Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

6680771881

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **May/June 2016**

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 **9** printed pages and **3** blank pages.

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

1 **(a)** Fig. 1.1 shows two leaves from a holly tree. Holly leaves have sharp spines (prickles).



Fig. 1.1

A student decided to investigate whether the number of spines on holly leaves growing nearer to the ground was different from the number of spines on leaves growing higher up on a tree.

The student collected 12 leaves growing 1 metre above the ground and 12 leaves growing 3 metres above the ground. They then counted the number of spines on each leaf.

The student's results are shown in Fig. 1.2.

number of spines on leaves growing 1 m above ground:
21, 15, 22, 17, 15, 20, 14, 12, 16, 12, 18, 10
number of spines on leaves growing 3 m above ground:
15, 13, 15, 15, 12, 9, 14, 14, 16, 15, 17, 13

Fig. 1.2

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(i) In the space below, construct a table of these results. Arrange the number of spines on each leaf in rank order, from lowest to highest.

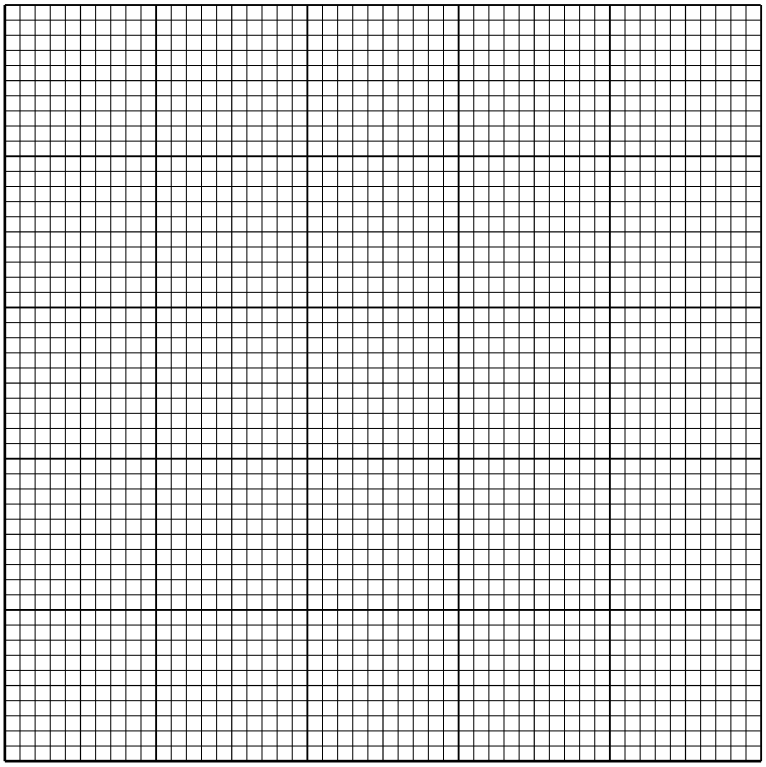
[4]

(ii) Calculate the mean number of spines on the leaves growing 1 m above the ground and the mean number of spines on the leaves growing 3 m above the ground.

mean number of spines on leaves growing 1 m above ground = ...

mean number of spines on leaves growing 3 m above ground = ... [2]

(iii) Construct a bar chart to compare the mean number of spines on leaves growing 1 m above the ground with the mean number of spines on leaves growing 3 m above the ground.



[3]

(iv) Describe what the student could conclude about the number of spines on holly leaves at 1 m and 3 m above the ground.

Use the information in your bar chart and in Fig. 1.2 to support your answer.

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.....[3]

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(v) Suggest **two** ways in which the reliability and validity of these conclusions could be improved.

1 .....

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2 .....

.....[2]

(b) Giving full experimental details, explain how you could compare the numbers of stomata on the upper and lower surfaces of a holly leaf.

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.....[4]

[Total: 18]

2 **(a)** Milk contains a reducing sugar. Explain how you could safely compare the reducing sugar contents of samples of cow's milk and goat's milk.

