Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/61**

Paper 6 Alternative to Practical **October/November 2018**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

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.

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 **12** printed pages and **4** blank pages.

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CAMBRIDGE International Examinations

1 Grapes are soft fruits that contain sugars.

Some students investigated the concentration of reducing sugars in grapes.

(a) Step 1 The students determined the volume of the grapes by placing 50 cm^3 of distilled water into a measuring cylinder.

Step 2 Four grapes were placed into the measuring cylinder and the total volume of the distilled water and grapes was measured.

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Fig. 1.1 shows the total volume of the distilled water and grapes in the measuring cylinder.

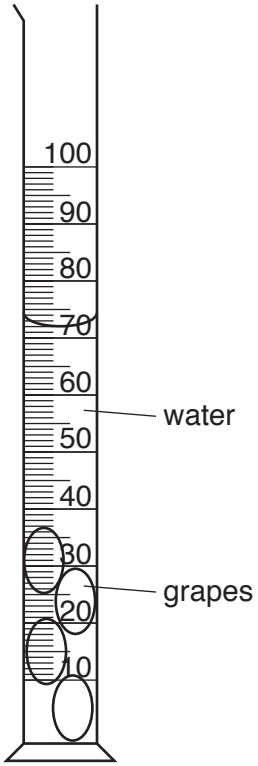

Fig. 1.1

(i) **Table 1.1**

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

Calculate the total volume of the four grapes using the information in Step **1** and Fig. 1.1.

Write your answers in Table 1.1. [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 Three test-tubes were labelled, **S1**, **S2** and **S3**.

Step 4 5.0 cm^3 of a sugar solution (**S**) was added to test-tube **S1**.

Step 5 1.0 cm^3 of solution **S** and 4.0 cm^3 of distilled water were added to test-tube **S2**. The contents of **S2** were mixed.

Step 6 0.2 cm^3 of solution **S** and 4.8 cm^3 of distilled water were added to test-tube **S3**. The contents of **S3** were mixed.

Step 7 Grape juice was extracted from ten grapes.

Step 8 5.0 cm^3 of the extracted grape juice was placed into a test-tube labelled **G**.

Step 9 5.0 cm^3 of Benedict's solution was added to each of test-tubes **S1**, **S2**, **S3** and **G**.

Step 10 Test-tubes **S1**, **S2**, **S3** and **G** were placed into an 80 °C water-bath.

Step 11 The time at which a colour change **first** appeared in each test-tube was recorded.

Step 12 Steps 3 to 11 were repeated to obtain a second set of results.

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Fig. 1.2 shows the students' results in minutes and seconds.



Fig. 1.2

(iii) Prepare a table to record the results, shown in Fig. 1.2.

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Your table should include:

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

[4]

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

Calculate the concentration of reducing sugar in solution **S2**, using the information in step **5**.

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

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(ii) State a conclusion for the reducing sugar investigation.

View solution

.....

.....

.....[1]

(c) (i) State **one** variable that was kept constant in the reducing sugar investigation.

View solution

.....[1]

(ii) The method used to estimate the concentration of reducing sugar in grapes contains potential sources of error.

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

View solution

error .....

.....

improvement .....

.....

.....

[2]

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

safety precaution .....

.....

reason for the safety precaution .....

.....

[2]

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

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Fig. 1.3 shows one group of grapes.



Fig. 1.3

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

Describe how the method 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.

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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 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.

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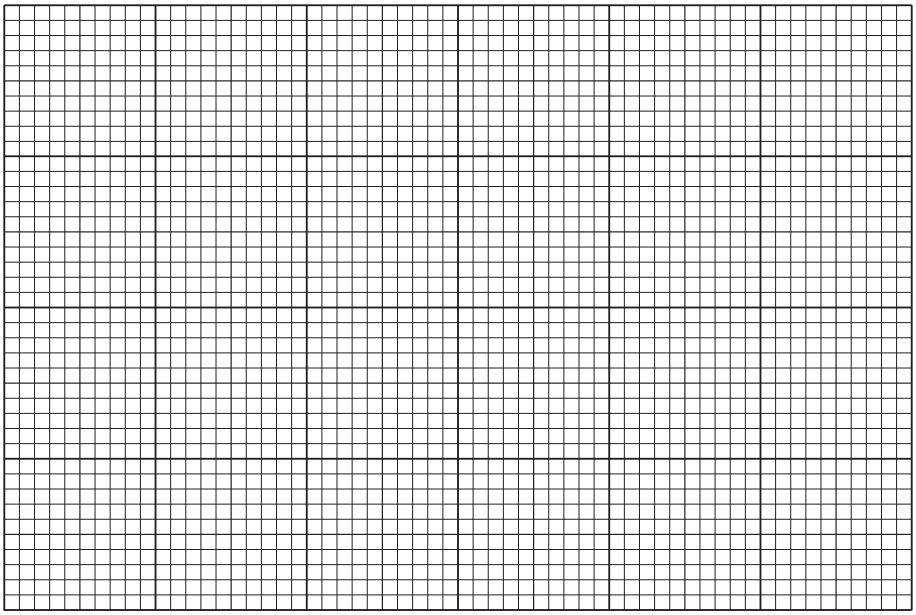

[4]

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

View solution

.....

