Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

3585141648

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **February/March 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 **10** printed pages and **2** blank pages.

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CAMBRIDGE International Examinations

[Turn over

1 A student investigated the effect of temperature on water uptake in celery stalks.

Water is transported in the xylem tissue in plant stems.

Step 1 One celery stalk was placed into a beaker containing **warm** red stain. Another celery stalk was placed into a beaker containing **cool** red stain.

This is shown in Fig 1.1.

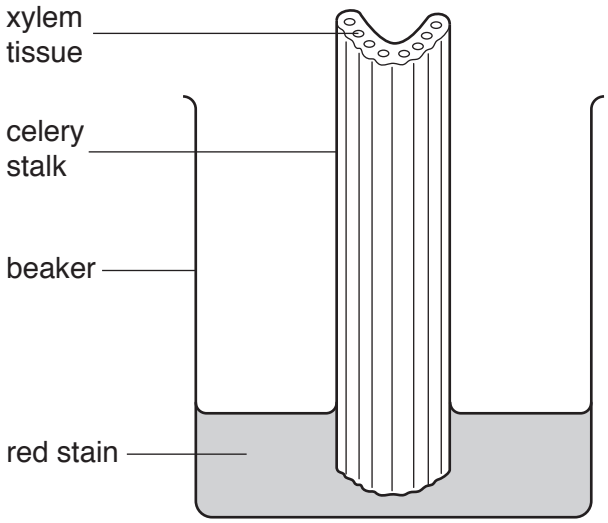


Fig. 1.1

Step 2 Both celery stalks were left in the red stain for 10 minutes.

Step 3 After 10 minutes the celery stalks were removed from the red stain.

Step 4 A 5 mm section was cut from the end of the celery stalk which had been in the **warm** red stain, as shown in Fig. 1.2.

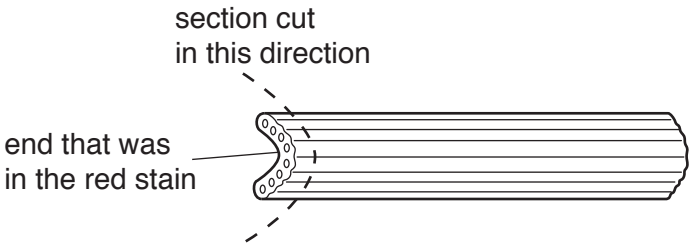


Fig. 1.2

Step 5 The section was inspected for the presence of the red stain in the xylem tissue in the celery stalk, as shown in Fig. 1.3.

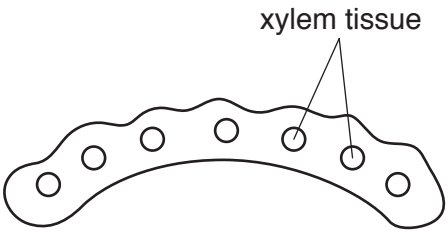


Fig. 1.3

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Step 6 If the red stain was visible in the cut section, another 5 mm section was cut and the process repeated until no red stain was visible in the cut section. This allowed the student to estimate how far the red stain had moved up the celery stalk.

Step 7 Steps 4 to 6 were repeated for the celery stalk which had been in the **cool** red stain.

(a) (i) State **one** safety precaution that should be taken while carrying out this method.

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.....[1]

(ii) The student's results are shown in Fig. 1.4.

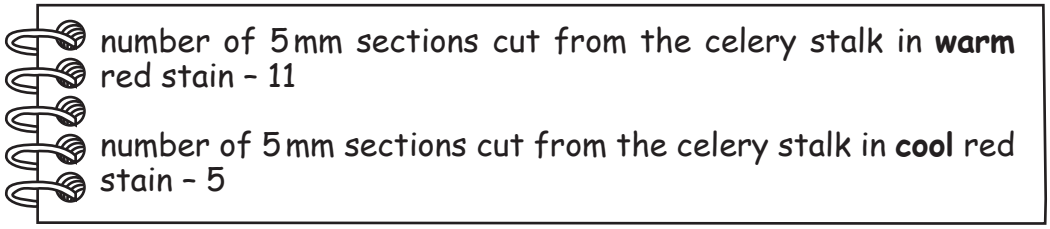


Fig. 1.4

Prepare a table and record your results in your table, in the space provided.
Your table should include:

- the temperature (cool or warm) of the red stain
- the number of sections that were stained in 10 minutes
- the total distance moved by the red stain in 10 minutes.

