

**EDEXCEL • GCSE BIOLOGY 1B10**

# Foundation Tier — Paper 2

June 2025 exam series

**QUESTION PAPER**

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Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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**Pearson Edexcel Level 1/Level 2 GCSE (9–1)**

**Monday 9 June 2025**

Morning (Time: 1 hour 45 minutes)

**Paper  
reference**

**1BI0/2F**

**Biology**  
**PAPER 2**

**Foundation Tier**

**You must have:**  
Ruler, calculator

Total Marks

## Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*

## Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*
- In the questions marked with an **asterisk** (\*), marks will be awarded for your ability to structure your answer logically, showing how points that you make are related or follow on from each other where appropriate.

## Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

**Turn over** ►

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Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

- 1 (a) Draw **one** straight line from each hormone to the endocrine gland that produces it.

(2)

**hormone**

**endocrine gland**

insulin

pituitary

adrenal

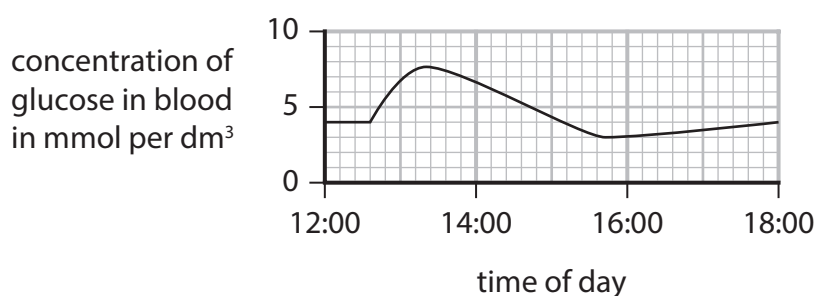
ovaries

oestrogen

testes

pancreas

- (b) Figure 1 shows the concentration of glucose in the blood of a person for a period of six hours.



**Figure 1**

- (i) State the highest blood glucose concentration during this six hour period.

(1)

..... mmol per dm³



(ii) Insulin was released from the pancreas at 13:30.

Describe the changes in the concentration of glucose in the blood from 13:30 to 18:00.

(2)

.....

.....

.....

.....

(c) The cells of people with type 2 diabetes do not respond to insulin.

Describe **two** ways that a person with type 2 diabetes can control the concentration of glucose in their blood.

(2)

1 .....

.....

2 .....

.....

(Total for Question 1 = 7 marks)

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2 Plants produce glucose by photosynthesis.

(a) Complete the word equation for photosynthesis shown in Figure 2.

(2)

water + .....  $\longrightarrow$  glucose + .....

**Figure 2**

(b) (i) State why photosynthesis does **not** occur in the roots of plants.

(1)

.....

.....

(ii) Which is transported in the phloem?

(1)

- ☐ **A** starch
- ☐ **B** sucrose
- ☐ **C** urea
- ☐ **D** plasma

(c) Chlorophyll is found in green leaf cells.

Describe the role of chlorophyll in leaf cells.

(2)

.....

.....

.....

.....



(d) A greenhouse contained an oil burning heater.

State **two** ways this could increase the rate of photosynthesis in the greenhouse.

(2)

1 .....

.....

2 .....

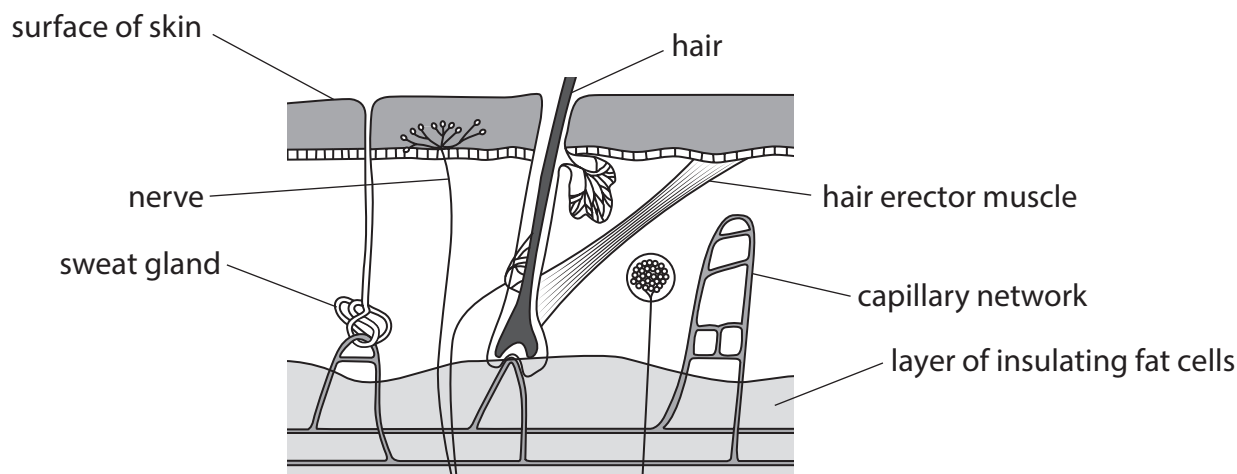
.....

