Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

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.

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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**.

View solution

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.

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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]

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(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.

View solution

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

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

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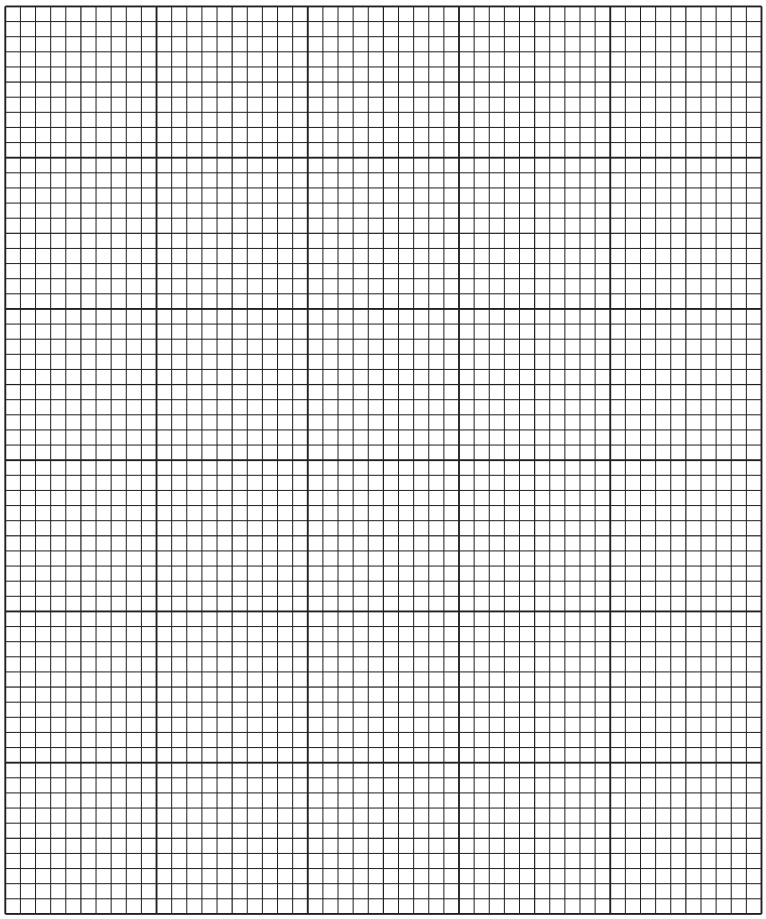

[4]

(ii) Describe the trend shown in your graph.

View solution

.....

.....

..... [1]

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

Show on your graph how you obtained your answer.

View solution

..... g
[2]

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

View solution

..... g per minute [1]

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

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..... [6]

View solution [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.

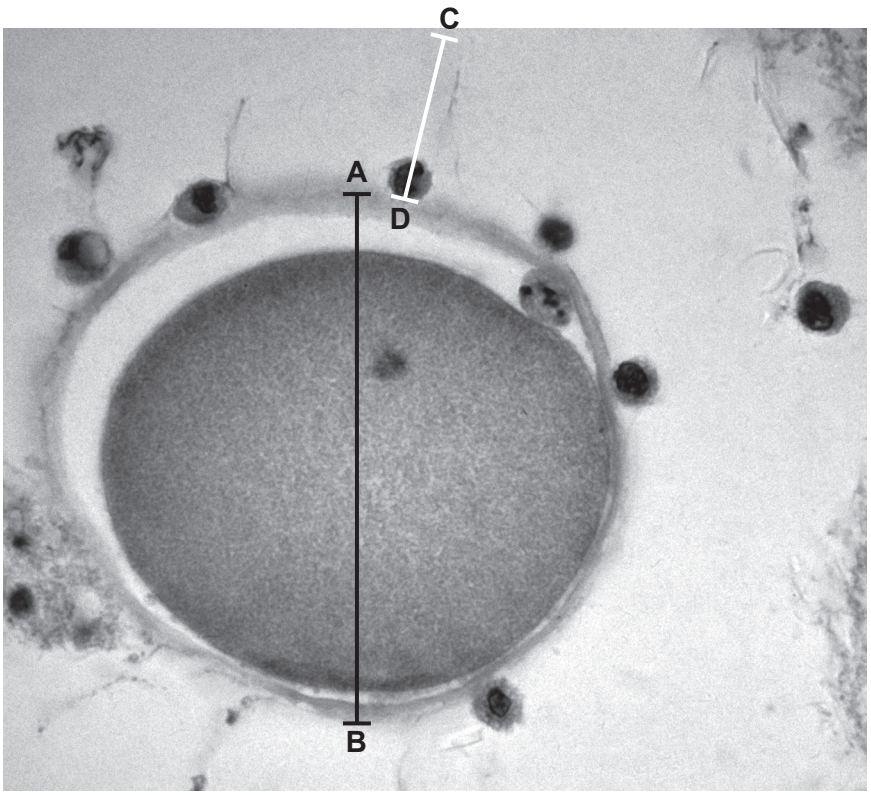

Fig. 2.1

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

View solution

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

[1]

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

View solution

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:

View solution

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

Give your answer to two decimal places.

..... mm

[3]

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

View solution

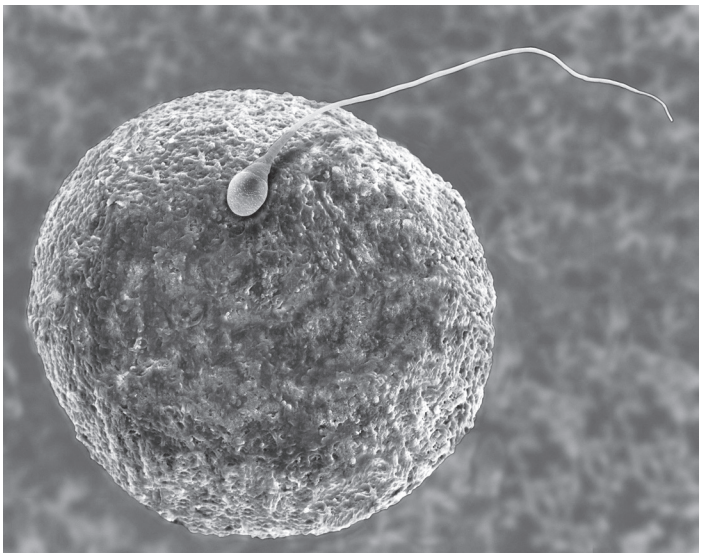

Fig. 2.2

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

Label the ovum on your drawing.

[5]

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(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]

View solution

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