CAMBRIDGE
OCR

Tuesday 12 May 2026 – Afternoon

GCSE (9–1) Biology A (Gateway Science)

J247/01 (Foundation Tier)

Time allowed: 1 hour 45 minutes

You must have:
- a ruler (cm/mm)

You can use:
- a scientific or graphical calculator
- an HB pencil

F

J247701

2690305324

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined page at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.

INFORMATION
- The total mark for this paper is **90**.
- The marks for each question are shown in brackets **[ ]**.
- Quality of extended response will be assessed in questions marked with an asterisk (*).
- This document has **28** pages.

ADVICE
- Read each question carefully before you start your answer.

© Cambridge OCR 2026 [601/8589/2]
DC (SL/TC) 361643/6
Cambridge OCR is an exempt Charity

for more: jadedamien673@gmail.com

Section A

You should spend a **maximum** of **30 minutes** on this section.

Write your answer to each question in the box provided.

1 Which structures form the **central nervous system**?

A Brain and spinal cord

B Effector and receptor

C Receptor and brain

D Spinal cord and effector

Your answer ☐ **[1]**

2 Which organ is responsible for maintaining the **water balance** of the body?

A Heart

B Kidney

C Lung

D Pancreas

Your answer ☐ **[1]**

3 Which hormones are present in the female combined pill which is used to prevent pregnancies?

A FSH and oestrogen

B FSH and progesterone

C Oestrogen and progesterone

D Oestrogen and testosterone

Your answer ☐ **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

4 A person has an accident and damages their brain. They are having difficulty breathing.

Which part of the brain is damaged?

A Cerebellum

B Hypothalamus

C Medulla

D Pituitary

Your answer ☐ **[1]**

5 Reproductive hormones in cows have the same roles as in humans.

A farmer injects cows with a hormone so that they develop more egg cells.

Which hormone does the farmer inject the cows with?

A FSH

B Oestrogen

C Progesterone

D Testosterone

Your answer ☐ **[1]**

6 Yeast cells are used in bread making to make the bread rise.

Which product of anaerobic respiration by the yeast will make the bread rise?

A Carbon dioxide

B Ethanol

C Glucose

D Oxygen

Your answer ☐ **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

7 Which process is represented by the word equation?

glucose ⟶ lactic acid

A Aerobic respiration in animal cells

B Aerobic respiration in plant cells

C Anaerobic respiration in animal cells

D Anaerobic respiration in plant cells

Your answer ☐ **[1]**

8 Mitosis is part of the cell cycle.

Which event happens in mitosis?

A Cell growth

B Chromosomes move to opposite poles of the cell

C DNA replication

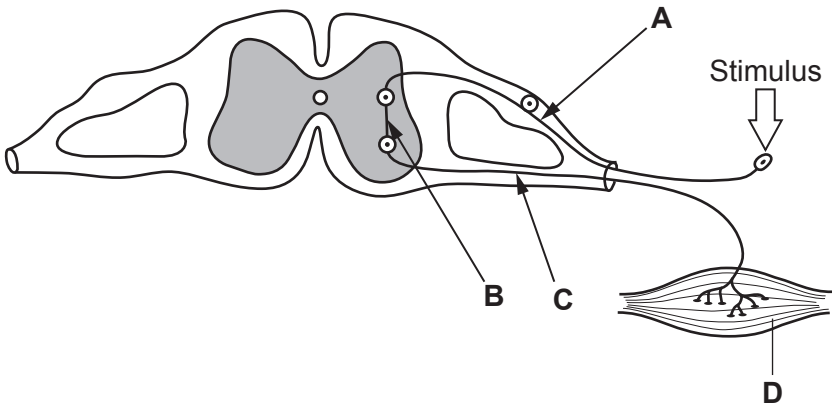
D Sub-cellular structures are made

Your answer ☐ **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

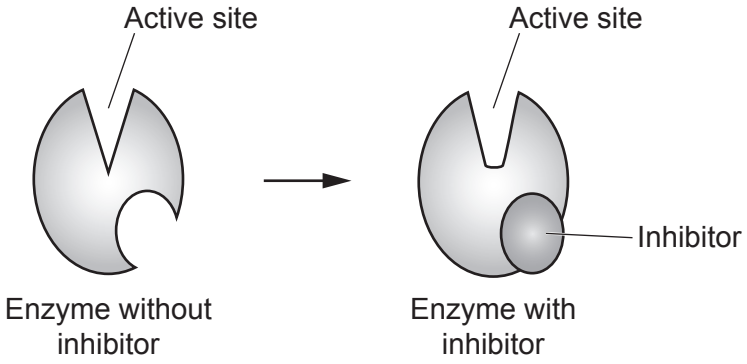
9 The diagram shows the structures involved in a reflex arc.



Which structure is the motor neurone?

Your answer ☐ **[1]**

10 The diagram shows a chemical called an inhibitor binding to an enzyme.



The inhibitor changes the shape of the enzyme's active site.

