Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

8107535018

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **October/November 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 **10** printed pages and **2** blank pages.

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

1 Fig. 1.1 shows a flower.



Fig. 1.1

(a) (i) Describe **two** visible features of this flower that suggest it is likely to be insect-pollinated rather than wind-pollinated.

1 .....

.....

2 .....

.....

[2]

(ii) Make a large drawing of the structures of the flower shown within the box on Fig. 1.1.

[4]

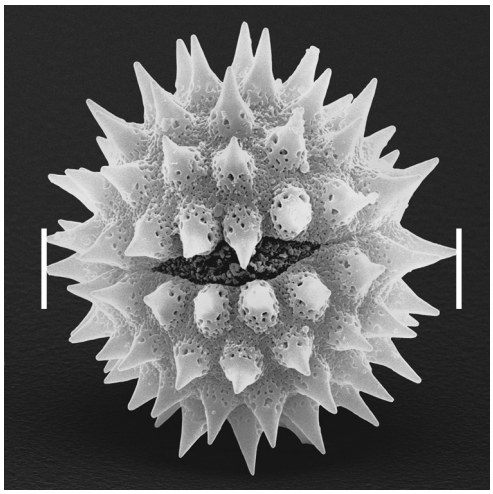
(iii) **On your drawing** label the following structures with a label line, the appropriate letter and its biological name:

A the part of the flower in which pollen grains are produced

B the part of the flower to which the pollen grains are transferred during pollination

C the part of the flower through which the pollen tube grows after pollination. [3]

(b) Fig. 1.2 shows a pollen grain from an insect-pollinated flower, as seen with an electron microscope.



magnification ×200

Fig. 1.2

(i) Describe **one** feature of this pollen grain that indicates it has been produced by an insect-pollinated flower.

.....

.....[1]

(ii) Measure and record the diameter of the pollen grain, as indicated by the two lines in Fig. 1.2.

measured diameter .....

Calculate the actual diameter of the pollen grain.

Show your working.

.....[3]

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(c) After pollination and fertilisation have taken place in a flower, a fruit containing seeds develops.

As the fruit matures, in addition to the increased size of the fruit, there are changes in colour, composition and texture.

(i) Describe a test to show that a fruit contains reducing sugar.

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.....[4]

(ii) Describe an investigation you could carry out using this test to compare the amount of reducing sugar in an unripe, immature fruit with a ripe, mature fruit.

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.....[4]

[Total: 21]

2 Catalase is an enzyme found in living plant and animal tissue.

It catalyses the breakdown of hydrogen peroxide into water and oxygen.

$$2H_2O_2 \rightarrow 2H_2O + O_2$$

hydrogen peroxide water oxygen

The activity of this enzyme can be measured by collecting the oxygen gas released as shown in Fig. 2.1.

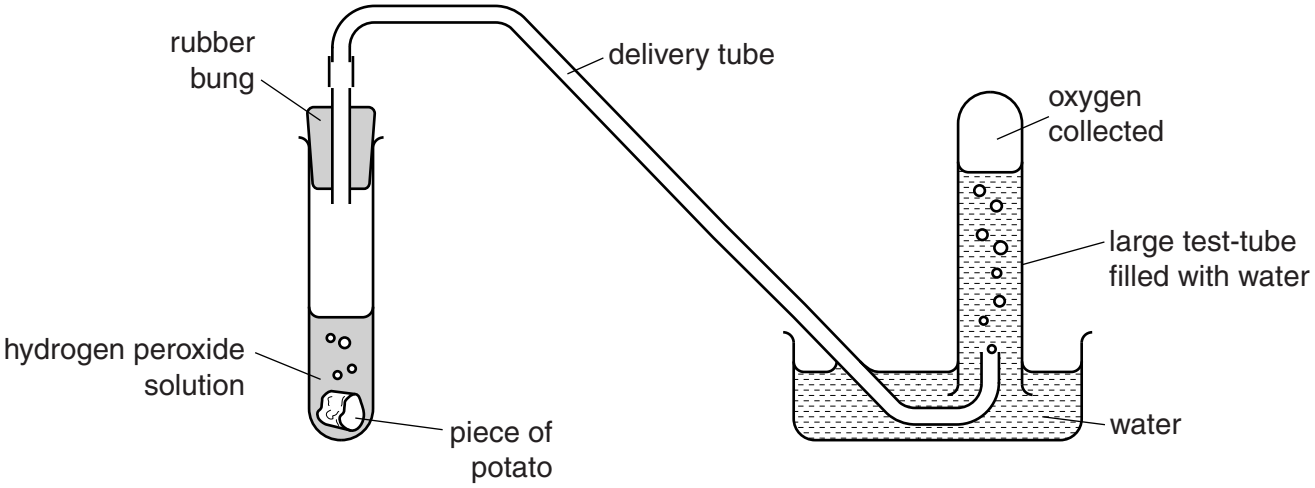
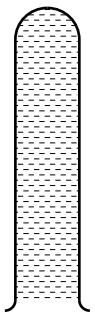


