AQA GCSE Biology | 8461

SPECIFICATION POINT 4.1.1.5

Microscopy

Past-paper questions

Tier	**Foundation**
Question groups	**13**
Available paper years	**2010–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.1.1.5 Microscopy

Question 01

January 2019 | BLY3F | Original Q3 | Legacy

3 (a) Why did the students set up three flasks like **Flask A** rather than just one?

.....

.....

(1 mark)

3 (b) After one week, the students looked at one drop of liquid from each flask under a microscope.

Their results are given in the table.

Repeat number	Flask A	Flask B
1	No bacteria	Bacteria visible
2	No bacteria	Bacteria visible
3	No bacteria	Bacteria visible

4.1.1.5 Microscopy

Question 01 · continued

for mark

Explain the results for **Flask A** and **Flask B**.

Flask A

.....

.....

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Flask B

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.....

(3 marks)

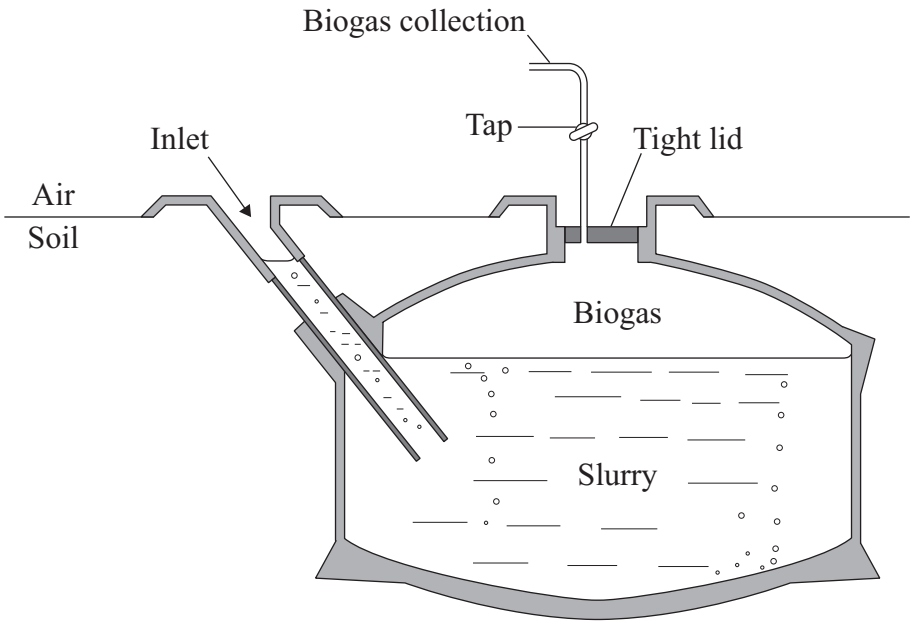
4

4.1.1.5 Microscopy

Question 01 · continued

for mark

4 The diagram shows one type of biogas generator.



4.1.1.5 Microscopy

Question 02

January 2010 | BLY3F | Original Q9 | Legacy

9 A student removed three similar leaves from a plant. The student spread petroleum jelly (a waterproofing substance) on some of the leaves, as follows:

Leaf A: on the lower surface
Leaf B: on the upper surface
Leaf C: none.

The student placed each leaf in a separate beaker. He weighed each beaker at intervals. The results are shown in the table.

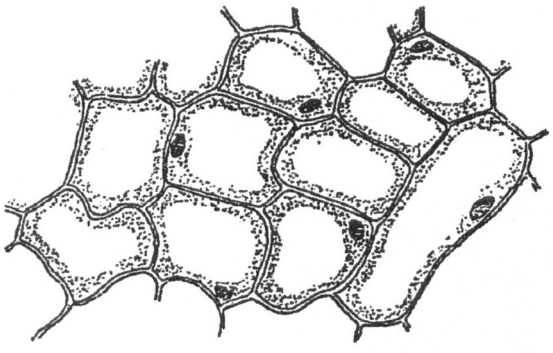
Time in hours	Mass of leaf + beaker in grams		
	Leaf A	Leaf B	Leaf C
0	50.00	55.01	51.99
1	49.99	54.95	51.90
3	49.97	54.90	51.85
5	49.95	54.86	51.80

9 (a) Which leaf, **A**, **B** or **C**, lost most water? ☐

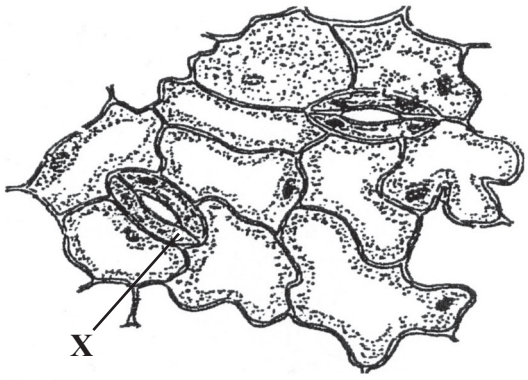
(1 mark)

9 (b) The diagram shows the appearance of the upper and lower surfaces of one of the leaves under a microscope.

Upper surface of leaf



Lower surface of leaf



9 (b) (i) Name cell **X**.....

(1 mark)

4.1.1.5 Microscopy

Question 02 · continued

for mark

9 (b) (ii) The petroleum jelly had a greater effect when it was spread on the lower surface than when it was spread on the upper surface.

Use information from the diagram to explain why.

.....

.....

.....

.....

.....

(2 marks)

4

4.1.1.5 Microscopy

Question 03

June 2011 | BLY2F | Original Q9 | Legacy

9 Cells contain a solution of salts and sugars.

A student is investigating how cells change when they are put into water.

9 (a) The student:

- looks at a plant cell using a microscope
- adds water to the cell.

The plant cell swells up.

Explain why, as fully as you can.

.....

.....

.....

.....

.....

.....

(3 marks)

9 (b) When **animal** cells are put in water, they swell up, and then burst.
When **plant** cells are put in water, they swell up, but do **not** burst.

How does the structure of plant cells prevent them from bursting?

.....

.....