(Total for Question 2 = 8 marks)

.....



3 Figure 3 shows a diagram of the skin.



**Figure 3**

(a) Structures in the skin, shown in Figure 3, help to control body temperature.

(i) Explain how the action of the hair erector muscle helps to keep the body warm.

(2)

(ii) Explain how sweating decreases body temperature.

(2)

- (b) A scientist investigated the air temperature at which women start to shiver.

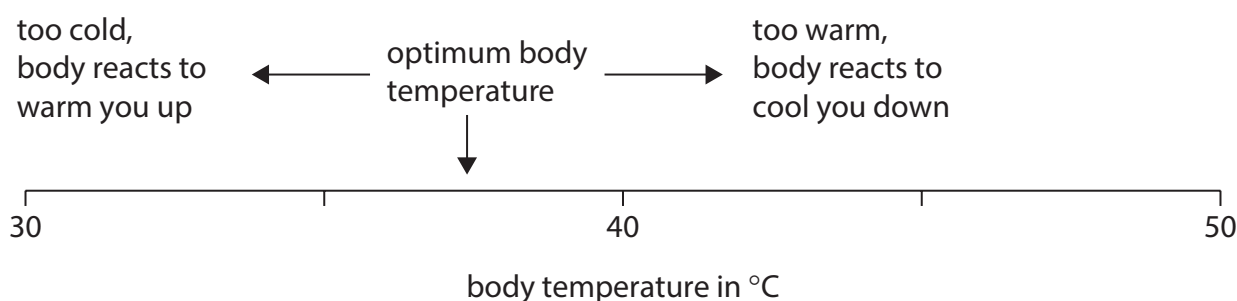
The scientist recorded the air temperature at which a 40-year-old woman started to shiver.

Which would improve the quality of the results in this investigation?

(1)

- ☐ **A** repeat the investigation on a 40-year-old man
- ☐ **B** record the body temperature of the 40-year-old woman
- ☐ **C** reduce the air temperature after shivering started
- ☐ **D** repeat the investigation on 20 different women

- (c) Figure 4 shows the responses to body temperatures that are too cold or too warm.



**Figure 4**

- (i) State the optimum body temperature as shown in Figure 4.

(1)

..... °C

- (ii) Temperature affects the rate of diffusion of gases into and out of cells.

State **two** other factors that affect the rate of diffusion.

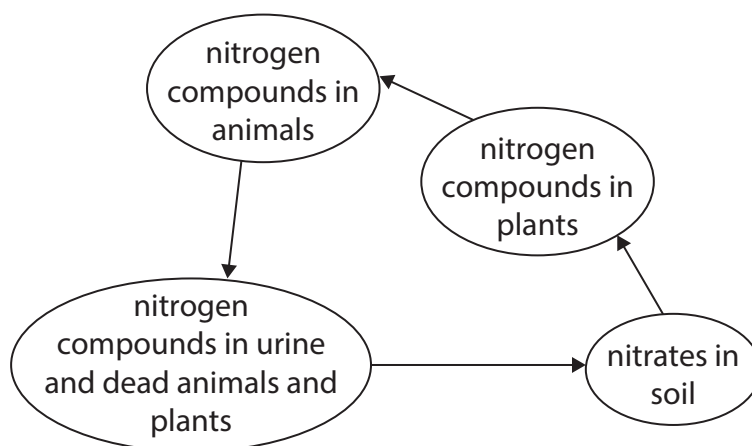
(2)

1 .....

2 .....

**(Total for Question 3 = 8 marks)**

4 Figure 5 shows part of the nitrogen cycle.



**Figure 5**

- (a) Use words from the box to complete the following sentences about the nitrogen cycle.

