Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

BIOLOGY **0610/62**

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.

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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1 Maize (corn) is an important food crop that produces grain. Fig. 1.1 shows a maize grain that has germinated to form a seedling.

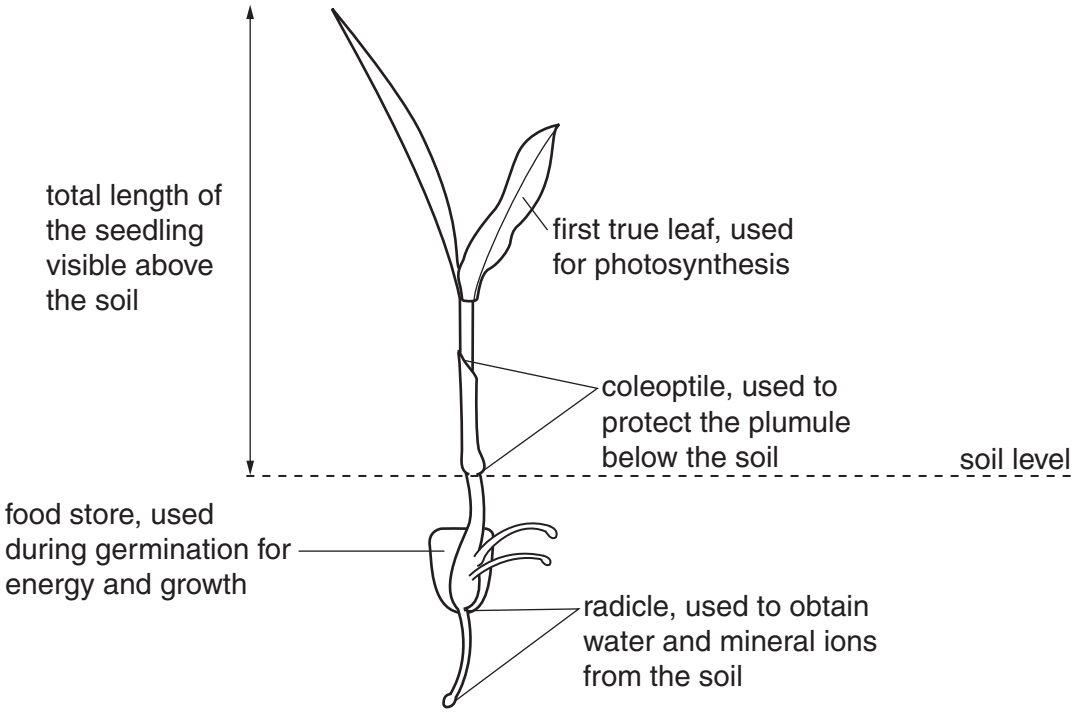

Fig. 1.1

Some students investigated the effect of light on the germination and early growth of maize. The students measured and observed maize grown in the light and maize grown in the dark.

Fig. 1.2 shows the surface of two pots containing maize seedlings, one set grown in the light and the other set grown in the dark.

The seedlings were grown at 20 °C and watered every day for ten days.

Step 1 Observe the appearance of the seedlings carefully.

(a) Complete Table 1.1 to record two **visible** differences in the seedlings grown in the light and the seedlings grown in the dark shown in Fig. 1.2.

View solution

Table 1.1

feature	seedlings grown in the light	seedlings grown in the dark

[2]