(1 mark)

4

4.1.1.5 Microscopy

Question 04

June 2019 | 8461/1F | Original Q5

0 5 A man has the following symptoms:

- yellow discharge from his penis
- pain when urinating.

0 5 . 1 The man has a bacterial infection.

What is the most likely cause of the man's symptoms?

[1 mark]

Tick (✓) **one** box.

Gonorrhoea ☐

HIV ☐

Measles ☐

Salmonella poisoning ☐

0 5 . 2 The man took a full course of antibiotics.

The man's symptoms did **not** improve.

Why did the antibiotics **not** cure the symptoms?

[1 mark]

Tick (✓) **one** box.

The bacteria are immune to the antibiotics. ☐

The bacteria are resistant to the antibiotics. ☐

The man is immune to the antibiotics. ☐

The man is resistant to the antibiotics. ☐

4.1.1.5 Microscopy

Question 04 · continued

0 5 . 3 Using a condom can stop the bacteria being passed to another person during sexual intercourse.

Suggest a different way the man could avoid passing the bacteria on to someone else.

[1 mark]

Question 5 continues on the next page

4.1.1.5 Microscopy

Question 04 · continued

A scientist investigated the effect of three different antibiotics on three different types of bacteria, **A**, **B** and **C**.

This is the method used.

1. Grow bacteria **A** on an agar plate.

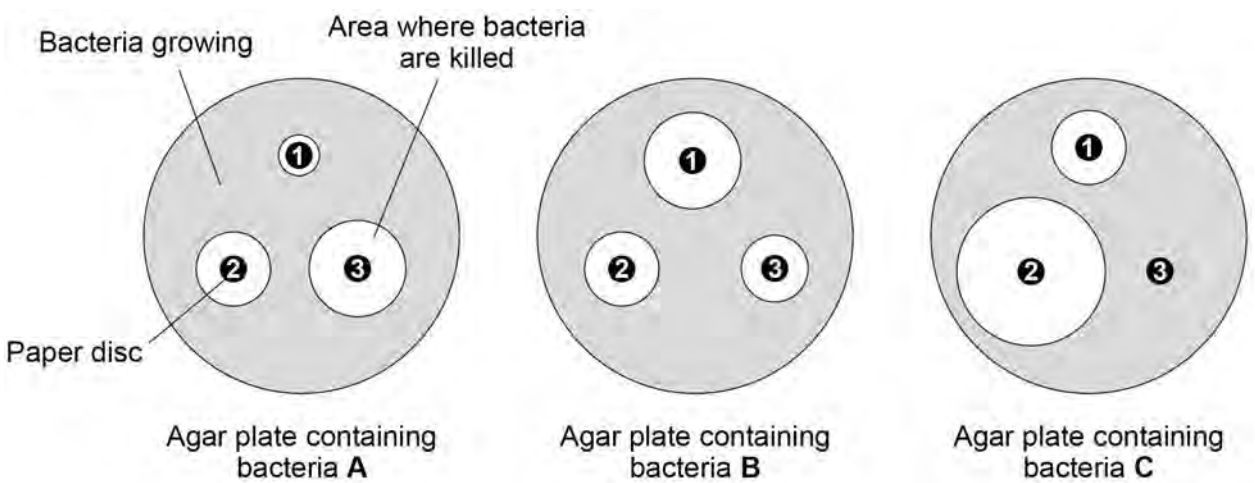
2. Put three separate paper discs each containing one of the antibiotics (**1**, **2** and **3**) onto the agar plate.

3. Put the agar plate into an incubator for 48 hours.

4. Repeat steps 1–3 for bacteria **B** and for bacteria **C**.

Figure 9 shows the scientist's results.

Figure 9



4.1.1.5 Microscopy

Question 04 · continued

0 5 . 4 Compare the effectiveness of the three antibiotics at killing the different types of bacteria.

[6 marks]

Question 5 continues on the next page

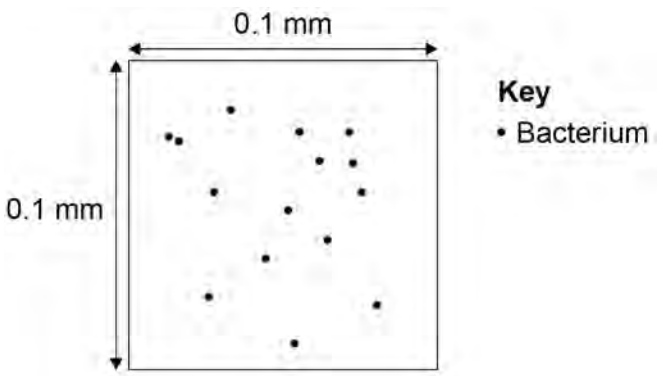
Question 04 · continued

Milk contains bacteria.

A small volume of raw milk was placed in a counting chamber in a special type of microscope slide.

Figure 10 shows what the counting chamber looked like when viewed using a microscope.

Figure 10



A scientist counted the number of bacteria in four samples of raw milk.

Table 4 shows the results.

Table 4

Milk sample	Number of bacteria in counting chamber
E	15
F	12
G	13
H	16

0 5 . 5 Which milk sample is shown in **Figure 10**?

[1 mark]

Tick (✓) **one** box.

Sample **E** ☐

Sample **F** ☐

Sample **G** ☐

Sample **H** ☐

4.1.1.5 Microscopy

Question 04 · continued

0 5 . 6 Calculate the mean number of bacteria in the four samples in **Table 4**.

[2 marks]

Mean number of bacteria = _____

0 5 . 7 Calculate the mean number of bacteria per mm^3 of milk in the samples.

Complete the following steps.

[3 marks]

Calculate the total area of the counting chamber in **Figure 10**.

Total area of counting chamber = _____ mm^2

The depth of the counting chamber is 0.01 mm

Calculate the volume of the counting chamber in **Figure 10**.

Use the equation:

volume = area × depth

Volume of counting chamber = _____ mm^3

Calculate the mean number of bacteria per mm^3 of milk in the samples.