What describes the effect of the inhibitor on the reaction catalysed by the enzyme?

A More enzyme-substrate complexes will be formed.

B More products will be formed.

C More substrates will be formed.

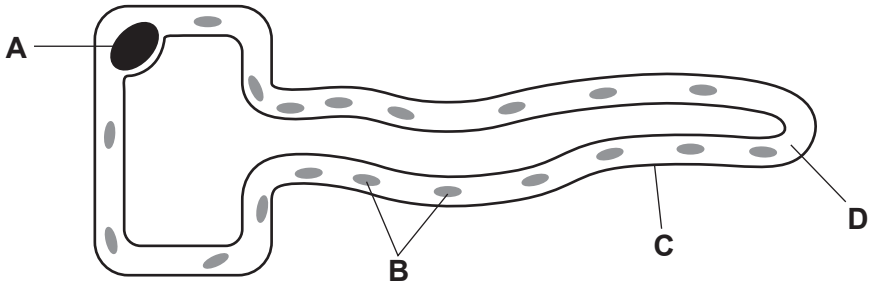
D The reaction will happen more slowly.

Your answer ☐ **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

11 The diagram shows a root hair cell.



Which labelled structure provides root hair cells with the energy required to take mineral ions from the soil?

Your answer ☐ **[1]**

12 A student investigates mitosis in a tissue sample.

They select six regions of the tissue sample and count the number of cells in each region in mitosis.

The results are in the table.

Region	Number of cells in mitosis
1	6
2	7
3	9
4	14
5	6
6	12

What are the median and the mode for the number of cells in mitosis?

A Median = 6 Mode = 9

B Median = 8 Mode = 6

C Median = 8 Mode = 9

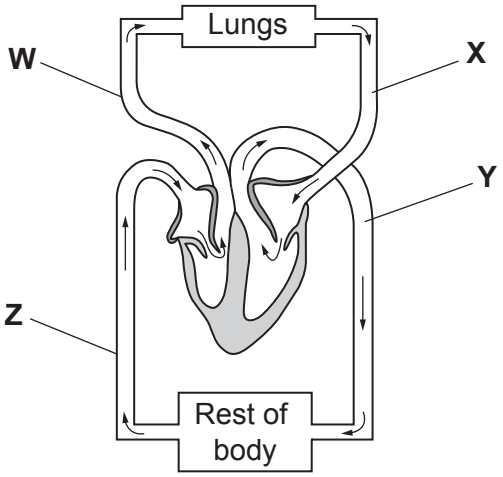
D Median = 9 Mode = 6

Your answer ☐ **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

13 The diagram shows the human circulatory system.



Which blood vessels are arteries?

A W and X

B W and Y

C W and Z

D Y and Z

Your answer ☐ **[1]**

14 Which of these is a plant hormone?

A Auxin

B Insulin

C Oestrogen

D Progesterone

Your answer ☐ **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

15 Which blood vessels have valves along their length?

A Arteries and veins only

B Arteries, capillaries and veins

C Arteries only

D Veins only

Your answer ☐ **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

BLANK PAGE

DO NOT WRITE ON THIS PAGE

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

Section B

16

(a) When the body is too hot or too cold, responses act to cool the body down or warm the body up.

Which of these responses will cool the body down and which will warm the body up?

Tick (✓) **one** box in each row.

	Cool down	Warm up
Increased blood flow to the skin's surface		
Increased shivering		
Increased sweating		

[2]

(b) If the body temperature changes, it can affect metabolic reactions.

Complete the sentences to explain why it is important to keep the internal temperature of the body constant.

Use words from the list.

active site	**denature**	**die**
dissolve	**solution**	**substrate**

If the body temperature becomes too high, reactions slow down because

enzymes will ..... .

This causes the ..... of the enzyme to change shape.

If the body temperature is too low, reactions will also slow down.

This is because there will be fewer collisions between the ..... and the

enzyme.

[3]

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

17 This question is about DNA.

(a) Which statements about DNA are **true** and which are **false**?

Tick (✓) **one** box in each row.

	True	False
DNA is in the nucleus of eukaryotic cells.		
DNA is a polymer.		
DNA is made of one strand, wound into a double helix.		
DNA is made from monomers called nucleotides.		

[3]

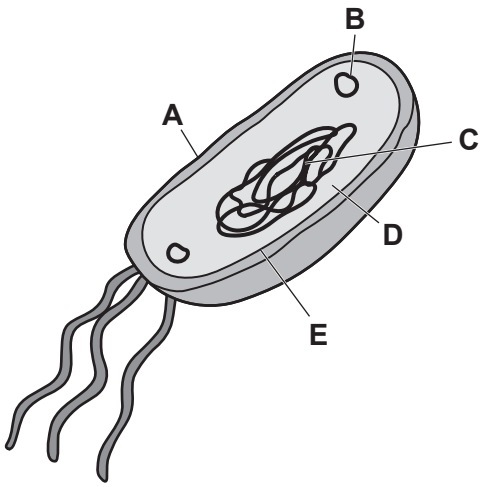
(b) DNA has four different bases, A, C, G and T.

