Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

6488323582

BIOLOGY **0610/51**

Paper 5 Practical Test **May/June 2020**

1 hour 15 minutes

You must answer on the question paper.

You will need: The materials and apparatus listed in the confidential instructions

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 [ ].

For Examiner's Use	
1	
2	
Total	

This document has **12** pages. Blank pages are indicated.

© UCLES 2020

1 Sugars are a source of energy in the diet.

You are going to estimate the concentration of glucose in an energy drink (**D**).

Read all the instructions but DO NOT CARRY THEM OUT until you have drawn a table for your results in the space provided in 1(a)(iii).

You should use the gloves and eye protection provided while you are carrying out the practical work.

Step 1 Label three test-tubes **A**, **B** and **C**.

Step 2 Use the volumes of 4% glucose solution and distilled water shown in Table 1.1 to make three different concentrations of glucose solution in test-tubes **A**, **B** and **C**.

(a) (i) Complete Table 1.1 by calculating and writing in the percentage concentration of glucose solution in test-tube **B**.

Table 1.1

test-tube	volume of 4% glucose solution / cm^3	volume of distilled water / cm^3	percentage concentration of glucose solution
A	10.0	0.0	4
B	5.0	5.0	
C	2.5	7.5	1

[1]

Step 3 Add 5 cm^3 of Benedict's solution to each of the glucose solutions in the test-tubes **A**, **B** and **C**. Shake each test-tube gently for 3 seconds to mix the contents.

Step 4 Add 5 cm^3 of Benedict's solution to test-tube **D** which contains 10 cm^3 of energy drink **D**. Shake the test-tube gently for 3 seconds to mix the contents.

Step 5 Raise your hand when you are ready for hot water to be put into the beaker labelled **water-bath**.

Step 6 Measure the temperature of the hot water in the water-bath (initial temperature).

(ii) Record the initial temperature in Table 1.2.

Table 1.2

initial temperature / °C	final temperature / °C

[1]

Step 7 Put test-tube **A** into the water-bath and immediately start the stop-clock.

Step 8 Observe test-tube **A** carefully and note the time at which the contents of the test-tube **first** change colour. **This reaction may occur very quickly.**

If there is no colour change after 5 minutes record the time as **>300**.

Record the time taken in seconds for the colour change in the table you have prepared in **1(a)(iii)**.

Step 9 Remove test-tube **A** from the water-bath and put it back into the test-tube rack.

Reset the stop-clock.

Step 10 Repeat steps 7, 8 and 9 with test-tube **B**.

Step 11 Repeat steps 7, 8 and 9 with test-tube **C**.

Step 12 Repeat steps 7, 8 and 9 with test-tube **D**.

Step 13 Measure the final temperature of the water in the water-bath.

Record this temperature in Table 1.2.

(iii) Prepare a table to record your results in the space provided.

[4]

(iv) Estimate the concentration of glucose in energy drink **D** using the information in Table 1.1 and your results.

..... % [1]

(v) Explain how you estimated the concentration of glucose in energy drink **D** in **1(a)(iv)**.

.....

.....

..... [1]

(b) Table 1.2 may indicate that there is a source of error in this investigation.

(i) Identify the possible source of error **and** suggest **one** way the method could be improved to reduce this error.

source of error .....

.....

improvement .....

.....

.....

[2]

(ii) Explain how the error identified in **1(b)(i)** could affect your results and the estimation of the concentration of glucose in energy drink **D**.

.....

.....

..... [1]

(c) State **two** variables that were kept constant in this investigation.

1 .....

2 .....

[2]

(d) Barley grains are used in the food industry as a source of sugars. Barley grains contain starch. Starch can be broken down into sugars by enzymes.

Students made a starch suspension from barley grains to investigate the breakdown of starch by enzymes. The starch suspension contained 100 g of starch. They mixed the starch suspension with enzymes and recorded the mass of starch remaining in the mixture at different times.

