Cambridge IGCSE

**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

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| CANDIDATE NAME | | | | | | | | | |
| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | | |

**BIOLOGY** **0610/51**

Paper 5 Practical Test **October/November 2018**

**1 hour 15 minutes**

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

**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.

| For Examiner's Use | |
|---|---|
| 1 | |
| 2 | |
| Total | |

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **11** printed pages and **1** blank page.

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**1** Grapes are soft fruits that contain sugars.

You are going to investigate the concentration of reducing sugars in grapes.

**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 safety equipment provided while you are carrying out the practical work.

Step 1 Put 50 $cm^3$ of distilled water into a measuring cylinder.

Step 2 Place four of the grapes into the measuring cylinder and record the total volume of distilled water and grapes in the measuring cylinder in Table 1.1.

**(a) (i)** Calculate the total volume of the four grapes and record it in Table 1.1.


View solution

**Table 1.1**

| total volume of distilled water and grapes in the measuring cylinder / $cm^3$ | total volume of the grapes / $cm^3$ |
|---|---|
| | |

[1]

**(ii)** Calculate the average volume of one grape using your answer to **1(a)(i)**.


View solution

Space for working.

..... $cm^3$ [1]

Step 3 Label a test-tube **G**.

Step 4 Pour the contents of the measuring cylinder into the container labelled **waste**.

Remove the four grapes and dry them with a paper towel. Return the four grapes to the Petri dish base.

Step 5 Use a spatula to crush all of the grapes in the Petri dish base and try to extract as much juice as possible. Pour the grape juice into the small beaker labelled **grape juice**.

Step 6 Use a clean syringe to put 5.0 $cm^3$ of the grape juice into test-tube **G**.

Step 7 Label three test-tubes, **S1**, **S2** and **S3**.

Step 8 Add 5.0 $cm^3$ of the solution labelled **S** to the test-tube labelled **S1**.

Step 9 Add 1.0 $cm^3$ of the solution labelled **S** to the test-tube labelled **S2** and then add 4.0 $cm^3$ of distilled water. Mix the contents of **S2**.

Step 10 Add 0.2 $cm^3$ of the solution labelled **S** to the test-tube labelled **S3** and then add 4.8 $cm^3$ of distilled water. Mix the contents of **S3**.

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Step 11 Use a clean syringe to add 5.0 $cm^3$ of Benedict's solution to each of test-tubes **S1**, **S2**, **S3** and **G**.

Raise your hand when you are ready for hot water to be added to the beaker labelled **water-bath**.

Step 12 Place the test-tubes **S1, S2, S3** and **G** into the water-bath at the same time.

Start timing and record the time at which a colour change **first** appears in each test-tube.

Record your results in your table in **1(a)(iii)**.

**(iii)** Prepare a table to record your results.

View solution

Your table should include:

- the solutions tested
- the time, in seconds, of the **first** appearance of a colour change in each solution.

Record your results in your table as you carry out the practical work.

[4]

**(b) (i)** The concentration of reducing sugar in solution **S** and **S1** is 200 g per $dm^3$.
The concentration of reducing sugar in solution **S3** is 8 g per $dm^3$.

View solution

Calculate the concentration of reducing sugar in solution **S2**, using the information in step **9**.

concentration of reducing sugar in **S2** ..... g per $dm^3$.
[2]

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**(ii)** State a conclusion for your reducing sugar investigation.

View solution

.....

.....

.....

..... [1]

**(c) (i)** State **one** variable that you kept constant in your investigation.

View solution

..... [1]

**(ii)** The method used in step **12** contains two potential sources of error.

View solution

State **one** source of error and suggest an improvement to minimise the error.

error .....

.....

improvement .....

.....

.....

[2]

**(iii)** Identify **one** safety precaution you used when carrying out this investigation and give a reason for this precaution.

safety precaution .....

.....

reason for the safety precaution .....

.....

[2]

View solution

**(d)** Grapes develop in large groups attached to their parent plant. As they develop, grapes increase in size and ripen.

View solution

Fig. 1.1 shows one group of grapes.



**Fig. 1.1**

A student suggested that the concentration of reducing sugars in grapes changed as the grapes developed and ripened.

Describe how the method you used in steps **3** to **12** could be modified to determine if there is a change in the concentration of reducing sugars in grapes during development.

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..... [2]

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**(e)** Some students placed eight grapes, that had been picked at different ages, into water. They measured the change in the volume of the grapes after 24 hours.

View solution

Table 1.2 shows the results of this investigation.