(2)

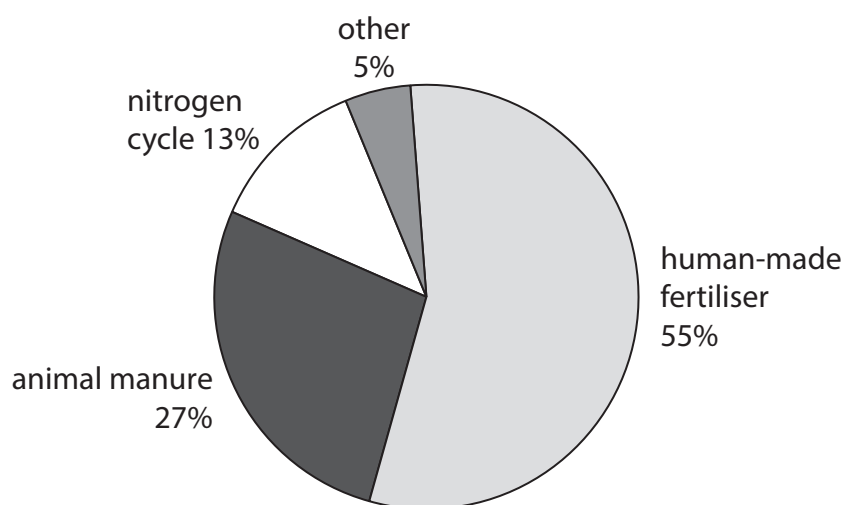
|         |          |             |
|---------|----------|-------------|
| animals | lipids   | decomposers |
| sugars  | proteins | predators   |

The nitrogen compounds in plants include .....

The nitrates from rotting dead plants are released into the soil by .....

- (b) 180 million tonnes of nitrates were used by crops growing on farms in the UK in 2020.

Figure 6 shows the different sources of nitrates used by the crops.



**Figure 6**

- (i) Calculate the mass of nitrates from human-made fertiliser that was used by crops in 2020.

(2)

..... million tonnes

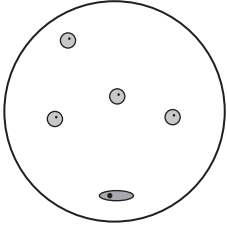
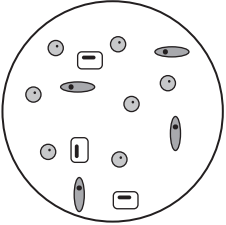
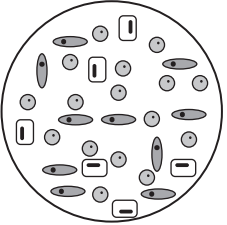
- (ii) Some of the nitrates spread on fields as fertiliser get into lakes.

Name the type of pollution caused by the build-up of nitrates in lakes.

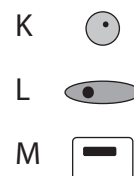
(1)

- (c) A student investigated how the concentration of nitrate affected the types of algae growing in three lakes.

Figure 7 shows microscope images of the algae in  $1 \text{ mm}^3$  of water, and the concentrations of nitrate ions in each lake.

|                                                                  | lake X                                                                            | lake Y                                                                            | lake Z                                                                             |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| microscopic view showing algae in $1 \text{ mm}^3$ of lake water |  |  |  |
| concentration of nitrate ions in $\text{mols per dm}^3$          | 2                                                                                 | 5                                                                                 | 8                                                                                  |

