AQA GCSE Biology | 8461

SPECIFICATION POINT 4.1.1.2

Animal and plant cells

Past-paper questions

Tier	**Foundation**
Question groups	**42**
Available paper years	**2008–2025**

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:** _____

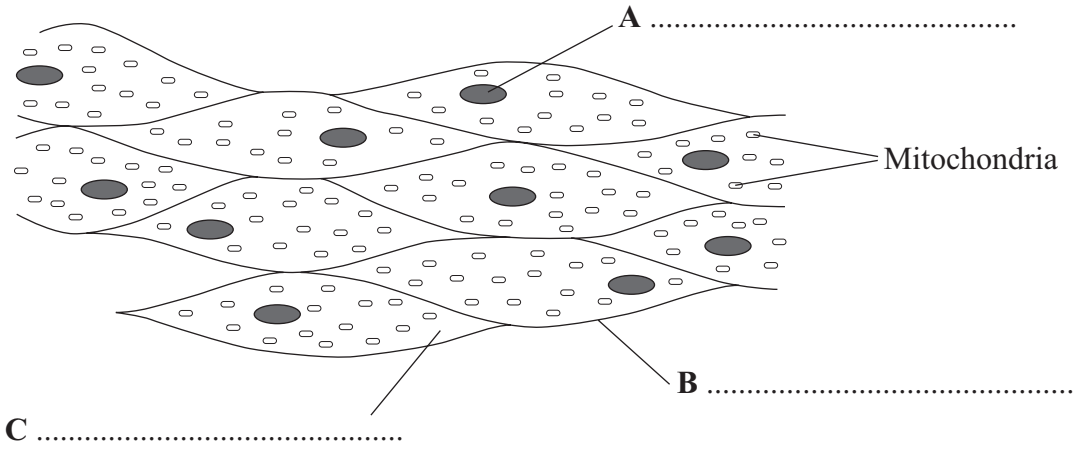
Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.1.1.2 Animal and plant cells

Question 01

January 2008 | BLY2F | Original Q1 | Legacy

1 The diagram shows a group of muscle cells from the wall of the intestine.



(a) On the diagram, use words from the box to name the structures labelled **A**, **B** and **C**.

cell membrane	**cell wall**	**chloroplast**	**cytoplasm**	**nucleus**

(3 marks)

(b) How are these muscle cells adapted to release a lot of energy?

.....

.....

.....

(2 marks)

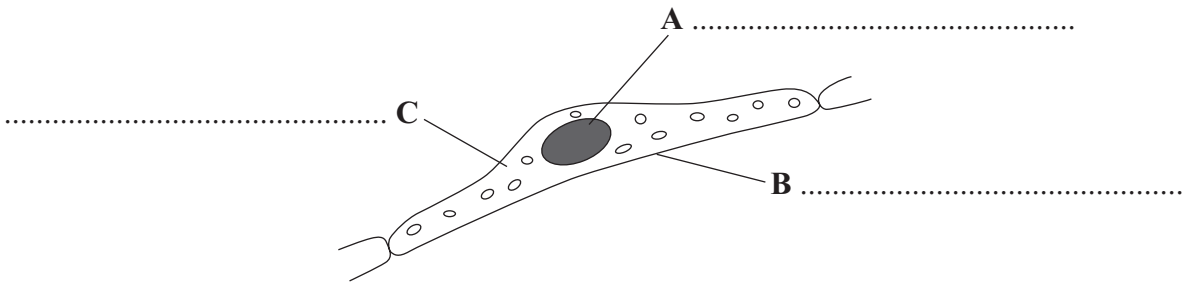
5

4.1.1.2 Animal and plant cells

Question 02

June 2008 | BLY2F | Original Q1 | Legacy

1 The diagram shows a cell from the lining of the lung. This cell is specialised to allow gases to pass through quickly.



1 (a) Use words from the box to label structures **A**, **B** and **C**.

cell membrane	**chloroplast**	**cytoplasm**	**mitochondria**	**nucleus**

(3 marks)

1 (b) (i) Which feature of this cell allows oxygen to pass through quickly?

Put a tick (✓) in the box next to your choice.

It is thin. ☐

It has a large nucleus. ☐

It has many mitochondria. ☐

(1 mark)

1 (b) (ii) Complete the sentence by drawing a ring around the correct answer in the box.

Oxygen passes through this cell by [diffusion / osmosis / respiration] .

(1 mark)

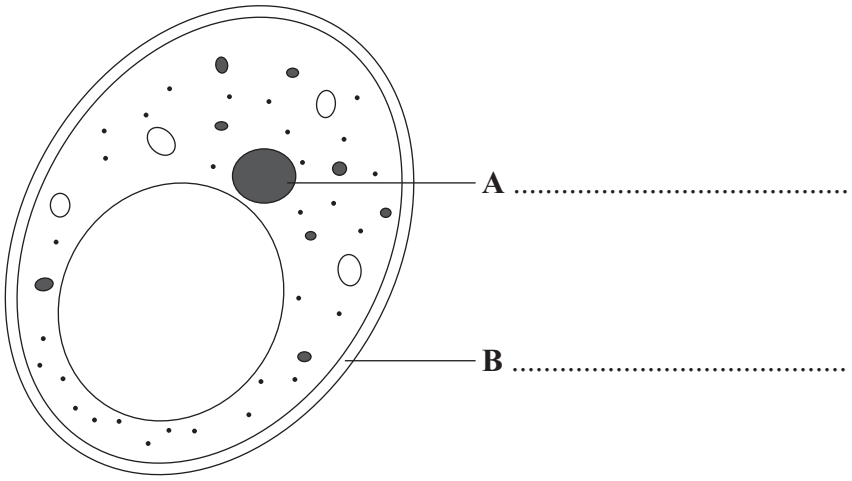
5

4.1.1.2 Animal and plant cells

Question 03

June 2008 | BLY3F | Original Q1 | Legacy

1 The diagram shows a yeast cell.



1 (a) Label structures **A** and **B** on the diagram.

Choose your answers from the list in the box.

cell membrane	**cell wall**	**nucleus**	**vacuole**

(2 marks)

1 (b) In bread making, the dough rises because a gas is produced by the yeast.

1 (b) (i) Which gas is produced by the yeast?

Draw a ring around **one** answer.

carbon dioxide **oxygen** **sulfur dioxide**

(1 mark)

1 (b) (ii) Name the process which produces this gas.

Draw a ring around **one** answer.

digestion **respiration** **transpiration**

(1 mark)

4.1.1.2 Animal and plant cells

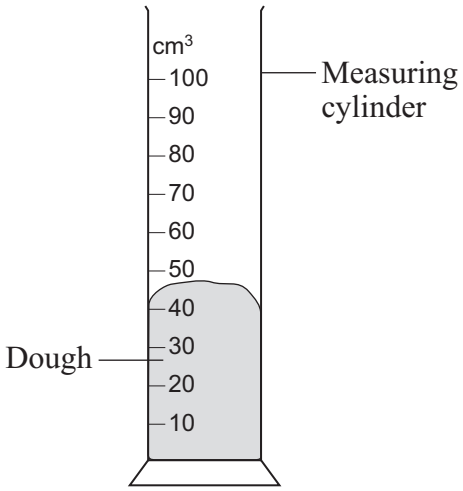
Question 03 · continued

for mark

1 (c) Some students investigated the effect of temperature on the rising of bread dough.

They mixed flour, yeast and water to make the dough.

They then placed pieces of dough into separate measuring cylinders, as shown in the diagram.



The students placed each measuring cylinder in a separate water bath.

Each water bath was at a different temperature.

The table shows the increase in volume of each piece of dough after 30 minutes.

Temperature in °C	0	10	20	25	30	35	40	50
Increase in volume of dough in cm^3	0	6	20	30	42	50	40	11

1 (c) (i) Give **one** variable which the students should have kept constant for each measuring cylinder.

.....

(1 mark)

1 (c) (ii) Use the table of results to find the temperature which gave the largest increase in the volume of the dough.

..... °C

(1 mark)

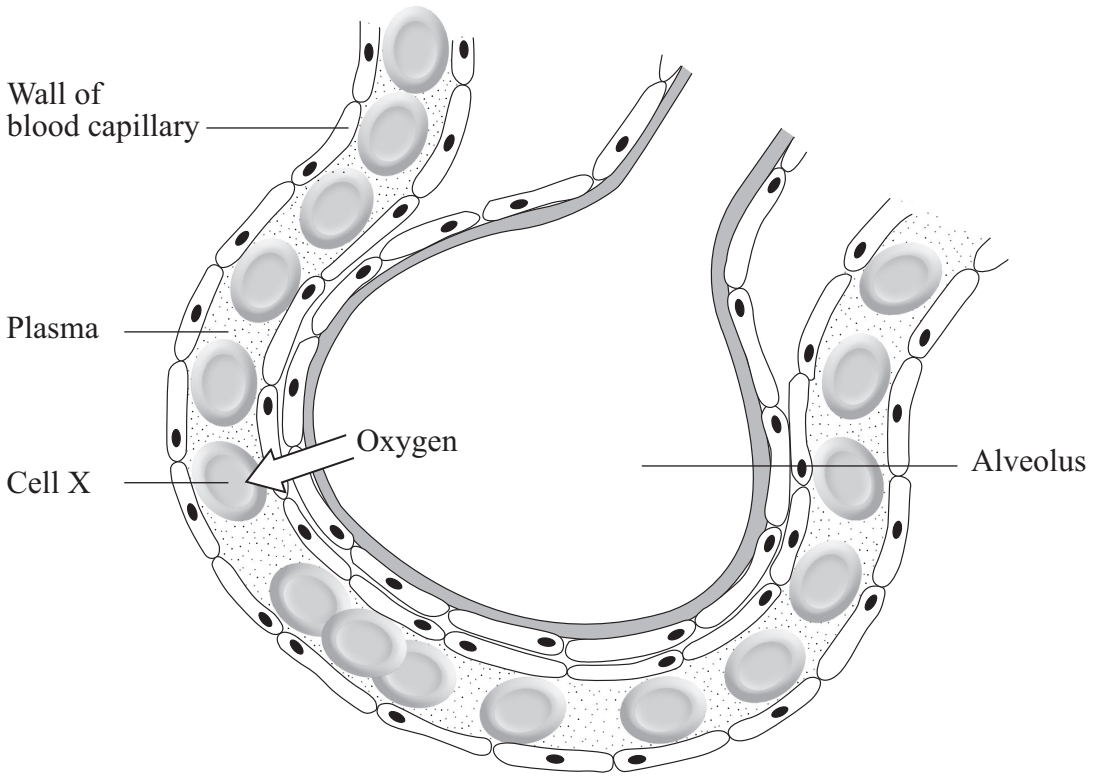
6

4.1.1.2 Animal and plant cells

Question 04

June 2008 | BLY3F | Original Q4 | Legacy

4 The diagram shows a small part of a lung.



4 (a) The arrow on the diagram shows the movement of oxygen from the air in the alveolus to cell **X**.

Complete the sentences by drawing a ring around the correct answer.

4 (a) (i) Cell **X** is a

platelet
red cell
white cell

.

(1 mark)

4 (a) (ii) Oxygen moves from the air in the alveolus into cell **X** by

diffusion
filtration
respiration

.

(1 mark)

4 (a) (iii) The substance in cell **X** that combines with oxygen is called

glycogen
haemoglobin
lactic acid

.

(1 mark)

4.1.1.2 Animal and plant cells

Question 04 · continued

for mark

4 (a) (iv) Cell **X** does **not** have

a cell membrane
cytoplasm
a nucleus

.

(1 mark)

4 (b) **On the diagram**, draw an arrow to show the movement of carbon dioxide during gas exchange. *(1 mark)*

5

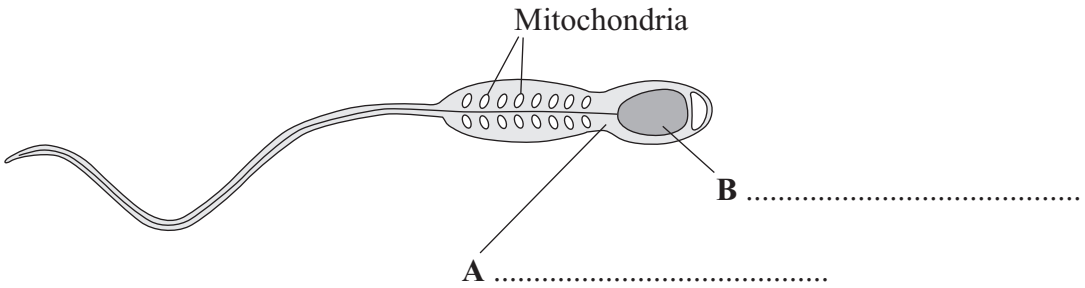
4.1.1.2 Animal and plant cells

Question 05

January 2009 | BLY2F | Original Q1 | Legacy

1 This question is about cells.

1 (a) (i) The diagram shows a sperm cell.

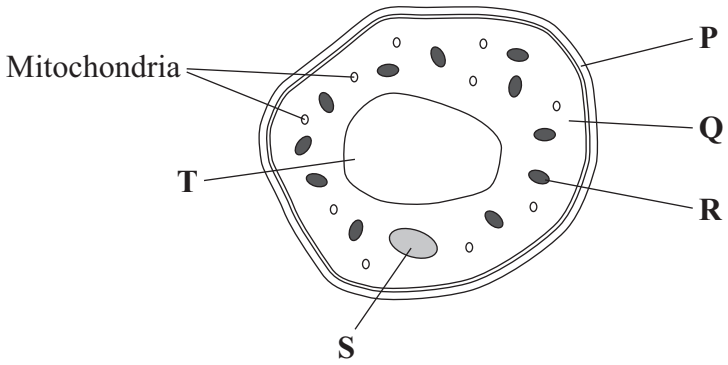


Use words from the box to label parts **A** and **B**.

cell membrane	**cytoplasm**	**nucleus**

(2 marks)

1 (a) (ii) The diagram shows a cell from a leaf.



Give the letters of **two** parts of the leaf cell which would **not** be found in a sperm cell. ☐ and ☐

(1 mark)

4.1.1.2 Animal and plant cells

Question 05 · continued

for mark

1 (b) Sperm cells have many mitochondria.

Why do sperm cells need many mitochondria?

Tick (✓) **one** box.

Sperm cells are involved in fertilisation. ☐

Sperm cells are produced in very large numbers. ☐

Sperm cells need a lot of energy to swim. ☐

(1 mark)

4

Turn over for the next question

4.1.1.2 Animal and plant cells

Question 06

January 2009 | BLY3F | Original Q1 | Legacy

1 (a) Draw a ring around **one** word to answer each of the following questions.