State which bases pair with each other.

.....

..... **[1]**

(c) The diagram shows a prokaryotic cell.



Which **two** of the labelled structures, **A**, **B**, **C**, **D** or **E**, on the diagram contain DNA?

..... and ..... **[2]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

18 This question is about people who have diabetes.

(a) Explain why people who have type 1 diabetes have high blood sugar levels.

.....

.....

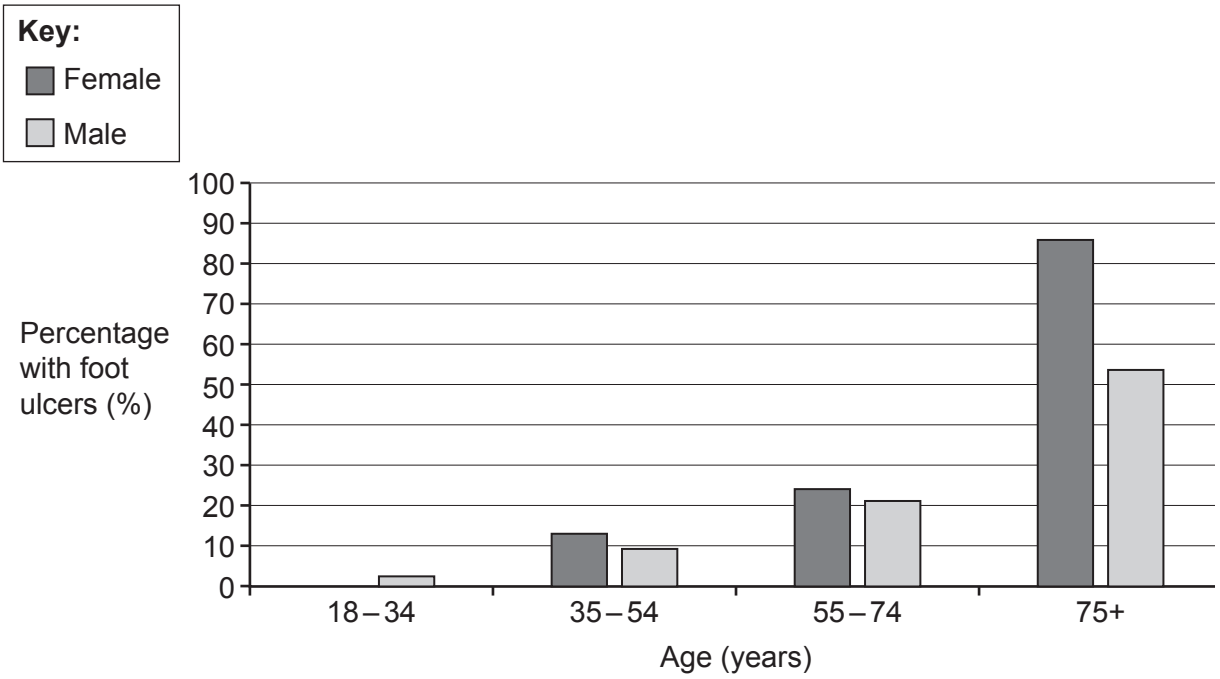
.....

..... **[2]**

(b) A study in Pakistan looked at the occurrence of foot ulcers in people who have diabetes.

A foot ulcer is an open sore on the foot.

The graph shows the percentage of females and males in different age groups in the study that had foot ulcers.



(i) Give **two** conclusions that can be made from the results in the graph.

1 .....

.....

2 .....

.....

[2]

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

(ii) The total number of participants in the study was 1503.
504 were male and 999 were female.

Suggest **two** ways the scientists could improve their study to give greater confidence in their conclusions.

1 .....

.....

2 .....

.....

[2]

(c) In the UK, 5.6 million people have diabetes.

Between 1.1% and 2.2% of all people with diabetes have foot ulcers.

Calculate the **minimum** number of people with diabetes in the UK that have foot ulcers.

Give your answer to **2** significant figures.

Minimum number of people = ... **[4]**

(d) Ulcers can be treated using skin grafts.

Skin is grown in the laboratory using adult stem cells. This skin is then used to cover the ulcer.

(i) Name the type of cell division that produces new skin cells.

..... **[1]**

(ii) Describe **one** difference between adult stem cells and embryonic stem cells.

.....

.....

.....

