Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

BIOLOGY **0610/63**

Paper 6 Alternative to Practical **May/June 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.

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CAMBRIDGE International Examinations

1 A student investigated the effect of different concentrations of salt solution on a hollow plant stem.

They were provided with a 2% salt solution and distilled water. The student used these to make up different concentrations of salt solution.

Step 1 Four test-tubes were labelled **1**, **2**, **3** and **4**.

Step 2 The information in Table 1.1 was used to make up the four different salt solutions in the test-tubes.

Table 1.1

test-tube	volume of 2% salt solution / cm^3	volume of distilled water / cm^3	final percentage concentration of salt solution
1	0	20	0.0
2	5	15	
3	10	10	1.0
4	20	0	2.0

(a) (i) Complete Table 1.1 by calculating the final percentage concentration of the salt solution in test-tube **2**.

Space for working.

View solution

[1]

Step 3 The contents of each test-tube were poured into four Petri dishes labelled **1**, **2**, **3** and **4**.

Step 4 A hollow stem was cut into 12 rings using a sharp scalpel. Each stem ring was approximately 2 mm long, as shown in Fig. 1.1.

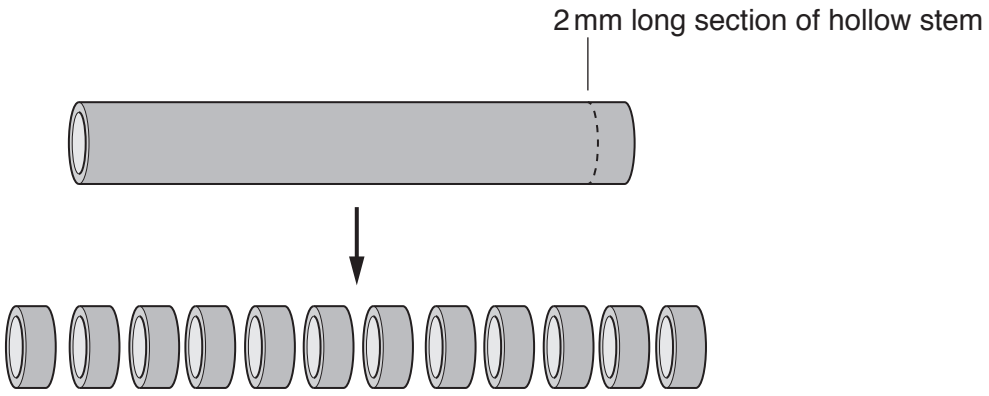

Fig. 1.1

Step 5 Each stem ring was then cut open as shown in Fig. 1.2.

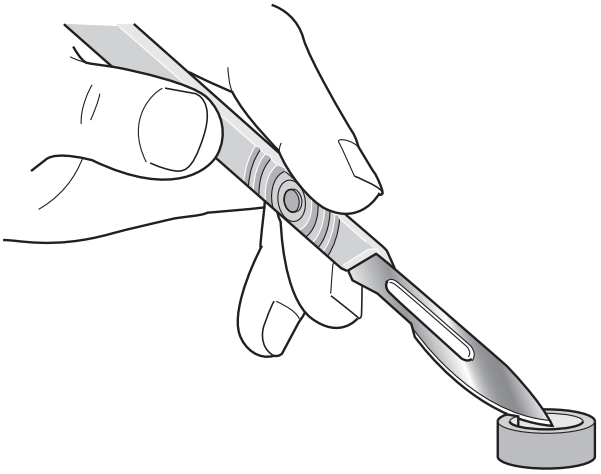

Fig. 1.2

Step 6 Three cut stem rings were put into each of the different salt solutions in the labelled Petri dishes and left for 10 minutes.

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Fig. 1.3 shows the appearance of the cut stem rings **after** 10 minutes.

