Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

3430U10-1

S24-3430U10-1

MONDAY, 10 JUNE 2024 – MORNING

SCIENCE (Double Award)

Unit 1: BIOLOGY 1
FOUNDATION TIER

1 hour 15 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**10**	
2.	**7**	
3.	**8**	
4.	**10**	
5.	**10**	
6.	**8**	
7.	**7**	
Total	**60**	

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ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

Question **5**(b) is a quality of extended response (QER) question where your writing skills will be assessed.

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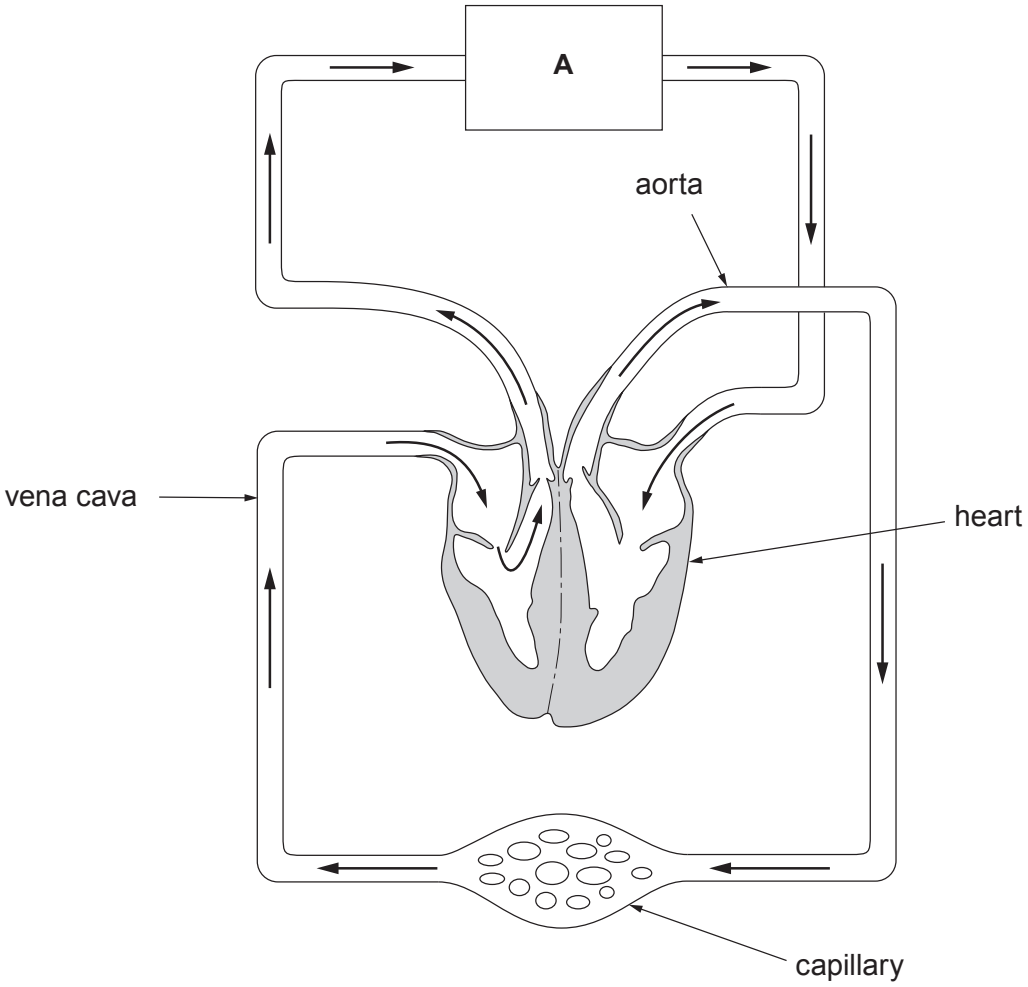
Answer **all** questions.

1. (a) **Image 1.1** shows part of the human circulatory system.

