



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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GCSE COMBINED SCIENCE: TRILOGY

F

Foundation Tier
Biology Paper 1F

Tuesday 15 May 2018

Afternoon

Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:

- a ruler
- a scientific calculator.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	



J U N 1 8 8 4 6 4 B 1 F 0 1

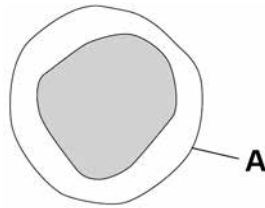
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0 1

Figure 1 shows one type of white blood cell.

Figure 1



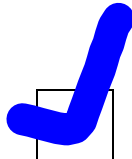
0 1 . 1

What is structure A?

[1 mark]

Tick **one** box.

Cell membrane



Cell wall

☐

Cytoplasm

☐

Nucleus

☐

0 1 . 2

White blood cells help to defend the body against pathogens.

How do the white blood cells do this?

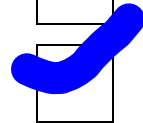
[3 marks]

Tick **three** boxes.

Clone pathogens

☐

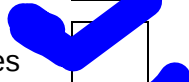
Engulf pathogens



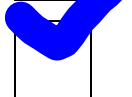
Produce antibiotics

☐

Produce antibodies



Produce antitoxins



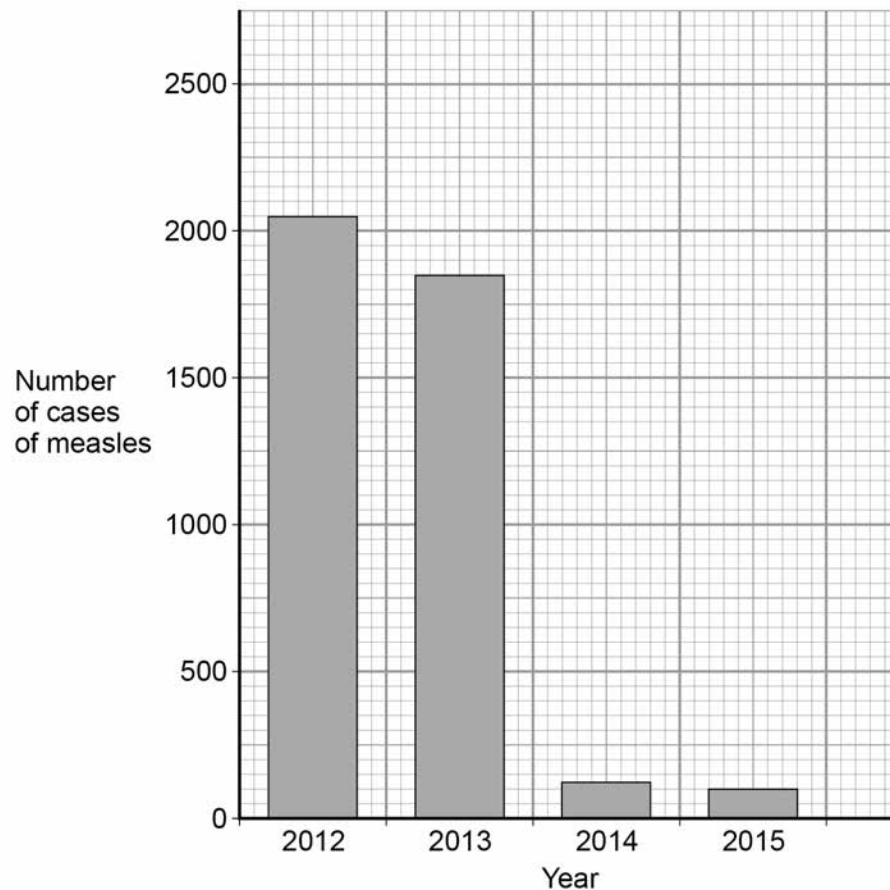
Produce toxins

☐


Measles is a serious disease. A person can die from measles.

Figure 2 shows the number of cases of measles in England and Wales between 2012 and 2015

Figure 2



0 1 3 Use **Figure 2** to calculate the decrease in the number of cases of measles between 2012 and 2015

[2 marks]

subtract 2015
numbers from
2012

2050-100

Answer = 1950 cases

0 1 4 Suggest **one** reason for the decrease in the number of cases of measles between 2012 and 2015

[1 mark]

increase in
vaccination

Turn over ►



0 1 . 5 Antibiotics **cannot** be used to treat measles.