1 (a) (i) Which type of blood vessel carries blood out of the heart?

artery **capillary** **vein**

(1 mark)

1 (a) (ii) Which type of blood vessel allows substances to enter and leave the blood?

artery **capillary** **vein**

(1 mark)

1 (b) Use words from the box to complete the sentences.

alveoli	**cell membrane**	**nucleus**
plasma	**red blood cells**	**villi**

Oxygen enters the blood through the walls of the ..... .

Most of the oxygen transported by the blood is carried in the

..... .

A red blood cell is different from other body cells because it does not have a

..... .

(3 marks)

5

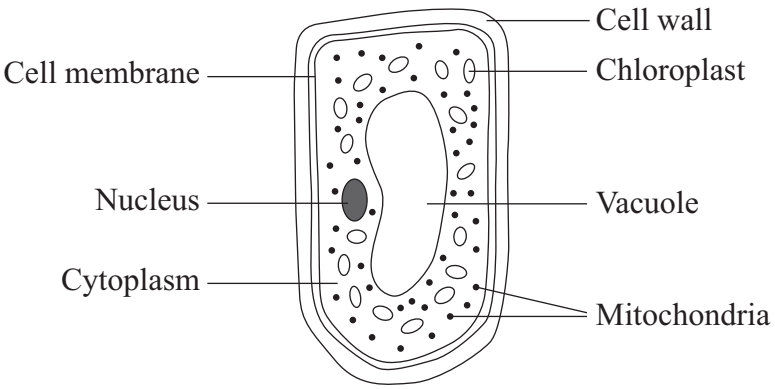
4.1.1.2 Animal and plant cells

Question 07

June 2009 | BLY2F | Original Q1 | Legacy

1 **Diagram 1** shows a cell from a leaf.

Diagram 1



1 (a) How is the leaf cell specialised to carry out photosynthesis?

Tick (✓) **one** box.

It has a permanent vacuole. ☐

It has many chloroplasts. ☐

It has cytoplasm. ☐

It has many mitochondria. ☐

(1 mark)

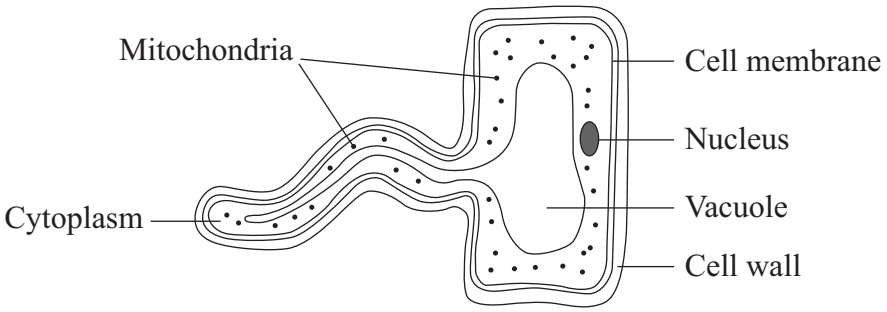
4.1.1.2 Animal and plant cells

Question 07 · continued

for mark

1 (b) **Diagram 2** shows another type of plant cell.

Diagram 2



Give **two** ways in which this cell is different from an animal cell.

1.....

.....

2.....

.....

(2 marks)

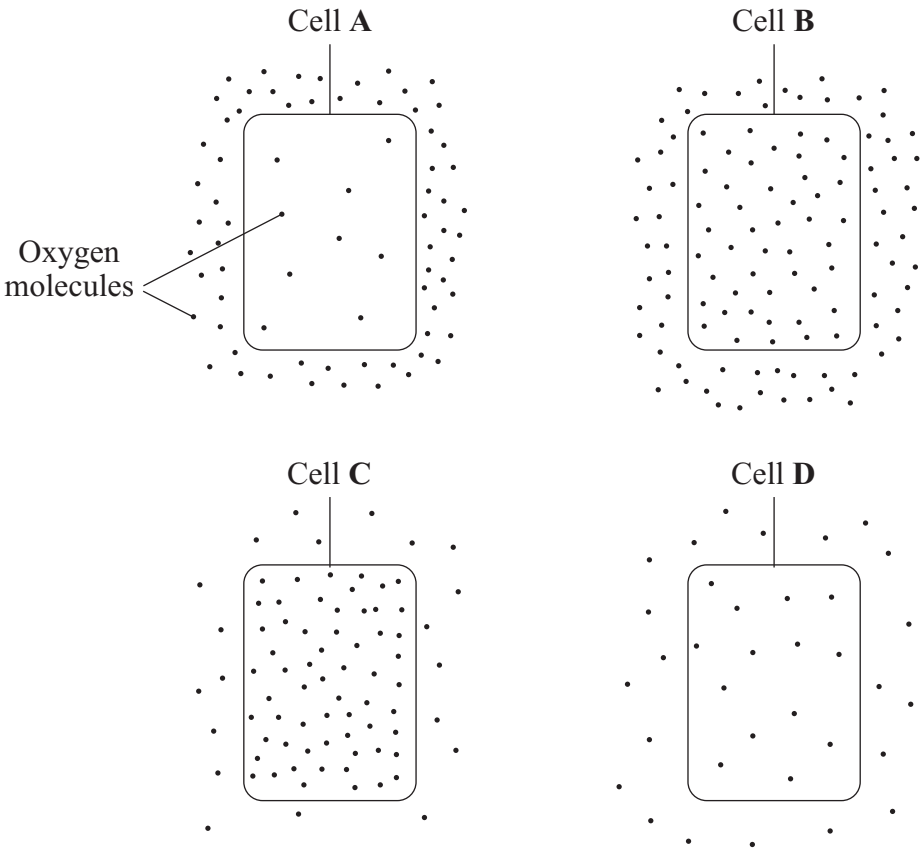
3

4.1.1.2 Animal and plant cells

Question 08

June 2009 | BLY2F | Original Q2 | Legacy

2 (a) The diagrams show cells containing and surrounded by oxygen molecules. Oxygen can move into cells or out of cells.



Into which cell, **A**, **B**, **C** or **D**, will oxygen move the fastest?

Write your answer, **A**, **B**, **C** or **D**, in the box.

(1 mark)

4.1.1.2 Animal and plant cells

Question 08 · continued

for mark

2 (b) Draw a ring around the correct word to complete each sentence.

2 (b) (i) Oxygen is taken into cells by the process of

diffusion
osmosis
respiration

.

(1 mark)

2 (b) (ii) Cells need oxygen for

breathing
photosynthesis
respiration

.

(1 mark)

2 (b) (iii) The parts of cells that use up the most oxygen are the

membranes
mitochondria
nuclei

.

(1 mark)

2 (b) (iv) Some cells produce oxygen in the process of

diffusion
photosynthesis
respiration

.

(1 mark)

5

4.1.1.2 Animal and plant cells

Question 09

2 Humans reproduce sexually.

Draw a ring around the correct answer to complete each sentence.

2 (a) (i) At fertilisation chromosomes / genes / sex cells join together.

(1 mark)

2 (a) (ii) At fertilisation a single cell forms, which has new pairs of chromosomes. / nuclei. / sex cells.

(1 mark)

2 (b) Cystic fibrosis can be inherited by children whose parents do not have it.

2 (b) (i) A person who has cystic fibrosis has two / three / four copies of the cystic fibrosis allele.

(1 mark)

2 (b) (ii) The cystic fibrosis allele is large. / recessive. / strong.

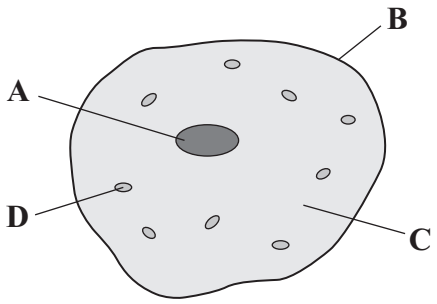
(1 mark)

4.1.1.2 Animal and plant cells

Question 09 · continued

for mark

2 (c) The diagram shows a human body cell.



Choose the correct answer from the box to complete each sentence.

cell membrane	**cell wall**	**cytoplasm**	**nucleus**

2 (c) (i) The part of the cell labelled **B** is the ..... .

(1 mark)

2 (c) (ii) The part of the cell labelled **C** is the ..... .

(1 mark)

2 (d) Which part of the cell, **A**, **B**, **C** or **D**:

2 (d) (i) contains the allele for cystic fibrosis ☐

(1 mark)

2 (d) (ii) is affected by cystic fibrosis? ☐

(1 mark)

8

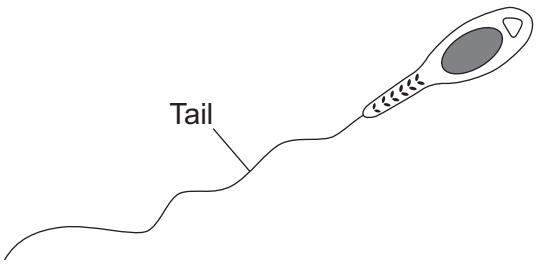
4.1.1.2 Animal and plant cells

Question 10

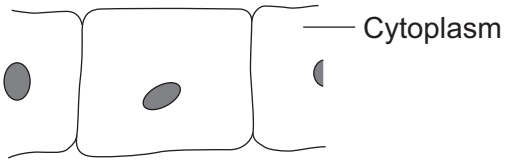
June 2010 | BLY2F | Original Q1 | Legacy

1 The diagrams show four types of cell, **A**, **B**, **C** and **D**.
Two of the cells are plant cells and two are animal cells.

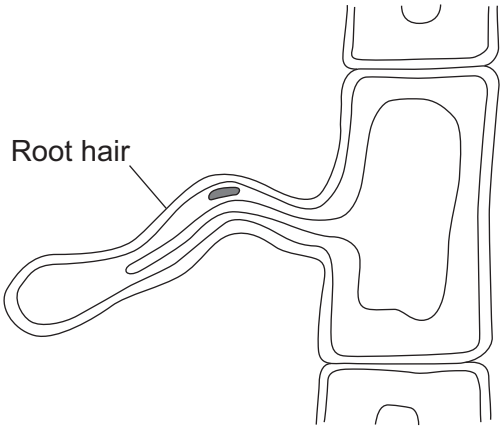
A



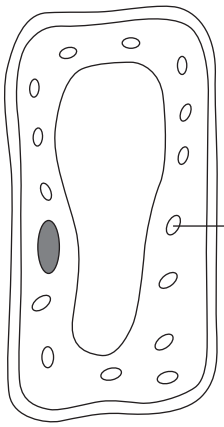
B



C



D



1 (a) (i) Which **two** of the cells are plant cells?

Tick (✓) **one** box.

A and **B** ☐

A and **D** ☐

C and **D** ☐

(1 mark)

4.1.1.2 Animal and plant cells

Question 10 · continued

1 (a) (ii) Which part is found **only** in plant cells?

Draw a ring around **one** answer.

cell membrane **cell wall** **nucleus**

(1 mark)

1 (b) (i) Which cell, **A**, **B**, **C** or **D**, is adapted for swimming? ☐

(1 mark)

1 (b) (ii) Which cell, **A**, **B**, **C** or **D**, can produce glucose by photosynthesis? ☐

(1 mark)

1 (c) Cells **A**, **B**, **C** and **D** all use oxygen.

For what process do cells use oxygen?

Draw a ring around **one** answer.

osmosis **photosynthesis** **respiration**

(1 mark)

5

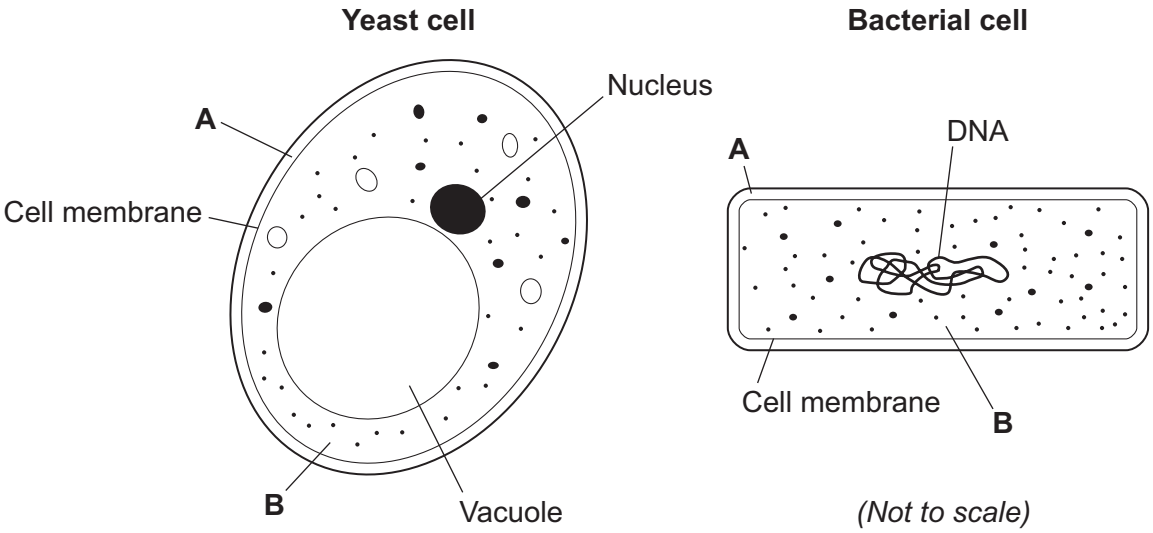
4.1.1.2 Animal and plant cells

Question 11

June 2010 | BLY3F | Original Q7 | Legacy

7 Sourdough bread is light in texture and tastes slightly sour. It is made using two types of microorganism, a yeast and a bacterium. The bacterium can make acids such as lactic acid. This acid makes the bread taste sour.

7 (a) The diagrams show the structures of the yeast cell and the bacterial cell.



7 (a) (i) Both the yeast cell and the bacterial cell have structures **A** and **B**.

Name structures **A** and **B**.

A .....

B .....

(2 marks)

7 (a) (ii) The yeast cell and the bacterial cell have different shapes.

Give **one** other way in which the structure of the bacterial cell is different from the structure of the yeast cell.

.....

.....