Image 1.1



From **Image 1.1**:

(i) Underline the name of organ **A** from the choices below. [1]

brain **lung** **kidney** **stomach**

(ii) Use the **blood vessels named in Image 1.1**, to state the blood vessel that:

I. is an artery; ..... [1]

II. releases oxygen and glucose to the body cells. [1]

.....

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(b) **Table 1.2** shows the volume of blood supplied to the muscles of an athlete at increasing levels of activity.

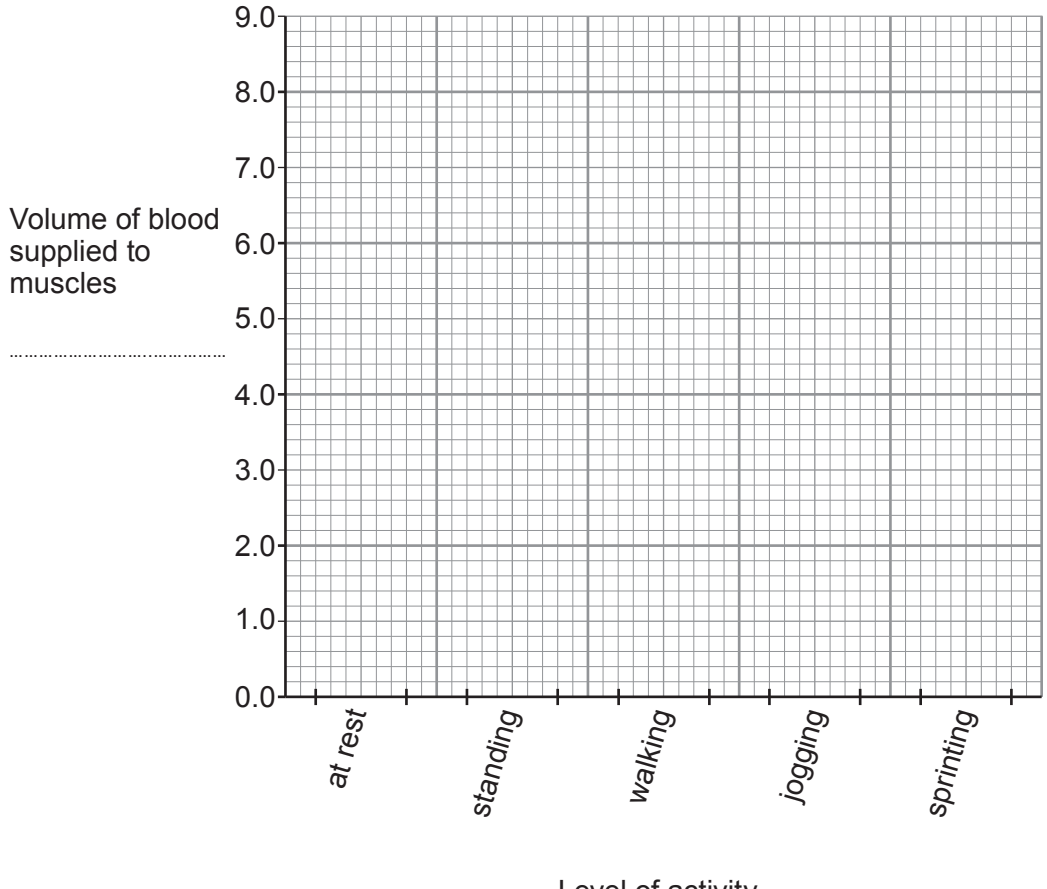
Table 1.2

Level of activity	Volume of blood supplied to muscles (dm^3/min)
at rest	2.0
standing	2.4
walking	3.6
jogging	5.0
sprinting	8.0

(i) Draw a **bar chart** of the data shown in **Table 1.2** on the grid below by: [3]

I. completing the label for the vertical axis by **adding the units**;

II. using a **ruler** to draw the bars.



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(ii) Calculate the difference in blood volume supplied per minute to the muscles when the level of activity changes from walking to sprinting. [1]

Difference = ... dm^3 / min

(iii) I. State how increasing the level of activity changes the volume of blood supplied to muscles. [1]

.....

