Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

9303603767

BIOLOGY **0610/53**

Paper 5 Practical Test **May/June 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 **10** printed pages and **2** blank pages.

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CAMBRIDGE International Examinations

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1 You are going to investigate the effect of different concentrations of salt solution on a hollow plant stem **S**.

You have been provided with a 2% salt solution and distilled water. You are going to use these to make up different concentrations of salt solution.

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)(ii).

Step 1 Label four test-tubes **1**, **2**, **3** and **4**.

Step 2 Add 20 cm^3 of distilled water to test-tube **1**.

Step 3 Add 5 cm^3 of 2% salt solution and 15 cm^3 distilled water to test-tube **2**.

Step 4 Use the information in Table 1.1 to make up the salt solutions in test-tubes **3** and **4**.

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.

[1]

Step 5 Mix the contents of the test-tubes by gently shaking each test-tube.

Step 6 Label four Petri dishes, **1**, **2**, **3** and **4**.

Step 7 Pour the contents of test-tube **1** into Petri dish **1**.
Pour the contents of test-tube **2** into Petri dish **2**.
Pour the contents of test-tube **3** into Petri dish **3**.
Pour the contents of test-tube **4** into Petri dish **4**.

Step 8 Cut 12 identical rings, each approximately 2 mm long from stem **S**, as shown in Fig. 1.1. Take care not to crush the stem as you cut it.

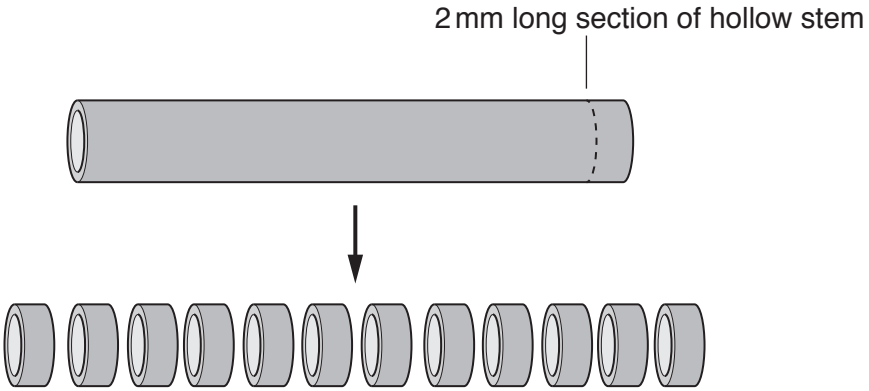

Fig. 1.1

Step 9 Carefully cut open each stem ring using a sharp knife as shown in Fig. 1.2. Make only one cut through each ring.

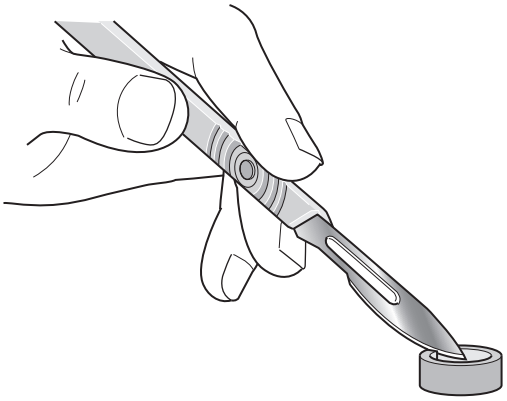

Fig. 1.2

Step 10 Carefully place three cut stem rings into each labelled Petri dish and leave them for 10 minutes.

While you are waiting, continue to answer the remaining questions.

Step 11 After 10 minutes, place the ruler beneath each of the Petri dishes and measure, in mm, the distance between the two cut ends of each stem ring (as shown in Fig. 1.3, where the distance is 12 mm).

Record this length in your table in **1(a)(ii)**.

Do not remove the rings from the Petri dish to measure them.

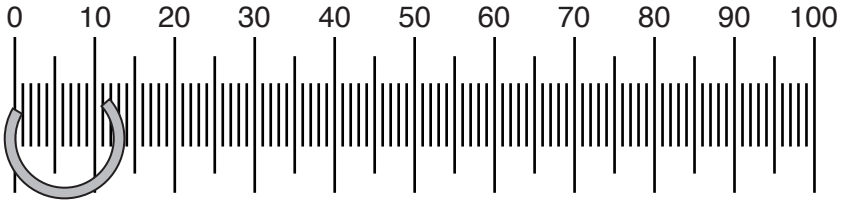

Fig. 1.3

(ii) 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.

[5]

(b) Identify one hazard in step 9 and describe a suitable safety precaution.

hazard .....

.....

precaution .....

.....

[2]

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

.....

.....

.....

.....[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.

1 .....

2 .....
[2]

(e) There are potential errors in steps 8 and 11.