Suggest why.

[1 mark]

0 1 . 6 Gonorrhoea is a disease caused by a bacterium.

Gonorrhoea **can** be treated with antibiotics.

Give **one** other way to control the spread of gonorrhoea.

[1 mark]

Antibiotics cannot be used to treat measles because measles is caused by a virus, and antibiotics are only affective against bacterial infection

A scientist investigated how effective different antibiotics were at killing gonorrhoea bacteria.

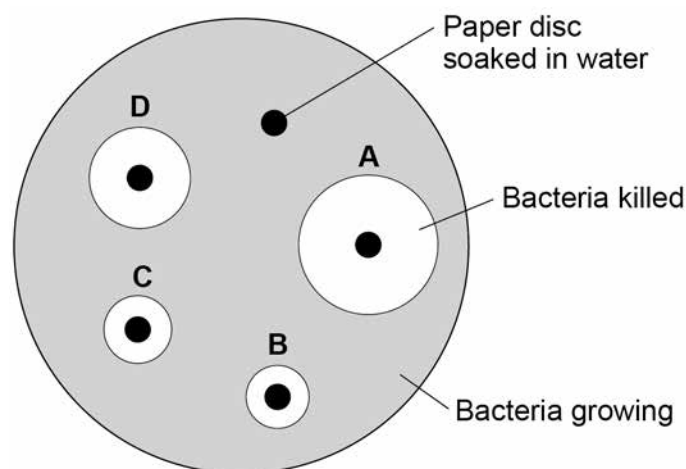
This is the method used.

1. Grow gonorrhoea bacteria on agar in a Petri dish.
2. Place one paper disc soaked in water onto the agar.
3. Place four other paper discs, each soaked in a different antibiotic, **A**, **B**, **C**, and **D**, onto the agar.
4. Use the same sized paper discs and the same concentration of each antibiotic.
5. Incubate the Petri dish for 3 days.

Figure 3 shows the scientist's results.

A clear area around the disc means the antibiotic has killed the bacteria.

Figure 3



0 1 . 7 Give **one** control variable the scientist used.

[1 mark]

same sized paper disc

0 1 . 8 Suggest why **one** disc was soaked in water.

[1 mark]

The disc soaked in water was used as a control to check for any effect of the disc itself on bacterial growth

0 1 . 9 Which antibiotic in **Figure 3** would be the best to treat gonorrhoea?

Give a reason for your answer.

[2 marks]

Antibiotic Antibiotic A

Reason Reason It has the largest clear area around the disc indicating that it is the most effective

13

Turn over for the next question

Turn over ►



There are no questions printed on this page

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outside the
box*

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ANSWER IN THE SPACES PROVIDED**



0 2

This question is about photosynthesis.

0 2

. 1

What are the **two** products of photosynthesis?**[2 marks]**Tick **two** boxes.

Carbon dioxide

☐

Chlorophyll

☐

Glucose

☒

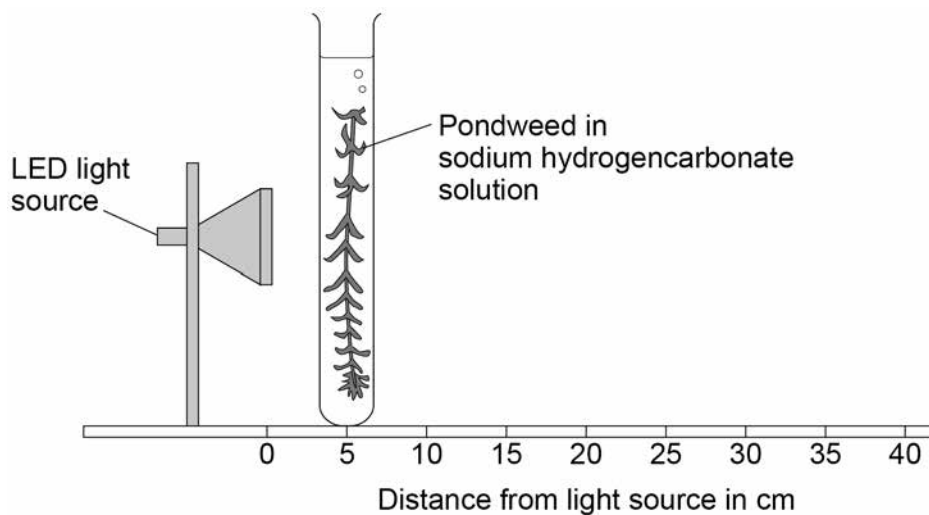
Oxygen

☒

Water

☐

A student investigated the effect of light intensity on the rate of photosynthesis.