II. Complete the sentence below by underlining the correct term in each bracket to explain how this change helps muscles work harder. [2]

This change provides more **(carbon dioxide / oxygen / nitrogen)**

for **(respiration / photosynthesis / digestion)**.

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2. Blood clots form at wounds in the skin.

(a) Complete the following sentence by underlining the correct part of the blood in the brackets. [1]

Blood clotting is a function of the **(platelets / red blood cells / white blood cells)**.

(b) Read the following information about blood clotting.

- Enzymes released into the plasma cause blood to clot.
- The plasma is at pH 7.4. This is the optimum pH for the enzymes.
- The clot forms fastest at 37 °C.
- The clot forms slower if the body temperature falls in very cold weather.

(i) Give **one** piece of evidence from the information to show that:

I. the optimum temperature for the enzymes is 37 °C; [1]

.....

II. blood plasma is alkaline. [1]

.....

(ii) **Complete the table** by writing true or false for each statement about enzymes. [4]

The first row has been done for you.

Enzymes	True or False
are made of amino acids	True
are needed to clot blood	.....
may be found in the liquid part of blood	.....
are lipids	.....
have specific active sites	.....
are not affected by temperature	.....

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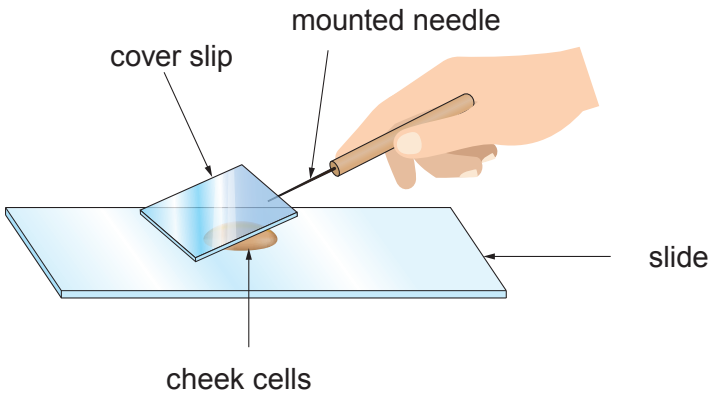
3. (a) Cerys makes a slide of her cheek cells. One stage in her method is shown in **Image 3.1**.

Image 3.1



Using the labels on **Image 3.1** describe what Cerys is doing **at this stage of her method**. [2]

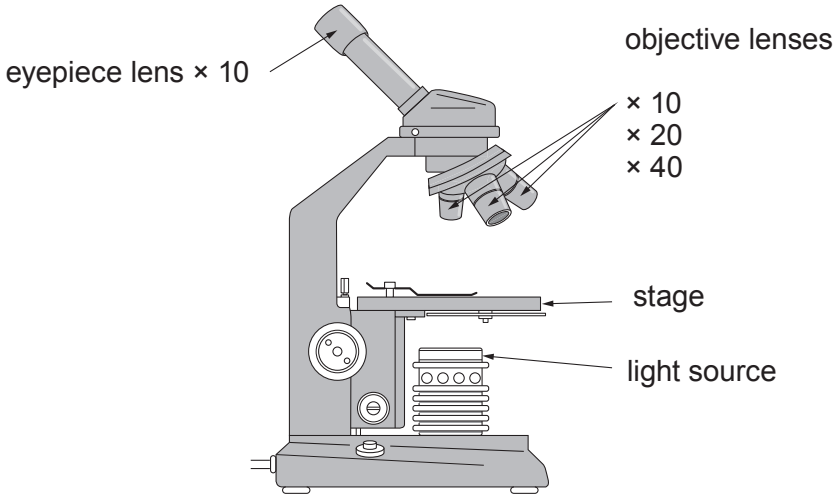
.....

.....

.....

(b) **Image 3.2** shows a light microscope.

