

### **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 a pencil for any diagrams, graphs or rough working. Do not use staples, paper clips, highlighters, glue or correction fluid. DO **NOT** WRITE IN ANY BARCODES.

Answer **both** questions.

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.

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1								
2								
Total								

This document consists of **7** printed pages and **1** blank page.



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[Turn over

## Read the whole of the question paper before you begin.

Set up the investigation in Question **1** then go on to Question **2** while you are waiting. Leave at least 15 minutes to complete Question **1** before the end of the examination.

- 1 You are required to investigate the effect of three different concentrations of a solution on strips of potato tissue.
  - (a) Remove the potato tissue from the solution and blot it gently with the paper towel to remove excess liquid.
    - Cut six strips of potato exactly 70 mm long by approximately 10 mm wide.
    - Label three dishes **A**, **B** and **C**, then place two potato strips in each.
    - Add solutions **A**, **B** and **C** to the appropriate labelled dish, ensuring that the potato strips in each dish are covered by the solution.
    - Note, in Table 1.1, the time when the solutions were added.

## Leave at least 30 minutes before returning to complete this question.

Carry on with Question 2 while you wait.

### Then:

- (i) Remove the strips from solution **A**, blot them gently.
  - Note the time in Table 1.1.
  - Measure their lengths and record them in Table 1.1.
  - Repeat this procedure for the strips in **B** and **C**.

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- (ii) Suggest why two strips were used, rather than one, in each solution.
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  [1]
  (iii) Explain how your observations do, or do not, support this suggestion.
  [2]
- (iv) Complete Table 1.1.

Table 1.1

solution	concentration /mol per dm <sup>3</sup>	time solution added	initial lengths /mm	mean length /mm	time removed from solution	final lengths /mm	mean length /mm	change in length /mm
A	0.8		70 and 70	70		and		
в	0.4		70 and 70	70		and		
с	0.1		70 and 70	70		and		

[4]

(b) (i) Using the information in Table 1.1 draw a graph, on the axes provided, of mean change in length against concentration of solution.

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- 2 Using forceps, place specimen **X** on the microscope slide. ٠
  - Examiner's Add two drops of the liquid in which specimen X was provided, to the specimen on the ٠ slide.
  - Rest the cover glass on the specimen. •
  - Observe specimen X carefully, using the hand lens. •
  - (a) (i) Make a large, labelled drawing of specimen X.

(ii)	Suggest two ways in which the addition of the liquid to the slide made it easier to see specimen <b>X</b> .
	1
	2
(iii)	Calculate the magnification of your drawing. Show all working clearly.
	measurement across drawing
	equivalent measurement of specimen <b>X</b> .

magnification = ......[4]

[6]

For

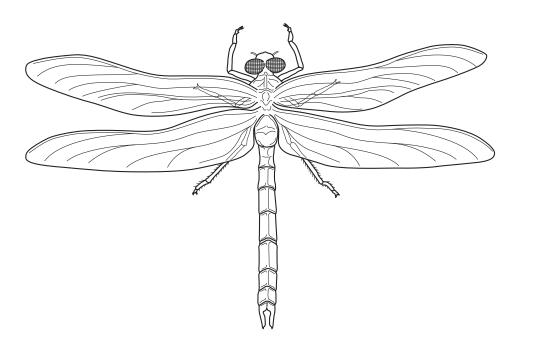
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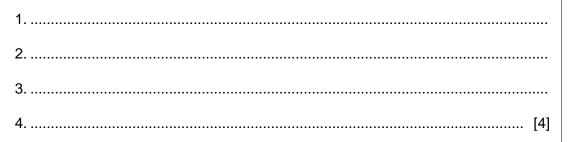
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(b) Fig. 2.1 shows a different member of the same group of organisms as specimen X.





(i) List four **visible** features that are the same in both specimen **X** and the specimen in Fig. 2.1.



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# (ii) Complete Table 2.1 with four pairs of differences that are **visible** in the specimens.

Table	2.1

	feature as seen in specimen <b>X</b>	same feature as seen in Fig. 2.1
1		
2		
3		
4		

[4]

[Total: 20]

## Remember to check that you have completed Question 1.

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