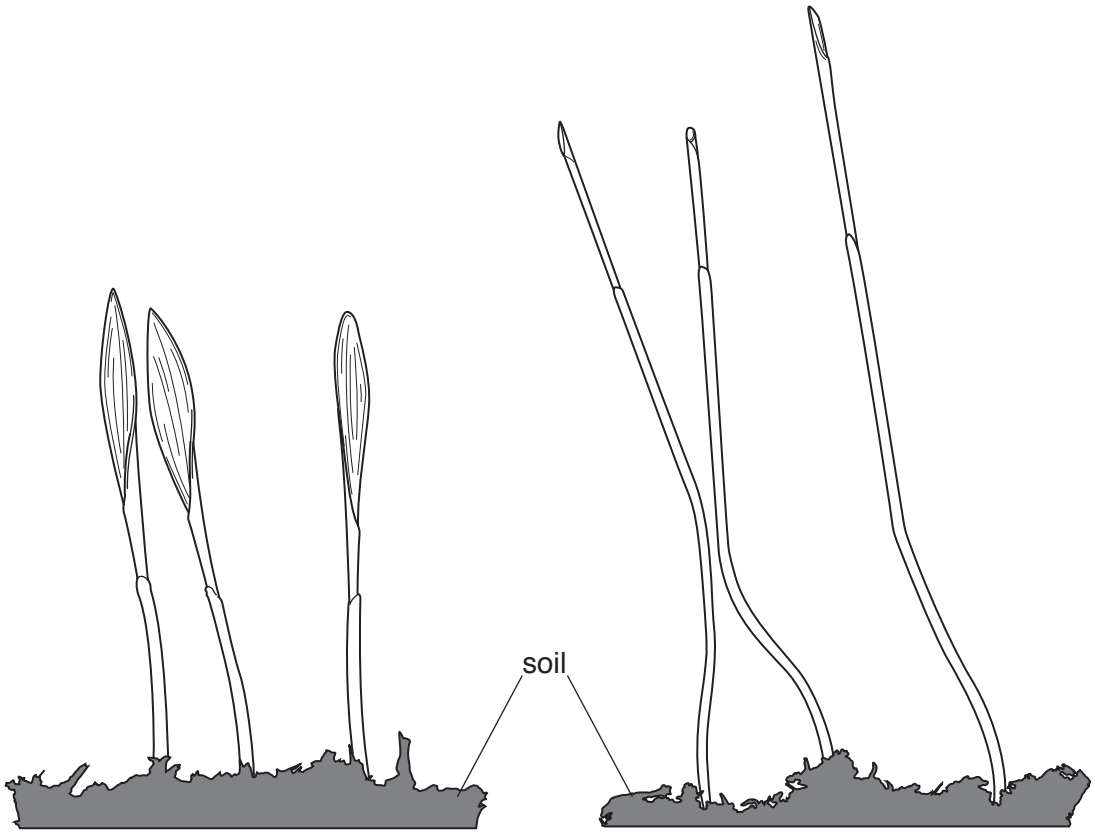

Fig. 1.2

You are going to measure the length of the coleoptiles and the total length of the seedlings visible above the soil. You will measure **all** the seedlings grown in the light and **all** the seedlings grown in the dark.

(b) (i) Prepare a table to record your results in the space below.

View solution

[6]

Step 2 Use a ruler to measure the length of the coleoptile and the total length of the seedling visible above the soil for each seedling.

Record your results in your table.

(ii) State **two** conclusions that can be made about the effect of light on the germination and early growth of maize.

1 .....

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2 .....

.....

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[2]

Step 3 A line was marked down the centre of a white tile and labelled **L** on one side and **D** on the other side.

Step 4 The three seedlings grown in the light and the three seedlings grown in the dark were dug out from each pot after ten days.

Step 5 The remains of the food store was cut away from each of the seedlings and washed in water. The outer skin was removed.

Step 6 The food stores were then placed on the white tile. The food stores from the seedlings grown in the light were placed on the side of the tile labelled **L** and the food stores from the seedlings grown in the dark were placed on the side labelled **D**.

Step 7 A clean spatula was used to crush together the three food stores from the seedlings grown in the light. This was then separated into three equal parts on the **L** side of the tile, as shown in Fig. 1.3.

Step 8 The spatula was cleaned and used to crush together the three food stores from the seedlings grown in the dark. This was also separated into three equal parts on the **D** side of the tile, as shown in Fig. 1.3.

View solution

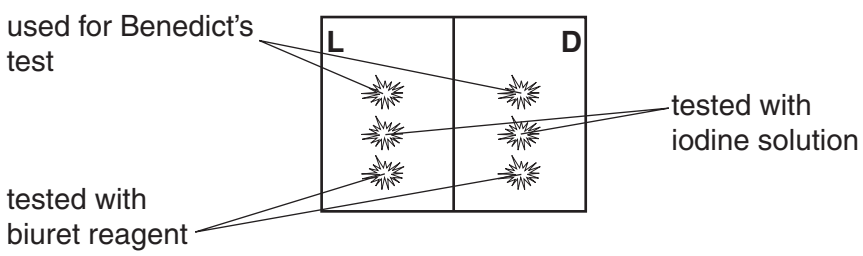

Fig. 1.3

Step 9 One of the food stores from the seedlings grown in the light was placed into a test-tube labelled **L** and 2 cm^3 of water added, taking care to wash the crushed food store to the bottom of the test-tube.

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Step 10 Step 9 was repeated using one of the food stores from the seedlings grown in the dark and a test-tube labelled **D**.

Step 11 A Benedict's test was carried out on the contents of test-tube **L** and test-tube **D**.