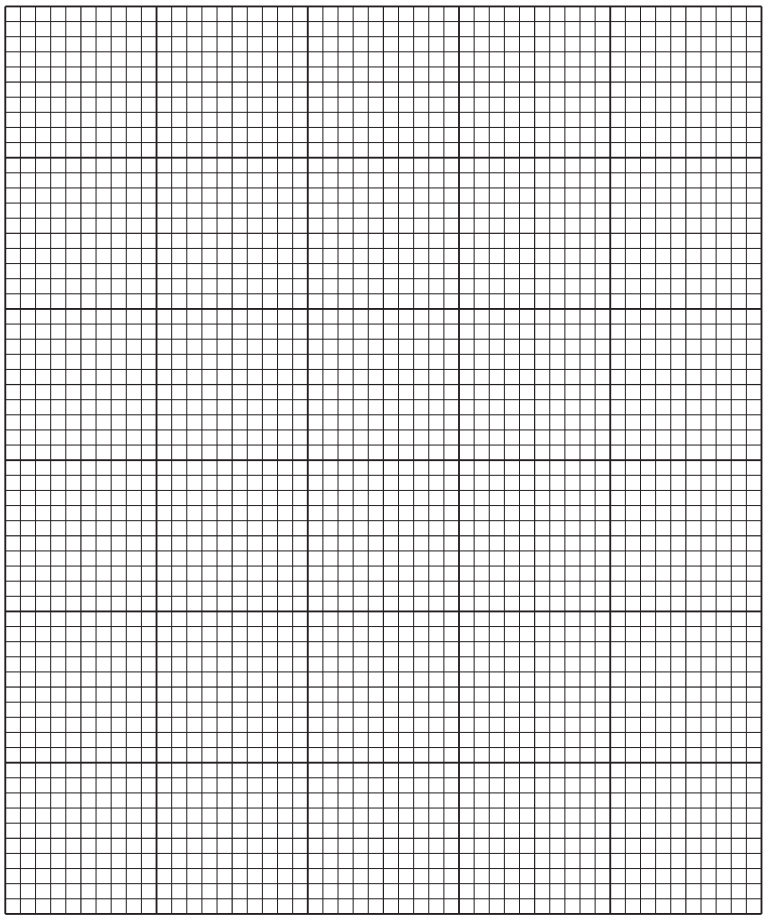
The results are shown in Table 1.3.

Table 1.3

time / minutes	mass of starch remaining / g
0	100
5	58
10	40
20	32
40	28

© UCLES 2020

(i) Plot a line graph on the grid of the data in Table 1.3.



[4]

(ii) Describe the trend shown in your graph.

.....

.....

..... [1]

(iii) Estimate the mass of starch remaining at 15 minutes.

Show on your graph how you obtained your answer.

..... g
[2]

(iv) Calculate the rate of starch breakdown in the first five minutes using the information in Table 1.3 or your graph.

..... g per minute [1]

(e) Plan an investigation to determine the effect of temperature on the breakdown of starch by enzymes.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 27]

2 **(a)** Human reproduction involves a male gamete (sperm) and a female gamete (ovum).

Fig. 2.1 is a photomicrograph of a single ovum and many sperm cells during fertilisation.

Line **AB** represents the diameter of the ovum.

Line **CD** represents the length of one sperm cell.