**Table 1.2**

| age of grapes when picked / days | starting volume of grapes / $cm^3$ | final volume of grapes after 24 hours / $cm^3$ | percentage change in volume |
|---|---|---|---|
| 12 | 5.0 | 5.5 | 10 |
| 24 | 7.6 | 8.5 | 12 |
| 36 | 12.0 | 13.7 | 14 |
| 48 | 17.0 | 19.7 | 16 |
| 60 | 22.0 | 26.0 | 18 |
| 72 | 25.0 | 30.0 | 20 |
| 84 | 30.0 | 36.6 | |
| 96 | 36.0 | 45.0 | 25 |
| 108 | 42.0 | 54.6 | 30 |
| 120 | 55.0 | 74.3 | 35 |

**(i)** Calculate the percentage change in volume of grapes aged 84 days.

Write your answer in Table 1.2.

Show your working.

[2]

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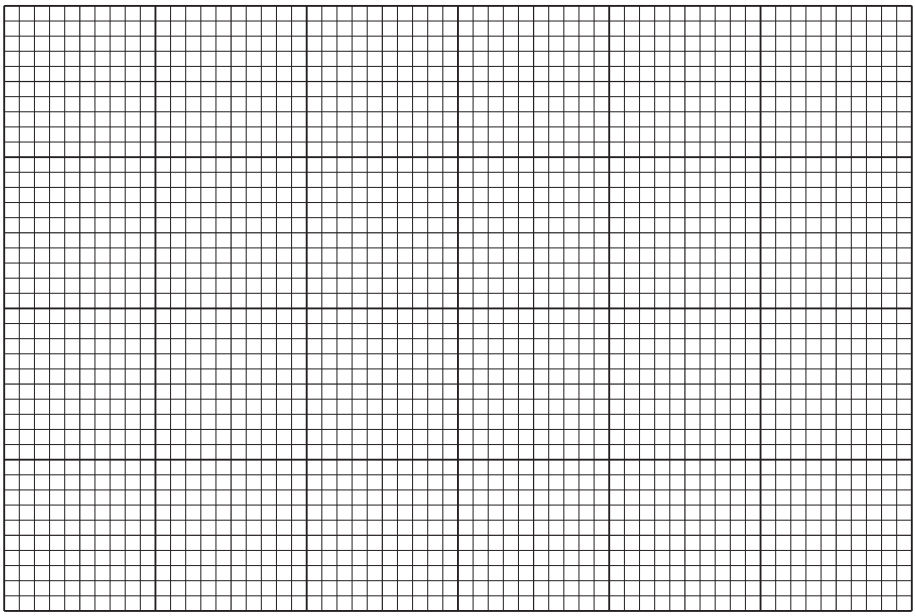
**(ii)** Plot a line graph on the grid of the age of the grapes against the percentage change in volume.

View solution



[4]

**(iii)** Describe the trends shown by the results in Table 1.2 and your graph.

View solution

.....

.....

.....

..... [2]

**(iv)** State the variable that was changed (independent variable) in this investigation.

..... [1]

[Total: 25]