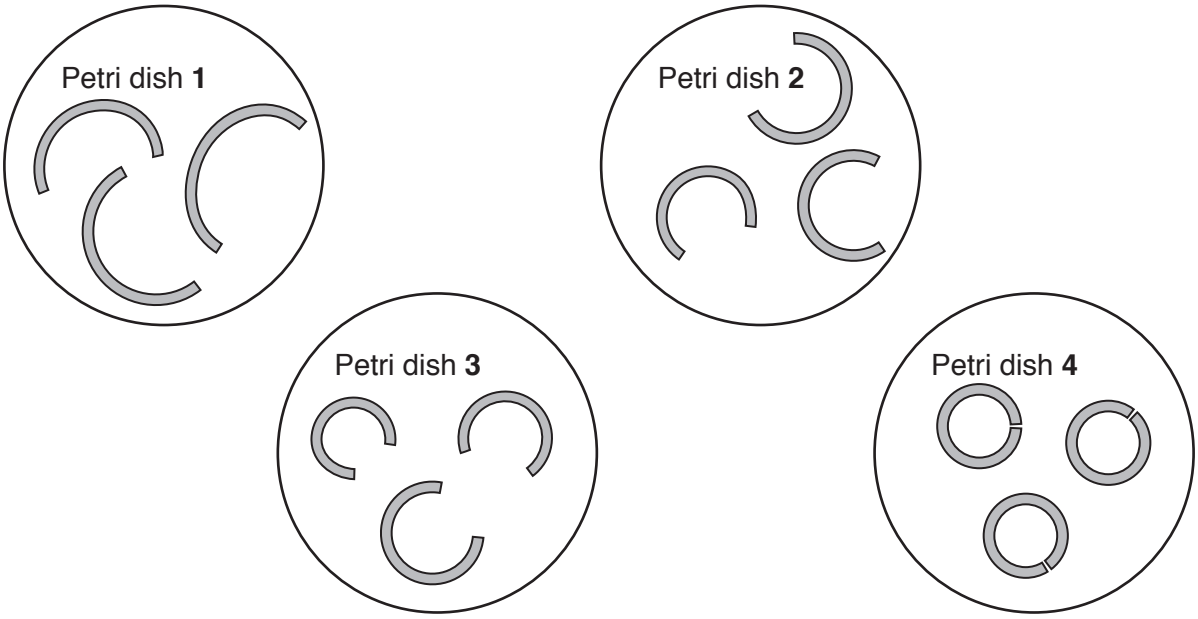

Fig. 1.3

Step 7 The distance between the two cut ends of each stem ring can be measured, as shown in Fig. 1.4.

In the example shown in Fig. 1.4 the distance is 12 mm.

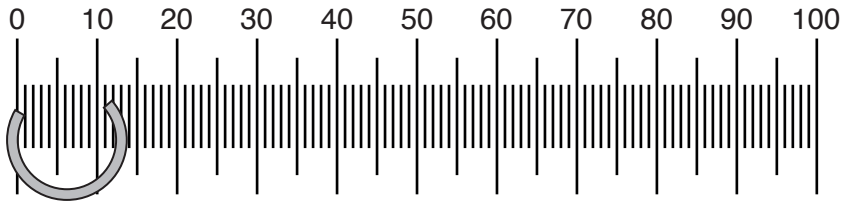

Fig. 1.4

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(ii) Measure the gap between the cut ends of all of the stem rings shown in Fig. 1.3.

View solution

Prepare a table in the space provided and record your measurements in your table.

Your table should show:

- all of your results
- a calculated average for each solution.

[4]

(iii) Use Table 1.1 and your measurements to describe the results shown in Fig. 1.3.

View solution

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.....[1]

(b) Identify one hazard in step 4 and describe a suitable safety precaution.

View solution

hazard .....

.....

precaution .....

.....

[2]

(c) Explain why more than one ring of the hollow stem was placed into each Petri dish. View solution

.....

.....

.....

.....[2]

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

.....[1]

(ii) Identify **two** variables that were kept constant in this investigation. View solution

1 .....

2 .....

[2]

(e) There are potential errors in steps 4 and 7. View solution

Identify **two** of these errors and suggest an improvement for each.

error 1 .....

.....

improvement 1 .....

.....

.....

error 2 .....

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improvement 2 .....

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[4]

(f) Fig 1.5 shows a section through a hollow plant stem observed through a light microscope.

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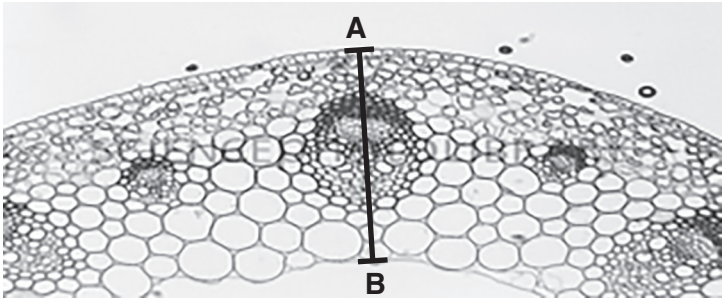


magnification ×50

Fig. 1.5

Measure the length of **AB** on Fig. 1.5. Include the unit.

measured length of **AB** on Fig. 1.5 .....