..... **[2]**

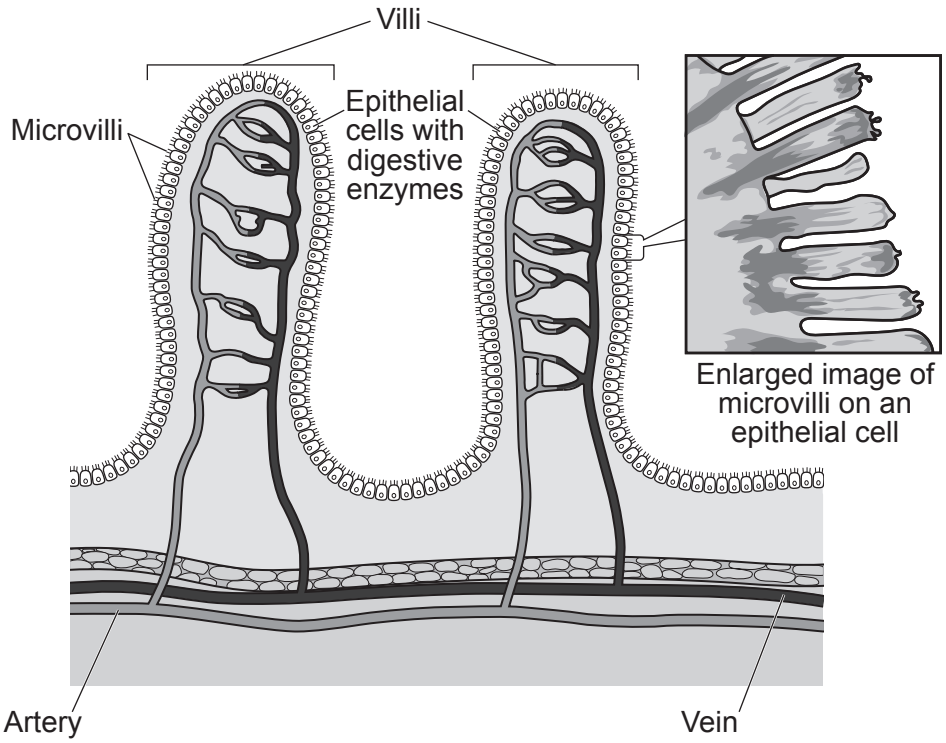
© Cambridge OCR 2026

for more: jadedamien673@gmail.com

19 The small intestine is an organ in the digestive system.
Its functions are to digest food and to absorb the products of digestion.

The small intestine is lined with structures called villi, which act as an exchange surface, as shown in **Figure 19.1**.

Figure 19.1



(a) Identify which feature shown in **Figure 19.1** carries out each function.

Tick (✓) **one** box in each row.

Function	Feature			
	Artery	**Enzymes**	**Microvilli**	**Vein**
Provides a large surface area for absorption				
Breaks down biological molecules				
Transports products of digestion away from the small intestine				

[3]

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

(b) In the digestive system, large biological molecules are broken down into small biological molecules.

Complete the sentences to describe the products of digestion.

Use words from the list.

amino acids	**fatty acids**	**glycerol**	**glycogen**
insulin	**starch**	**sugars**	

Fats are broken down into ..... and ..... .

Complex carbohydrates are broken down into ..... .

Proteins are broken down into ..... .

[3]

(c) Complete the sentence to describe how these small molecules move across the cell membranes of the cells lining the small intestine.

Put a (ring) around the correct option.

There will be a high concentration of these small soluble molecules in the small intestine,

so these molecules will move into the cells lining the small intestine by

active transport / **diffusion** / **osmosis**.

[1]

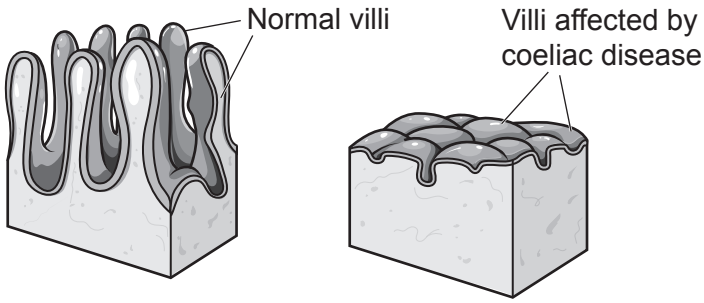
© Cambridge OCR 2026

for more: jadedamien673@gmail.com

(d) Some people have coeliac disease.
They have symptoms such as weight loss, stomach aches and diarrhoea.

Figure 19.2 shows normal villi from a person that does **not** have coeliac disease and villi from a person that does have coeliac disease.

Figure 19.2



(i) Explain why people with coeliac disease lose weight.

.....

.....

.....

..... **[2]**

(ii) It is estimated that the number of people with coeliac disease in the UK is 682 000.

Write this number in **standard form**.

Number of people with coeliac disease = ... **[1]**

(iii) Suggest why this number is only an estimation.

.....

..... **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

BLANK PAGE

DO NOT WRITE ON THIS PAGE

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

20 As people age, some develop a disease called osteoarthritis.

People with osteoarthritis of the hips may require a joint replacement.