[3]

(iii) Use the data to calculate the rate of movement of the red stain in the celery stalk at each temperature.

Space for working

warm ..... mm per minute

cool ..... mm per minute
[2]

(iv) State a conclusion for these results.

.....

.....

.....[1]

(b) State **two** variables which were kept constant in this experiment.

1 .....

2 .....
[2]

(c) One way of improving the method used in this investigation would be to repeat it a number of times.

Identify **two other** sources of error in this investigation.

For each error, suggest an improvement to minimise the effect of the error.

error 1 .....

.....

improvement 1 .....

.....

.....

error 2 .....

.....

improvement 2 .....

.....

.....
[4]

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(d) Some farmers wanted to investigate the effect of humidity on the rate of transpiration in celery plants.

Fig. 1.5 shows celery plants being harvested.



Fig. 1.5

One method of measuring the rate of transpiration is to record how long it takes a red stain to travel up the xylem tissue in a celery stalk that still has its leaves attached.

Plan an investigation to determine the effect of humidity on the rate of movement of water through leafy celery stalks.

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.....[6]

[Total: 19]

2 Fig. 2.1 shows a photomicrograph of a bronchus, surrounded by alveoli and other tissues, in the lung.

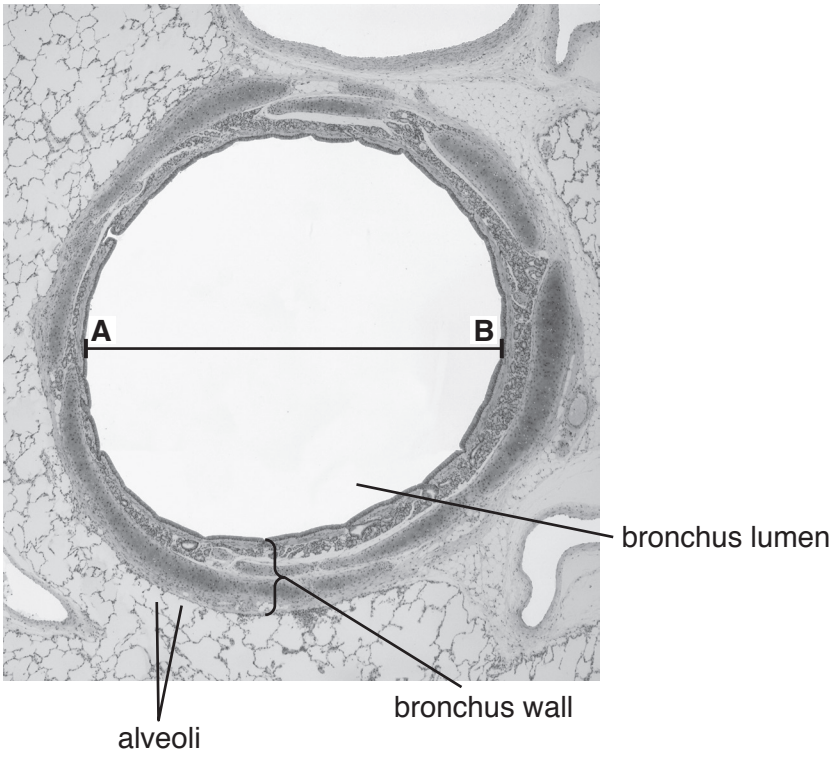


Fig. 2.1

(a) (i) Make a large drawing of the bronchus shown in Fig. 2.1.

Do **not** include any of the alveoli or other tissues in your drawing. Do **not** label your drawing.

[4]

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(ii) The diameter of the bronchus in Fig. 2.1 is shown by the line **AB**.

Measure the length of **AB** on Fig. 2.1. Include the units.

length of **AB** on Fig. 2.1 .....

The actual diameter of the bronchus in Fig. 2.1 is 1.5 mm.

The magnification of the bronchus in Fig. 2.1 can be calculated using the following equation:

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

Calculate the magnification of the bronchus in Fig. 2.1.