Step 12 A drop of iodine solution was added to one of the remaining food stores from the seedlings grown in the light and to one of the remaining food store from the seedlings grown in the dark on the white tile.

Step 13 A drop of biuret reagent was added to each of the remaining food stores.

Fig. 1.4 shows the results of these tests.

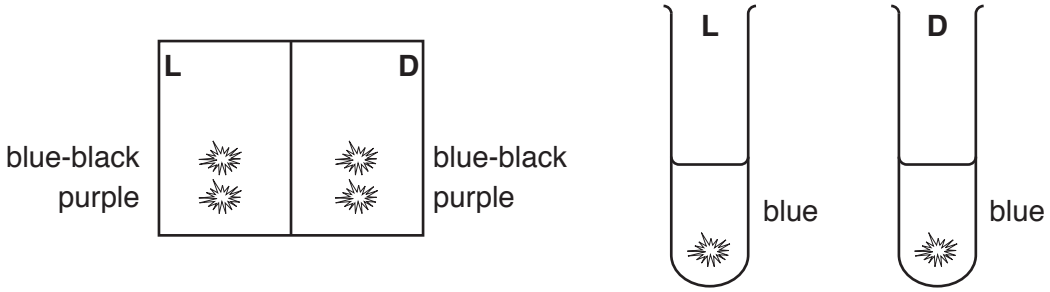

Fig. 1.4

(c) (i) Record the results of these tests in Table 1.2.

View solution

Table 1.2

test	seedlings grown in the light	seedlings grown in the dark
Benedict's		
iodine		
biuret		

[3]

(ii) State the conclusion for the results shown in Table 1.2.

View solution

.....

.....[1]

(d) A group of students investigated the changes in dry mass during germination and growth of maize grown in the light and maize grown in the dark.

View solution

The dry mass is the total mass left after all the water has been evaporated.

Table 1.3 shows the results of the investigation for the maize seedlings grown in the light.

Table 1.3

	time / days										
	0	2	4	6	8	10	12	14	16	18	20
dry mass of 10 maize seedlings / g	22	20	17	12	10	8	11	13	14	15	17

(i) Describe a method the students could have used to carry out this investigation.

Use the information on **page 2** to help you.

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.....[6]

(ii) Suggest why the students measured the dry mass instead of the mass including water in their investigation.

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.....[1]

[Total: 21]

View solution

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2 **(a)** A group of students investigated the effect of two different exercises on the heart rate of ten male and ten female students.

Before the first exercise, the pulse rate at rest was measured and the group then jumped on the same spot for two minutes without moving their arms. Every two seconds an investigator shouted jump.

After two minutes the pulse rate was measured and the students were allowed ten minutes to rest.

Before the second exercise, the pulse rate at rest was measured again and the group was asked to do a different exercise.

The students jumped on the same spot for two minutes lifting their arms above their head as they jumped up and dropping their arms as they came down. Every two seconds an investigator shouted 'jump'.


View solution

Table 2.1 shows the results of this investigation.

Table 2.1

activity	average pulse rate / beats per minute		
	male students	female students	all students
resting	68	74	71
after jumping	96	92	
after jumping and moving arms	128	140	

(i) Complete Table 2.1 by writing in the average pulse rate for all students after both forms of exercise. [2]

(ii) Describe **two** variables in this investigation that have been controlled.

1 .....

.....

2 .....

.....

[2]

(iii) Explain why the students had to rest before carrying out the second exercise.

.....

.....[1]

(iv) State **one** variable that cannot be controlled during the exercise and describe the effect on the results of the investigation.

variable .....

effect on results .....

.....

.....

[2]