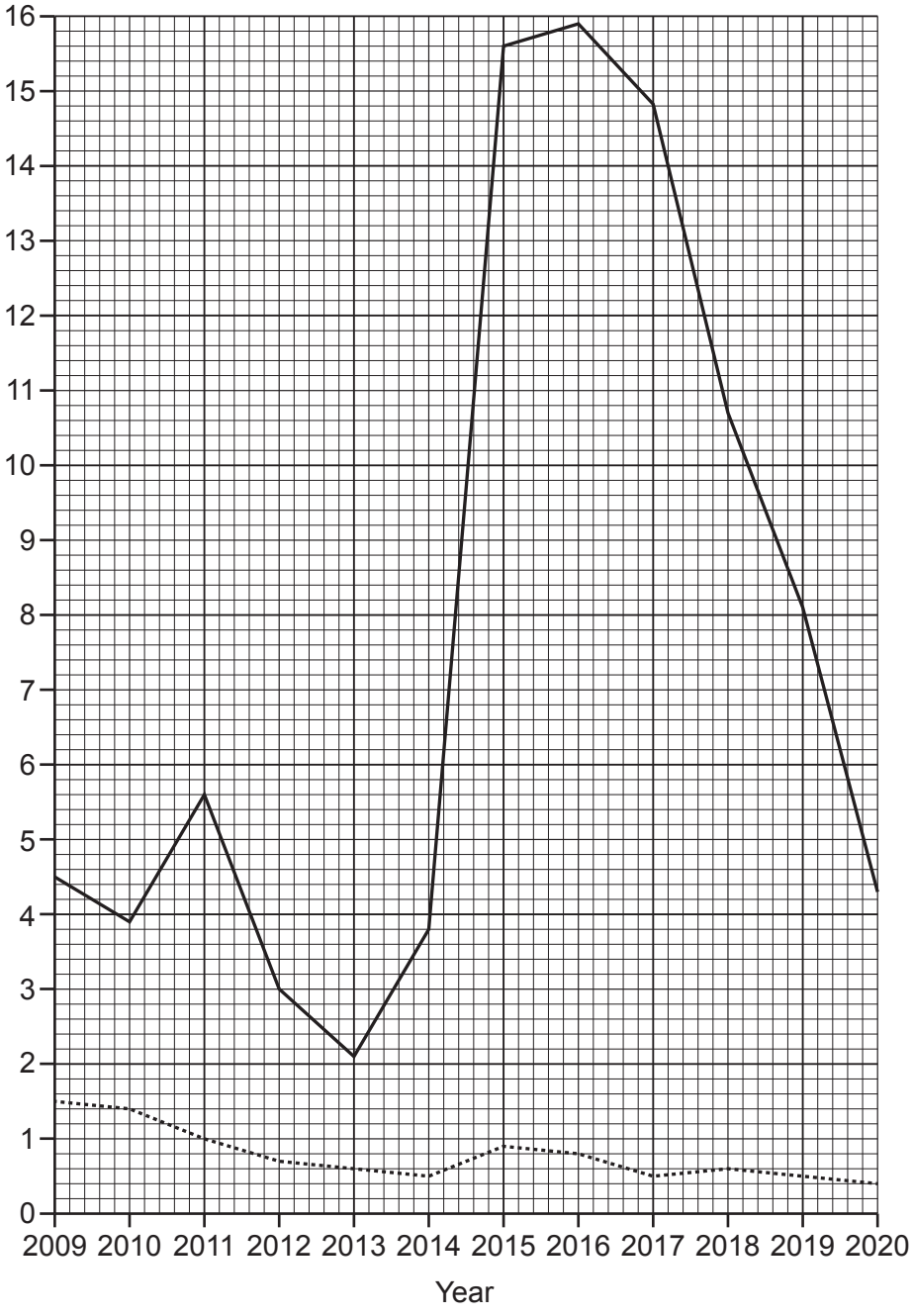
In this surgery the diseased joint will be removed and a new joint inserted.

During this surgery, some patients may need a blood transfusion and some patients will develop blood clots.

(a) The graph shows the percentage of patients that had blood transfusions during surgery and the percentage that had blood clots between 2009 and 2020.

Key:

—— Blood transfusions ····· Blood clots



© Cambridge OCR 2026

for more: jadedamien673@gmail.com

(i) What percentage of patients had blood clots in 2016?

Percentage = ... % **[1]**

(ii) Describe how the percentage of blood transfusions changed between 2009 and 2020.

Use data from the graph in your answer.

.....

.....

.....

.....

..... **[3]**

(iii) Scientists are concerned that the blood transfusions increase the patients' risk of developing blood clots in their veins.

Which statements based on the data in the graph are **true** and which are **false**?

Tick (✓) **one** box in each row.

	True	False
The three years with the highest percentages of blood transfusions also had the highest percentages of blood clots.		
The percentages of both blood transfusions and blood clots were higher in 2015 than in 2009.		
The percentages of both blood transfusions and blood clots were lower in 2020 than in 2009.		

[2]

(b) The blood clots usually develop in deep veins located in the calf or thigh of the leg.

Suggest why blood clots in veins cause health problems.