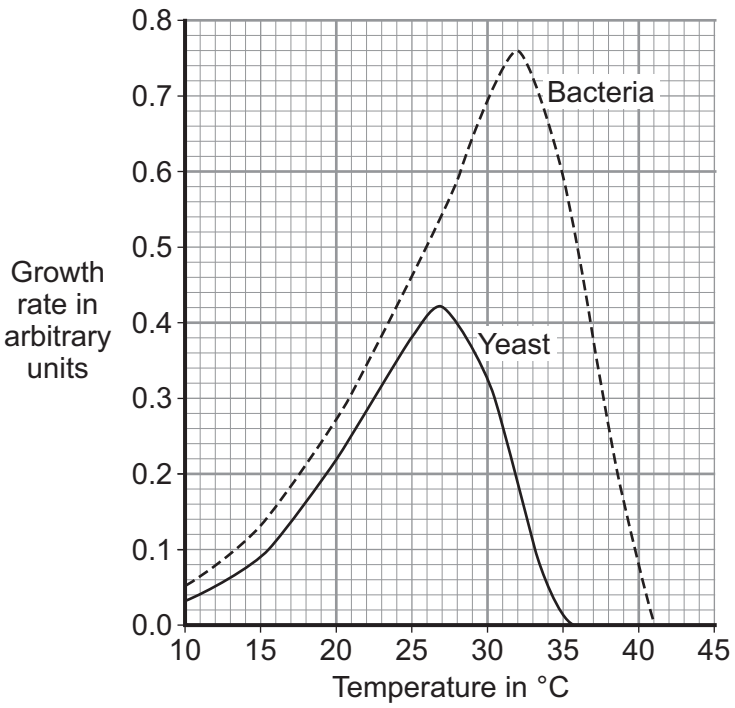
(1 mark)

Question 7 continues on the next page

4.1.1.2 Animal and plant cells

Question 11 · continued

7 (b) The graph shows how the growth rates of the yeast and the bacteria change with temperature.



7 (b) (i) Sourdough bread rises fastest at 27 °C.

Explain why.

.....

.....

.....

.....

(2 marks)

7 (b) (ii) The bread has a sourer taste if it rises at 32 °C.

Explain why.

.....

.....

.....

.....

(2 marks)

4.1.1.2 Animal and plant cells

Question 11 · continued

7 (b) (iii) The growth rate of the yeast is unaffected by pH in the range 3.5 to 7.0 pH units.

Why is this useful in the production of sourdough bread?

.....

.....

(1 mark)

8

Turn over for the next question

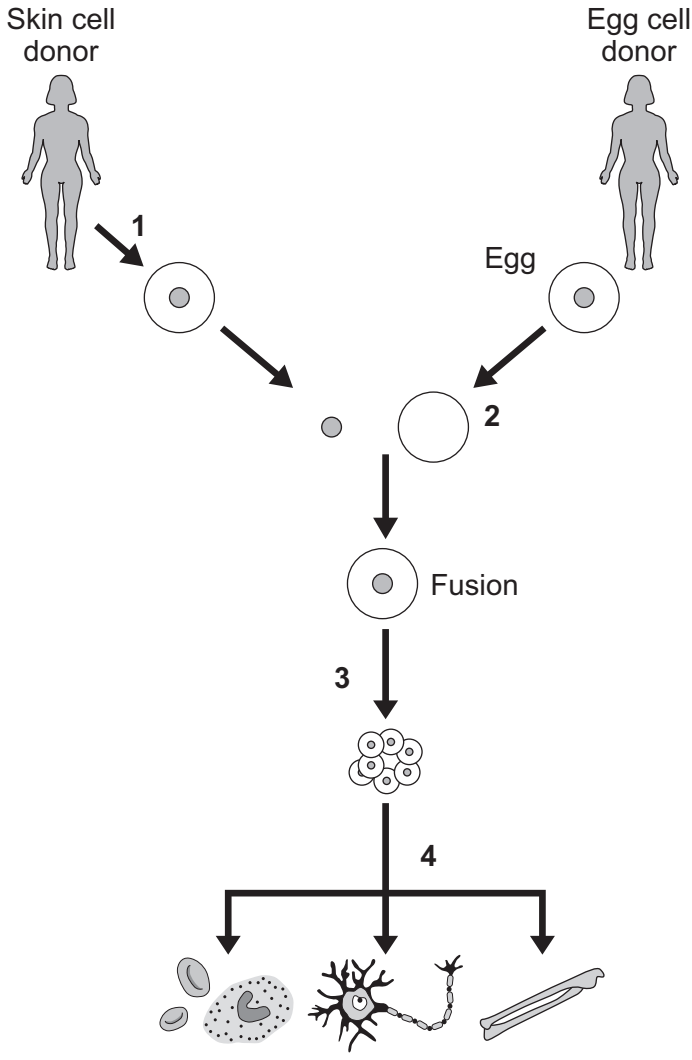
4.1.1.2 Animal and plant cells

Question 12

November 2010 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

Fusion cell cloning can make different types of body cell. The diagram shows one way of doing this.



Match statements, **A**, **B**, **C** and **D**, with the stages **1–4** on the diagram.

A A skin cell is taken from a donor.

B The new cell divides to make a group of similar cells.

C Different types of body cell are produced.

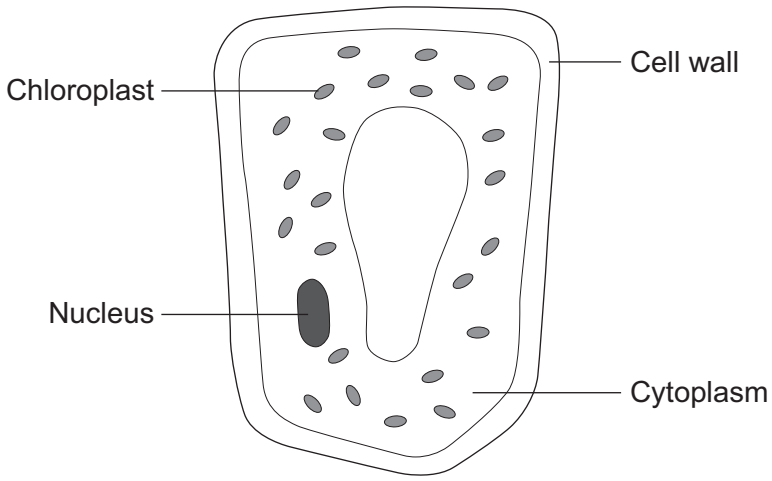
D The nucleus is removed, leaving cytoplasm.

4.1.1.2 Animal and plant cells

Question 13

January 2011 | BLY2F | Original Q1 | Legacy

1 The diagram shows a plant cell from a leaf.



1 (a) **List A** gives the names of three parts of the cell.
List B gives the functions of parts of the cell.

Draw a line from each part of the cell in **List A** to its function in **List B**.

List A **Parts of the cell**	**List B** **Functions**
	Where most of the chemical reactions take place
Nucleus	
	Absorbs light energy to make food
Cytoplasm	
	Strengthens the cell
Chloroplast	
	Controls the activities of the cell

(3 marks)

4.1.1.2 Animal and plant cells

Question 13 · continued

1 (b) Respiration takes place in the cell.

Draw a ring around the correct answer to complete the sentence.

All cells use respiration to release

- energy.
- oxygen.
- sugar.

(1 mark)

4

Turn over for the next question

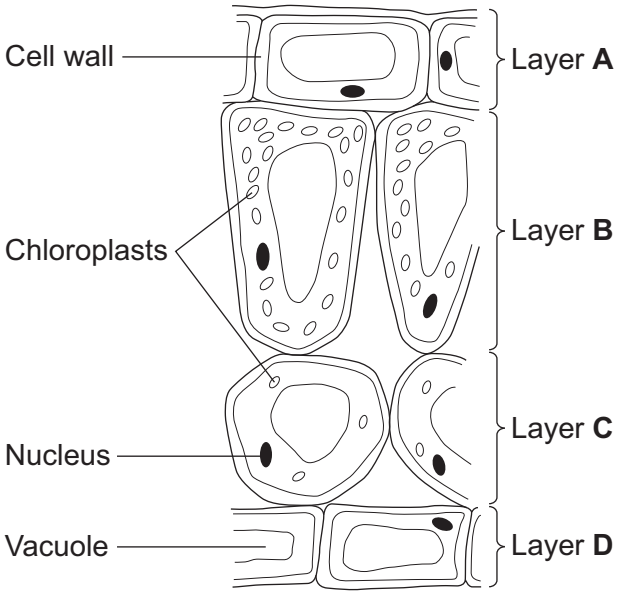
4.1.1.2 Animal and plant cells

Question 14

June 2011 | BLY2F | Original Q1 | Legacy

1 Leaves are made from layers of cells.

The diagram shows a section through part of a leaf.



1 (a) (i) Which word in the table describes layer **A**?

Tick (✓) **one** box.

Layer A	Tick (✓)
Tissue	
Organ	
Cell	

(1 mark)

1 (a) (ii) Which word describes a whole leaf?

Draw a ring around **one** answer.

organ **tissue** **organism**

(1 mark)

4.1.1.2 Animal and plant cells

Question 14 · continued

1 (b) (i) Which **two** layers of cells, **A**, **B**, **C** and **D**, can photosynthesise?

Use information from the diagram to help you.

Tick (✓) **two** boxes.

Layer **A** ☐

Layer **B** ☐

Layer **C** ☐

Layer **D** ☐

(2 marks)

1 (b) (ii) Give **one** reason for your answer.

.....

.....

(1 mark)

1 (c) List **X** gives the names of two parts of a cell.
List **Y** gives information about parts of a cell.

Draw **one** line between each part of the cell in list **X** and information about it in list **Y**.

List X **Part of a cell**	**List Y** **Information**
	Controls the passage of substances into the cell
Vacuole	
	Contains the cell sap
Nucleus	
	Controls the activities of the whole cell

(2 marks)

7

4.1.1.2 Animal and plant cells

Question 15

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

4.1.1.2 Animal and plant cells

Question 16

June 2012 | BL1FP | Original Q4 | Legacy

4 When animals die, they usually fall to the ground and decay.
In 1977 the body of a baby mammoth was discovered.
The baby mammoth died 40 000 years ago and its body froze in ice.

The picture shows the mammoth.



© Ria Novosti/Science Photo Library

4 (a) Explain why the body of the baby mammoth did **not** decay.

.....

.....

.....

.....

(2 marks)

4.1.1.2 Animal and plant cells

Question 16 · continued

4 (b) Mammoths are closely related to modern elephants.
The pictures show these two animals.

What scientists think a mammoth looked like



Modern elephant



© Christian Darkin/Science Photo Library

Mammoths are *extinct*. What does *extinct* mean?

.....

.....

(1 mark)

Question 4 continues on the next page

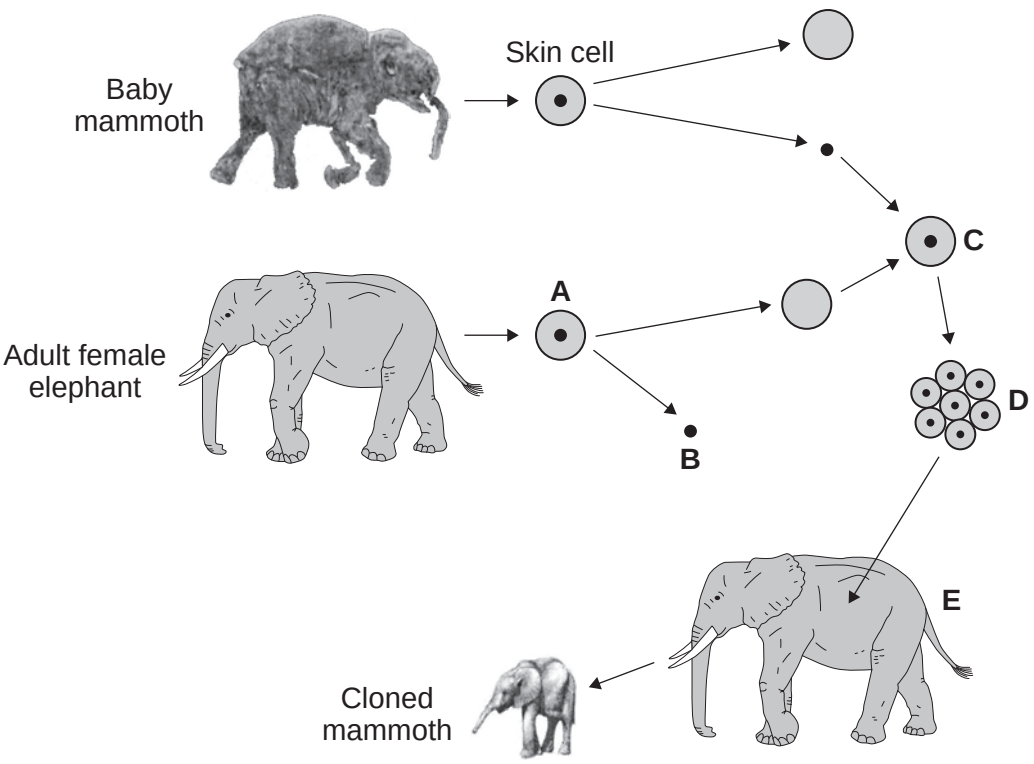
4.1.1.2 Animal and plant cells

Question 16 · continued

4 (c) Scientists believe they may be able to use adult cell cloning to recreate a living mammoth.

The scientists will use a skin cell from the baby mammoth.

The diagrams show how the skin cell will be used.



In each question, draw a ring around the correct answer.

4 (c) (i) What type of cell is cell **A**?

skin cell **egg cell** **sperm cell**

(1 mark)

4 (c) (ii) Part **B** is removed from cell **A**.

What part of the cell is part **B**?

nucleus **cytoplasm** **cell membrane**

(1 mark)

4.1.1.2 Animal and plant cells

Question 16 · continued

4 (c) (iii) After cell **C** is formed, it divides into embryo cells.

What is done to cell **C** to make it divide?

Cell **C** is

treated with enzymes.
mixed with sperm cells.
given an electric shock.

(1 mark)

4 (c) (iv) The embryo cells form a ball of cells. The ball of cells will be put into female elephant, **E**.

Which part of elephant **E** is the ball of cells put into?

womb **stomach** **ovary**

(1 mark)

4 (d) The scientists expect any offspring of the adult cell cloning to look like a mammoth and **not** like an elephant.

Why?

.....

.....

(1 mark)

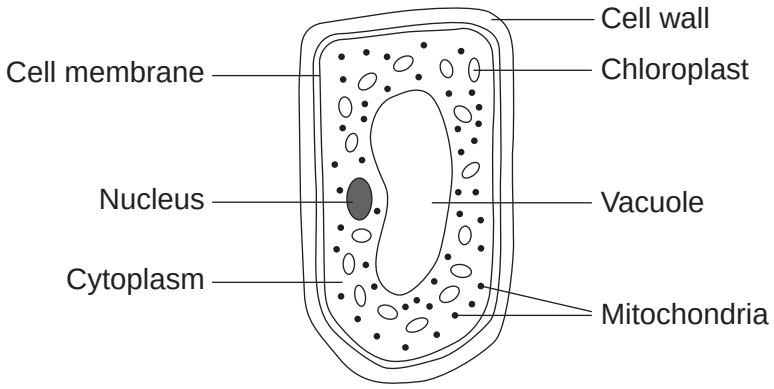
8

4.1.1.2 Animal and plant cells

Question 17

June 2012 | BL2FP | Original Q1 | Legacy

1 The diagram shows a cell from a plant leaf.



1 (a) Name the part of this cell that:

1 (a) (i) controls the passage of substances in and out of the cell

.....