Use the equation:

$$\text{mean number of bacteria per mm}^3\text{ of milk} = \frac{\text{mean number of bacteria from Question 05.6}}{\text{volume of counting chamber}}$$

Mean number of bacteria per mm^3 of milk = _____

Question 04 · continued

Milk is heated to reduce the number of bacteria it contains before it is sold for humans to drink.

Milk with more than 20 000 bacteria per cm^3 cannot be sold for humans to drink.

Table 5 shows the number of bacteria per cm^3 in four different samples of milk.

Table 5

Milk sample	Number of bacteria per cm^3 of milk
P	1.8×10^4
Q	2.2×10^4
R	2.2×10^{-5}
S	1.8×10^3

0 5 . 8 Which of the milk samples could **not** be sold for humans to drink?

[1 mark]

Tick (✓) **one** box.

P ☐ **Q** ☐ **R** ☐ **S** ☐

0 5 . 9 Why should milk sold for humans to drink **not** contain large numbers of bacteria?

[1 mark]

17

4.1.1.5 Microscopy

Question 05

June 2019 | 8461/1F | Original Q7

0 7 **Figure 12** shows an animal cell viewed using a microscope.

Figure 12



0 7 . 1 The cell contains a nucleus.

What is the function of the nucleus?

[1 mark]

0 7 . 2 Name **one** type of cell that does **not** contain a nucleus.

[1 mark]

4.1.1.5 Microscopy

Question 05 · continued

0 7 . 3 Draw a simple diagram of the cell in **Figure 12**.

Label **two** parts of the cell.

[2 marks]

0 7 . 4 Name **one** structure found in a plant cell but **not** found in an animal cell.

[1 mark]

_____

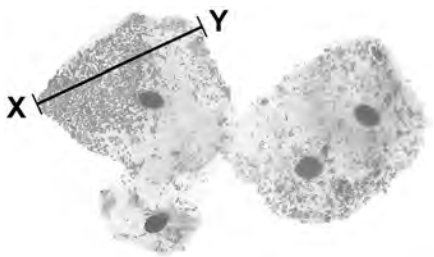
Question 7 continues on the next page

4.1.1.5 Microscopy

Question 05 · continued

Figure 13 shows some different cells.

Figure 13



0 7 . 5 The real length from point **X** to point **Y** is 0.06 mm

Calculate the magnification.

Use the equation:

$$\text{magnification} = \frac{\text{size of image}}{\text{real size of object}}$$

[3 marks]

Magnification = × _____

4.1.1.5 Microscopy

Question 05 · continued

0 7 . 6 The cells shown in **Figure 13** were viewed using a light microscope.

Give **two** advantages of using an electron microscope instead of a light microscope.

[2 marks]

1 _____

_____

2 _____

_____

10

Turn over for the next question

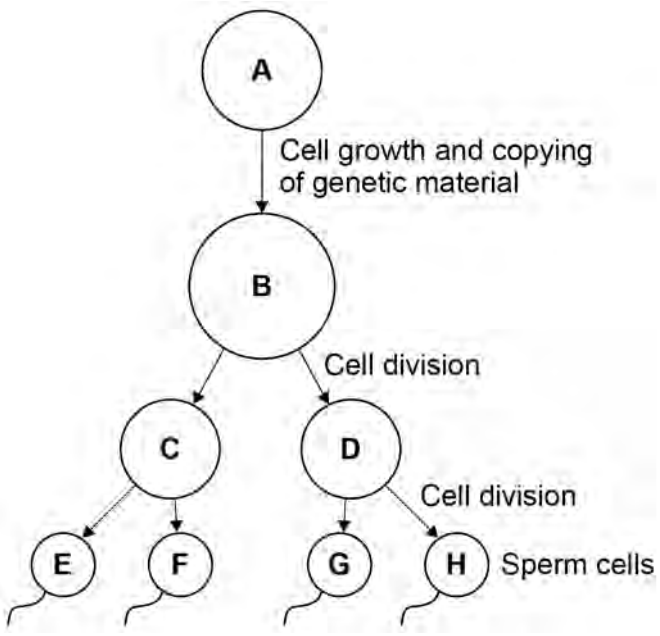
4.1.1.5 Microscopy

Question 06

June 2019 | 8461/2F | Original Q3

0 3 **Figure 6** shows the production of sperm cells in humans.

Figure 6



0 3 . 1 Cell **A** is a normal body cell.

How many chromosomes are there in cell **A**?

[1 mark]

Tick (✓) **one** box.

23 ☐ 46 ☐ 48 ☐ 92 ☐

0 3 . 2 What is the mass of DNA in cell **E**?

[1 mark]

Tick (✓) **one** box.

A quarter of the mass of the DNA in cell **A** ☐

Half the mass of the DNA in cell **A** ☐

The same mass as the DNA in cell **A** ☐

Twice the mass of the DNA in cell **A** ☐

4.1.1.5 Microscopy

Question 06 · continued

0 3 . 3 What type of cell division produces sperm cells?

[1 mark]

Tick (✓) **one** box.

- Binary fission ☐
- Differentiation ☐
- Meiosis ☐

0 3 . 4 Sometimes there are errors in copying the genetic material.

What term describes an error in the genetic material?

[1 mark]

Tick (✓) **one** box.

- Absorption ☐
- Fertilisation ☐
- Mitosis ☐
- Mutation ☐

0 3 . 5 A woman has three children, aged 4, 6 and 9 years.

Why are the children **not** genetically identical?

[2 marks]

Question 06 · continued

In sexual reproduction, a sperm cell fuses with an egg cell to form a new single cell.

An embryo develops from the single cell.

The cell divides three times to produce the embryo.

0 3 . 6 How many cells are there in the embryo after three cell divisions?