**Key to algae**

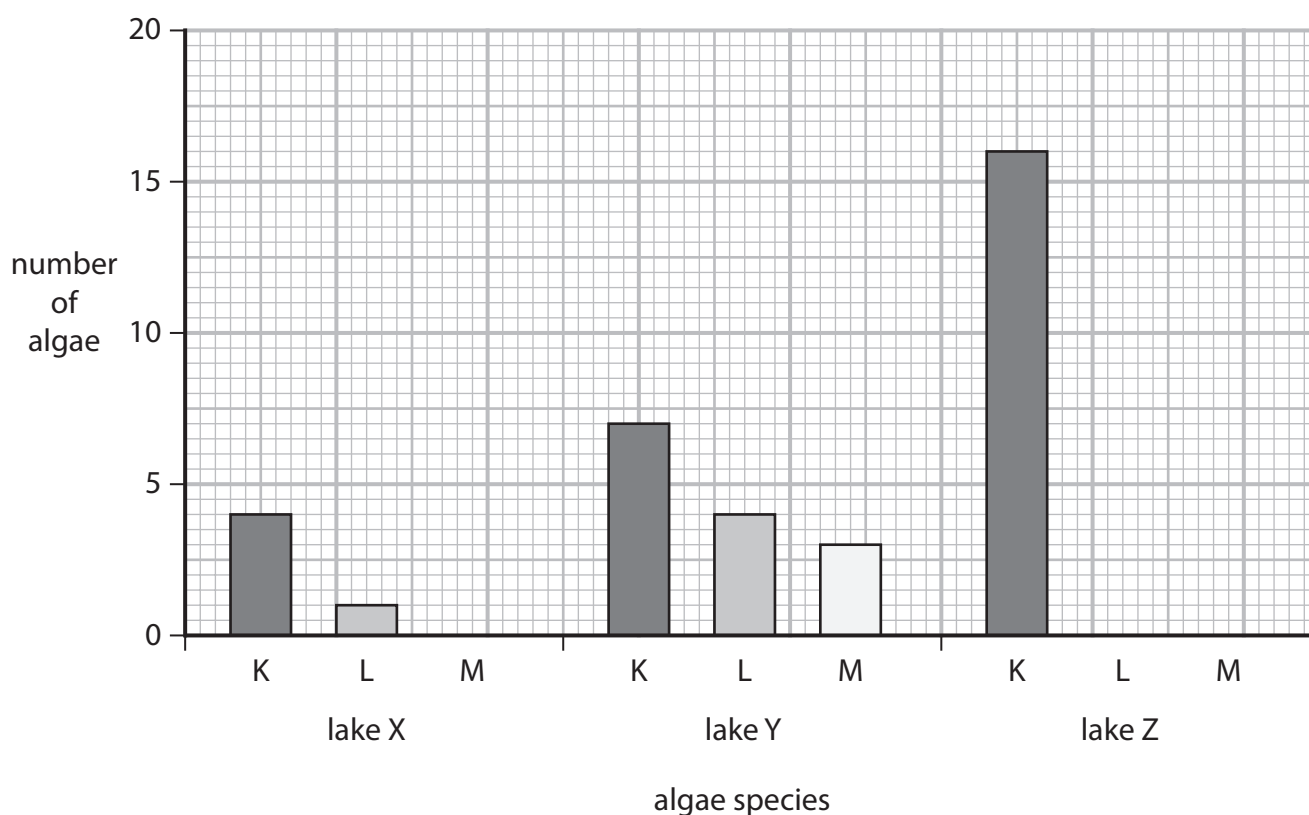


**Figure 7**

- (i) Figure 8 shows a bar chart for the algae in lakes X, Y and Z.

Complete the bar chart for algae L and algae M in lake Z.

(2)



**Figure 8**

(ii) State **two** conclusions about the relationship between nitrate concentration and the algae in these lakes.

(2)

1 .....

.....

2 .....

.....

(iii) A build-up of algae on the surface of the lake can affect plants growing at the bottom of the lake.

Which statement shows how this would affect the plants at the bottom of the lake?

(1)

- ☐ **A** plants grow faster because they are warmer
- ☐ **B** plants can photosynthesise more
- ☐ **C** plants die as they do not receive enough light
- ☐ **D** plants cannot absorb water

(Total for Question 4 = 10 marks)

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- 5 (a) Figure 9 shows a stoma on the lower epidermis of a leaf as seen using a light microscope.

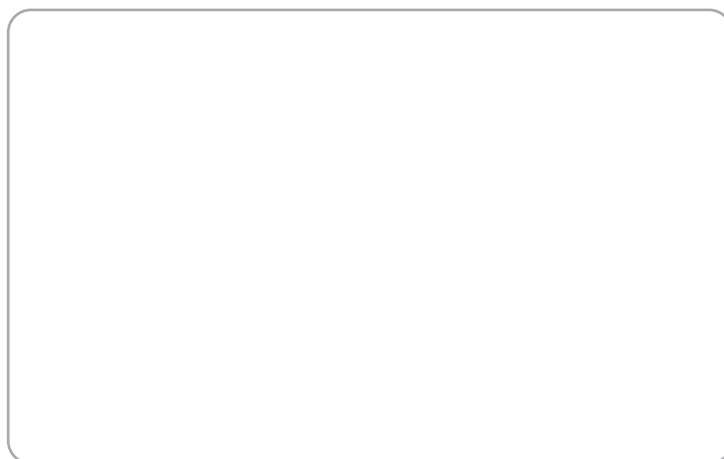


(Source: © Dew\_gdragon/Shutterstock)

**Figure 9**

- (i) Draw the stoma and two cells around it in the box.

(2)



- (ii) Give the name of the two cells around the stoma.

(1)

(b) A student observed that a plant in a room had grown towards the light.

(i) Name the plant hormone that causes the plant to grow towards the light.

(1)

(ii) Name the type of tropism that causes the plant to grow towards the light.

(1)



(c) Figure 10 compares the root hair cells of two plants.

Plant A is adapted to growing in wet soil.

Plant B is adapted to growing in dry soil.

|         | soil condition | mean length of root hair cells in $\mu\text{m}$ | mean number of root hair cells per $1\text{ mm}^2$ of root surface |
|---------|----------------|-------------------------------------------------|--------------------------------------------------------------------|
| plant A | wet            | 221                                             | 40                                                                 |
| plant B | dry            | 458                                             | 92                                                                 |

**Figure 10**

(i) Compare the root hair cells of Plant A with the root hair cells of plant B.

