Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2705444432

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **May/June 2021**

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. Any blank pages are indicated.

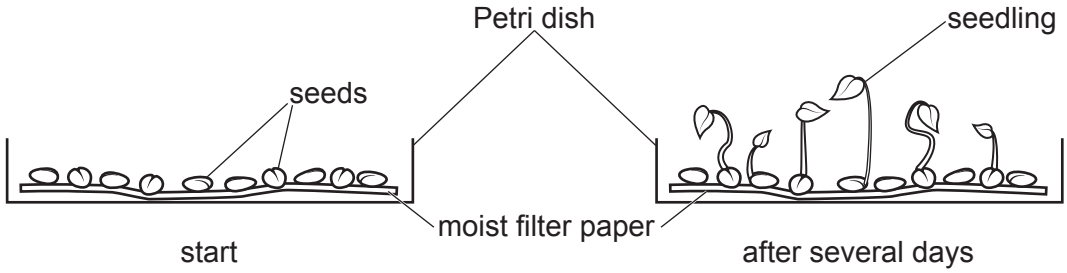
© UCLES 2021

BLANK PAGE

© UCLES 2021

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

1 Some students investigated the growth of some seedlings.



They had three dishes of seedlings, **A**, **B** and **C**, that had been growing in the same conditions for different amounts of time.

(a) They selected three seedlings from each dish and measured their heights to the nearest millimetre. The results for dishes **A** and **C** are shown in the table.

dish	height of seedling 1 / mm	height of seedling 2 / mm	height of seedling 3 / mm	mean height of seedlings / mm
A	21	23	25	
B				
C	2	4	3	

(i) Three seedlings from dish **B** are shown below. Measure them and record their heights to the nearest millimetre in the table.



seedling 1 seedling 2 seedling 3

[2]

(ii) Calculate the mean height of the three seedlings from each dish to the nearest millimetre and complete the table. [2]

(iii) Use the data to suggest which seedlings had been growing for the longest period of time and give a reason for your answer.

.....

..... [1]

(iv) Suggest **two** reasons why a number of seeds, rather than just one seed, were placed in each Petri dish at the beginning of the investigation.

1. .....

.....

2. .....

.....

[2]

(v) The students selected three seedlings from each dish to measure. Suggest a method the students could have used for choosing the three seedlings and state an advantage of this method.

method .....

.....

advantage .....

.....

[2]

(b) In another investigation, some students calculated the mean heights of some seedlings as they grew. They recorded their results.

Grown for 6 days mean height 8 mm.

Grown for 10 days mean height 23 mm.

Grown for 12 days mean height 27 mm.

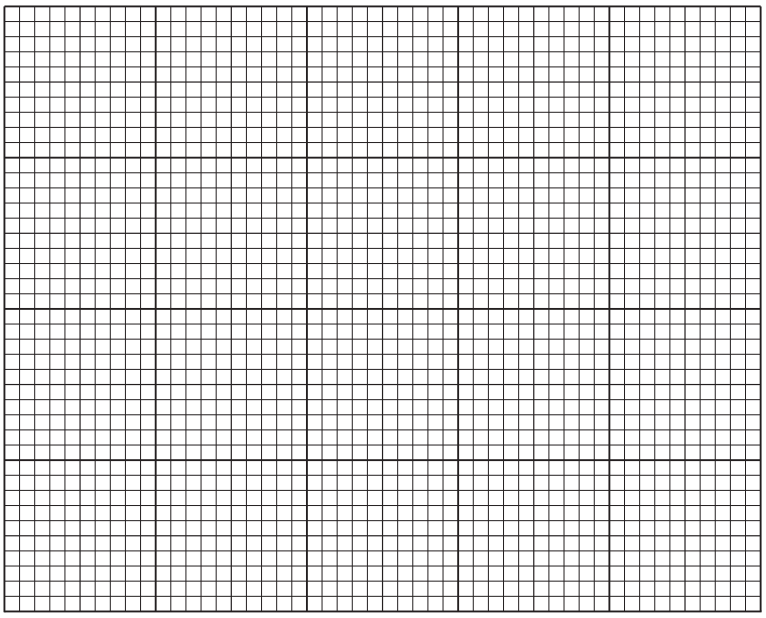
Grown for 15 days mean height 32 mm.

Grown for 20 days mean height 36 mm.

Grown for 23 days mean height 37 mm.

© UCLES 2021

(i) On the grid construct a line graph to show the relationship between time and mean height for these seedlings. Join your points with ruled lines.



[4]

(ii) Use the graph to describe the growth of these seedlings.

.....

..... [2]

(iii) Use the graph to state the time period during which the rate of growth of the seedlings was greatest.

..... [1]

(iv) Use the data and your graph to calculate the rate of growth of the seedlings for the five days from day 15 to day 20.

Space for working.

rate ..... [2]

(v) State **two** variables that need to be controlled whilst growing these seedlings and explain why they need to be controlled.

variable 1 .....

variable 2.....

explanation .....

.....

[3]

The seeds needed water to germinate and for the seedlings to grow.

(c) Design an investigation to determine the effect of the pH of water on the growth (mean height) of seedlings. You should use seedlings grown in Petri dishes in a laboratory.

.....

.....

.....

.....

.....

.....

.....

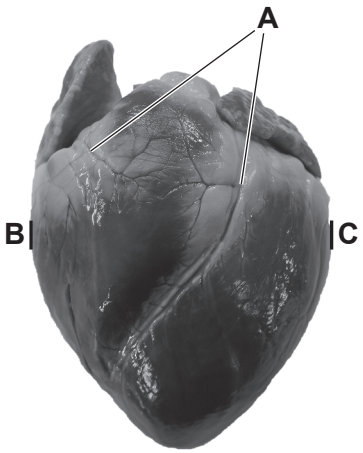
.....

.....

..... [6]

[Total: 27]

2 The photograph shows the surface of a mammalian organ.



(a) (i) Identify this organ ..... [1]

(ii) Name the structures labelled **A** ..... [1]

(b) In the space below, make a large drawing of this organ as it appears in the photograph.

[5]

(c) (i) **On the photograph**, draw a line between **B** and **C**.

Measure and record this length.

..... mm [2]

(ii) **On your drawing**, draw a line at the same location as the line **B–C**.

Measure and record the length of this line.

..... mm [2]

(iii) Use your measurements in **(c)(i)** and **(c)(ii)** to calculate the magnification of your drawing compared to the photograph. Give your answer to one decimal place.

Space for working.

magnification × ..... [2]

[Total: 13]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.