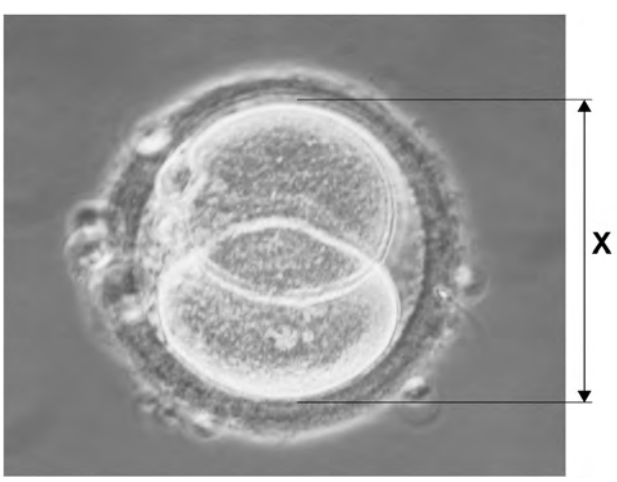
[1 mark]

Tick (✓) **one** box.

3 ☐ 6 ☐ 8 ☐ 9 ☐

Figure 7 shows a different human embryo.

Figure 7



0 3 . 7 Measure image length **X** on **Figure 7**.

[1 mark]

Give your answer in millimetres (mm).

X = _____ mm

4.1.1.5 Microscopy

Question 06 · continued

0 3 . 8 The image in **Figure 7** has been magnified ×500

Calculate the real length of the embryo.

Use the equation:

$$\text{real length of the embryo} = \frac{\text{image length}}{\text{magnification}}$$

Give your answer in micrometres (μm).

1 mm = 1000 μm

[3 marks]

Real length of the embryo = _____ μm

0 3 . 9 The embryo may **not** implant in the lining of the uterus.

The embryo will then be lost from the woman's body several days later.

Explain why the woman may **not** notice this has happened.

[2 marks]

13

4.1.1.5 Microscopy

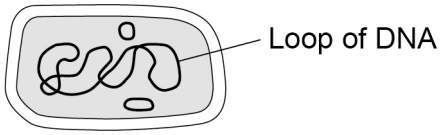
Question 07

November 2020 | 8461/1F | Original Q1

0 1 This question is about cells.

0 1 . 1 **Figure 1** shows a cell.

Figure 1



What type of cell is shown in **Figure 1**?

[1 mark]

Tick (✓) **one** box.

Animal ☐

Bacterium ☐

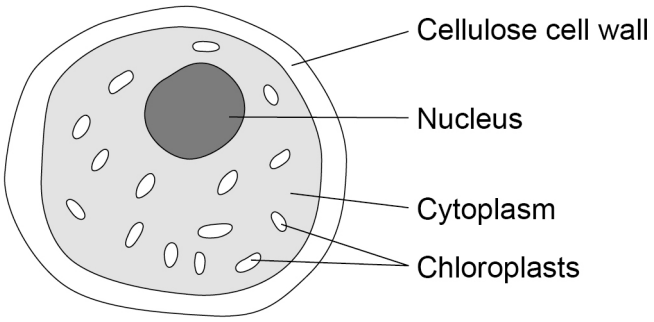
Plant ☐

4.1.1.5 Microscopy

Question 07 · continued

Figure 2 shows an algal cell.

Figure 2



0 1 . 2 What is the function of the cell wall?

[1 mark]

Tick (✓) **one** box.

- To contain the genetic material ☐
- To stop the chloroplasts leaking out ☐
- To strengthen the cell ☐

0 1 . 3 The algal cell is green.

Which part of the algal cell makes it green in colour?

[1 mark]

Tick (✓) **one** box.

- Cellulose ☐
- Chloroplast ☐
- Cytoplasm ☐
- Nucleus ☐

4.1.1.5 Microscopy

Question 07 · continued

0 1 . 4 Cells contain sub-cellular structures.

Draw **one** line from each structure to its function.

[3 marks]

Structure	Function
	Controls transport of substances into the cell
Cell membrane	
	Where energy is released
Mitochondria	
	Where glucose is made
Ribosomes	
	Where photosynthesis takes place
	Where proteins are made

4.1.1.5 Microscopy

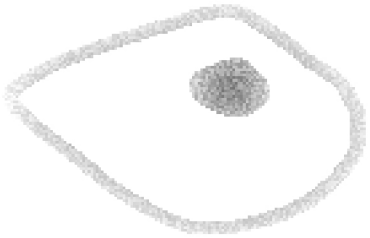
Question 07 · continued

A student prepared a microscope slide of cheek cells.

The student looked at one cell using a microscope.

Figure 3 shows the image the student saw.

Figure 3



0 1 . 5 What should the student do to get a clear image?

[1 mark]

Tick (✓) **one** box.

Adjust the focus knob ☐

Make the light dimmer ☐

Put water on the slide ☐

Question 1 continues on the next page

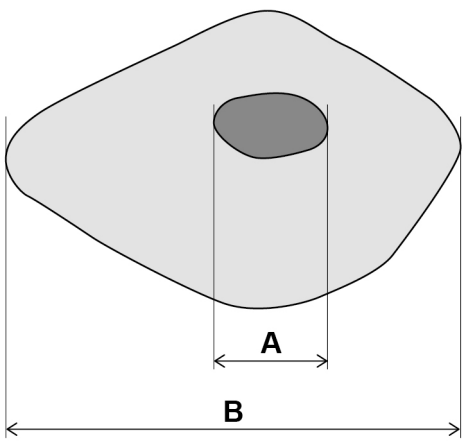
4.1.1.5 Microscopy

Question 07 · continued

The student then obtained a clear image.

Figure 4 shows the clear image.

Figure 4



0 1 . 6 Measure the length of the nucleus (**A**) and the length of the cell (**B**) in millimetres (mm).

[2 marks]

A = _____ mm

B = _____ mm

0 1 . 7 How many times longer is the cell (**B**) than the nucleus (**A**)?

[1 mark]

_____

Number of times longer = _____

4.1.1.5 Microscopy

Question 07 · continued

0 1 . 8 The student looked at another cell.

The image width of the cell was 40 mm

The real width of the cell was 0.1 mm

Calculate the magnification of the cell.