(1 mark)

1 (a) (ii) is filled with cell sap.

.....

(1 mark)

1 (b) Give the names of **two** parts of the leaf cell that would **not** be found in a human liver cell.

..... and .....

(2 marks)

1 (c) The chloroplasts produce oxygen.

Draw a ring around the correct answer to complete the sentence.

The oxygen produced by the chloroplasts passes out of the cell by

diffusion.

digestion.

respiration.

(1 mark)

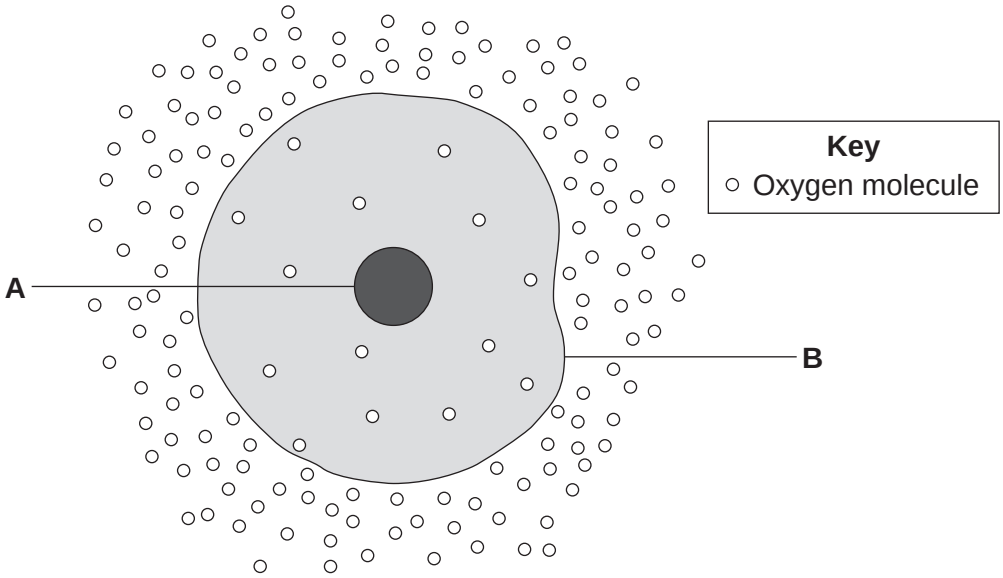
5

4.1.1.2 Animal and plant cells

Question 18

January 2013 | BL2FP | Original Q1 | Legacy

1 The diagram shows a cell.



1 (a) (i) Use words from the box to name the structures labelled **A** and **B**.

cell membrane	chloroplast	cytoplasm	nucleus

A .....

B .....

(2 marks)

1 (a) (ii) The cell in the diagram is an animal cell.

How can you tell it is an animal cell and **not** a plant cell?

Give **two** reasons.

1 .....

.....

2 .....

.....

(2 marks)

4.1.1.2 Animal and plant cells

Question 18 · continued

1 (b) Oxygen will diffuse into the cell in the diagram.

Why?

Use information from the diagram.

.....

.....

(1 mark)

1 (c) The cell shown in the diagram is usually found with similar cells.

Draw a ring around the correct answer to complete the sentence.

Scientists call a group of similar cells

- an organ.
- a system.
- a tissue.

(1 mark)

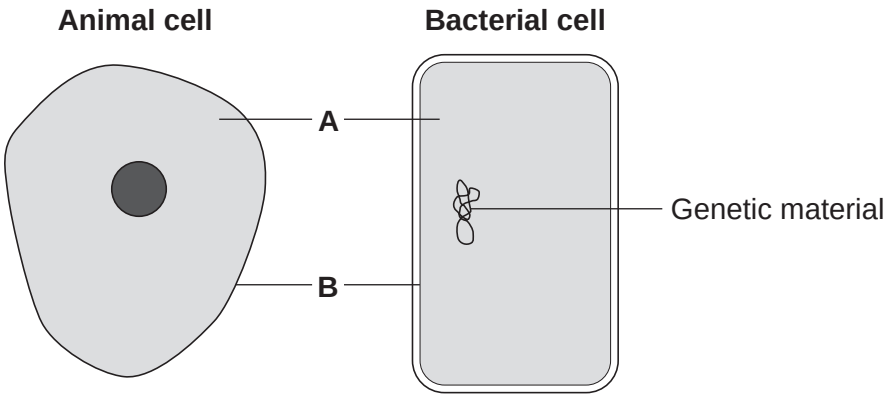
6

4.1.1.2 Animal and plant cells

Question 19

June 2013 | BL2FP | Original Q1 | Legacy

1 The diagrams show an animal cell and a bacterial cell.



1 (a) (i) Structures **A** and **B** are found in both the animal cell and the bacterial cell.

Use words from the box to name structures **A** and **B**.

cell membrane	**chloroplast**	**cytoplasm**	**vacuole**

A .....

B .....

(2 marks)

1 (a) (ii) Both cells contain genetic material.

Name the structure in the animal cell that contains genetic material.

.....

(1 mark)

4.1.1.2 Animal and plant cells

Question 19 · continued

1 (b) **List A** gives three structures found in animal cells.

List B gives four functions of cell structures.

Draw **one** line from each structure in **List A** to its correct function in **List B**.

List A – Structure	List B – Function
Cell membrane	Controls what substances enter the cell
Mitochondrion	Photosynthesis
Ribosome	Protein synthesis
	Respiration

(3 marks)

6

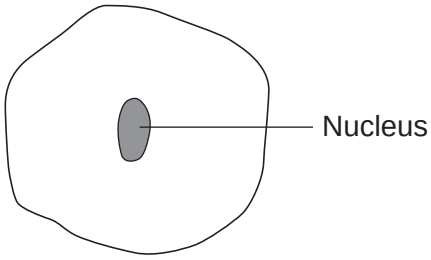
4.1.1.2 Animal and plant cells

Question 20

June 2014 | BL1FP | Original Q1 | Legacy

1 **Figure 1** shows a cell.

Figure 1



1 (a) Draw a ring around the correct answer to complete each sentence.

1 (a) (i) In the nucleus of a cell, genes are part of

chromosomes.
membranes.
receptors.

[1 mark]

1 (a) (ii) Different genes control different

characteristics
gametes
nuclei

of an organism.

[1 mark]

1 (a) (iii) Studying the similarities and differences between organisms allows us to

classify
clone
grow

the organisms.

[1 mark]

1 (b) Complete the following sentence.

[1 mark]

Living things can be grouped into animals, microorganisms and ..... .

4

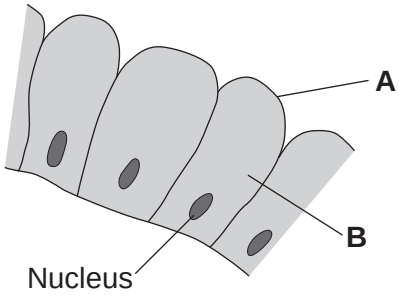
4.1.1.2 Animal and plant cells

Question 21

June 2014 | BL2FP | Original Q1 | Legacy

1 **Figure 1** shows some cells in the lining of the stomach.

Figure 1



1 (a) (i) Use words from the box to name structures **A** and **B**.

[2 marks]

cell membrane	**chloroplast**	**cytoplasm**	**vacuole**

A .....

B .....

1 (a) (ii) What is the function of the nucleus?

Tick (✓) **one** box.

[1 mark]

To control the activities of the cell ☐

To control movement of substances into and out of the cell ☐

To release energy in respiration ☐

4.1.1.2 Animal and plant cells

Question 21 · continued

1 (b) Draw **one** line from each part of the human body to its correct scientific name.

[3 marks]

Part of human body	Scientific name
Layer of cells lining the stomach	An organ
Stomach	An organism
Mouth, stomach, intestines, liver and pancreas	An organ system
	A tissue

6

4.1.1.2 Animal and plant cells

Question 22

June 2014 | BL3FP | Original Q3 | Legacy

3 Substances can move into cells and out of cells.

3 (a) Draw a ring around the correct answer to complete each sentence.

[2 marks]

Water moves into cells and out of cells by

- active transport.
- osmosis.
- reabsorption.

The water moves through a

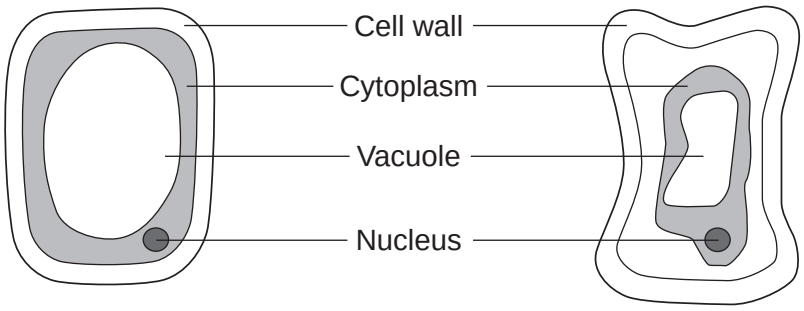
- freely permeable
- non-permeable
- partially permeable

membrane.

3 (b) Students put plant cells into two different strengths of sugar solutions, **A** and **B**.

Figure 5 shows what the cells looked like after 1 hour.

Figure 5



Cell in sugar solution **A** (after 1 hour)

Cell in sugar solution **B** (after 1 hour)

3 (b) (i) Describe **two** ways in which the cell in sugar solution **B** is different from the cell in sugar solution **A**.

[2 marks]

1 .....

.....

2 .....

.....

4.1.1.2 Animal and plant cells

Question 22 · continued

3 (b) (ii) A student put red blood cells into water.

Suggest what would happen to the cells.

[1 mark]

.....

.....

.....

3 (c) In the human body, glucose is absorbed into the blood from the small intestine.

The small intestine contains many villi.

Which **two** of the following help the absorption of glucose in the small intestine?

Tick (✓) **two** boxes.

[2 marks]

Villi have a cell wall. ☐

Villi are covered in thick mucus. ☐

Villi give the small intestine a large surface area. ☐

Villi have many blood capillaries. ☐

7

4.1.1.2 Animal and plant cells

Question 23

June 2015 | BL1FP | Original Q1 | Legacy

1 Humans use the nervous system to react to changes in the environment.

1 (a) (i) Which word means a change in the environment?

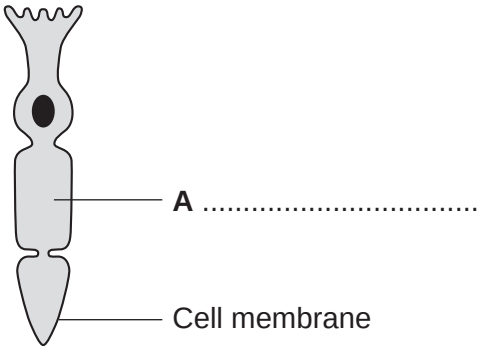
Draw a ring around the correct answer.

[1 mark]

neurone **reflex** **stimulus**

1 (a) (ii) **Figure 1** shows a light receptor cell.

Figure 1



Use the correct answer from the box to label part **A** on **Figure 1**.

[1 mark]

chloroplast	**cytoplasm**	**vacuole**

1 (b) **Figure 2** shows a boy riding a bicycle on a sunny day.

Figure 2



4.1.1.2 Animal and plant cells

Question 23 · continued

1 (b) (i) Receptors in the boy's body detect changes in the environment.

Complete **Table 1** to show which organ of the body contains the receptors for each change in the environment.

[3 marks]

Table 1

Change in the environment	Organ that contains the receptors
Sound of traffic from behind him	
Flashing blue lights of a police car	
Cooler air temperature in the shadows	

1 (b) (ii) The boy's response to danger is to pull on the bicycle brakes.

Which type of effector causes this response?

Tick (✓) **one** box.

[1 mark]

A gland ☐

A muscle ☐

A synapse ☐

6

4.1.1.2 Animal and plant cells

Question 24

June 2015 | BL1FP | Original Q4 | Legacy

4 Modern scientists use cloning techniques.

4 (a) Which **one** of the following is a method of producing cloned plants?

Tick (✓) **one** box.

[1 mark]

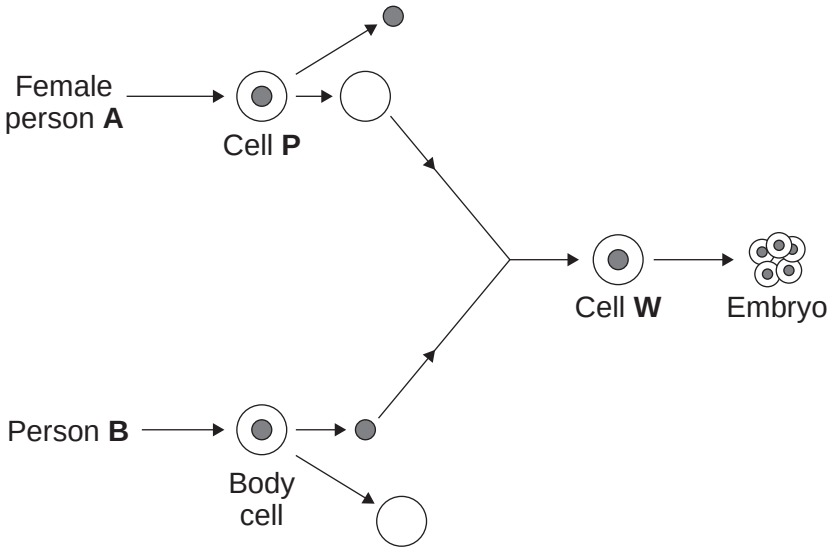
Joining male and female sex cells ☐

Taking cuttings from plants ☐

Transferring genes from one plant to another plant ☐

4 (b) **Figure 5** shows a method that could be used in the future to produce a human.

Figure 5



4 (b) (i) What is the name of the method shown in **Figure 5**?

Tick (✓) **one** box.

[1 mark]

Adult cell cloning ☐

Embryo transplant ☐

Tissue culture ☐

4.1.1.2 Animal and plant cells

Question 24 · continued

4 (b) (ii) What type of cell is cell **P**?

Draw a ring around the correct answer.

[1 mark]

an egg cell **a skin cell** **a sperm cell**

4 (b) (iii) Use the correct answer from the box to complete the sentence.

[1 mark]

cell membrane	**cytoplasm**	**nucleus**

The ..... of cell **P** is removed and is discarded.

4 (b) (iv) Use the correct answer from the box to complete the sentence.

[1 mark]

an electric shock	**enzymes**	**hormones**

To make cell **W** divide to form an embryo, the cell must be treated with

..... .

4 (b) (v) The embryo must be placed in an adult female to develop into a child.