Figure 4 shows the apparatus.**Figure 4**

This is the method used.

1. Place the pondweed at 5 cm from the light source.
2. Measure the rate of photosynthesis by counting the number of bubbles produced in 30 seconds.
3. Repeat the investigation with the pondweed at different distances from the light source.

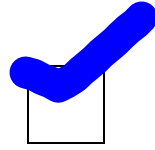
Turn over ►

0 2 . 2 How could the student measure the rate of photosynthesis more accurately?

[2 marks]

Tick **two** boxes.

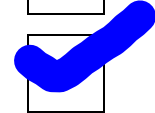
Count the number of bubbles produced in 1 minute



Measure the change in mass of the pondweed in 30 seconds

☐

Measure the volume of gas produced in 30 seconds



Place the pondweed further from the light source

☐

Use water instead of sodium hydrogencarbonate solution

☐

0 2 . 3 The LED light source does **not** get hot.

Why is this important?

[1 mark]

This is important because it prevents overheating of the pondweed, which could damage or kill it.

Table 1 shows the student's results.

Table 1

Distance of light source from pondweed in cm	Number of bubbles produced in 30 seconds
5	40
10	13
15	5
20	2
25	1
30	0



0 2 . 4

Calculate the number of bubbles produced in 2 minutes when the light source was 10 cm from the pondweed.

[1 mark]