(2)

.....

.....

.....

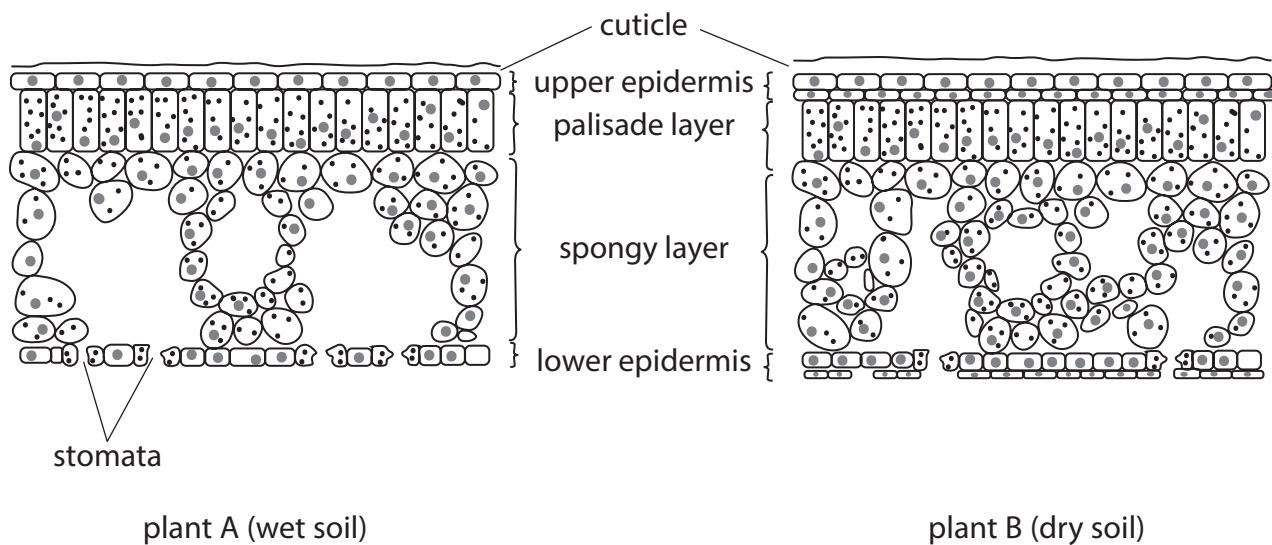
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(ii) Figure 11 shows sections of a leaf from plant A and a leaf from plant B.



**Figure 11**

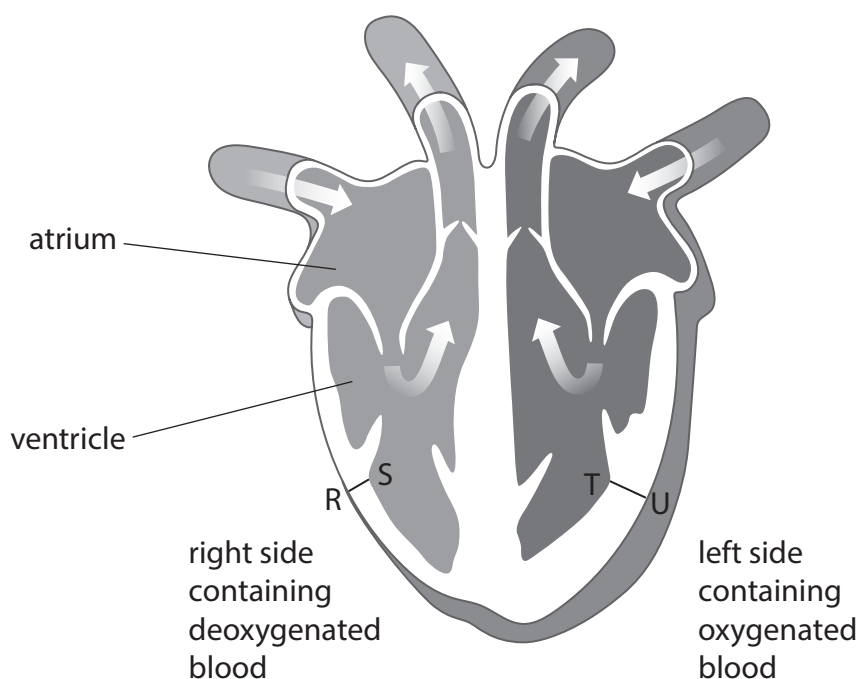
State **two** differences in the leaf structure shown in Figure 11 that help plant B to survive in a dry environment.