Where, in the adult female, should the embryo be placed?

[1 mark]

.....

4 (c) Some children have kidney disease. Kidney disease cannot be cured.
In the future, scientists could make a healthy clone of a child with kidney disease.
One kidney could then be transplanted from the cloned child into the child with kidney disease. The cloned child would still live with only one remaining kidney.

Suggest **two** reasons why people might disagree with cloning a child to get a kidney for transplanting.

[2 marks]

1 .....

.....

2 .....

.....

8

4.1.1.2 Animal and plant cells

Question 25

June 2015 | BL2FP | Original Q4 | Legacy

4 Photosynthesis uses carbon dioxide to make glucose.

4 (a) (i) Complete the equation for photosynthesis.

[2 marks]

carbon dioxide + ... $\xrightarrow{\text{energy}}$ glucose + ...

4 (a) (ii) What type of energy does a plant use in photosynthesis?

[1 mark]

.....

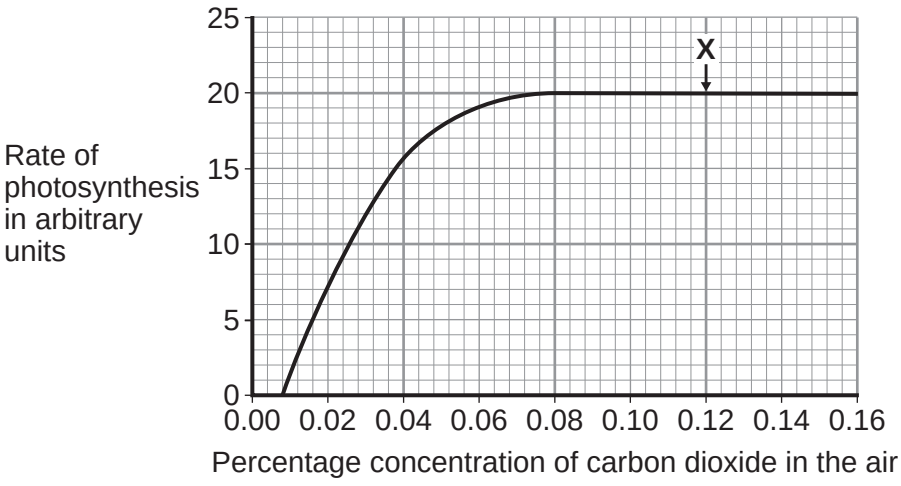
4 (a) (iii) Which part of a plant cell absorbs the energy needed for photosynthesis?

[1 mark]

.....

4 (b) **Figure 3** shows the effect of the concentration of carbon dioxide on the rate of photosynthesis in tomato plants at 20 °C.

Figure 3



4 (b) (i) What is the maximum rate of photosynthesis of the tomato plants shown in **Figure 3**?

[1 mark]

..... arbitrary units

4 (b) (ii) At point **X** on **Figure 3**, carbon dioxide is **not** a limiting factor of photosynthesis.

Suggest **one** factor that is limiting the rate of photosynthesis at point **X**.

[1 mark]

.....

4.1.1.2 Animal and plant cells

Question 25 · continued

4 (c) A farmer plans to grow tomatoes in a large greenhouse.

The concentration of carbon dioxide in the atmosphere is 0.04%.
The farmer adds carbon dioxide to the greenhouse so that its concentration is 0.08%.

4 (c) (i) Why does the farmer use 0.08% carbon dioxide?

[1 mark]

Tick (✓) **one** box.

- To increase the rate of growth of the tomato plants ☐
- To increase the rate of respiration of the tomato plants ☐
- To increase water uptake by the tomato plants ☐

4 (c) (ii) Why does the farmer **not** use a concentration of carbon dioxide higher than 0.08%?

[2 marks]

Tick (✓) **two** boxes.

- Because it would cost more money than using 0.08% ☐
- Because it would decrease the temperature of the greenhouse ☐
- Because it would not increase the rate of photosynthesis of the tomato plants any further ☐
- Because it would increase water loss from the tomato plants ☐

9

4.1.1.2 Animal and plant cells

Question 26

June 2016 | BL2FP | Original Q1 | Legacy

1 Living organisms are made of cells.

1 (a) Animal and plant cells have several parts. Each part has a different function.

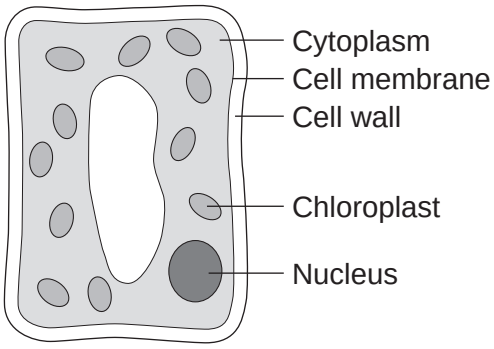
Draw **one** line from each cell part to the correct function of that part.

[3 marks]

Cell part	Function
Cell membrane	Where most energy is released in respiration
Mitochondria	Controls the movement of substances into and out of the cell
Nucleus	Controls the activities of the cell
	Where proteins are made

1 (b) **Figure 1** shows a cell from a plant leaf.

Figure 1



Which **two** parts in **Figure 1** are **not** found in an animal cell?

[2 marks]

1 _____

2 _____

5

4.1.1.2 Animal and plant cells

Question 27

June 2017 | BL2FP | Original Q1 | Legacy

1 Green plants make their own food.

1 (a) (i) What is the name of the process that plants use to make food?

[1 mark]

Draw a ring around the correct answer.

digestion **growth** **photosynthesis** **respiration**

1 (a) (ii) Plants need energy to make food.

Where does this energy come from?

[1 mark]

Draw a ring around the correct answer.

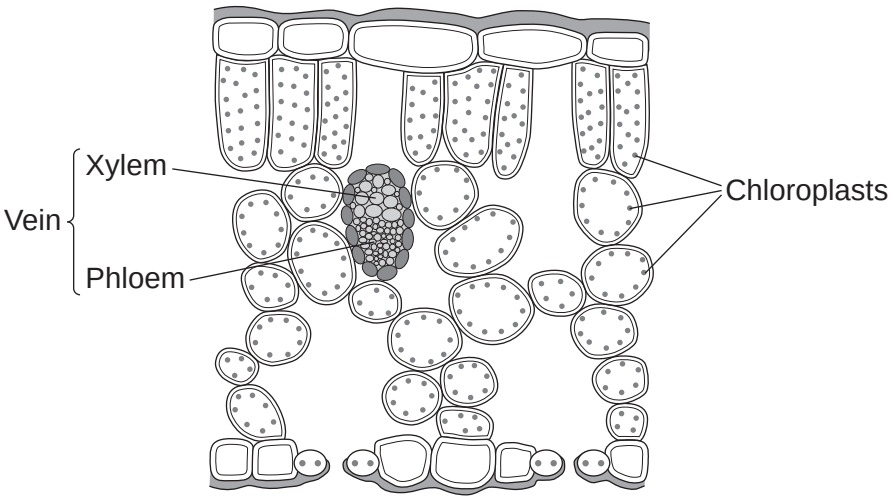
light **oxygen** **soil** **water**

1 (b) In plants, most of the food is made by the leaves.

Figure 1 shows a section through a plant leaf.

In the leaf, many of the cells contain chloroplasts.

Figure 1



1 (b) (i) Chloroplasts contain a green substance.

Name this green substance.

[1 mark]

_____

4.1.1.2 Animal and plant cells

Question 27 · continued

1 (b) (ii) How does this green substance help chloroplasts to make food?

[1 mark]

_____

_____

1 (b) (iii) What is the function of the vein shown in **Figure 1**?

[1 mark]

_____

_____

1 (b) (iv) Plants make glucose.

Name **two** substances a plant must take in to make glucose.

[2 marks]

1 _____

2 _____

7

4.1.1.2 Animal and plant cells

Question 28

June 2017 | BL2FP | Original Q6 | Legacy

6 There are many different types of cell in the human body.

6 (a) (i) Describe where epithelial cells are found in the human body.

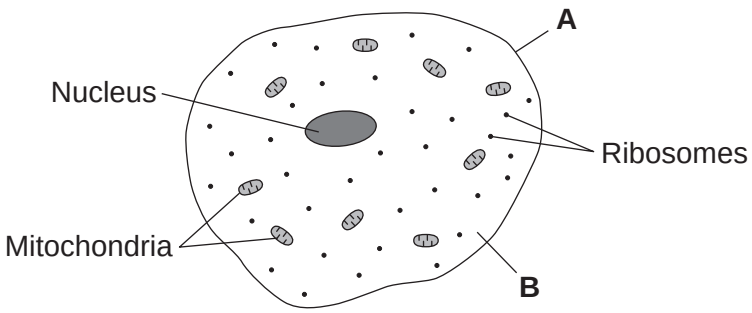
[1 mark]

_____

_____

6 (a) (ii) **Figure 6** shows an epithelial cell.

Figure 6



Name part **A** and part **B**.

[2 marks]

A _____

B _____

6 (b) What is the function of ribosomes?

[1 mark]

Tick (✓) **one** box.

Aerobic respiration ☐

Digestion ☐

Photosynthesis ☐

Protein synthesis ☐

4.1.1.2 Animal and plant cells

Question 28 · continued

6 (c) Carbon dioxide moves out of an epithelial cell by diffusion.

[2 marks]

What is diffusion?

_____

_____

_____

_____

6

Turn over for the next question

4.1.1.2 Animal and plant cells

Question 29

June 2018 | 8461/1F | Original Q2

0 2 Plants are made up of cells, tissues and organs.

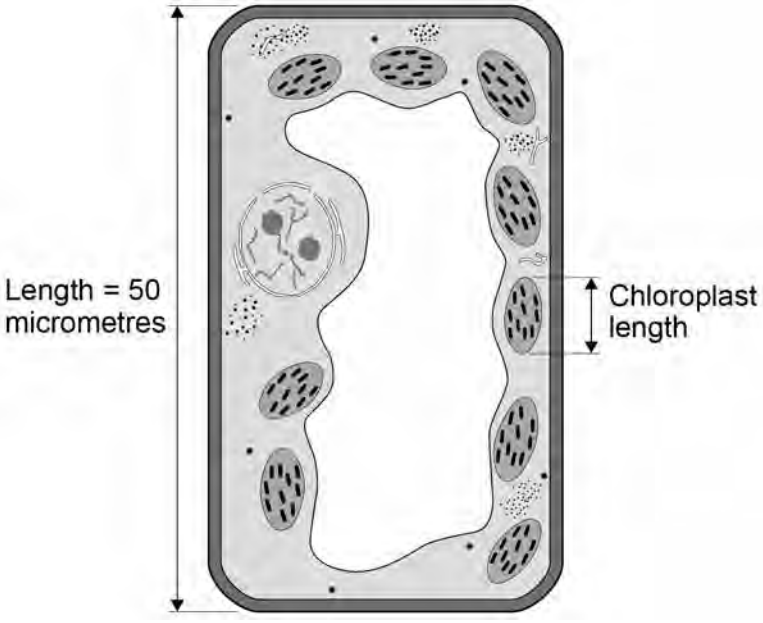
0 2 . 1 Draw **one** line from each level of organisation to the correct plant part.

[2 marks]

Level of organisation	Plant part
	Leaf
Organ	Root hair
	Spongy mesophyll
Tissue	Vacuole
	Xylem cell

Figure 3 shows a plant cell drawn to scale.

Figure 3



4.1.1.2 Animal and plant cells

Question 29 · continued

0 2 . 2 Where in a plant would the cell in **Figure 3** be found?

[1 mark]

Tick **one** box.

- Epidermis ☐
- Palisade mesophyll ☐
- Phloem ☐
- Xylem ☐

0 2 . 3 Calculate the length of the chloroplast labelled in **Figure 3**.

[2 marks]

Length = _____ micrometres

0 2 . 4 Cells in plant roots do **not** photosynthesise.

Give **one** reason why.

[1 mark]

4.1.1.2 Animal and plant cells

Question 29 · continued

0 2 . 5 As a plant grows, new root hair cells are formed from unspecialised cells.

How does an unspecialised cell become a new root hair cell?

[1 mark]

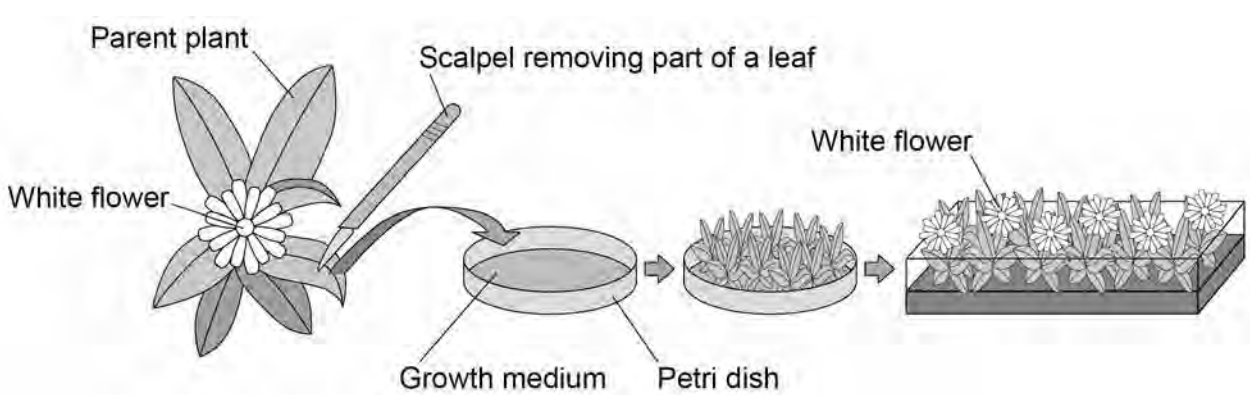
Tick **one** box.

- Differentiation ☐
- Metabolism ☐
- Transpiration ☐
- Transport ☐

Scientists can clone plants using tissue culture.

Figure 4 shows the process of tissue culture.

Figure 4



4.1.1.2 Animal and plant cells

Question 29 · continued

0 2 . 6 Why might scientists want to clone plants?

[1 mark]

Tick **one** box.

- To create new species of plants. ☐
- To introduce variation into plants. ☐
- To protect endangered plants from extinction. ☐
- To reduce disease resistance in plants. ☐

0 2 . 7 What is the advantage of cloning plants using tissue culture?

[1 mark]

Tick **one** box.

- No special equipment is needed. ☐
- Plants can be produced quickly. ☐
- The flowers are all different colours. ☐
- The offspring are all genetically different. ☐

0 2 . 8 The growth medium in **Figure 4** helps the plants to grow.

Name **one** substance in the growth medium.