Image 3.2



The lowest magnification of the microscope is ×100.

Calculate the **highest** magnification of the microscope shown in **Image 3.2**. [1]

Highest magnification = × .....

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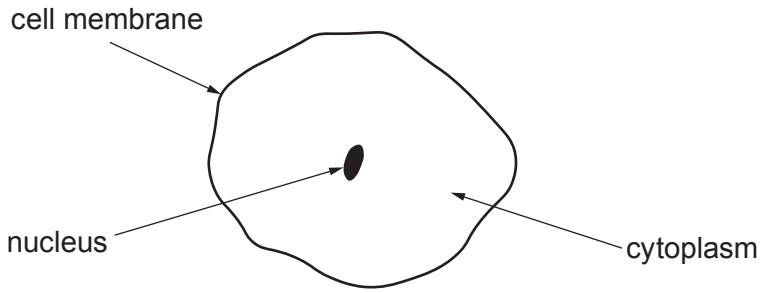
(c) Cerys drew and labelled a cheek cell. This is shown in **Image 3.3**.

Image 3.3



Complete the table below. [2]

Cell structure	Function
nucleus	.....
.....	site of most cell reactions

(d) Cerys put a drop of stain on the slide before adding her cheek cells. [1]
State the purpose of staining the cells.

.....

.....

(e) (i) Using this light microscope, it is not possible to see the mitochondria even at the highest magnification. State the reason for this. [1]

.....

.....

(ii) Complete the following sentence by underlining the correct word from the brackets. [1]

The mitochondria can be seen using an **(electronic / electron / electric)** microscope.

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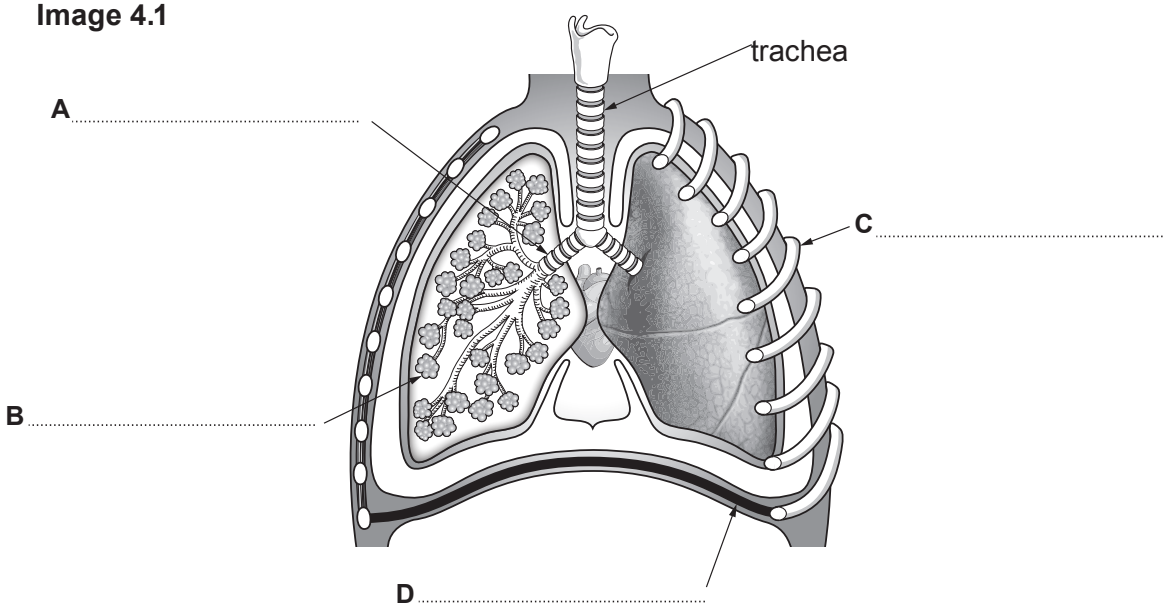
4. (a) **Image 4.1** shows a diagram of the thorax.