Calculate the actual length of **AB** using the following equation:

$$\text{magnification} = \frac{\text{measured length of } \mathbf{AB}}{\text{actual length of } \mathbf{AB}}$$

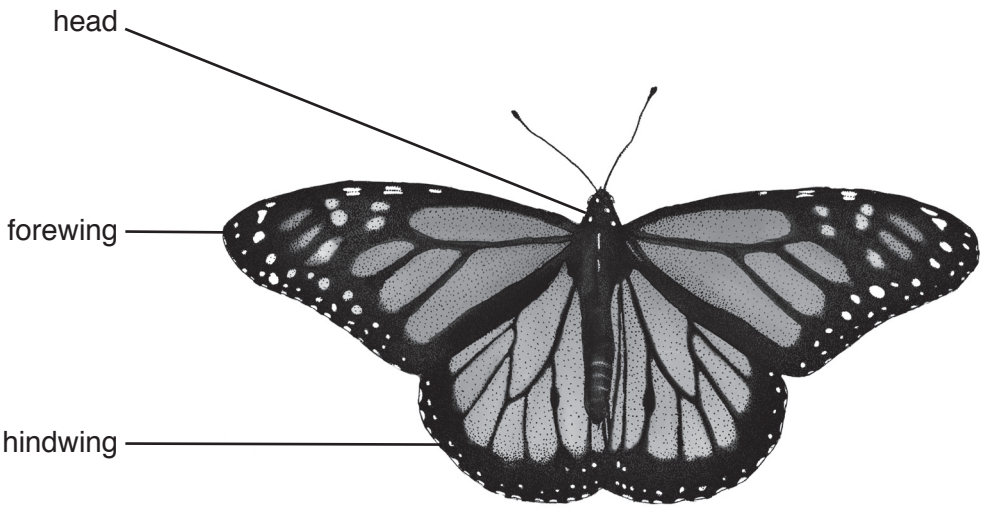
Show your working.

.....

[3]

[Total: 20]

2 Fig. 2.1 shows an image of a monarch butterfly, *Danaus plexippus*.



magnification ×1

Fig. 2.1

(a) Make a large drawing of **one** of the hindwings of the monarch butterfly shown in Fig. 2.1.

View solution

[4]

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(b) Fig 2.2 shows an image of a viceroy butterfly, *Limenitis archippus*.

View solution



magnification ×1

Fig. 2.2

Describe **one** visible similarity and **two** visible differences between the viceroy and the monarch butterflies' **wings**.

similarity .....

.....

difference 1 .....

.....

difference 2 .....

.....

[3]

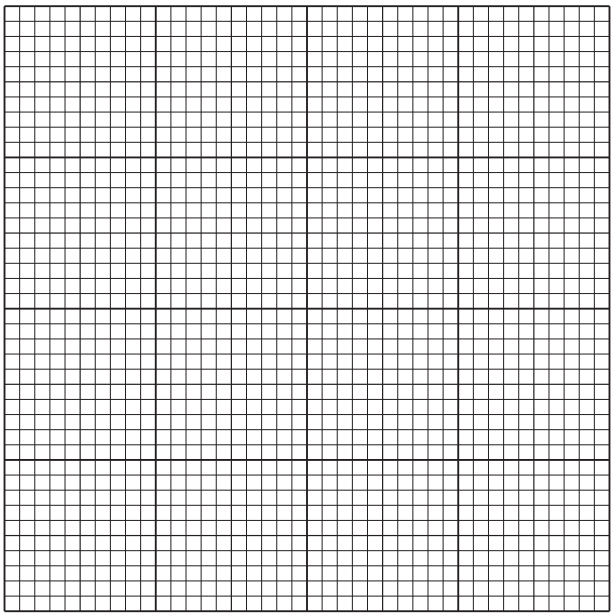
(c) A student investigated the relationship between the body mass of monarch butterflies and the length of their forewings. The student recorded the data for five butterflies in Table 2.1.

View solution

Table 2.1

butterfly	body mass / g	forewing length / mm
A	0.2	38
B	0.3	42
C	0.5	50
D	0.7	58
E	0.8	62

(i) Plot a graph on the grid to show the relationship between body mass and forewing length.



[4]

(ii) Describe the relationship shown on the graph.

View solution

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.....[1]

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(iii) A student found a monarch butterfly with a forewing length of 55 mm. Use the graph to estimate the body mass of this butterfly.

Show **on the graph** how you obtained your answer.

View solution

..... g
[2]

(d) Adult monarch butterflies feed on nectar. Nectar is a liquid that is produced by plants.

View solution

Plan an investigation to determine the types of food molecules that nectar contains.

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[Total: 20]

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