View solution

**2** Fig. 2.1 shows a photomicrograph of part of the lung of a mammal.

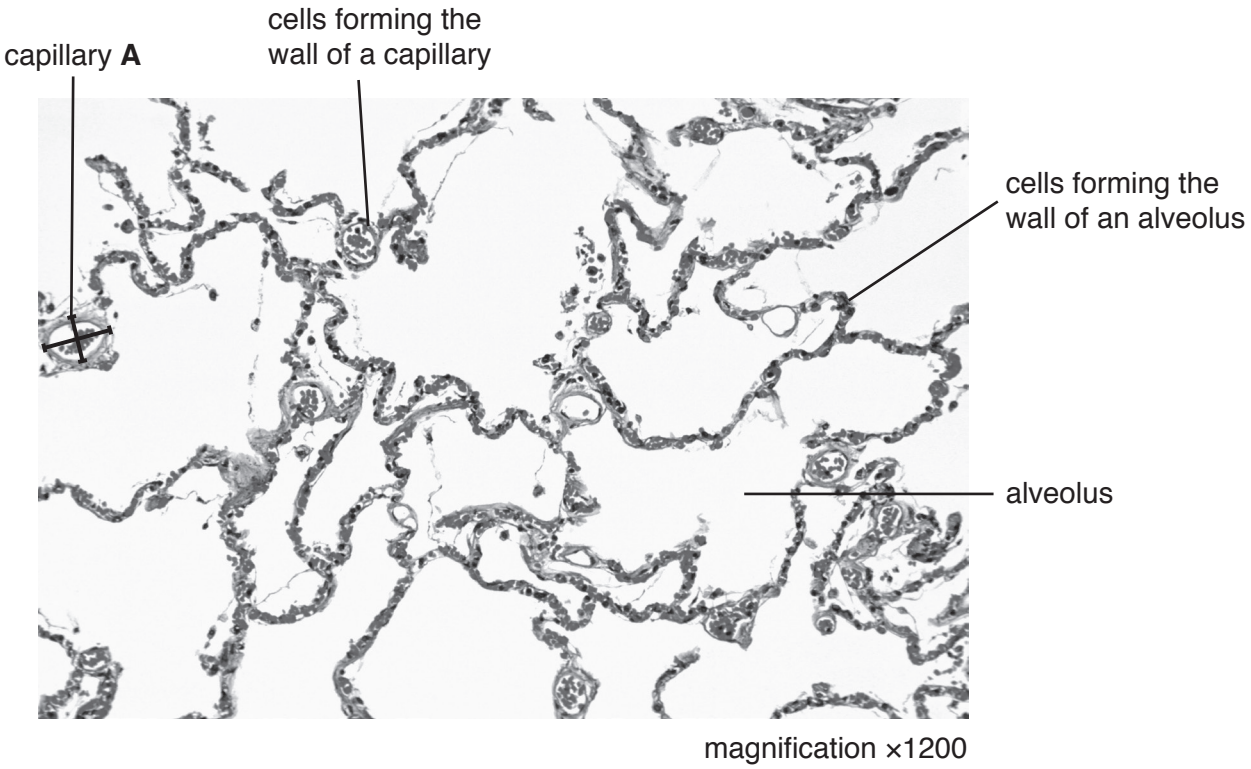



**Fig. 2.1**

**(a) (i)** Measure the diameter of the capillary labelled **A** using the two lines drawn on the capillary in Fig. 2.1. Include the unit.

View solution

diameter 1 .....

diameter 2 .....

Calculate the average diameter of capillary **A**.

.....
[2]

**(ii)** Calculate the actual average diameter of capillary **A** using your answer to **2(a)(i)** and the formula:

View solution

$$\text{magnification} = \frac{\text{average diameter of capillary } \mathbf{A} \text{ on Fig. 2.1}}{\text{actual average diameter of capillary } \mathbf{A}}$$

1 mm = 1000 μm

Give your answer to the nearest whole μm.

..... μm
[3]

**(iii)** Make a large drawing of three alveoli and one capillary, that are next to each other in Fig. 2.1. Do not draw individual cells.

View solution

[4]

**(b)** Some students measured the average increase in chest circumference, during breathing, when at rest. Each student wrapped a tape measure around their chest just below the armpits, as shown in Fig. 2.2.

View solution

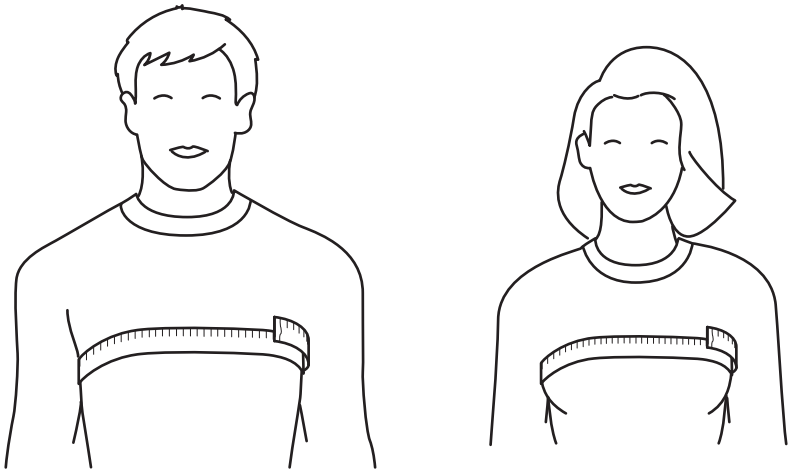


**Fig. 2.2**

Each student then breathed out and took a measurement of their chest circumference. They then breathed in and took a second measurement. The difference between the two measurements is the increase in chest circumference.

Table 2.1 shows the results of their measurements.

**Table 2.1**

| | increase in chest circumference / mm | |
|---|---|---|
| | male | female |
| | 40 | 32 |
| | 31 | 37 |
| | 48 | 25 |
| | 28 | 38 |
| | 46 | 27 |
| | 33 | 30 |
| | 39 | 22 |
| | 41 | 38 |
| | 25 | 27 |
| | 39 | 34 |
| average | 37 | |

**(i)** Calculate the average increase in chest circumference for females.

Write your answer in Table 2.1. [1]

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**(ii)** Describe how the students could find out the effect of exercise intensity on chest circumference during breathing.

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..... [5]

[Total: 15]

View solution

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