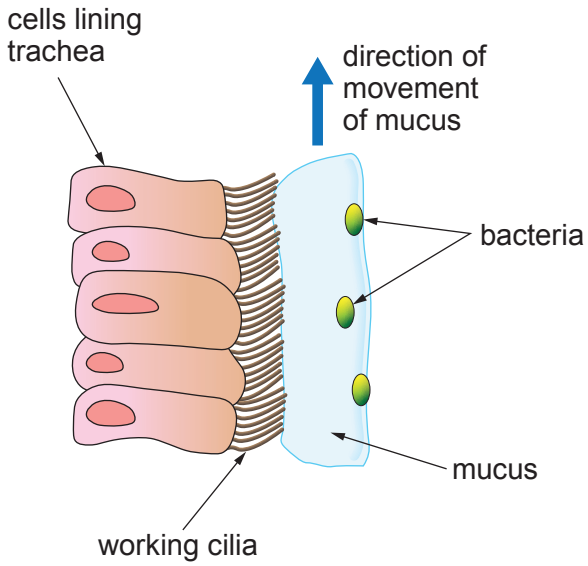
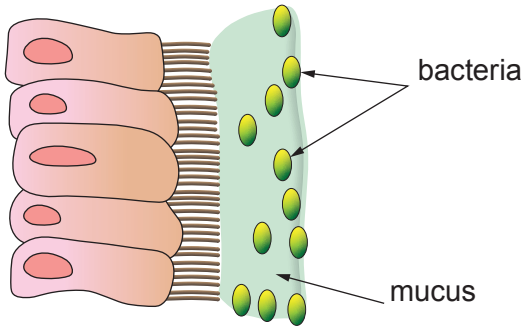
Choose words from the list to label parts **A** to **D** on **Image 4.1**. [4]

bronchiole **rib** **alveolus** **bronchus** **diaphragm** **membrane**

Image 4.1



(b) **Images 4.2A** and **4.2B** show part of the lining of the trachea **for a non-smoker and a smoker**.

Lining of trachea	
Image 4.2A – non smoker	**Image 4.2B – smoker**
	

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(i) Use **Image 4.2A** to describe how the mucus and cilia work together to remove bacteria from the trachea in a non-smoker.

I. mucus [1]

.....

II. cilia [1]

.....

(ii) Use **Image 4.2B**, to explain how smoking can lead to bacteria infecting the lungs. [2]

.....

.....

.....

.....

(c) Smoking cigarettes can cause lung disease.

(i) State the name of **one** lung disease caused by smoking cigarettes. [1]

.....

(ii) In 2007, the Welsh Government banned smoking in enclosed public spaces. Suggest **one** reason for the ban. [1]

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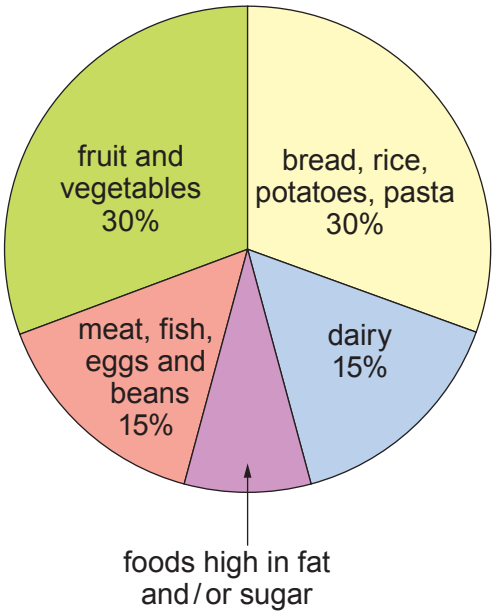
5. **Image 5** shows the daily recommended percentages of certain foods in the diet.

Image 5



(a) (i) Use **Image 5** to calculate the percentage of the diet containing foods high in fat and/or sugar. [2]

Space for working.

Percentage = ...

(ii) In a survey, most people said they ate more fat and sugar than is considered healthy.