© UCLES 2020

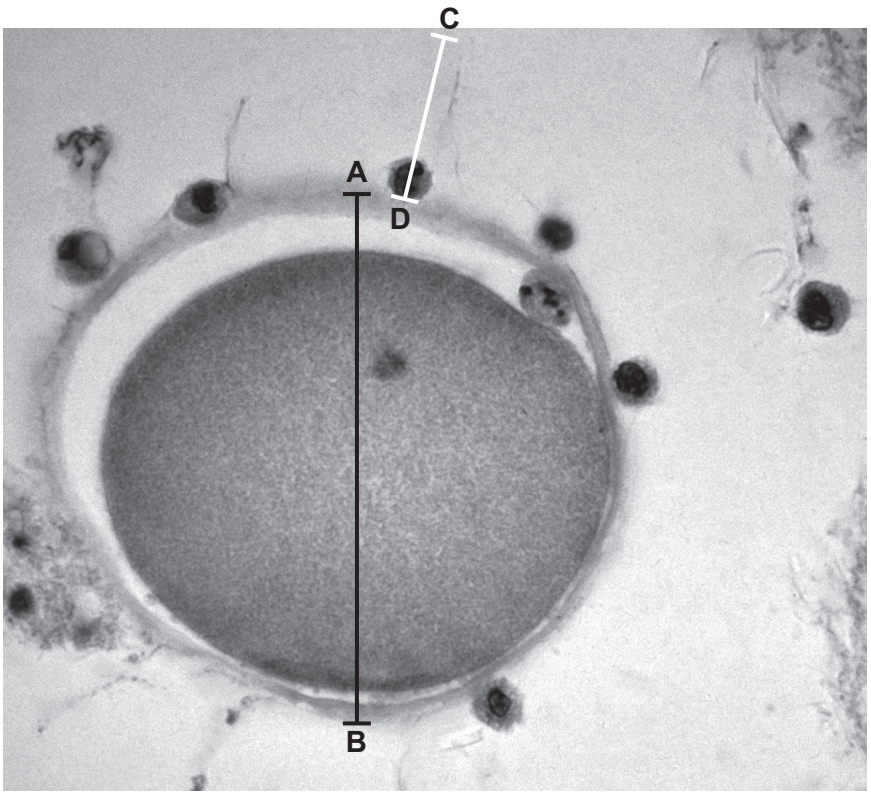


Fig. 2.1

(i) Measure the lengths of lines **AB** and **CD** on Fig. 2.1. Include the unit.

length of line **AB** ..... length of line **CD** .....

[1]

(ii) The actual diameter of the ovum is 0.10 mm.

Calculate the magnification of the ovum in Fig. 2.1 using the formula:

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ on Fig. 2.1}}{\text{actual diameter of ovum}}$$

..... [1]

(iii) Calculate the actual length of the sperm cell using the magnification you calculated in **2(a)(ii)** and the formula:

$$\text{magnification} = \frac{\text{length of line } \mathbf{CD} \text{ on Fig. 2.1}}{\text{actual length of sperm cell}}$$

Give your answer to two decimal places.

..... mm

[3]

© UCLES 2020

[Turn over

(b) Fig. 2.2 is a different photomicrograph of an ovum and one sperm cell.

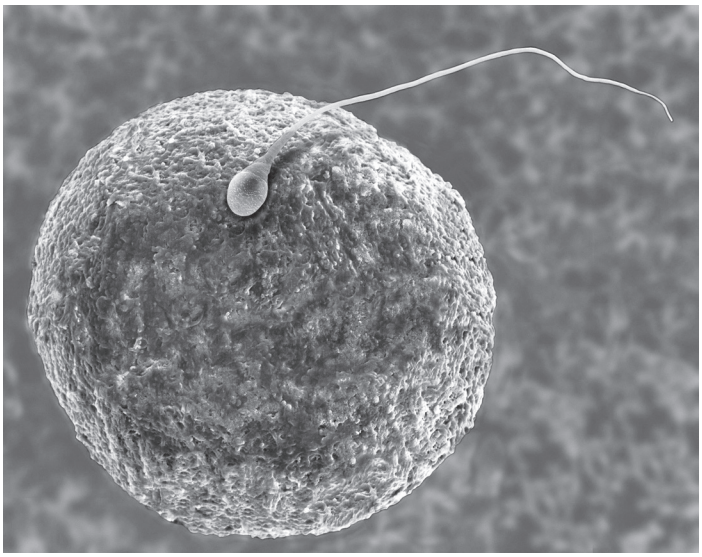


Fig. 2.2

(i) Make a large drawing of the ovum and the sperm cell shown in Fig. 2.2.

Label the ovum on your drawing.

[5]

© UCLES 2020

(ii) State **three** visible differences between the ovum and the sperm cell that can be seen in Fig. 2.2.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

[Total: 13]

BLANK PAGE

BLANK PAGE

© UCLES 2020

BLANK PAGE

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.

© UCLES 2020