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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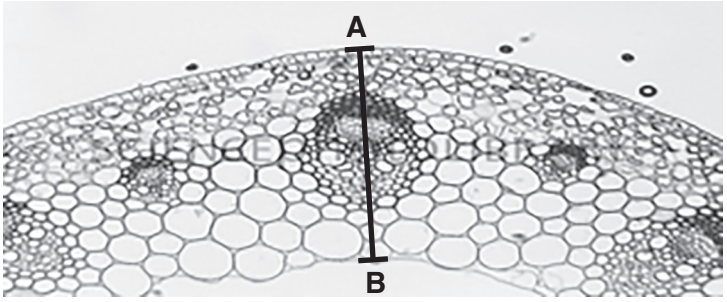
[4]

(f) Fig. 1.4 is a photomicrograph of a cross-section of a hollow stem.



magnification ×50

Fig. 1.4

Measure the length of **AB** on Fig. 1.4. Include the unit.

measured length of **AB** on Fig. 1.4 .....

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*.

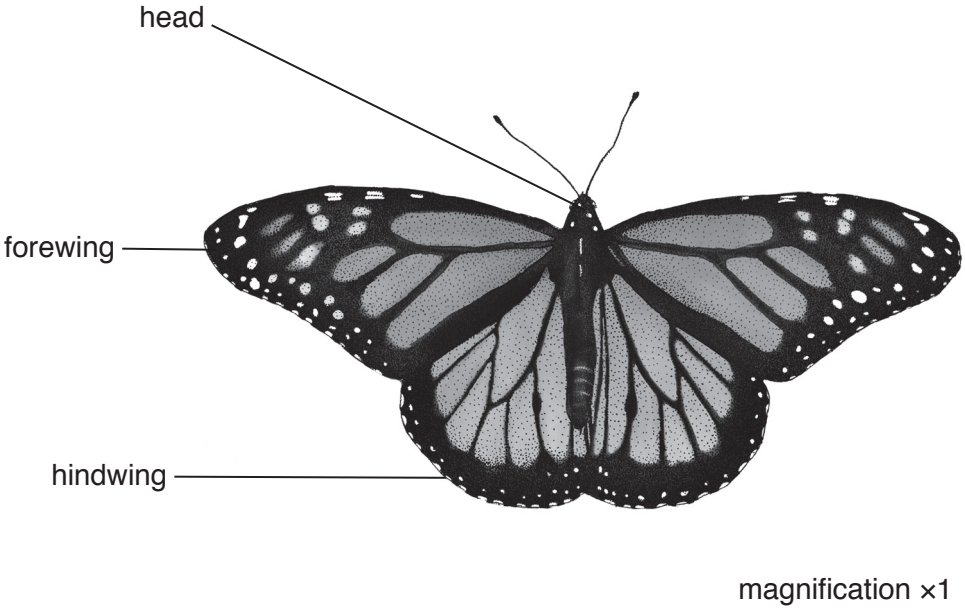
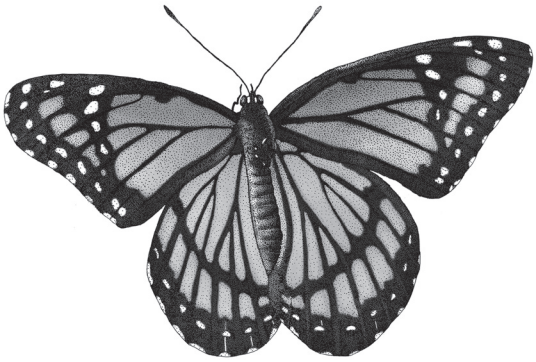


Fig. 2.1

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

[4]

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



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 .....

.....

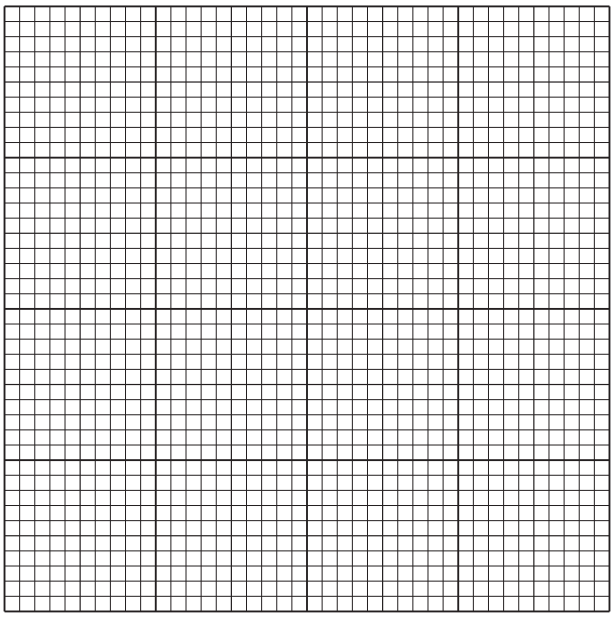
[3]

(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.

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.

.....

.....

.....

.....[1]

(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.

..... g
[2]

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

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

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.....[6]

[Total: 20]

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