State **two** health problems related to eating too much fat. [2]

1. .....

2. .....

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(b) A public health campaign is planned to take place in Wales starting in July 2025. The aim of the campaign is to increase the number of people who eat a healthy diet by July 2026.

Whether or not the campaign is successful will be assessed using the survey sheet below both **before** and **after** the campaign.

Healthy Eating Survey	**date of survey:** .....
ask ***each person*** *this question* **Do you eat a healthy diet?**	*circle* their answer: **yes** **no** **don't know**

Describe how you would do the survey using the above sheet.

Your answer should include:

- how you would make your survey representative of the whole population of Wales;
- when you would do the survey;
- how you would decide if the campaign was successful. [6 QER]

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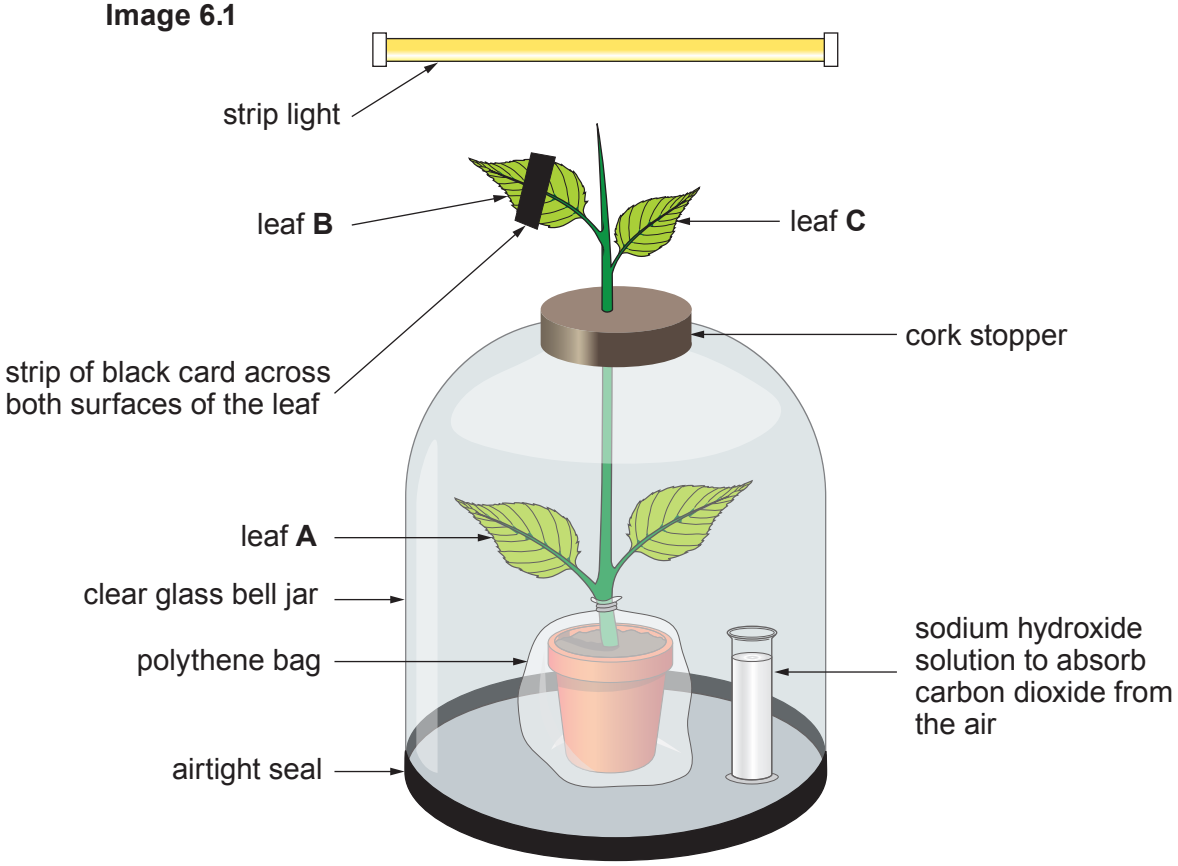
6. (a) State the function of chlorophyll. [1]

.....