Give your answer to the nearest whole number.

Space for working.

.....
[2]

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[Turn over

(b) A student investigated the effect of exercise on breathing rate.

The breathing rates of five people were measured at rest and after running for different periods of time. The people rested between each period of running.

The results are shown in Table 2.1.

Table 2.1

running time / minutes	breathing rate / breaths per minute					
	person					average
	one	two	three	four	five	
0	20	24	22	26	28	24
2	32	31	28	32	32	31
4	39	41	38	42	40	
6	46	52	52	46	44	48
8	48	50	52	46	44	48
10	49	51	51	46	43	48

(i) Complete Table 2.1 by calculating the average breathing rate for four minutes of running.

Space for working.

[1]

(ii) The student thought that the result for person two at six minutes was an anomaly.

Suggest what the student should do to determine if the result is anomalous.

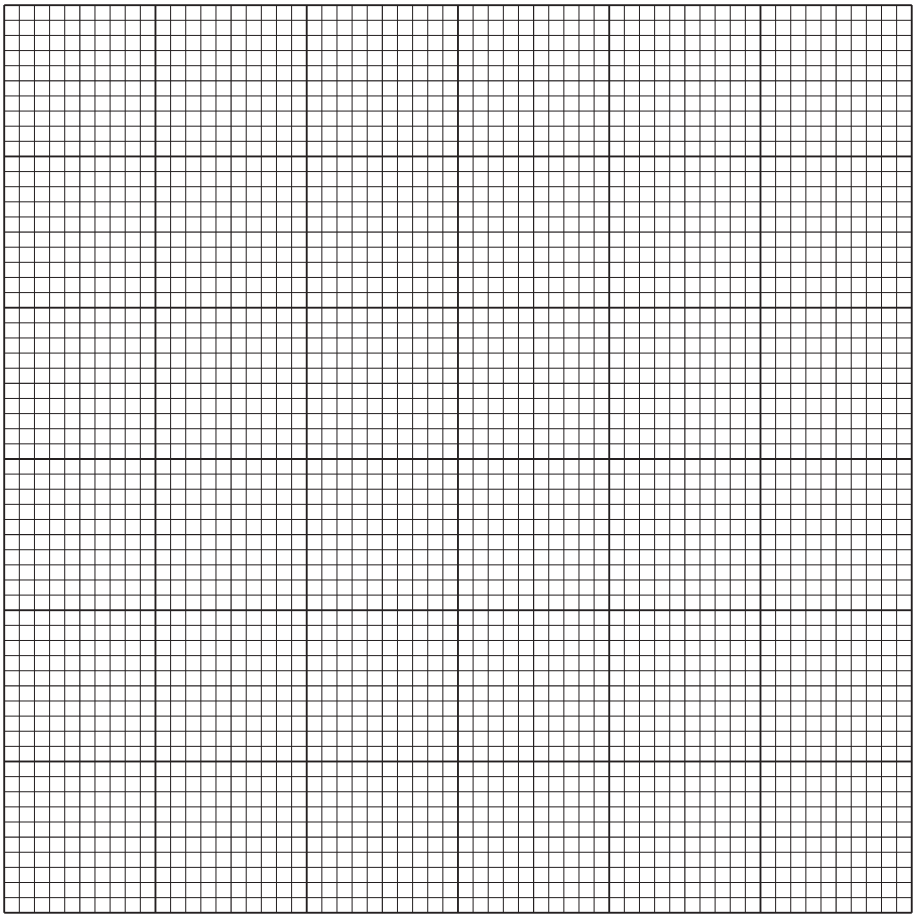
.....

.....

.....[1]

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(iii) Plot a graph, on the grid, to show the relationship between running time and the average breathing rate. Draw a line of best fit.



[4]

(iv) Use your graph to estimate the average breathing rate for one minute of the running.

Show on the graph how you obtained your answer.

.....[2]

(v) Use your graph to describe the relationship between running time and the average breathing rate.

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.....[3]

(c) (i) Suggest **one** safety precaution for this investigation.

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.....[1]

(ii) State **two** variables that should be kept constant during this investigation.

1 .....

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2 .....

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[2]

(iii) State the variable that has been changed (the independent variable) in this investigation.

.....[1]

[Total: 21]

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