[2 marks]

Use the equation:

$$\text{magnification} = \frac{\text{size of image}}{\text{size of real object}}$$

Magnification = × _____

12

Turn over for the next question

4.1.1.5 Microscopy

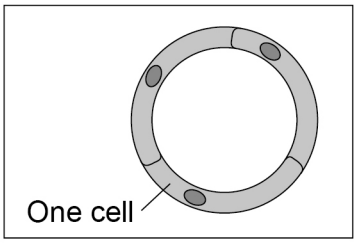
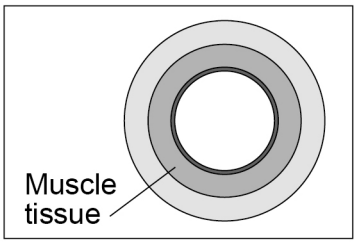
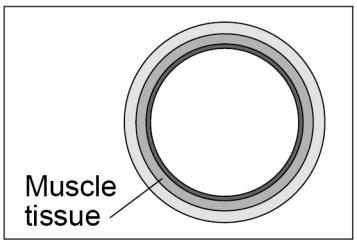
Question 08

November 2020 | 8461/1F | Original Q6

0 6 Blood is transported around the body in blood vessels.

0 6 . 1 Draw **one** line from each type of blood vessel to the structure of the blood vessel.

[2 marks]

Type of blood vessel	Structure of blood vessel
Artery	
Capillary	
Vein	

0 6 . 2 Explain how the structure of an artery is related to its function.

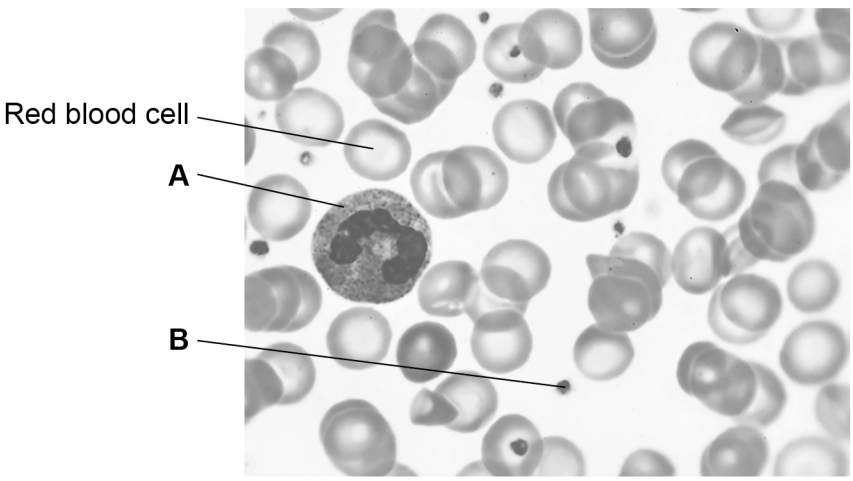
[2 marks]

4.1.1.5 Microscopy

Question 08 · continued

Figure 9 shows blood viewed through a microscope.

Figure 9



0 6 . 3 Name **A** and **B** in **Figure 9**.

[2 marks]

A _____

B _____

0 6 . 4 A red blood cell:

- has no nucleus
- contains a red pigment called haemoglobin.

Suggest how these adaptations help the red blood cell carry out its function.

[2 marks]

No nucleus _____

_____

Haemoglobin _____

_____

4.1.1.5 Microscopy

Question 08 · continued

0 6 . 5 The blood components are carried around the body in the liquid part of the blood.

What is the liquid part of the blood called?

[1 mark]

Tick (✓) **one** box.

Cell sap ☐

Plasma ☐

Saliva ☐

Urine ☐

Table 2 shows the results of a man's blood test.

Table 2

Blood component	Patient results	Normal range
Red blood cells	4.8	4.5 to 6.5
Lymphocytes	2.6	1.0 to 4.0
Neutrophils	5.1	1.8 to 7.5
Platelets	50	140 to 400

0 6 . 6 Which component of the man's blood is **not** within the normal range?

[1 mark]

0 6 . 7 Suggest a symptom the man might show.

[1 mark]

11

4.1.1.5 Microscopy

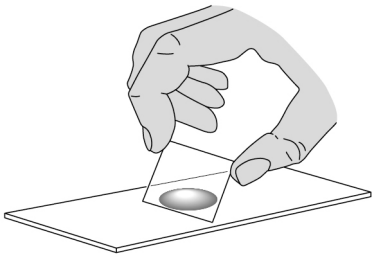
Question 09

November 2021 | 8461/1F | Original Q7

0 7 A student prepared some animal cells to view using a microscope.

Figure 14 shows the student preparing the cells.

Figure 14



0 7 . 1 Name **two** pieces of laboratory equipment the student could have used to **prepare** cells to view using a microscope.

[2 marks]

1 _____

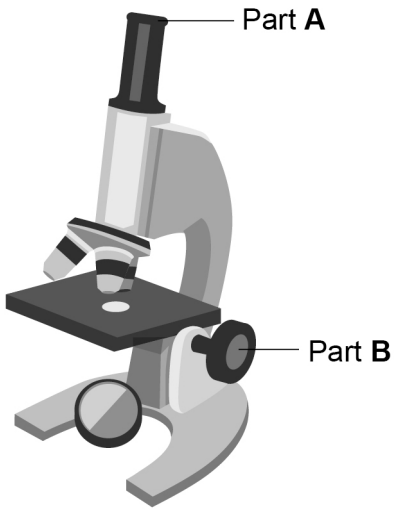
2 _____

4.1.1.5 Microscopy

Question 09 · continued

Figure 15 shows the student's light microscope.

Figure 15



0 7 . 2 Name part **A**.

[1 mark]

0 7 . 3 What is the function of part **B**?

[1 mark]

0 7 . 4 The student tried to look at the cells using the microscope.

Suggest **one** reason why the student could **not** see any cells when looking through part **A**.

[1 mark]

Question 7 continues on the next page

4.1.1.5 Microscopy

Question 09 · continued

0 7 . 5 Red blood cells are specialised animal cells.

Compare the structure of a red blood cell with the structure of a plant cell.

[6 marks]

0 7 . 6 When placed into a beaker of water:

- a red blood cell bursts
- a plant cell does **not** burst.

Explain why the red blood cell bursts but the plant cell does **not** burst.

