Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

1757638178

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **October/November 2020**

1 hour

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **8** pages. Blank pages are indicated.

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1 When a seed germinates, the stem of the seedling grows upwards. A student wanted to investigate the effect of light and dark on the growth of seedlings. She grew some seedlings in the light and some in the dark, for the same length of time. The photograph shows the seedlings at the end of the investigation.

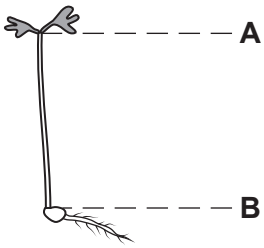
(a) **(i)** State **two** factors, apart from light and dark, that should be controlled when growing the seedlings for this investigation.

1 .....

2 .....
[2]

(ii) The student measured the length of the stems of some of the seedlings.

One seedling grown in the light is shown in the diagram below. Measure the length of the stem between **A** and **B** and record it.



length of stem ..... mm [1]

(iii) The length of the stems in millimetres of four other seedlings grown in the light and five grown in the dark were recorded by the student, as shown below.

dark stems	*27, 25, 33, 35, 30*
light stems	*13, 12, 19, 13*

Use this data and your measurement in **(a)(ii)** to complete the table below.

seedling	stem length in dark / mm	stem length in light / mm
1		
2		
3		
4		
5		
mean length / mm		

[3]

(b) **(i)** Another student thought that it would be better to measure 20 seedlings grown in the light and 20 seedlings grown in the dark. Suggest why this would improve the investigation.

.....

..... [1]

(ii) Suggest why the growth observed in the dark might be an advantage to a plant in a shady, forest environment.

.....

..... [1]

(iii) Use the photograph to describe **one** other visible difference between the seedlings grown in the light and the dark.

.....

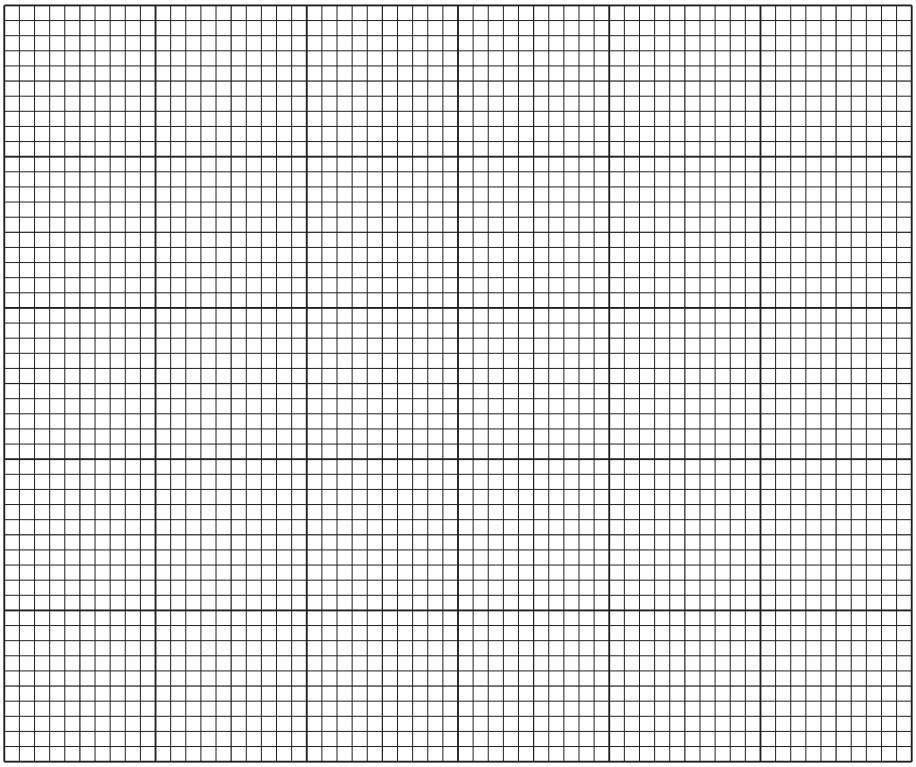
..... [1]

(c) Some scientists wanted to investigate the effect of fertiliser on the growth of wheat. Wheat seeds were planted in soil to which nitrogen fertiliser had been added. After the seedlings had grown to a height of 8 cm, they were measured at regular intervals.

The mean heights of the plants are shown in the table.

time / days	**mean height of plants / cm**
0	8
10	10
30	29
60	58
90	73
110	73

(i) Construct a line graph of the data on the grid below. Join your points with ruled, straight lines.



[4]

(ii) Use your graph to find the mean height of the plants at 50 days. Show your working on the graph.

mean height ..... [2]

(iii) Describe how the rate of growth of these plants changed between days 0 and 110.

.....

.....

.....

.....

.....

..... [3]

(iv) Describe how to complete this investigation to find whether fertiliser does have an effect on the rate of growth of wheat.

.....

.....

.....

..... [2]

(v) Increase in height was used as a measure of growth. Suggest **two** other plant features that could have been used to measure growth.

.....

.....

.....

..... [2]

[Total: 22]

2 The photograph shows the bone from the upper leg (between the hip and knee) of two different adult humans. The bones are labelled **C** and **D**.

C **D** **magnification ×0.17**

(a) Use the table to describe **two** differences between bones **C** and **D** as they appear in the photograph.

	bone C	**bone D**
1		
2		

[2]

(b) Make a large drawing of **bone C** in the space below.

[5]

(c) **(i)** On the photograph measure the length of **bone D**.

..... mm [1]

(ii) Use your measurement to calculate the actual length of **bone D**.

Show your working.

..... [3]

[Total: 11]

3 Milk contains casein, a protein that gives it a white colour. A student tested the effect of a protease enzyme on this protein.

He marked a cross (**X**) on the base of a small glass beaker with a wax pencil.

He knew that if he added milk to the beaker while looking down on the cross, the **X** would become less clear until it could not be seen through the milk.

He wanted to measure the volume of milk that was needed to make the **X** no longer visible.

(a) Suggest a method that he could use to determine this volume of milk.

.....

.....

.....

.....

..... [3]

When he added protease to the milk, it digested the casein. As a result, the milk became colourless after five minutes and he could see the **X** through it.

(b) A fruit contains a protease enzyme. Not all protease enzymes can digest casein.

Using a method similar to the one above, design an investigation to find out whether this fruit protease will digest casein.

.....

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.....

.....

.....

.....

..... [4]

[Total: 7]

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