[1 mark]

_____

_____

10

4.1.1.2 Animal and plant cells

Question 30

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]

4.1.1.2 Animal and plant cells

Question 30 · continued

June 2019 | 8461/1F | Original Q7

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]

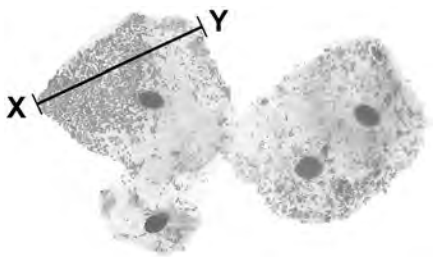
Question 7 continues on the next page

4.1.1.2 Animal and plant cells

Question 30 · 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 = × _____

4.1.1.2 Animal and plant cells

Question 30 · 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

4.1.1.2 Animal and plant cells

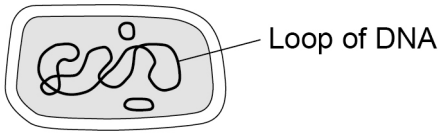
Question 31

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 ☐

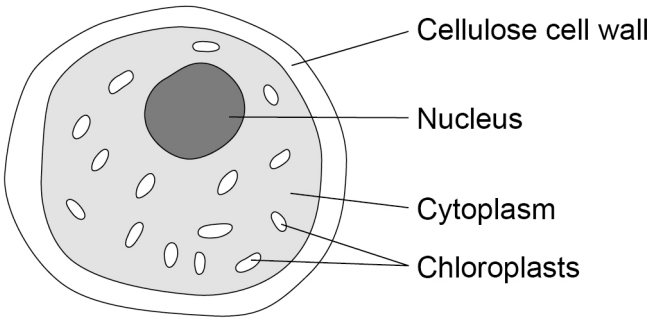
Plant ☐

4.1.1.2 Animal and plant cells

Question 31 · 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 ☐

4.1.1.2 Animal and plant cells

Question 31 · 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

4.1.1.2 Animal and plant cells

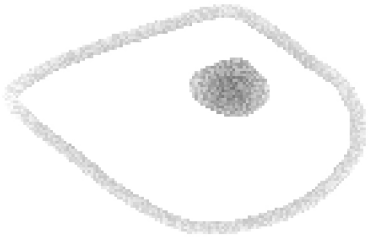
Question 31 · continued

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 ☐

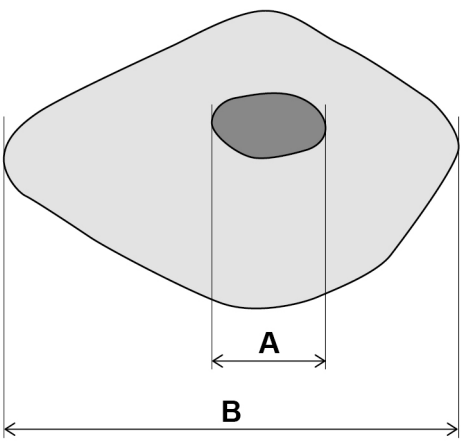
Question 1 continues on the next page

Question 31 · 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 = _____

4.1.1.2 Animal and plant cells

Question 31 · 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

4.1.1.2 Animal and plant cells

Question 32

November 2020 | 8461/1F | Original Q2

0 2 This question is about cell division.

0 2 . 1 Which process makes two identical new body cells for growth and repair?

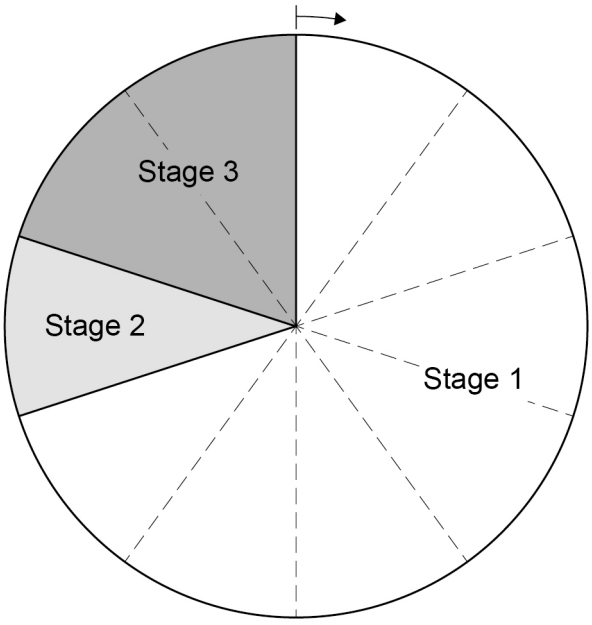
[1 mark]

Tick (✓) **one** box.

- Differentiation ☐
- Fertilisation ☐
- Mitosis ☐

Figure 5 shows the three stages of a cell cycle.

Figure 5



4.1.1.2 Animal and plant cells

Question 32 · continued

0 2 . 2 Draw **one** line from each stage of the cell cycle to what happens during that stage.

[2 marks]

Stage of cell cycle	What happens during that stage
Stage 1	One set of chromosomes is pulled to each end of the cell
Stage 2	The cytoplasm and cell membrane divide to form two new cells
Stage 3	The cell grows and the chromosomes replicate

0 2 . 3 What percentage of the total time for the cell cycle is taken by stage 1?

[2 marks]

Percentage = _____ %

0 2 . 4 A cell divides to form two new cells every 24 hours.

How many days will it take for the original cell to divide into 8 cells?

[1 mark]

Tick (✓) **one** box.

1 ☐ 3 ☐ 6 ☐ 8 ☐

4.1.1.2 Animal and plant cells

Question 32 · continued

0 2 . 5 The chromosomes contain the genetic material.

Name the chemical which the genetic material is made from.

[1 mark]

0 2 . 6 The genetic material is made of many small sections.

Each section codes for a specific protein.

What is one section of genetic material on a chromosome called?

[1 mark]

Tick (✓) **one** box.

- A gamete ☐
- A gene ☐
- A nucleus ☐

0 2 . 7 Stem cells are cells which have **not** yet been specialised to carry out a particular job.

Bone marrow cells are one example of stem cells.

Explain how a transplant of bone marrow cells can help to treat medical conditions.

[2 marks]

10

4.1.1.2 Animal and plant cells

Question 33

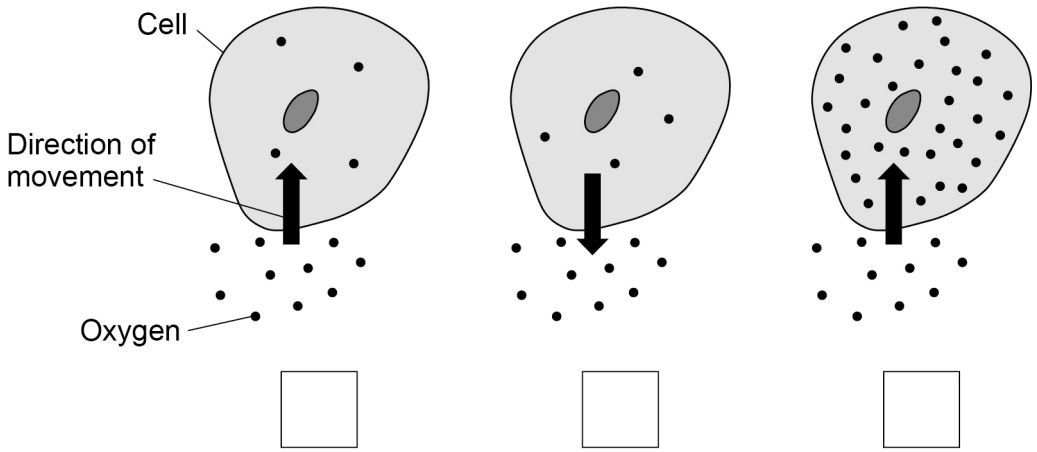
November 2021 | 8461/1F | Original Q1

0 1 This question is about cells.

0 1 . 1 Which diagram shows oxygen moving by diffusion?

[1 mark]

Tick (✓) **one** box.



0 1 . 2 Complete the sentences.

[3 marks]

Choose answers from the box.

carbon dioxide	**chlorophyll**	**energy**
light	**mineral ions**	**water**

Plant cells absorb substances from the soil.

Plant cells use osmosis to absorb _____.

Plant cells use active transport to absorb _____.

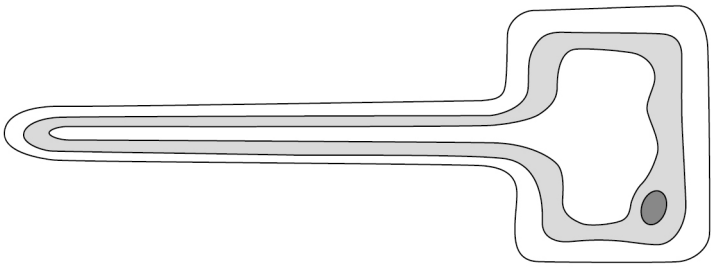
Active transport moves substances against the concentration gradient and needs _____.

4.1.1.2 Animal and plant cells

Question 33 · continued

Figure 1 shows a specialised cell that absorbs substances from the soil.

Figure 1



0 1 . 3 Name the type of specialised cell in **Figure 1**.

[1 mark]

0 1 . 4 Describe how the cell in **Figure 1** is adapted to increase the absorption of substances from the soil.

[1 mark]

Question 1 continues on the next page

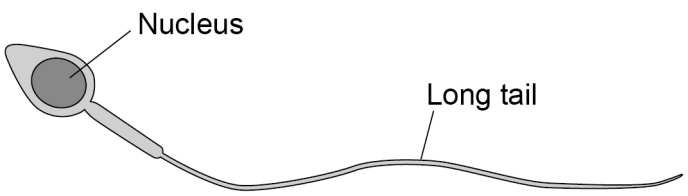
4.1.1.2 Animal and plant cells

Question 33 · continued

A sperm cell is another specialised cell.

Figure 2 shows a sperm cell.

Figure 2



0 1 . 5 Draw **one** line from each feature to how the feature helps the sperm cell carry out its function.

[2 marks]

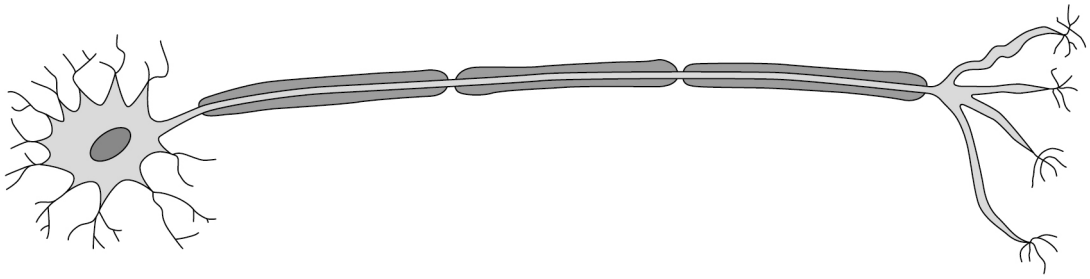
Feature of sperm cell	How the feature helps
Contains a nucleus	To break the outer layer of the egg
	To help the cell to swim to the egg
Has a long tail	To provide the chromosomes for fertilisation
	To release energy

4.1.1.2 Animal and plant cells

Question 33 · continued

Figure 3 shows another specialised cell.

Figure 3



0 1 . 6 Name the type of cell in **Figure 3**.

Describe **one** feature of the cell that helps it to carry out its function.

[2 marks]

Name of the cell _____

Feature of the cell _____

_____

10

4.1.1.2 Animal and plant cells

Question 34

November 2021 | 8461/1F | Original Q2

0 2 Viruses cause disease.

0 2 . 1 What name is given to microorganisms that cause disease?

[1 mark]

Tick (✓) **one** box.

- Pathogens ☐
- Predators ☐
- Prokaryotes ☐

0 2 . 2 How do viruses cause the symptoms of disease?

[1 mark]

Tick (✓) **one** box.

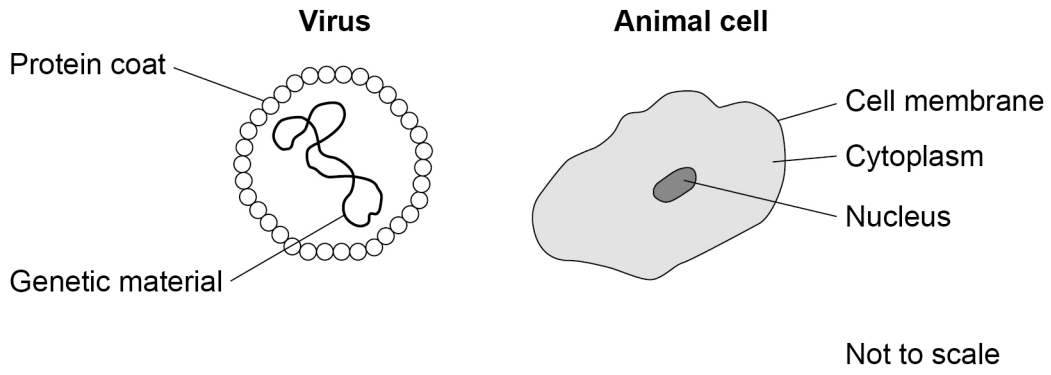
- Viruses engulf white blood cells, destroying them. ☐
- Viruses produce antibodies that damage tissues. ☐
- Viruses reproduce inside cells, damaging them. ☐

4.1.1.2 Animal and plant cells

Question 34 · continued

Figure 4 shows a virus and an animal cell.

Figure 4



0 2 . 3 Suggest **one** reason why viruses are **not** classed as cells.

[1 mark]

A vaccine can protect humans from a viral disease.

0 2 . 4 What does the vaccine contain?

[1 mark]

Tick (✓) **one** box.