(2)

- 1 .....
- 2 .....

**(Total for Question 5 = 9 marks)**

- 6 Figure 12 shows the structure of the human heart and the direction of blood flow.



**Figure 12**

- (a) (i) Measure the thickness of the left ventricle wall between points T and U.

(1)

T-U = ..... mm

- (ii) Describe how deoxygenated blood leaves the right side of the heart and becomes oxygenated.

(2)

.....

.....

.....

.....



(iii) Which blood vessel returns deoxygenated blood to the right side of the heart?

(1)

- ☐ **A** aorta
- ☐ **B** pulmonary artery
- ☐ **C** pulmonary vein
- ☐ **D** vena cava

(b) Figure 12 shows the valves that stop blood from flowing in the wrong direction.

State the number of valves in the right side of the human heart shown in Figure 12.

(1)

(c) The heart is part of the circulatory system.

Describe what happens to the blood when the left ventricle contracts.

(3)

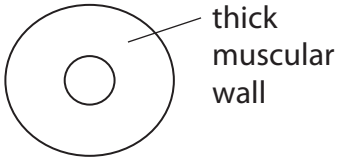
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(d) Figure 13 shows information about three types of blood vessel.

| blood vessel                  | A                                                                                                     | B                                                                                 | C                                                                                                      |
|-------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| type of blood vessel          | artery                                                                                                | capillary                                                                         | ?                                                                                                      |
| cross-section of blood vessel |  thick muscular wall |  |  thin muscular wall |

**Figure 13**

(i) State the type of blood vessel shown as C in Figure 13.

(1)

(ii) Describe how the structure of a capillary helps gas exchange in the lungs.

(2)

**(Total for Question 6 = 11 marks)**

7 Urine contains water, urea and other dissolved substances.

(a) Where is urea produced in the human body?

(1)

- ☐ **A** kidneys
- ☐ **B** liver
- ☐ **C** lungs
- ☐ **D** bladder

(b) Name the substance that is broken down to produce urea.

(1)

(c) The kidneys are part of the urinary system.

People with kidney disease can be treated by dialysis or by having a kidney transplant.

(i) Figure 14 shows some stages of the process of dialysis.

Complete boxes 3 and 4 by writing the missing details of the process of dialysis.

(2)

1. The patient's blood is taken out of a vein and transferred to the dialysis machine.

2. In the machine, the blood flows through a porous tube, surrounded by dialysis fluid.

3. Urea moves from the blood into the dialysis fluid by .....

4. This lowers the concentration of urea in the .....

**Figure 14**

(ii) State **two disadvantages** of using kidney donation to treat a patient with kidney failure.

(2)

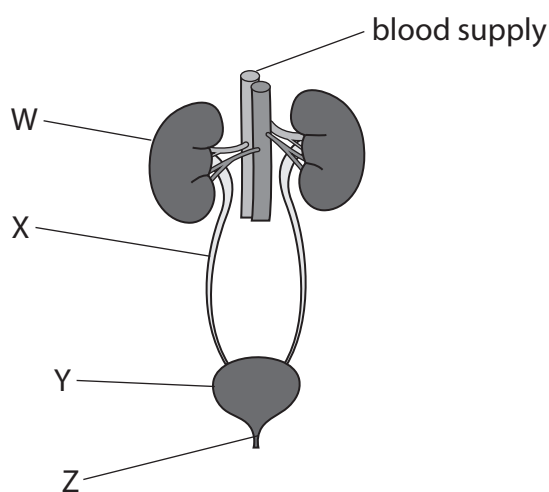
1 .....

.....

2 .....

.....

\*(d) Figure 15 shows the human urinary system.



**Figure 15**

Describe the roles of parts W, X, Y and Z in making urine and removing the urine from the body.

Name parts W, X, Y and Z in your answer.

(6)

.....

.....

.....

.....

.....

.....

.....

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**(Total for Question 7 = 12 marks)**



- 8 (a) Explain why a person's heart rate increases when they are running compared with when they are at rest.