..... **[1]**

© Cambridge OCR 2026

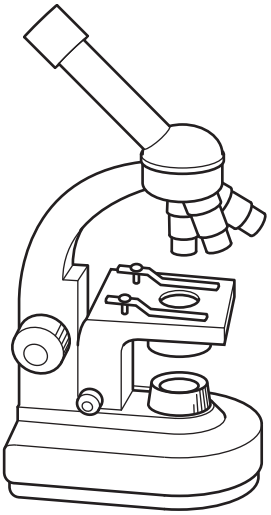
for more: jadedamien673@gmail.com

21

(a) A student has added a stain to some human cheek cells on a microscope slide.

The student now wants to look at the cheek cells using the light microscope shown in **Figure 21.1**.

Figure 21.1



Light microscope

Statements **A** to **F** show the steps the student should use. They are **not** in the correct order.

A Select the highest magnification objective lens and refocus.

B Place the slide on the stage.

C Select the medium magnification objective lens and refocus.

D Place a cover slip on the slide.

E Select the lowest magnification objective lens.

F Use the focusing knob to focus the image.

Write the letters in the boxes to show the correct order of the steps.

One has been done for you.

		E			

[4]

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

(b) The student views the slide using the ×40 objective lens.
The eyepiece has a magnifying power of ×6.

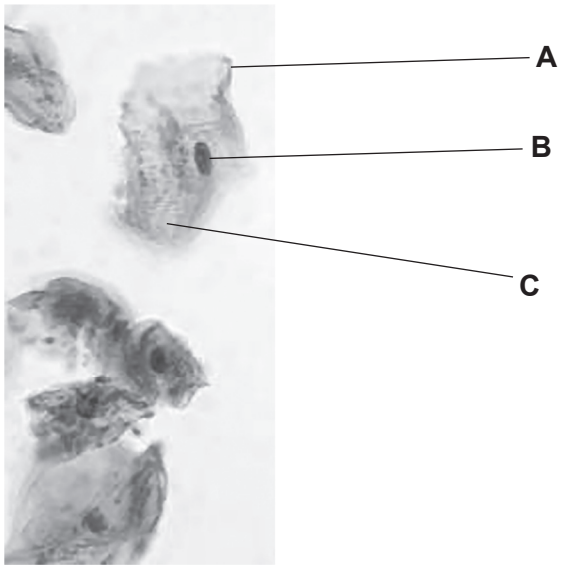
Calculate the total magnification the student uses to view the cheek cells.

Total magnification = ... **[2]**

(c) **Figure 21.2** shows an image of the cheek cells.

Identify the three labelled parts of the cell shown on **Figure 21.2**.

Figure 21.2



A .....

B .....

C .....

[3]

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

(d)* The student then investigates the changes to animal and plant cells when placed in distilled water.

They think that the presence of a cell wall in plant cells will result in different changes compared to the animal cells.

The student has two slides:

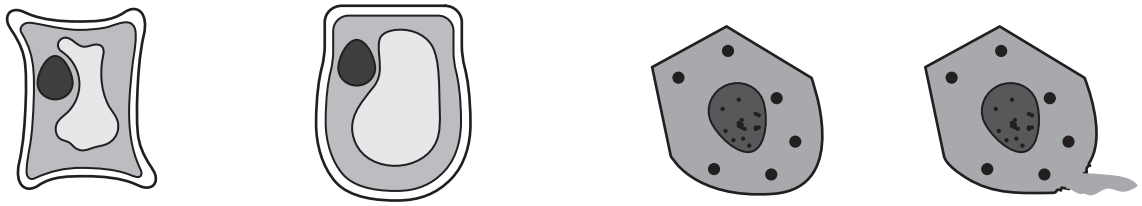
- Slide 1 has plant cells.
- Slide 2 has animal cheek cells.

The student adds three drops of distilled water to each slide and leaves the cells for 30 minutes.

They then look at the cells using the light microscope.

Figure 21.3 is a drawing of the two types of cell before and after placing them in water.

Figure 21.3



Plant cell before being placed in water

Plant cell after being placed in water

Animal cell before being placed in water

Animal cell after being placed in water

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

Explain what happened to the animal and plant cells after they were placed in the water.