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.....

.....[2]

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

..... [1]

[Total: 25]

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

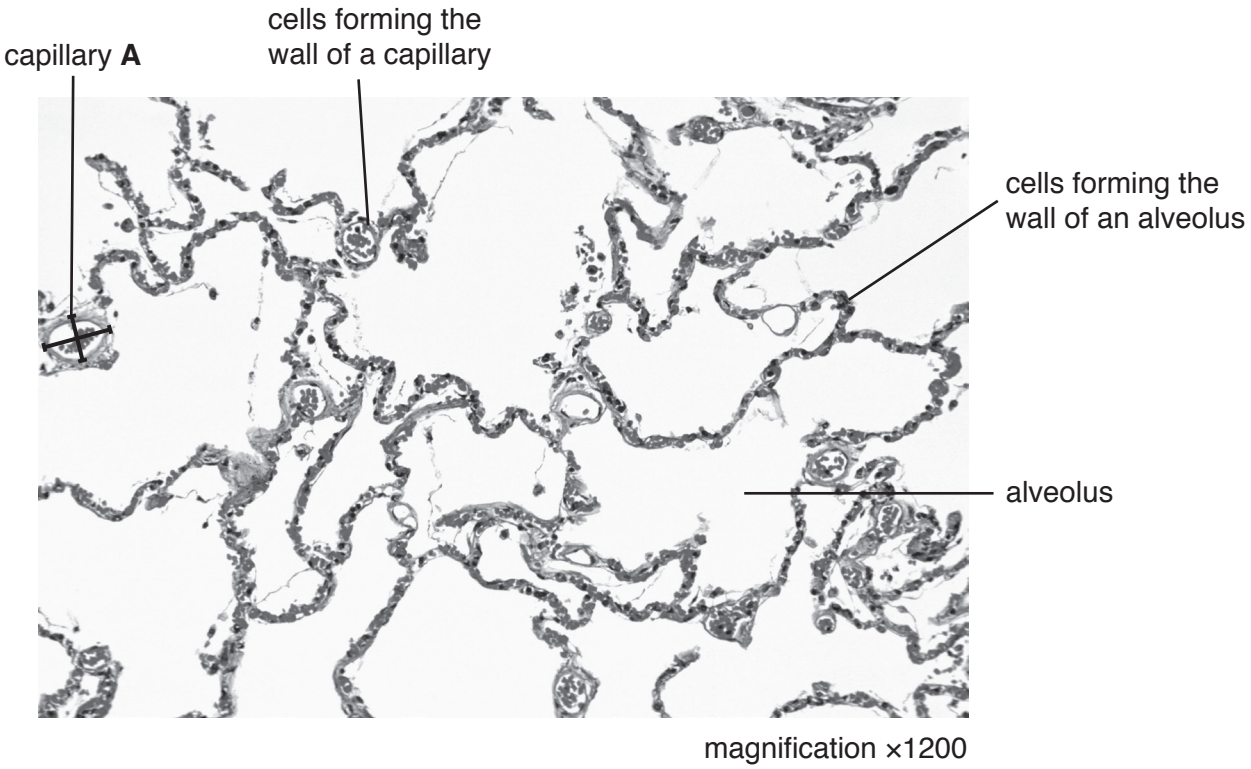

Fig. 2.1

(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 body just below the armpits, as shown in Fig. 2.2.

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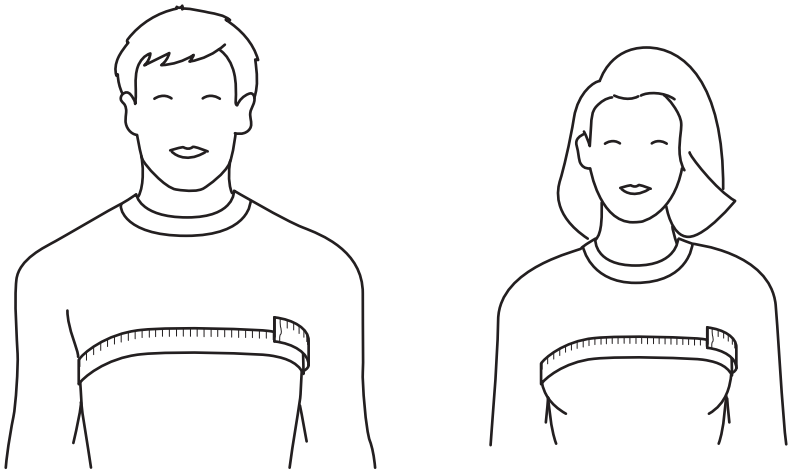

Fig. 2.2

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]

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