf for leaves at the height of 2 m. [3]

(iii) Construct a bar chart of the mean number of spines per leaf at each height, on the grid below.



[4]

(iv) State what the students could conclude from the bar chart about the effect of height on the mean number of spines.

.....

.....[1]

(v) Suggest **two** ways in which the students could have improved their investigation to give them more confidence that their conclusion was valid and reliable.

1 .....

.....

2 .....

.....

[2]

(b) The holly tree is a flowering plant. It produces two types of flower – one in which only the male parts function and one in which only the female parts function. These flowers are shown in the diagram.

magnification ×10

Complete the table to compare the stamens and carpels of these two types of flower.

flower structure	flower A	flower B
stamens		short filaments with small anthers
carpels		

[3]

[Total: 15]

3 Caffeine is a chemical present in coffee. Some people think that drinking caffeine in coffee may lead to an increase in the rate at which the heart beats.

(a) Describe how you would measure the rate at which a person's heart beats.

.....

.....

.....[2]

(b) Describe an investigation you could do to find out whether caffeine in coffee affects the rate at which the heart beats.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[4]

(c) A student suggests that another drink contains even more caffeine than coffee. You want to design an investigation to test whether this is true. State **two** factors which you should control so that the results can be compared with the results of your coffee investigation in **(b)**.

1 .....

.....

2 .....

.....
[2]

[Total: 8]

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