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.....[5]

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(b) In the process of converting milk into cheese, an enzyme is added to the milk. Bacteria are also added. The enzyme causes solid curds to form. The solid curds are left to mature to form the cheese.

An investigation was carried out into the changes in pH during the formation of cheese. The pH was measured at the start and then every week for 6 weeks.

The results of this investigation are shown in Fig. 2.1.

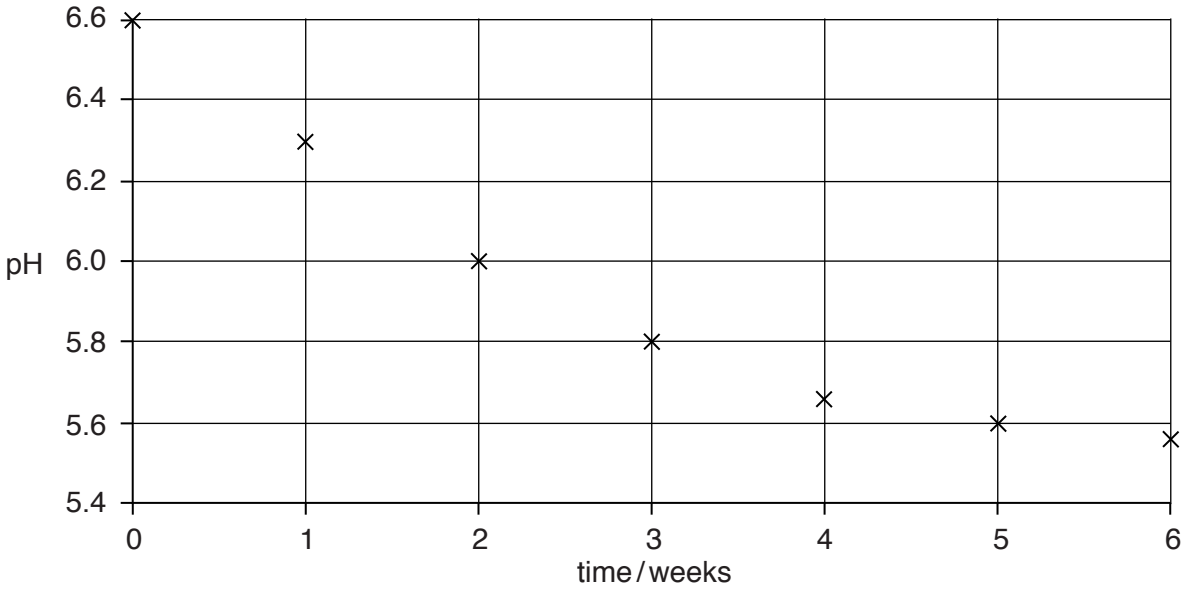


Fig. 2.1

(i) Join the plotted points on Fig. 2.1 with ruled lines. [1]

(ii) Using the information in Fig. 2.1, describe the changes in pH.

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.....[2]

(iii) Suggest an explanation for the changes you have described.

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.....[3]

[Total: 11]

3 Fig. 3.1 shows two bones from the arm of a human.



Fig. 3.1

(a) Identify the bones labelled **A** and **B**

A .....

B ..... [2]

(b) In the space below, make a drawing of the bone labelled **B**. Your drawing should be the same size as the bone in Fig. 3.1. You do not need to label your drawing.

[3]

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(c) (i) Measure and record the length of the bone labelled **B** in Fig. 3.1.

length of bone **B** = ...mm [1]

(ii) The actual length of this bone is 243 mm. Use your measurement in **(c)(i)** to calculate the magnification of Fig. 3.1.

Show your working.

magnification × .....[2]

(d) (i) State the type of joint formed between bone **A** and bone **B**.

.....[1]

(ii) Describe the movement permitted by this joint.

.....

.....

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.....[2]

[Total: 11]

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