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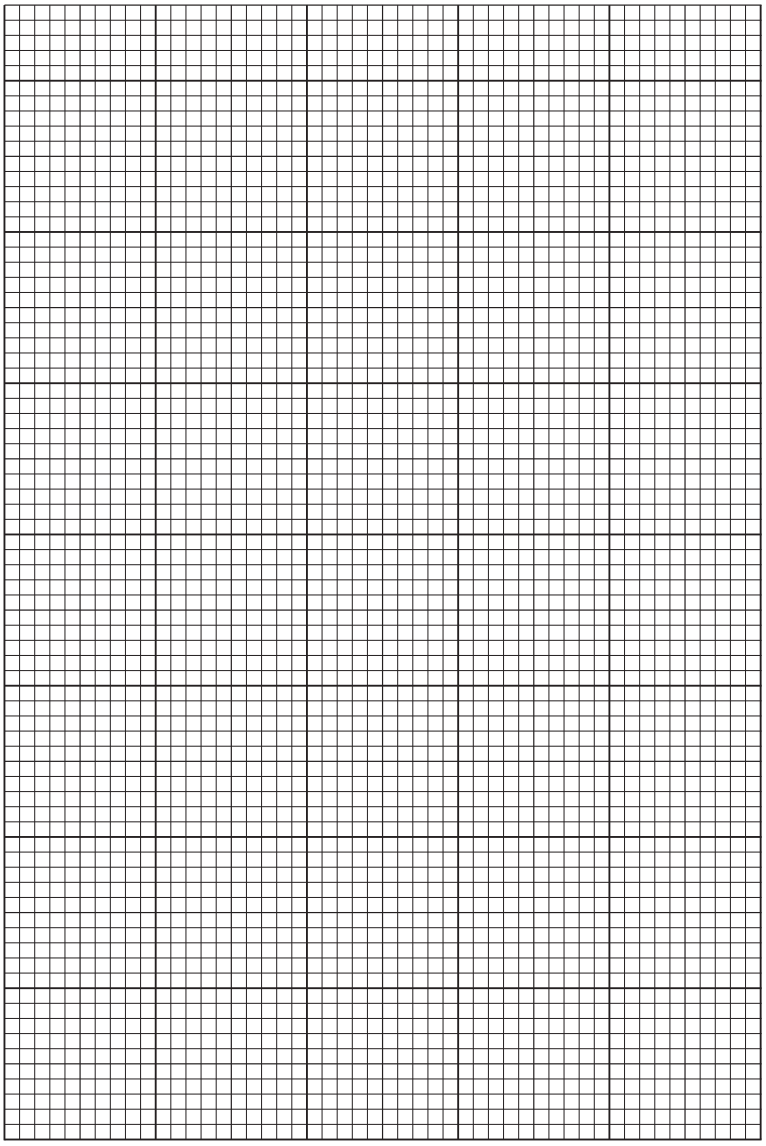
(b) (i) Plot a bar chart of the data in Table 2.1, for both the male students and the female students, on the grid.

View solution



[4]

(ii) State **one** similarity and **one** difference the effect of exercise has on males and females.

similarity .....

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difference .....

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[2]

(c) Fig. 2.1 shows a photomicrograph of a cross section of an artery from a mammal.

View solution

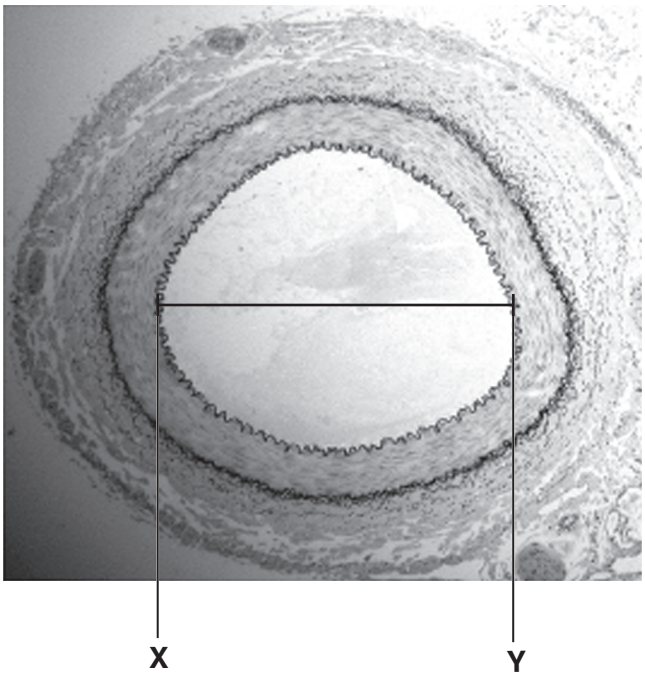

Fig. 2.1

(i) Make a large diagram of this cross section to show the layers forming the wall of the artery.

[3]

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(ii) Measure the diameter of the lumen of the artery between points **X** and **Y** on Fig. 2.1. **Include the unit.**

View solution

Diameter of the lumen on Fig. 2.1 .....

Draw a line in the same position on your drawing and measure the diameter of the lumen on your drawing.

Diameter of the lumen on your drawing .....

$$\text{magnification} = \frac{\text{diameter of the lumen on your drawing}}{\text{diameter of the lumen on Fig. 2.1}}$$

Calculate the magnification of your drawing using the equation given and your answers.

Show your working.

magnification .....

[3]

[Total: 19]

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