bubble in 30s = 13

bubble in 1mint = $13 \times 2 = 26$

bubble in 2 minute = 26×2

Number of bubbles produced in 2 minutes = 52

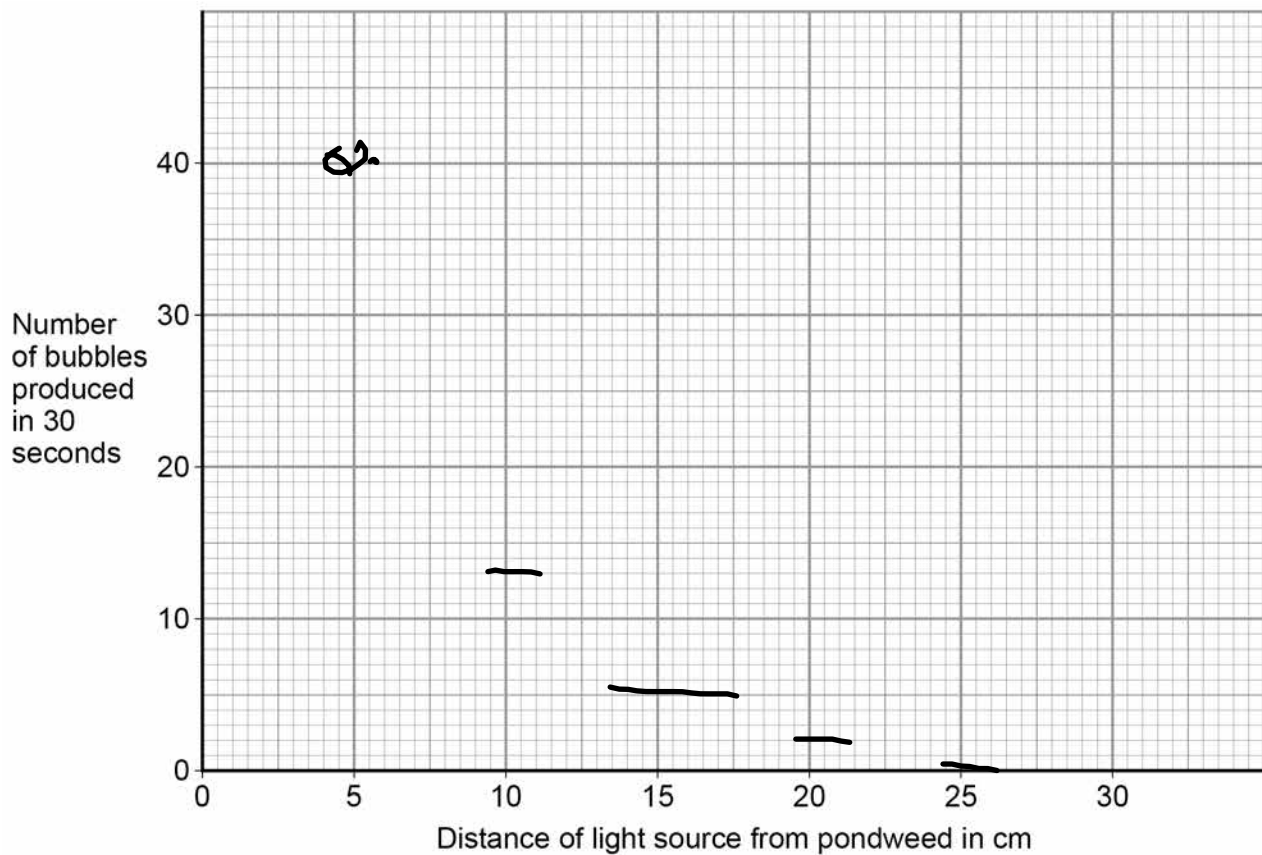
0 2 . 5

Plot the data from **Table 1** on **Figure 5**

Draw a line of best fit.

[3 marks]

Figure 5



0 2 . 6

Give **one** conclusion that can be made from these results.

[1 mark]

when the distance increased the number of bubbles decreased



0 3

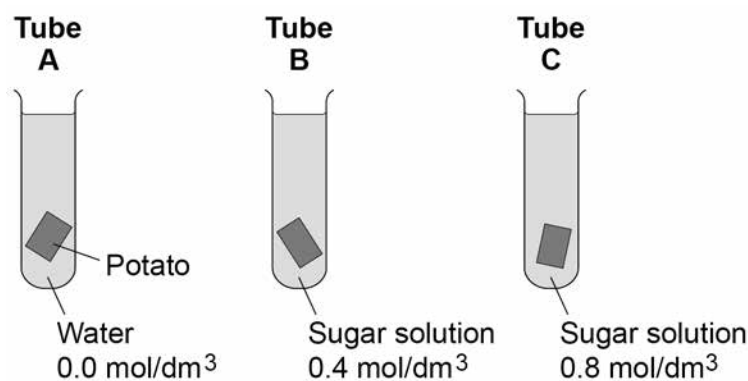
A student investigated the effect of different concentrations of sugar solution on pieces of potato.

This is the method used.

1. Cut three pieces of potato to the same length.
2. Dry each piece on a paper towel.
3. Weigh each piece.
4. Place each piece in a different concentration of sugar solution.
5. Leave all three pieces for 2 hours.
6. Remove the three pieces of potato from the solutions.
7. Dry each piece on a paper towel.
8. Measure the length and mass of each piece of potato.

Figure 6 shows how the investigation was set up.

Figure 6



0 3

1

Why did the student dry each piece of potato before weighing it?

[1 mark]

The student dried each piece of potato before weighing it to remove excess moisture, ensuring an accurate initial weight measurement



0 3 . 2

What **two** changes would you expect in the potato in **tube A** after 2 hours?

[2 marks]

Tick **two** boxes.

Breaks into pieces

☐

Decrease in hardness

☐

Decrease in size

☒

Increase in mass

☒

Increase in length

☐

0 3 . 3

Complete the sentences.

[3 marks]

Water moves into and out of cells by a process called osmosis.

Water would move inside the potato cells in **tube A**.

The solution outside the potato in **tube A** is at a lower concentration than the solution inside the potato cells.

0 3 . 4

The potato in **tube B** did **not** change.Give **one** conclusion that can be made from this observation.