[2 marks]

13

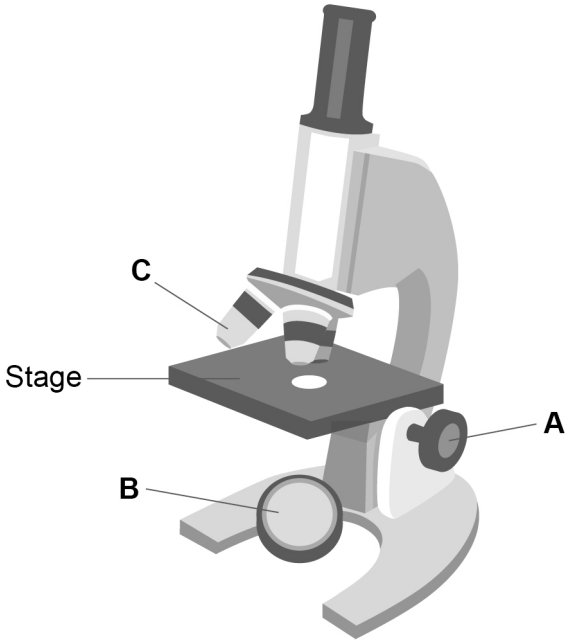
4.1.1.5 Microscopy

Question 10

June 2022 | 8461/1F | Original Q4

0 4 **Figure 3** shows a microscope.

Figure 3



0 4 . 1 Draw **one** line from each part of the microscope to the function of the part.

[3 marks]

Part of the microscope	Function
	To adjust the focus of the microscope
A	To direct light into the viewer's eye
B	To hold a slide in place
	To magnify the image of a specimen
C	To support the microscope

4.1.1.5 Microscopy

Question 10 · continued

A student prepared some onion cells.

The student viewed the onion cells using a microscope.

This is the method used.

1. Cut an onion into pieces using a sharp knife.
2. Peel off a thin layer of cells from one piece.
3. Place the layer of cells onto a microscope slide.
4. Add three drops of iodine solution to the layer of cells.
5. Cover with a cover slip.
6. Place the slide on the stage of the microscope.

0 4 . 2 Why was iodine solution added to the layer of onion cells?

[1 mark]

Tick (✓) **one** box.

To dry the cells ☐

To separate the cells ☐

To stain the cells ☐

0 4 . 3 Why was a **thin** layer of onion cells used?

[1 mark]

Tick (✓) **one** box.

To allow light to pass through the cells ☐

To allow oxygen to pass through the cells ☐

To allow water to pass through the cells ☐

Question 4 continues on the next page

0 4 . 4 The student was worried about using a sharp knife to cut the onion.

The student wrote a risk assessment for using a knife.

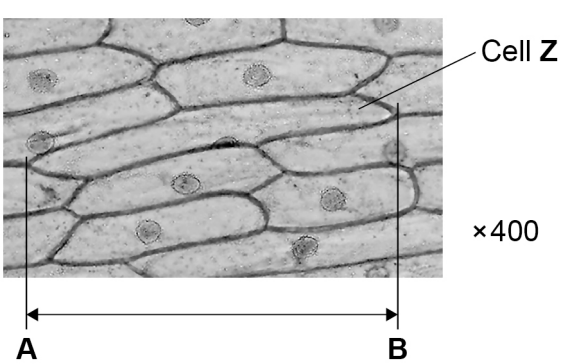
Draw **one** line from each part of the risk assessment to the description of the part.

[2 marks]

Part of risk assessment	Description
Hazard	Call a first aider
	Cut the onion on a chopping board
Plan to minimise risk	The onion is cut into pieces
	The knife is sharp

Figure 4 shows what the student saw using the microscope at a magnification of ×400.

Figure 4



4.1.1.5 Microscopy

Question 10 · continued

0 4 . 5 Line **A**–**B** in **Figure 4** shows the length of cell **Z**.

Calculate the real length of cell **Z**.

Complete the following steps.

[4 marks]

Measure the length of line **A**–**B** in millimetres (mm).

Length of line **A**–**B** = _____ mm

Give your measurement of the length of line **A**–**B** in micrometres (μm).

1 mm = 1 000 μm

Length of line **A**–**B** = _____ μm

Calculate the real length of cell **Z**.

Use the equation:

$$\text{real length of cell } \mathbf{Z} \text{ (in μm)} = \frac{\text{length of line } \mathbf{A}\text{–}\mathbf{B} \text{ (in μm)}}{\text{magnification}}$$

Real length of cell **Z** = _____ μm

Question 4 continues on the next page

4.1.1.5 Microscopy

Question 10 · continued

0 4 . 6 How would onion cells look different if they were seen using an electron microscope?

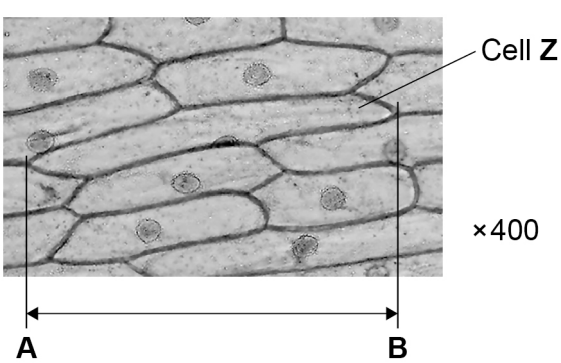
[2 marks]

Tick (✓) **two** boxes.

- The cells would be coloured. ☐
- The cells would have no nuclei. ☐
- The cells would look larger. ☐
- The cells would look more blurred. ☐
- The cells would show more internal structures. ☐

0 4 . 7 **Figure 4** is repeated below.