- A toxic form of a virus ☐
- A weakened form of a virus ☐
- An active form of a virus ☐

Question 2 continues on the next page

4.1.1.2 Animal and plant cells

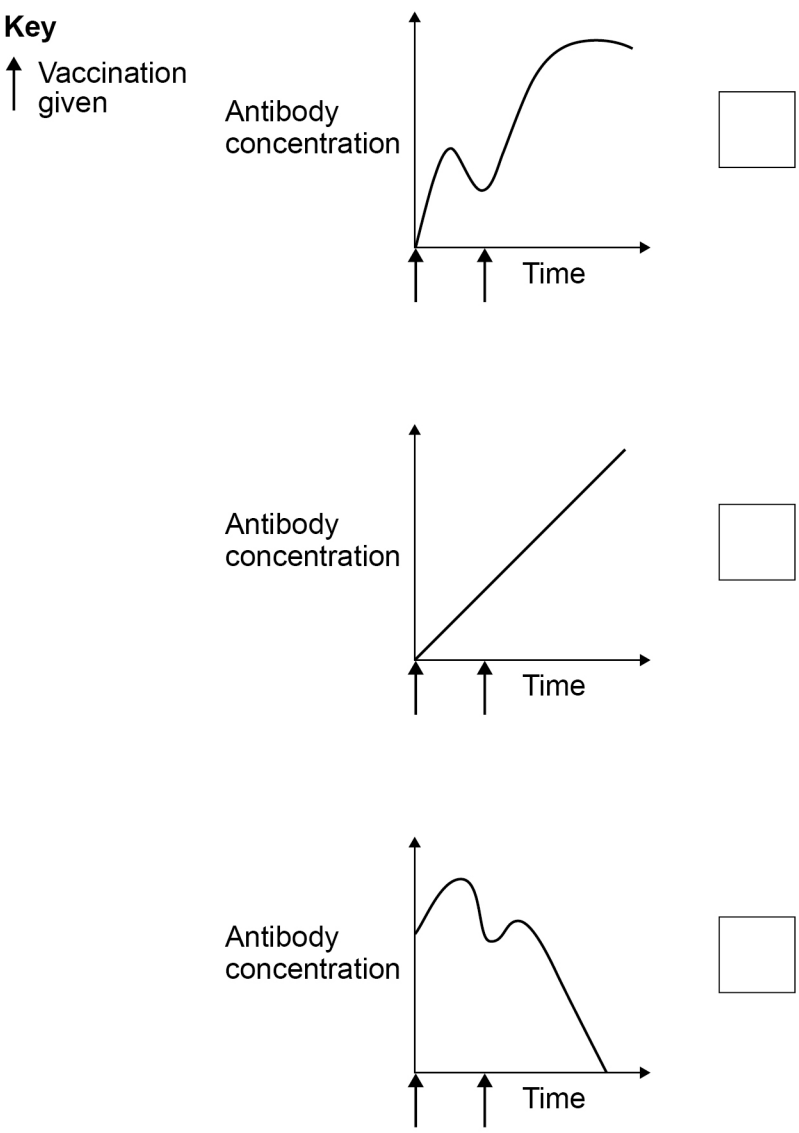
Question 34 · continued

In some cases, a first vaccination needs to be followed by a second vaccination some time later.

0 2 . 5 Which graph shows how the concentration of antibodies in a person's blood changes after the first and second vaccinations?

[1 mark]

Tick (✓) **one** box.



4.1.1.2 Animal and plant cells

Question 34 · continued

Tobacco mosaic virus (TMV) causes disease in plants.

TMV affects the rate of photosynthesis in plants.

0 2 . 6 Which part of a plant shows discolouration caused by TMV?

[1 mark]

Tick (✓) **one** box.

- Flower ☐
- Leaf ☐
- Root ☐

Question 2 continues on the next page

4.1.1.2 Animal and plant cells

Question 34 · continued

Table 1 shows the rate of photosynthesis in four different tobacco plants.

Table 1

Tobacco plant	Level of TMV infection in plant	Rate of photosynthesis in arbitrary units
A	None	15
B	Mild	13
C	Medium	7
D	High	3

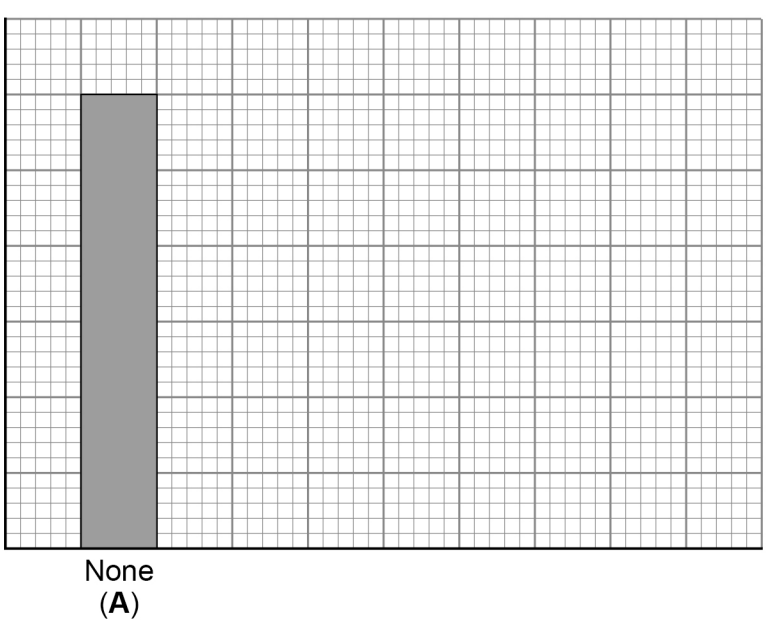
0 2 . 7 Complete **Figure 5**.

You should:

- label the y-axis
- add the correct scale to the y-axis
- plot the data from **Table 1**
- label each bar.

[5 marks]

Figure 5



4.1.1.2 Animal and plant cells

Question 34 · continued

0 2 . 8 What conclusion can be made from the data in **Table 1**?

[1 mark]

0 2 . 9 Explain why a high level of TMV infection reduces growth in a plant.

[2 marks]

14

Turn over for the next question

4.1.1.2 Animal and plant cells

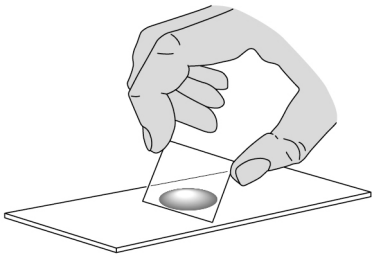
Question 35

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 _____

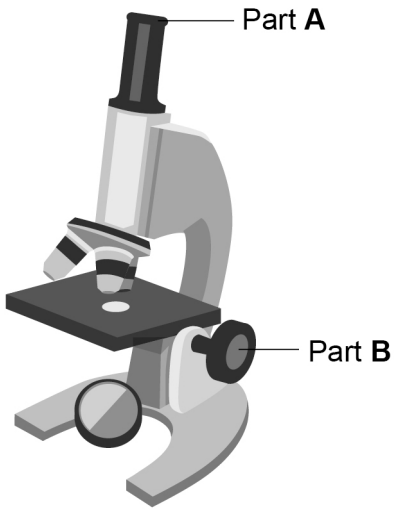
2 _____

4.1.1.2 Animal and plant cells

Question 35 · 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

4.1.1.2 Animal and plant cells

Question 35 · 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

4.1.1.2 Animal and plant cells

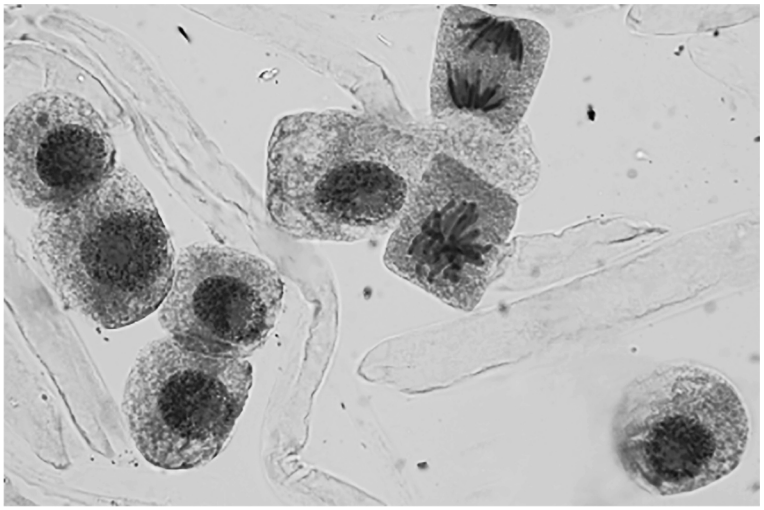
Question 36

June 2022 | 8461/1F | Original Q2

0 2 **Figure 1** shows animal cells.

Some of the cells are dividing by mitosis for growth and repair.

Figure 1



0 2 . 1 What fraction of the cells in **Figure 1** is dividing by mitosis?

[1 mark]

Tick (✓) **one** box.

$\frac{1}{8}$ ☐ $\frac{1}{4}$ ☐ $\frac{1}{2}$ ☐ $\frac{3}{4}$ ☐

4.1.1.2 Animal and plant cells

Question 36 · continued

0 2 . 2 The cells which are **not** dividing in **Figure 1** each contain 10 chromosomes.

One of these cells divides by mitosis to produce two new cells.

How many chromosomes will each new cell contain after mitosis?

[1 mark]

Tick (✓) **one** box.

5 ☐ 10 ☐ 15 ☐ 20 ☐

0 2 . 3 Cells divide in a series of stages called the cell cycle.

Complete the sentences.

Choose answers from the box.

[3 marks]

contracts	**divides**	**grows**
reacts	**relaxes**	**replicates**

Before mitosis occurs, the cell _____.

The genetic material in the cell doubles when the DNA _____.

After the chromosomes have been pulled to each end of the cell, the cytoplasm _____.

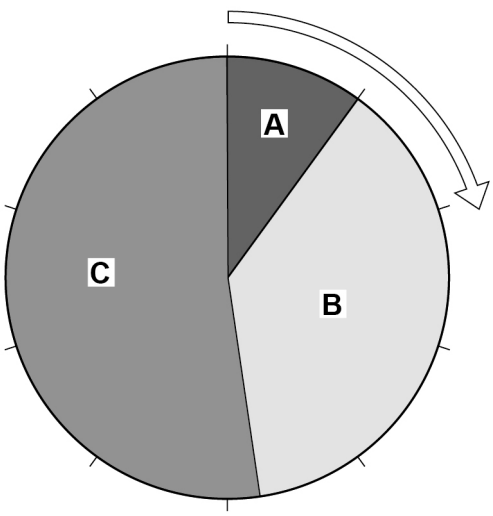
Question 2 continues on the next page

4.1.1.2 Animal and plant cells

Question 36 · continued

Figure 2 shows the time taken to complete different stages of the cell cycle.

Figure 2



0 2 . 4 Which stage of the cell cycle takes the most time?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐

0 2 . 5 What percentage of time in the cell cycle is stage **A**?

[1 mark]

Tick (✓) **one** box.

5% ☐ 10% ☐ 15% ☐ 25% ☐

4.1.1.2 Animal and plant cells

Question 36 · continued

Stem cells divide by mitosis.

Scientists can use stem cells from an embryo to create heart cells in a laboratory.

0 2 . 6 Which organ system contains heart cells?

[1 mark]

Tick (✓) **one** box.

- Circulatory system ☐
- Digestive system ☐
- Nervous system ☐
- Respiratory system ☐

0 2 . 7 Name **one** medical condition that could be treated using heart cells created from an embryo.

[1 mark]

_____

0 2 . 8 Give **one** reason why a patient may **not** want to be treated with heart cells created from an embryo.

[1 mark]

_____

_____

10

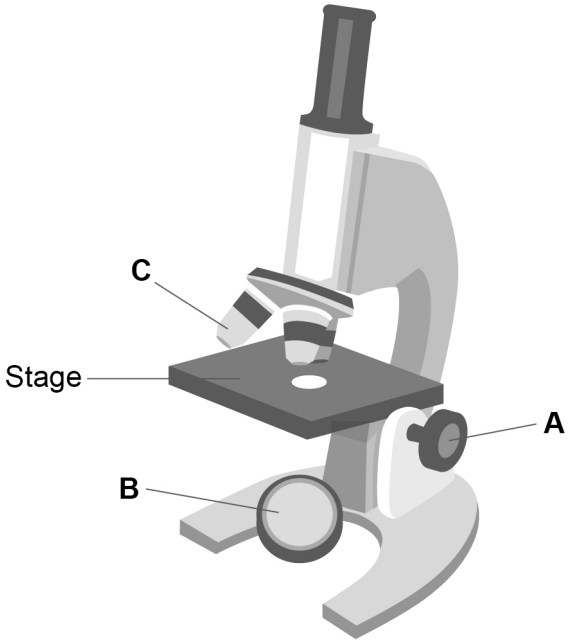
4.1.1.2 Animal and plant cells

Question 37

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

4.1.1.2 Animal and plant cells

Question 37 · 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

Question 37 · continued

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.

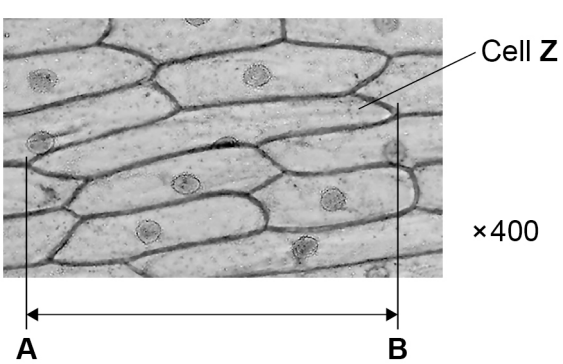
Draw **one** line from each part of the risk assessment to the description of the part.

[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



4.1.1.2 Animal and plant cells

Question 37 · 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

4.1.1.2 Animal and plant cells

Question 37 · continued

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

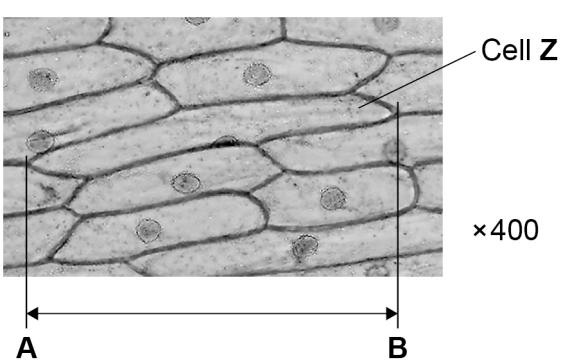
[2 marks]

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

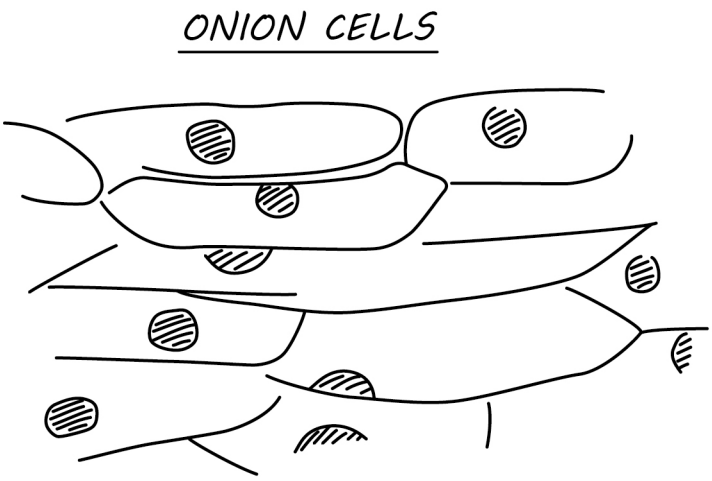


4.1.1.2 Animal and plant cells

Question 37 · 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

4.1.1.2 Animal and plant cells

Question 38

June 2022 | 8461/1F | Original Q7

0 7 This question is about cells and transport.