In your answer you should include:

- a description of how the appearance of each type of cell changed
- why the appearance of each type of cell changed.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

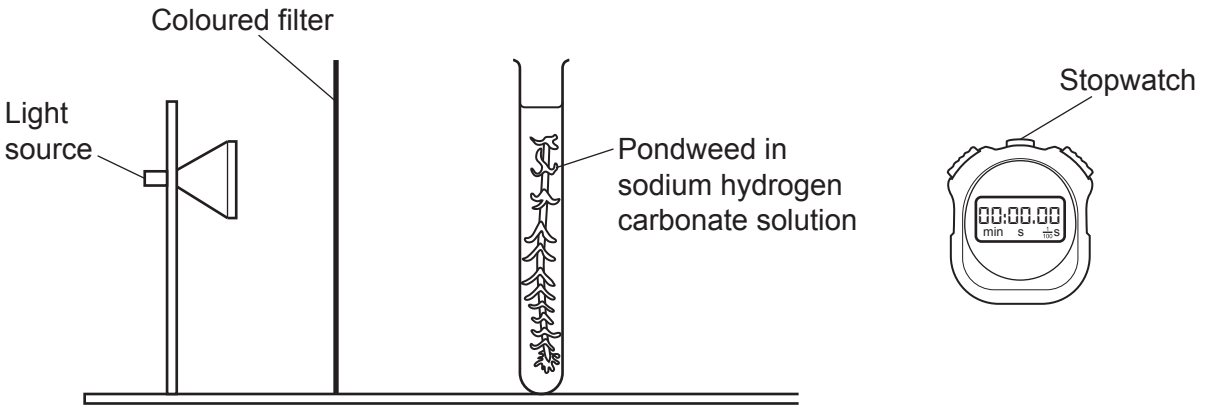
..... **[6]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

22 A student investigated the effect of different colours of light on the rate of photosynthesis.

They set up the equipment shown in the diagram.



This is their method:

- Place a piece of pondweed in sodium hydrogen carbonate solution at room temperature.
- Put a filter in the space between the pondweed and the light source.

A coloured filter only allows one colour of light to pass through.

(a) Describe how the student should:

- collect data using this method
- adapt the method to collect data for different colours of light.

.....

.....

.....

.....

.....

.....

.....

..... **[4]**

(b) The student is concerned that the heat from the lamp may affect the results of the investigation.

Suggest **one** way that the method could be improved to control this factor.

.....

..... **[1]**

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

(c) Explain how a decrease in temperature affects the rate of photosynthesis.

.....

.....

..... **[2]**

(d) State **two** variables, other than temperature, that the student needs to control in this investigation.

1 .....

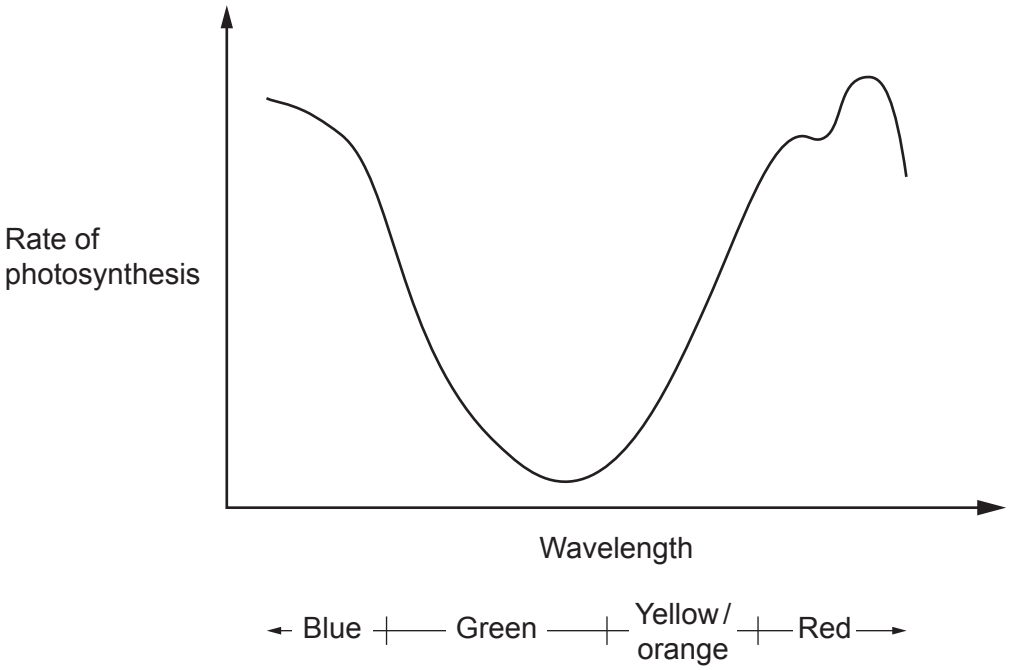
2 .....

[2]

(e) The student makes a statement about how the colour of light affects how well it is absorbed.

'I think that a plant absorbs least light when it is exposed to red or blue light.'

The graph shows how different colours of light and their wavelengths affect the rate of photosynthesis.



The student's statement is **incorrect**.

Explain how the graph shows that their statement is incorrect.

.....

.....

.....