(2)

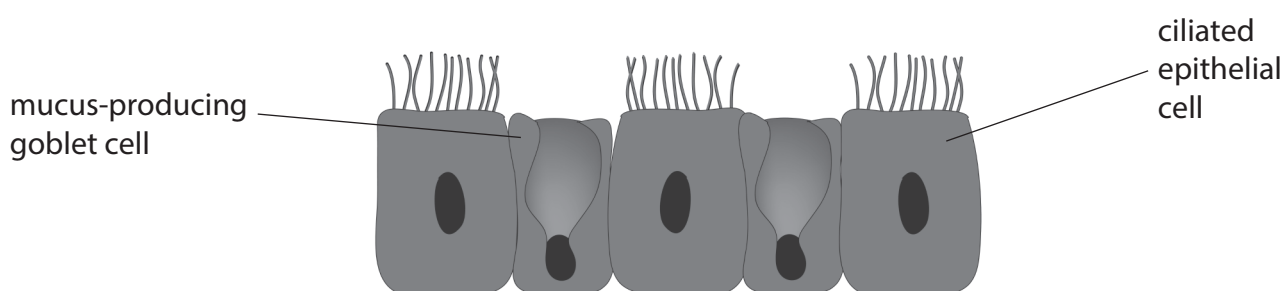
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- (b) Figure 16 shows a diagram of mucus-producing goblet cells and ciliated epithelial cells in the airways of the lungs.



(Source: © K.K.T Madhusanka/Shutterstock)

**Figure 16**

Describe how pathogens are removed from the airways by ciliated epithelial cells.

(2)

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(c) During a race, athletes respire aerobically and anaerobically.

Figure 17 shows an athlete after a race.



(Source: © voronaman/Shutterstock)

**Figure 17**

Explain how aerobic respiration provides energy for running.

(2)

.....

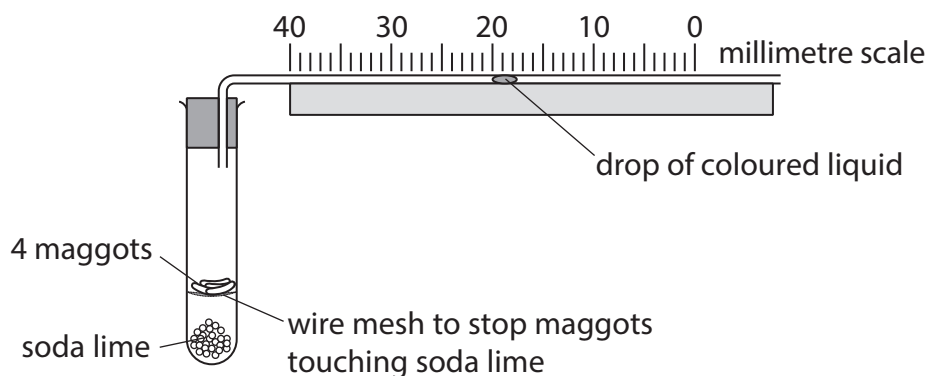
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- (d) The rate of respiration of maggots was investigated using the equipment shown in Figure 18.



**Figure 18**

- (i) State the reason why the soda lime is placed in the test tube.

(1)

- (ii) The drop of liquid in Figure 18 is at 20 mm.

The drop of coloured liquid moved at a mean rate of 2 mm per minute.

Draw, on Figure 19, the new position of the bubble after the five minutes.

(1)



**Figure 19**

(iii) The investigation was repeated with two maggots.

Explain how the movement of the drop of coloured liquid would be affected if the investigation was repeated using fewer maggots.

(2)

(iv) State **one** way this investigation can be improved to obtain more reliable results.

(1)

(Total for Question 8 = 11 marks)

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- 9 (a) In 2018, all the plants were removed from the soil in a 1000 m<sup>2</sup> area.

A wall was built around this area to keep people out.

In 2019, three species of plants were recorded growing in this area.

Two of these species were indigenous.

- (i) State what is meant by the term 'indigenous'.

(1)

- (ii) Name **one** piece of equipment that could be used to sample the number of indigenous plants in this area.

(1)

- (b) The area was surveyed every year and the number of plants of each species (A to H) was estimated.

Figure 20 shows the results.

| estimated number of each plant species found in the survey |     |    |     |    |   |    |   |   |
|------------------------------------------------------------|-----|----|-----|----|---|----|---|---|
| year                                                       | A   | B  | C   | D  | E | F  | G | H |
| 2018                                                       | —   | —  | —   | —  | — | —  | — | — |
| 2019                                                       | 491 | 23 | 66  | —  | — | —  | — | — |
| 2020                                                       | 664 | 48 | 186 | 1  | 8 | —  | — | — |
| 2021                                                       | 470 | 25 | 283 | 3  | 6 | 7  | 1 | — |
| 2022                                                       | 120 | 41 | 354 | 7  | 4 | 11 | 7 | — |
| 2023                                                       | 44  | 39 | 421 | 21 | 6 | 11 | 9 | 8 |

Figure 20



- (i) State the trend shown by the data in Figure 20 for plant species C from 2019 to 2023.

(1)

- (ii) A scientist suggested that the decrease in the number of plants of species B in 2021 was caused by competition from one of the other species of plant.

Which species is most likely to have out-competed species B in 2021?