Figure 4

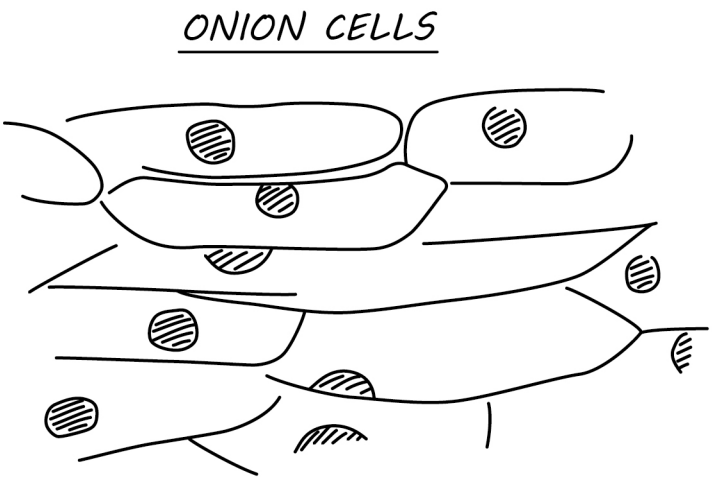


4.1.1.5 Microscopy

Question 10 · continued

Figure 5 shows the student's drawing of **Figure 4**.

Figure 5



What **two** improvements could the student make to the drawing in **Figure 5**?

[2 marks]

Tick (✓) **two** boxes.

- Add colour to the cells. ☐
- Complete the cell walls. ☐
- Draw each cell on a separate piece of paper. ☐
- Include the magnification. ☐
- Use a ruler to draw the cells. ☐

15

4.1.1.5 Microscopy

Question 11

June 2024 | 8461/1F | Original Q5

0 5 Cancer occurs when there is uncontrolled cell division.

0 5 . 1 Which **two** factors can cause cancer?

[2 marks]

Tick (✓) **two** boxes.

- Antibiotics ☐
- Ionising radiation ☐
- Monoclonal antibodies ☐
- Salmonella ☐
- Viruses ☐

0 5 . 2 What type of cell division occurs in cancerous cells?

[1 mark]

Tick (✓) **one** box.

- Binary fission ☐
- Fertilisation ☐
- Mitosis ☐

4.1.1.5 Microscopy

Question 11 · continued

0 5 . 3 Complete the sentences.

Choose answers from the box.

[2 marks]

decrease	**fertilise**	**grow**	**replicate**

Before a cell divides, the cell needs to _____.

Before a cell divides, the DNA in the nucleus needs to _____.

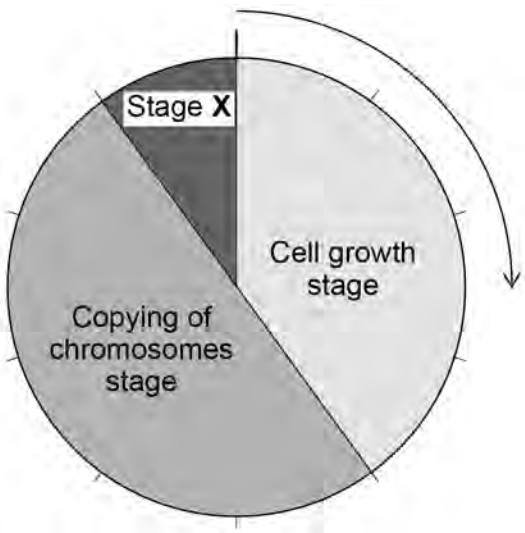
Question 5 continues on the next page

4.1.1.5 Microscopy

Question 11 · continued

Figure 4 shows the cell cycle.

Figure 4



0 5 . 4 What percentage of the time taken for the cell cycle does the cell growth stage take?

Use **Figure 4**.

[1 mark]

Tick (✓) **one** box.

10% ☐ 20% ☐ 40% ☐ 90% ☐

0 5 . 5 What happens during stage **X** of the cell cycle in **Figure 4**?

[1 mark]

Tick (✓) **one** box.

Chromosomes are pulled to each end of the cell. ☐

The cell increases in size and mass. ☐

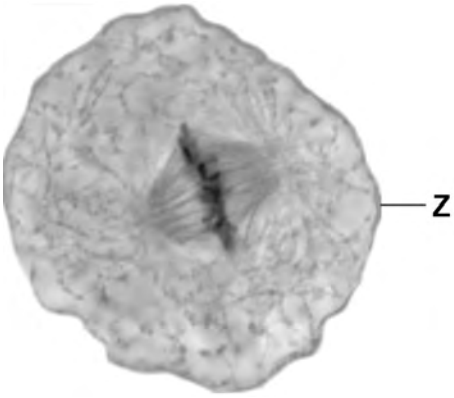
The number of mitochondria increases. ☐

4.1.1.5 Microscopy

Question 11 · continued

Figure 5 shows an animal cell during cell division.

Figure 5



0 5 . 6 Name structure **Z** in **Figure 5**.

[1 mark]

Question 5 continues on the next page

4.1.1.5 Microscopy

Question 11 · continued

0 5 . 7 The image of the cell in **Figure 5**:

- is magnified 800 times
- has a width of 50 mm.

Calculate the real width of the cell in **Figure 5**.

Give your answer in micrometres (µm).

Use the equation:

$$\text{real width of cell} = \frac{\text{width of image of cell}}{\text{magnification}}$$

1 mm = 1000 µm

[3 marks]

Real width of cell = _____ µm

4.1.1.5 Microscopy

Question 11 · continued

Some drugs can treat cancer.

0 5 . 8 Complete the sentences.

Choose answers from the box.

[2 marks]

cells	**people**	**plants**	**viruses**

Preclinical testing of cancer drugs is done using _____.

To check if the drug is safe, the drug is tested on _____.

0 5 . 9 In drug trials some patients are given a tablet which does **not** contain the drug.

What name is given to the tablet that does **not** contain the drug?

[1 mark]

_____

14

4.1.1.5 Microscopy

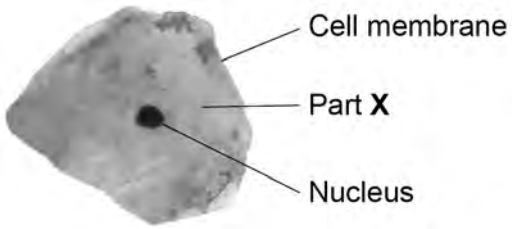
Question 12

June 2025 | 8461/1F | Original Q1

0 1 This question is about cells.