Fig. 2.1

Some students investigated the catalase activity of potato.

One large piece of **raw** potato was placed in a test-tube containing hydrogen peroxide solution. The amount of oxygen collected in 5 minutes is shown in Table 2.1.

Table 2.1

sample of potato	**one large piece of raw potato**	**raw potato cut into smaller pieces**	**one large piece of boiled potato**
oxygen collected in 5 minutes			
height /mm	.....	.....	0.0 .....

The apparatus was set up again. The procedure was repeated using another similar sized piece of **raw** potato that had been cut into smaller pieces. All of these smaller pieces were placed in an unused test-tube of hydrogen peroxide and the amount of oxygen collected in 5 minutes is shown in Table 2.1.

The apparatus was set up again. A large piece of previously **boiled** potato was tested in the same way and the result is shown in Table 2.1.

(a) (i) Measure the height of oxygen collected in each test-tube and record it in Table 2.1. [2]

(ii) Describe and explain these results.

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.....[4]

(b) Suggest how you could improve the method used in this investigation to obtain more valid and reliable results.

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.....[4]

[Total: 10]

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3 Two students measured how good their reactions were by using a metre ruler as shown in Fig. 3.1. The reaction being tested was catching a falling metre ruler.

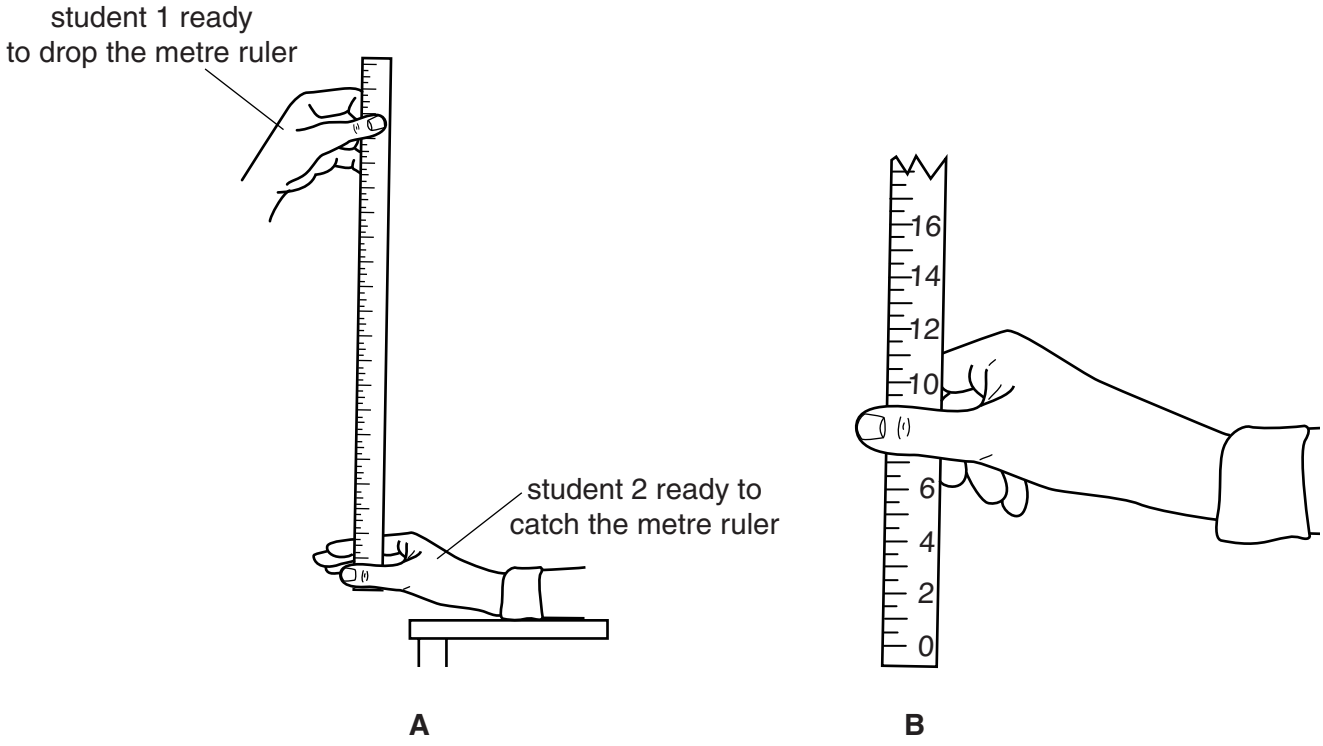


Fig. 3.1

Student 1 held the metre ruler near the 100 cm end so that when they let it drop, student 2 would be able to catch it between the thumb and fingers that were held open ready at the 0 cm end of the metre ruler. The measurement on the metre ruler where it was caught by student 2 was recorded. The students then swapped so that student 2 dropped the ruler and student 1 caught it. The ruler was dropped and caught a total of 5 times by each student.

The results obtained by the students were:

Student 1: 16.0 cm ; 12.0 cm ; 10.0 cm ; 15.0 cm ; 7.0 cm

Student 2: 18.0 cm ; 15.5 cm ; 12.0 cm ; 51.0 cm ; 12.5 cm

(a) (i) Draw a table that could be used to display these results.

[3]

(ii) Calculate the mean result for student 1.

..... cm [1]

(iii) Suggest why, when calculating the mean result for student 2, the result of 51.0 cm should be omitted.

.....

.....[1]

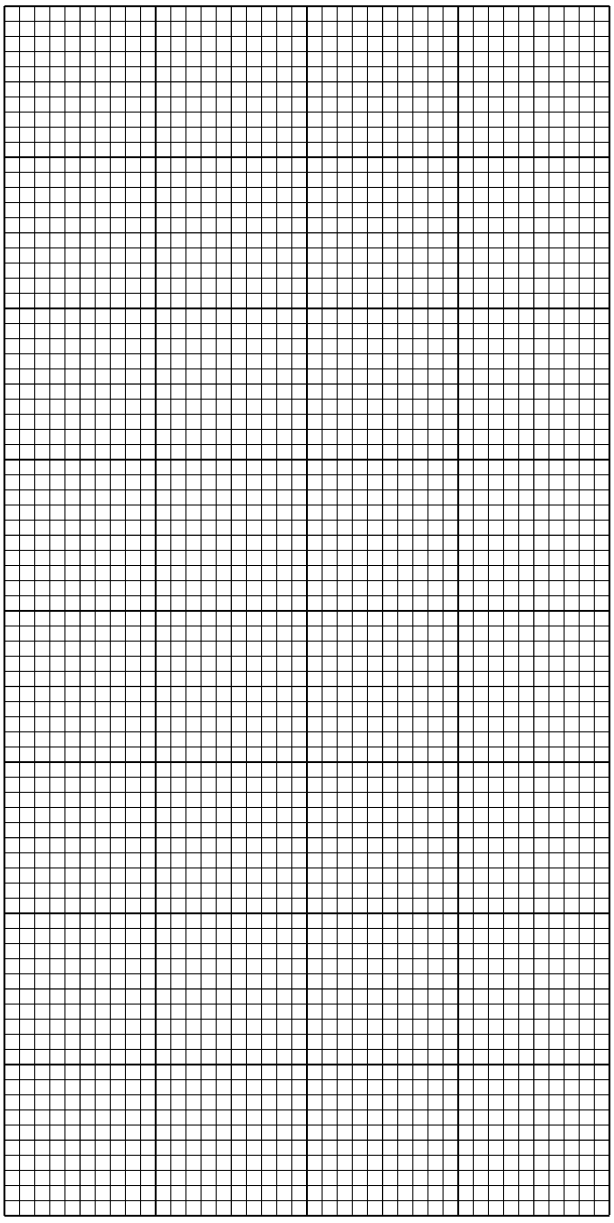
(iv) Suggest an explanation for this result of 51.0 cm.

.....

.....[1]

(v) Construct a bar chart of the mean results obtained for the two students.

The mean result calculated for student 2 was 14.5 cm (omitting the 51.0 cm reading from the calculation).



[3]

[Total: 9]

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