..... **[2]**

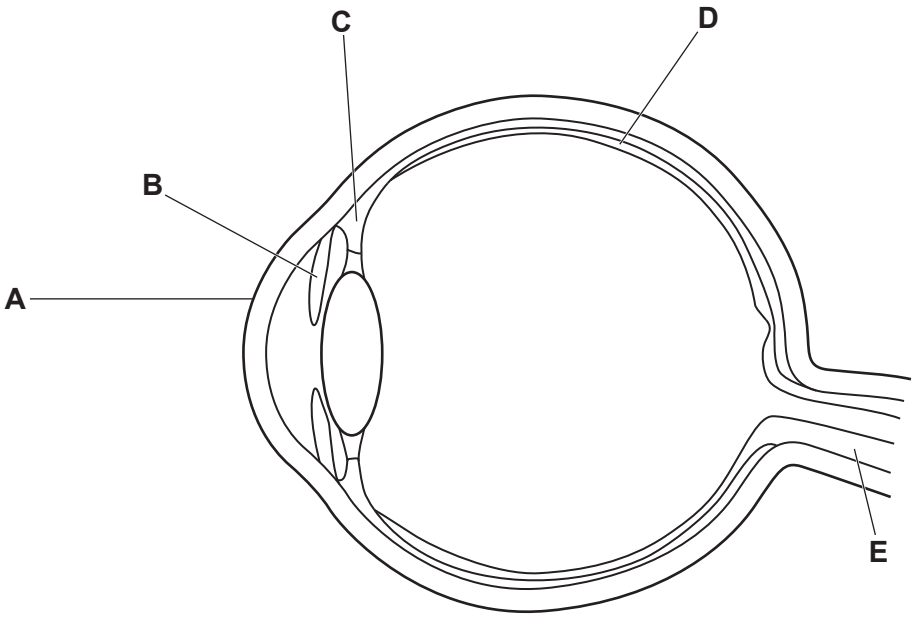
© Cambridge OCR 2026

for more: jadedamien673@gmail.com

23 The structures found in the eye of a dog are the same as those found in the human eye.

Figure 23.1 is a diagram of a dog's eye.

Figure 23.1



(a) Complete the table to identify which structure carries out each function.

Letter on diagram	Name of structure	Function
.....	ciliary muscle	alters the shape of the lens
.....	cornea	bends the light as it enters the eye
E	.....	carries electrical impulses between the eye and the brain
D	.....	contains light receptors to detect the image

[4]

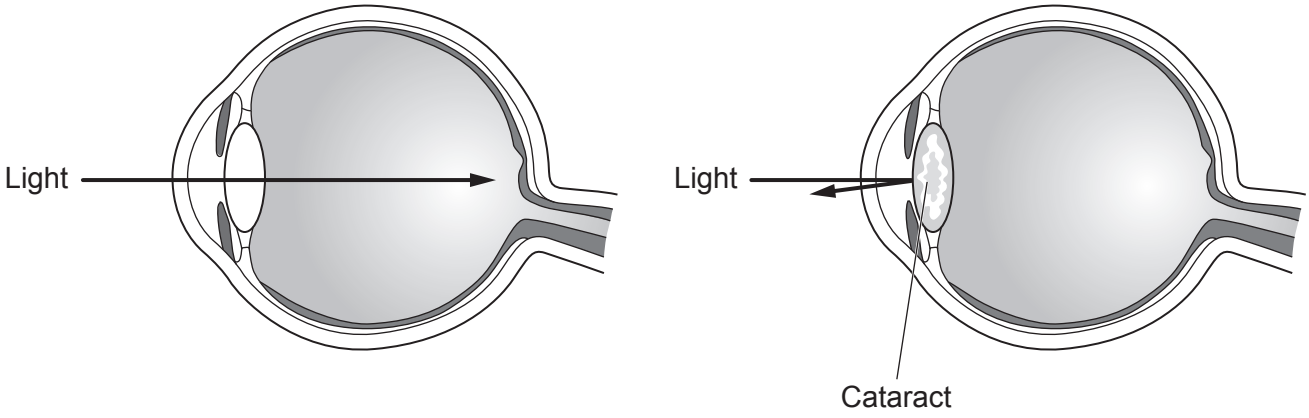
© Cambridge OCR 2026

for more: jadedamien673@gmail.com

(b) Cataracts can develop in the eyes of older dogs.

Figure 23.2 shows the eye of a dog without a cataract and with a cataract.

Figure 23.2



Eye without cataract **Eye with cataract**

(i) Which structure in the eye is affected by cataracts?

..... **[1]**

(ii) Describe how the cataract will affect the function of the eye.

.....

.....

.....

..... **[2]**

END OF QUESTION PAPER

© Cambridge OCR 2026

for more: jadedamien673@gmail.com

EXTRA ANSWER SPACE

If you need extra space use this lined page. You must write the question numbers clearly in the margin.

CAMBRIDGE OCR

Copyright Information

Cambridge OCR is committed to securing permission to reproduce all third-party content that it uses in its assessment materials. If Cambridge OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, Cambridge OCR will be happy to correct its mistake at the earliest possible opportunity. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the Cambridge OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

For queries or further information please contact The Cambridge OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

Cambridge OCR is part of Cambridge University Press & Assessment, which is itself a department of the University of Cambridge.

© Cambridge OCR 2026

for more: jadedamien673@gmail.com