0 1 . 1 **Figure 1** shows an animal cell seen through a microscope.

Figure 1



What is part **X** in **Figure 1**?

[1 mark]

Tick (✓) **one** box.

Cytoplasm ☐

Mitochondrion ☐

Vacuole ☐

0 1 . 2 Name **one** structure found in the nucleus.

[1 mark]

0 1 . 3 Name **one** cell part that is found in a plant cell but is **not** found in an animal cell.

[1 mark]

4.1.1.5 Microscopy

Question 12 · continued

0 1 . 4 Root hair cells are found in plants.

Which substance do root hair cells absorb from the soil?

[1 mark]

Tick (✓) **one** box.

Glucose ☐

Protein ☐

Water ☐

0 1 . 5 A sperm cell is a specialised cell.

What is the function of a sperm cell?

[1 mark]

Question 1 continues on the next page

4.1.1.5 Microscopy

Question 12 · continued

0 1 . 6 Draw **one** line from each specialised cell to the type of organism where the specialised cell is found.

[2 marks]

Specialised cell	Type of organism
Nerve cell	Animals
Xylem cell	Bacteria
	Fungi
	Plants

0 1 . 7 The cell membrane controls which substances move into and out of cells.

Which **two** processes move substances into and out of cells?

[2 marks]

Tick (✓) **two** boxes.

- Active transport ☐
- Diffusion ☐
- Mitosis ☐
- Mutation ☐
- Respiration ☐

4.1.1.5 Microscopy

Question 12 · continued

0 1 . 8 **Table 1** shows substances that are exchanged between the blood and muscle cells.

Complete **Table 1** to show the direction of movement of each substance.

[3 marks]

Tick (✓) **one** box in each row.

Table 1

Substance	Direction of movement of substance		
	ONLY from blood to muscle cells	**ONLY from muscle cells to blood**	**From blood to muscle cells AND from muscle cells to blood**
Carbon dioxide			
Oxygen			
Water			

12

4.1.1.5 Microscopy

Question 13

June 2025 | 8461/1F | Original Q3

0 3 Blood contains different types of cell.

0 3 . 1 Complete the sentences.

Choose answers from the box.

[2 marks]

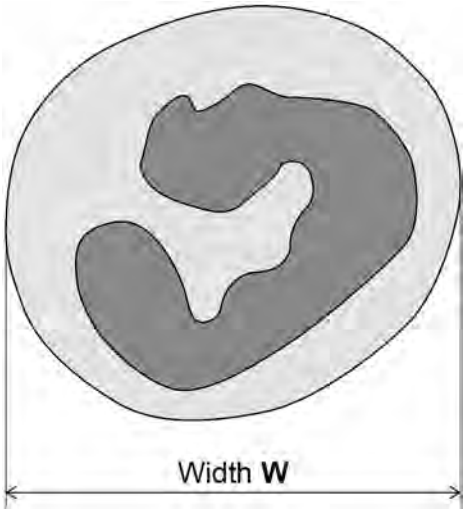
antibiotics	**antitoxins**	**painkillers**	**pathogens**

White blood cells defend the body against _____.

Some white blood cells release chemicals that neutralise toxins. These chemicals are called _____.

0 3 . 2 **Figure 3** shows a white blood cell.

Figure 3



The image of the white blood cell in **Figure 3** is magnified 4000 times.

4.1.1.5 Microscopy

Question 13 · continued

Calculate the real width of the white blood cell.

[4 marks]

Complete the following steps.

Measure width **W** in millimetres (mm).

Width **W** = _____ mm

Convert your measurement to micrometres (µm).

1 millimetre (mm) = 1000 micrometres (µm).

_____

_____

Width **W** in micrometres = _____ µm

Calculate the real width of the white blood cell.

Use the equation:

$$\text{real width} = \frac{\text{width } \mathbf{W} \text{ (µm)}}{\text{magnification}}$$

_____

_____

_____

_____

Real width = _____ µm

Table 3 shows information about different types of blood vessel.

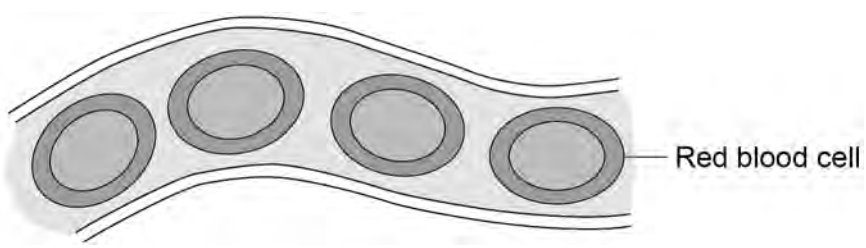
Table 3

Blood vessel	Width of blood vessel in micrometres (µm)	Pressure of blood travelling through the blood vessel
Artery	10 000	High
Capillary	10	Low
Vein	20 000	Very low

0 3 . 3 The width of a red blood cell is 8 µm.

Figure 4 shows red blood cells in one type of blood vessel.

Figure 4



Which type of blood vessel is shown in **Figure 4**?

Use **Table 3**.

[1 mark]

Tick (✓) **one** box.

Artery ☐

Capillary ☐

Vein ☐

4.1.1.5 Microscopy

Question 13 · continued

0 3 . 4 Explain why arteries need to have thick walls.

Use **Table 3**.

[2 marks]

Coronary arteries in the heart can become narrowed.

0 3 . 5 What happens inside coronary arteries to cause them to become narrowed?

[1 mark]

0 3 . 6 Explain why narrowed coronary arteries can be dangerous.

[2 marks]

Question 3 continues on the next page

4.1.1.5 Microscopy

Question 13 · continued

0 3 . 7 Treatments are available for some cardiovascular diseases.

Draw **one** line from each cardiovascular disease to a treatment for the disease.

[3 marks]

Cardiovascular disease	Treatment
A blocked coronary artery	Antibiotics
Heart failure	Heart transplant
High blood cholesterol	Statins
	Stent

0 3 . 8 Why is coronary heart disease described as a 'non-communicable disease'?

[1 mark]

_____

_____

16