0 7 . 1 Complete **Table 5**.

[3 marks]

Table 5

Name of cell part	Function of cell part
	Contains genetic information
Mitochondria	
	Controls the movement of substances into and out of the cell

Cells in potatoes are plant cells.

Cells in potatoes do **not** contain chloroplasts.

0 7 . 2 What is the function of chloroplasts?

[1 mark]

0 7 . 3 Name **one** type of cell in a potato plant that does **not** contain chloroplasts.

[1 mark]

Question 7 continues on the next page

4.1.1.2 Animal and plant cells

Question 38 · continued

June 2022 | 8461/1F | Original Q7

A student investigated the effect of salt concentration on pieces of potato.

This is the method used.

1. Cut three pieces of potato of the same size.
2. Record the mass of each potato piece.
3. Add 150 cm^3 of 0.4 mol/dm^3 salt solution to a beaker.
4. Place each potato piece into the beaker.
5. After 30 minutes, remove each potato piece and dry the surface with a paper towel.
6. Record the mass of each potato piece.
7. Repeat steps 1 to 6 using different concentrations of salt solution.

0 7 . 4 What is the independent variable in the investigation?

[1 mark]

Tick (✓) **one** box.

- Concentration of salt solution ☐
- Mass of potato piece ☐
- Time potato is left in salt solution ☐
- Volume of salt solution ☐

0 7 . 5 Why did the student dry the surface of each potato piece with a paper towel in step **5**?

[1 mark]

4.1.1.2 Animal and plant cells

Question 38 · continued

The student calculated the percentage change in mass of each potato piece.

0 7 . 6 For one potato piece:

- the starting mass was 2.5 g
- the end mass was 2.7 g.

Calculate the percentage increase in mass of the potato piece.

[2 marks]

Use the equation:

$$\text{percentage increase in mass} = \frac{\text{increase in mass}}{\text{starting mass}} \times 100$$

Percentage increase in mass = _____ %

Question 7 continues on the next page

Question 38 · continued

The student used the results from each potato piece to calculate the mean percentage change in mass at each concentration.

Table 6 shows the results.

Table 6

Concentration of salt solution in mol/dm^3	Mean percentage (%) change in mass
0.0	9.8
0.1	9.5
0.2	7.0
0.3	0.4
0.4	−1.4

0 7 . 7 Complete **Figure 9**.

You should:

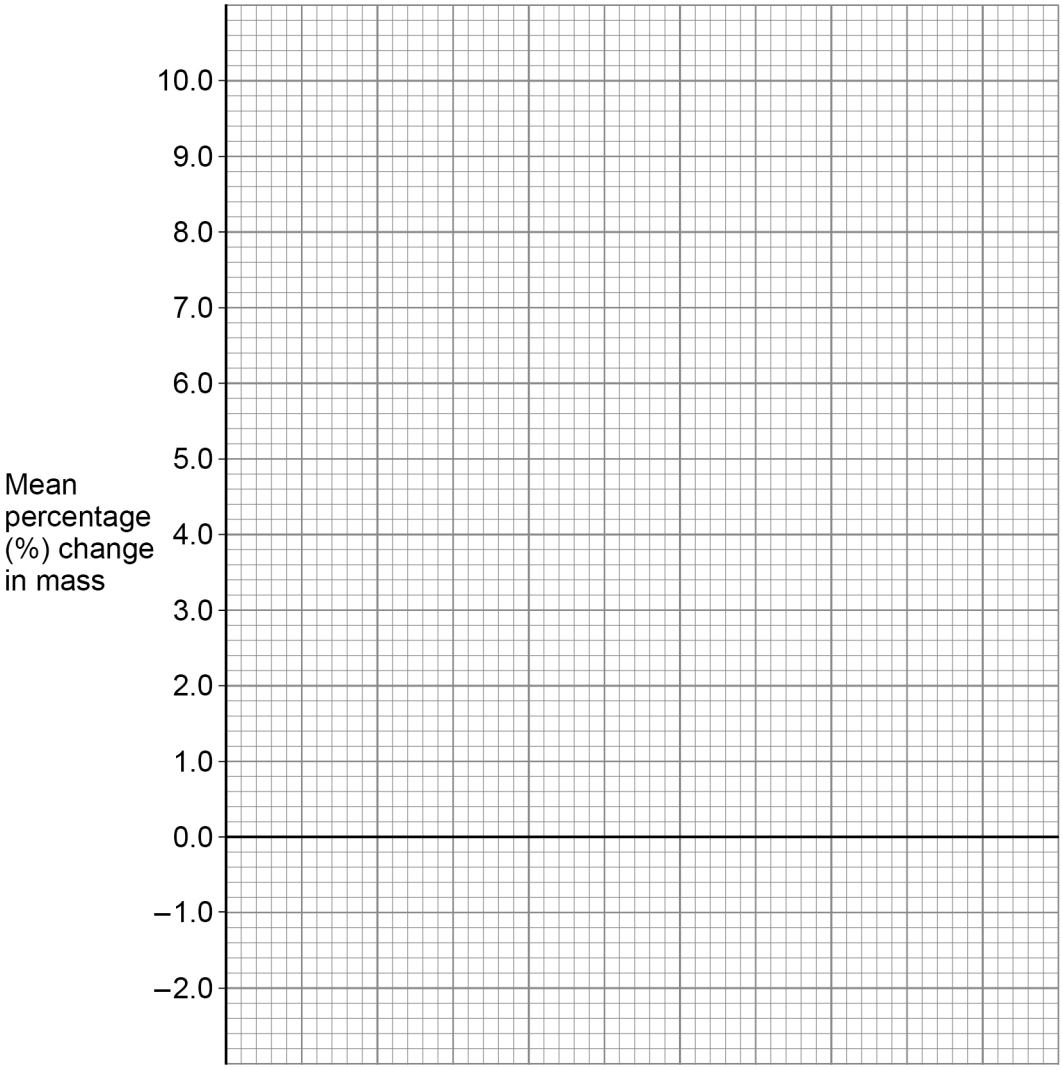
- label the x-axis
- use a suitable scale for the x-axis
- plot the data from **Table 6**
- draw a line of best fit.

[4 marks]

4.1.1.2 Animal and plant cells

Question 38 · continued

Figure 9



0 7 . 8 What concentration of salt solution was equal to the concentration of the solution inside the potato pieces?

Use **Figure 9**.

[1 mark]

Concentration = _____ mol/dm^3

Question 7 continues on the next page

4.1.1.2 Animal and plant cells

Question 38 · continued

0 7 . 9 Explain why the potato pieces in the 0.4 mol/dm^3 salt solution decreased in mass.

[3 marks]

17

4.1.1.2 Animal and plant cells

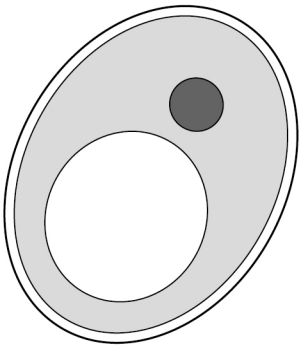
Question 39

June 2022 | 8461/1F | Original Q8

0 8 Plant cells and fungal cells are similar in structure.

Figure 10 shows a fungal cell.

Figure 10



0 8 . 1 Name **one** structure in **Figure 10** which is present in both plant cells and fungal cells but **not** in animal cells.

[1 mark]

0 8 . 2 Which disease is caused by a fungus?

[1 mark]

Tick (✓) **one** box.

- Gonorrhoea ☐
- Malaria ☐
- Measles ☐
- Rose black spot ☐

Question 8 continues on the next page

4.1.1.2 Animal and plant cells

Question 39 · continued

0 8 . 3 A fungal cell divides once every 90 minutes.

How many times would this fungal cell divide in 24 hours?

[2 marks]

Number of times cell divides in 24 hours = _____

4.1.1.2 Animal and plant cells

Question 39 · continued

Some types of fungal cell are grown to produce high-protein food.

The high-protein food can be used to make meat-free burgers.

0 8 . 4 Where is protein digested in the human digestive system?

[1 mark]

Tick (✓) **one** box.

- Large intestine ☐
- Liver ☐
- Salivary glands ☐
- Stomach ☐

0 8 . 5 Which chemical could be used to test if the burgers contain protein?

[1 mark]

Tick (✓) **one** box.

- Benedict's reagent ☐
- Biuret reagent ☐
- Ethanol ☐
- Iodine solution ☐

Question 8 continues on the next page

4.1.1.2 Animal and plant cells

Question 39 · continued

0 8 . 6 **Table 7** shows some information about burgers made from meat and meat-free burgers.

Table 7

	Mass per 100 g of burger	
	Burgers made from meat	**Meat-free burgers**
Protein in g	14.0	9.0
Fibre in g	0.9	5.5
Fat in g	16.0	5.2
Carbohydrate in g	15.5	15.1
Cholesterol in mg	120.0	0.0

Evaluate the use of burgers made from meat compared with meat-free burgers in providing humans with a healthy, balanced diet.

Use information from **Table 7** and your own knowledge.

[6 marks]

4.1.1.2 Animal and plant cells

Question 39 · continued

June 2022 | 8461/1F | Original Q8

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4.1.1.2 Animal and plant cells

Question 40

June 2023 | 8461/1F | Original Q1

0 1 Plants are made of cells, tissues and organs.

0 1 . 1 Which part of a plant is the largest?

[1 mark]

Tick (✓) **one** box.

A guard cell ☐

A leaf ☐

A root hair ☐

Students investigated the effect of concentration of salt solution on the mass of pieces of potato.

This is the method used.

1. Cut two pieces of potato to the same size.
2. Record the mass of each piece of potato.
3. Place one piece of potato into a beaker containing a dilute salt solution.
4. Place the other piece of potato into a beaker containing a concentrated salt solution.
5. After 20 minutes, remove each piece of potato from its solution.
6. Record the change in mass of each piece of potato.
7. Repeat steps 1 to 6 two more times.

Table 1 shows the results.

Table 1

Solution	**Change in mass of piece of potato in grams**			
	Test 1	**Test 2**	**Test 3**	**Mean**
Dilute salt solution	1.1	1.1	1.4	**X**
Concentrated salt solution	–7.2	–6.8	–32.4	–7.0

4.1.1.2 Animal and plant cells

Question 40 · continued

0 1 . 2 Calculate mean value **X** in **Table 1**.

[2 marks]

X = _____ grams

There is an anomalous result for the concentrated salt solution in **Table 1**.

0 1 . 3 Draw a ring around the anomalous result in **Table 1**.

[1 mark]

0 1 . 4 What did the students do with the anomalous result when calculating the mean in **Table 1**?

[1 mark]

0 1 . 5 What name is given to a variable that is kept the same during an investigation?

[1 mark]

Tick (✓) **one** box.

- Control variable ☐
- Dependent variable ☐
- Independent variable ☐

Question 1 continues on the next page

4.1.1.2 Animal and plant cells

Question 40 · continued

0 1 . 6 One variable the students kept the same during the investigation was the size of the pieces of potato.

Which other variable did the students keep the same?

[1 mark]

Tick (✓) **one** box.

Change in mass of pieces of potato ☐

Concentration of salt solution ☐

Time in the salt solution ☐

0 1 . 7 The pieces of potato in the concentrated salt solution decreased in mass.

Complete the sentence.

Choose the answer from the box.

[1 mark]

excretion	**osmosis**	**respiration**

Water moved out of the potato by the process of _____.

4.1.1.2 Animal and plant cells

Question 40 · continued

0 1 . 8 The potato cells have a partially permeable membrane.

Which particles can pass through a partially permeable membrane?

[1 mark]

Tick (✓) **one** box.

No particles ☐

Some particles ☐

All particles ☐

0 1 . 9 How could the students improve their investigation?

[1 mark]

Tick (✓) **one** box.

Boil the pieces of potato at the start. ☐

Leave the skin on some pieces of potato. ☐

Use more concentrations of salt solution. ☐

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4.1.1.2 Animal and plant cells

Question 41

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 ☐

4.1.1.2 Animal and plant cells

Question 41 · 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 _____.

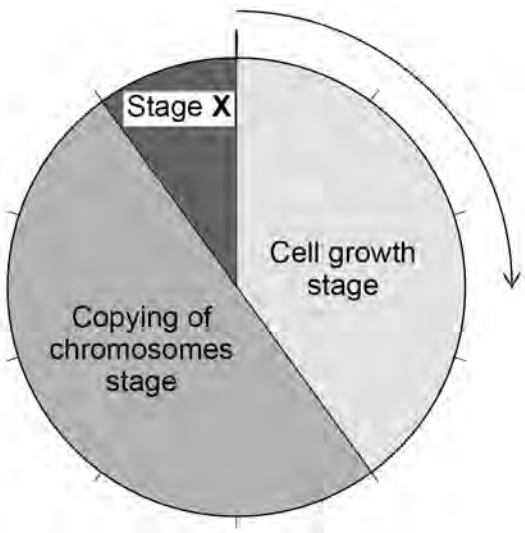
Question 5 continues on the next page

4.1.1.2 Animal and plant cells

Question 41 · 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. ☐

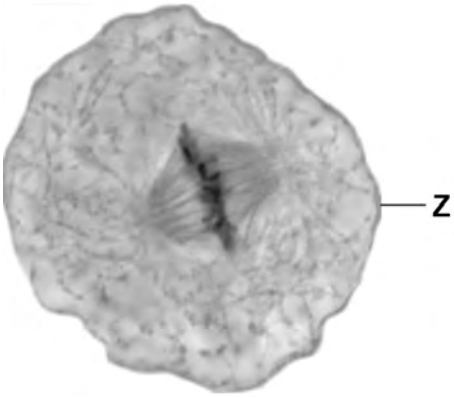
The number of mitochondria increases. ☐

4.1.1.2 Animal and plant cells

Question 41 · 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

4.1.1.2 Animal and plant cells

Question 41 · 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

4.1.1.2 Animal and plant cells

Question 41 · 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]

_____

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4.1.1.2 Animal and plant cells

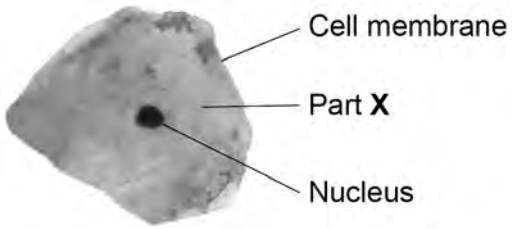
Question 42

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]

_____

4.1.1.2 Animal and plant cells

Question 42 · 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

4.1.1.2 Animal and plant cells

Question 42 · 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 ☐

4.1.1.2 Animal and plant cells

Question 42 · 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			

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