(b) James investigated photosynthesis in a potted plant using the following method:

- Place a potted plant in the dark for 24 hours to destarch the leaves.
- After 24 hours, set up the apparatus as shown in **Image 6.1**.

Image 6.1



- Leave the apparatus containing the potted plant in bright light for 24 hours.
- Remove leaves **A**, **B** and **C**, then:
  - remove the card from leaf **B**
  - place the leaves in boiling water
  - place the leaves in boiling ethanol to remove the chlorophyll
  - dip the leaves in hot water and blot dry
- Carry out the starch test by dropping iodine solution onto the leaves.

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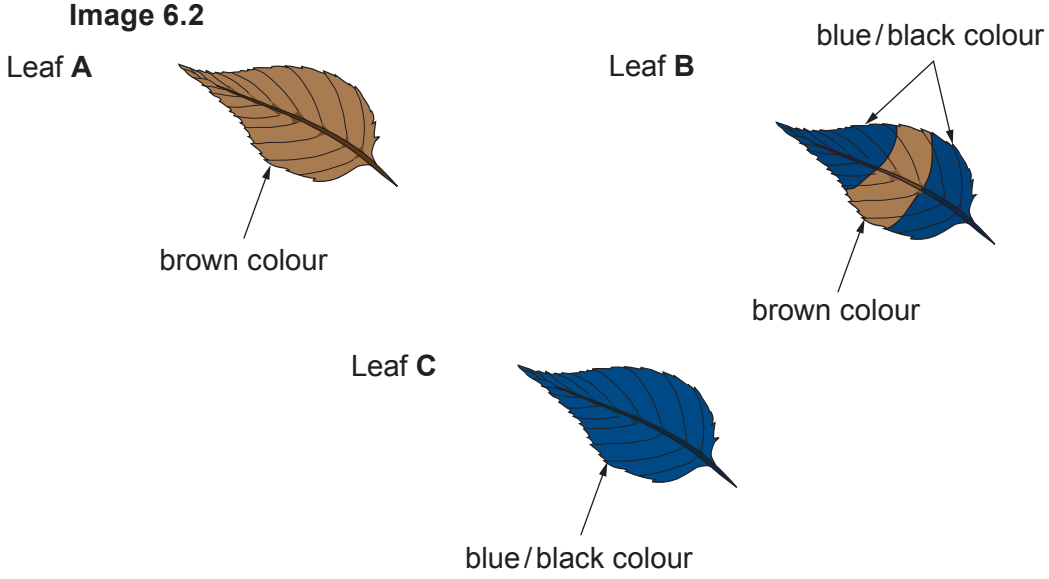
The appearance of each leaf after the starch test is shown in **Image 6.2**.

Image 6.2



(i) I. Explain the results for leaf **A** in **Image 6.2**. [3]

.....

.....

.....

.....

.....

.....

II. Explain the appearance of the brown band across the middle of leaf **B** in **Image 6.2**. [2]

.....

.....

.....

.....

(ii) Identify the control leaf (**A, B,** or **C**) and give the reason for your choice.

Leaf: ..... [1]

Reason: [1]

.....

.....

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7. Fertilisers used by farmers can accidentally enter lakes.
In 2016, Natural Resources Wales reported that 12 lakes contained high levels of nitrates from fertilisers.