(1)

- ☐ **A** species A
- ☐ **B** species C
- ☐ **C** species D
- ☐ **D** species H

- (iii) Explain **one** way that this species could have out-competed species B.

(2)

- (iv) Give **one** way that species H could have moved into the area.

(1)

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\*(c) Figure 21 shows some plants growing in a small area of a 1000 m<sup>2</sup> field.



**Figure 21**

Devise a plan to estimate the number of named plant species growing in this field.

(6)

(Total for Question 9 = 13 marks)

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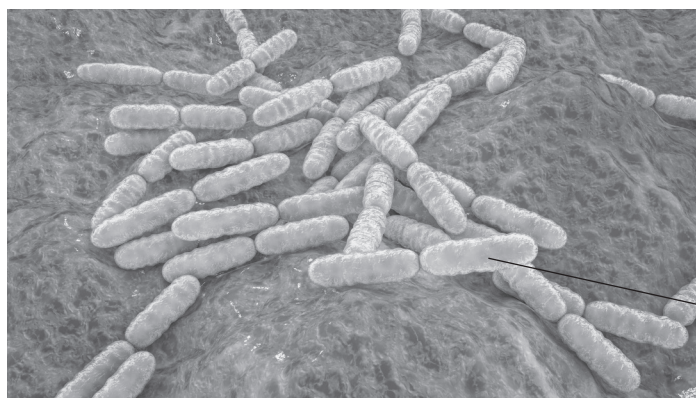
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- 10 (a) Figure 22 shows a type of bacteria (*Lactobacillus acidophilus*) that is found in cow's milk.



(Source: © Kateryna Kon/Shutterstock)

**Figure 22**

The magnification of this image is  $\times 18\,000$ .

Measure the length of the bacterium labelled A.

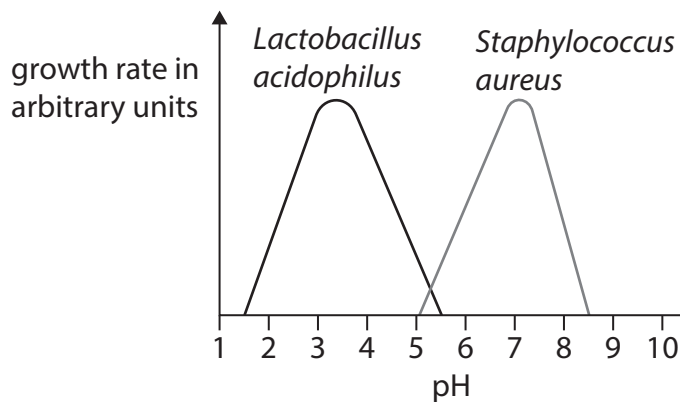
Use your measurement to calculate the actual length of this bacterium in millimetres.

Give your answer in standard form.

(3)

..... mm

(b) Figure 23 shows the growth rate of two species of bacteria at different pH values.



**Figure 23**

- (i) State a pH that allows the growth of both *Lactobacillus acidophilus* and *Staphylococcus aureus*.

(1)

- (ii) Describe the relationship between pH and the growth of *Staphylococcus aureus*, as shown in Figure 23.

(2)

(c) A student investigated the effect of temperature on the decay of milk.

Milk was placed in a beaker in a water bath at 5 °C for 72 hours.

The pH of the milk was measured every 24 hours using a pH probe.

The investigation was repeated at different temperatures.

Figure 24 shows the results of this investigation.

| temperature<br>in °C | pH         |             |             |             |
|----------------------|------------|-------------|-------------|-------------|
|                      | at 0 hours | at 24 hours | at 48 hours | at 72 hours |
| 5                    | 6.6        | 6.6         | 6.6         | 6.5         |
| 10                   | 6.6        | 6.5         | 6.4         | 6.3         |
| 20                   | 6.6        | 6.0         | 5.6         | 5.2         |
| 30                   | 6.6        | 5.8         | 5.0         | 4.8         |

**Figure 24**

(i) Which is a variable that the student needs to control in this investigation?

(1)

- ☐ **A** pH of the milk
- ☐ **B** temperature of the milk
- ☐ **C** incubation time
- ☐ **D** volume of the milk



- (ii) Describe the changes in the pH of the milk at 30°C from 0 hours to 72 hours, as shown in Figure 24.

(2)

- (iii) Calculate the rate of decay of the milk at 20°C for the 72 hours of this investigation.

Use the equation:

$$\text{rate of decay} = \frac{\text{change in pH}}{\text{time taken}}$$

(2)

..... change in pH per hour

**(Total for Question 10 = 11 marks)**

**TOTAL FOR PAPER = 100 MARKS**



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