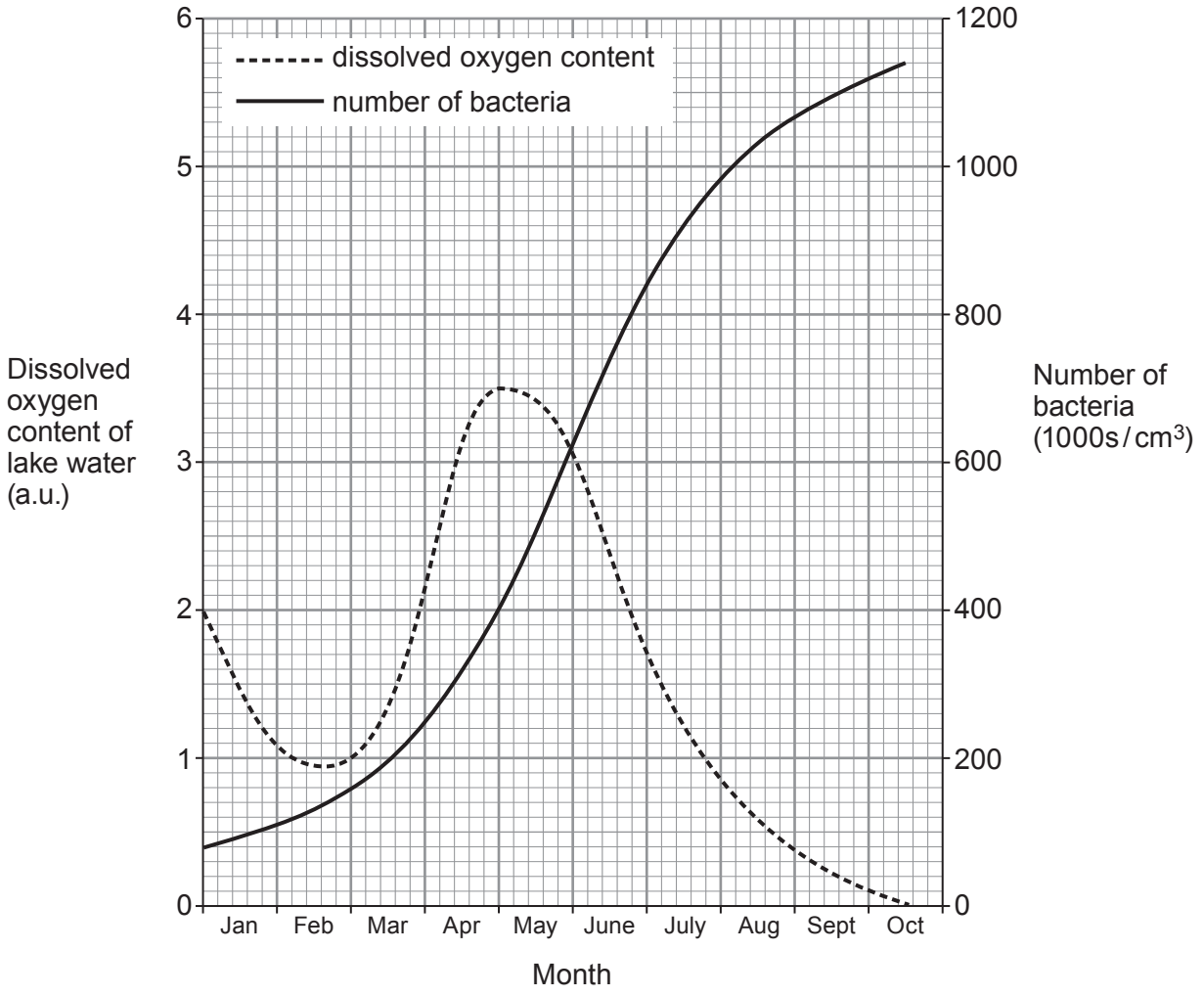
(a) Suggest how the fertilisers accidentally entered these lakes. [1]

.....

.....

(b) Students used a computer to model the effect of fertiliser on dissolved oxygen content and bacteria numbers in a lake, after adding fertiliser.
The results are shown in **Graph 7.1**.

Graph 7.1



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(i) Calculate the **percentage** increase in dissolved oxygen from the start of March to the start of May. [2]

Increase = ... %

(ii) Explain why the dissolved oxygen content and number of bacteria change from May to September. [3]

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.....

.....

.....

(iii) Suggest why the increase in the number of bacteria was slow in January and February. [1]

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END OF PAPER

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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