[1 mark]

meaning it has same concentration of solutes as cell . it is isotonic

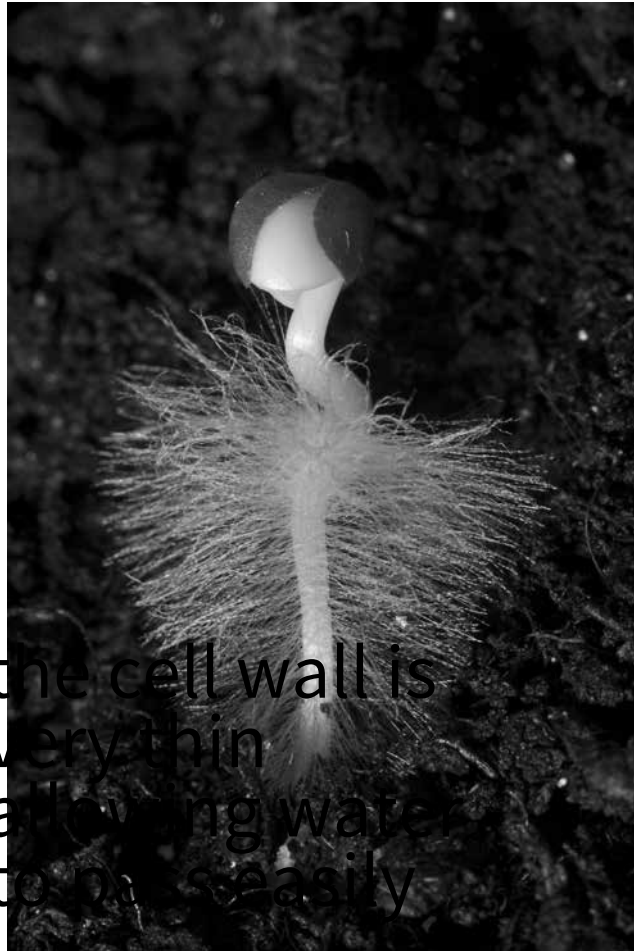
Question 3 continues on the next page

Turn over ►



0 3 . 5 Figure 7 shows the root of a germinating seed.

Figure 7



the cell wall is
very thin
allowing water
to pass easily

Describe **two** ways the root is adapted to absorb water efficiently.

root has many tiny root hair cells which [2 marks]
increase its surface area allowing it to absorb
more water

the cell wall is very thin allowing water
to pass easily



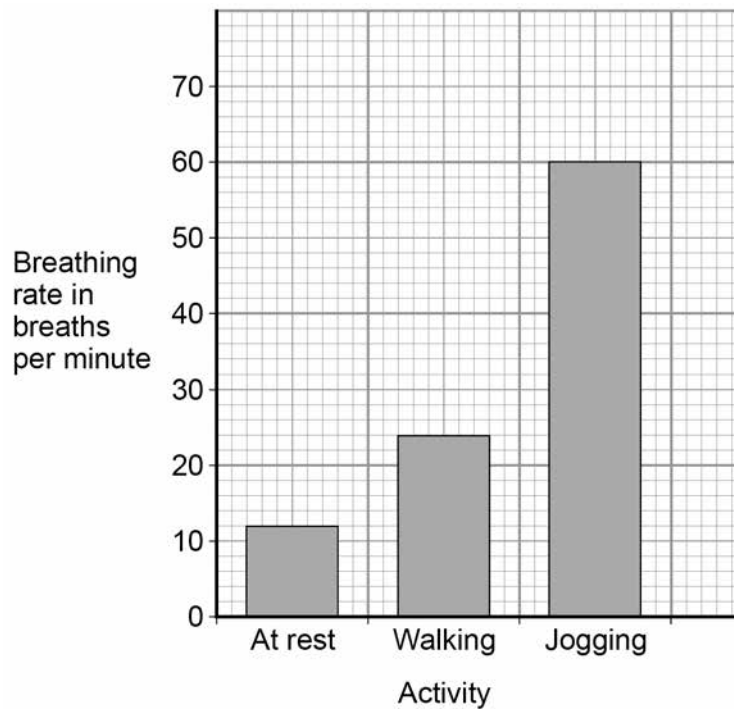
0 4

Exercise can improve health.

A student measured her breathing rate at rest, when walking and when jogging.

Figure 8 shows her results.

Figure 8



0 4 . 1

Compare the breathing rates when doing the **three** different activities.

Use values from **Figure 8** in your answer.

[3 marks]

The breathing rate at rest is 12 breathsmin.
When walking, the breathing rate increases to
25 breath per minute while jogging
breathing rate increased to 60
breath per minute

Question 4 continues on the next page

Turn over ►



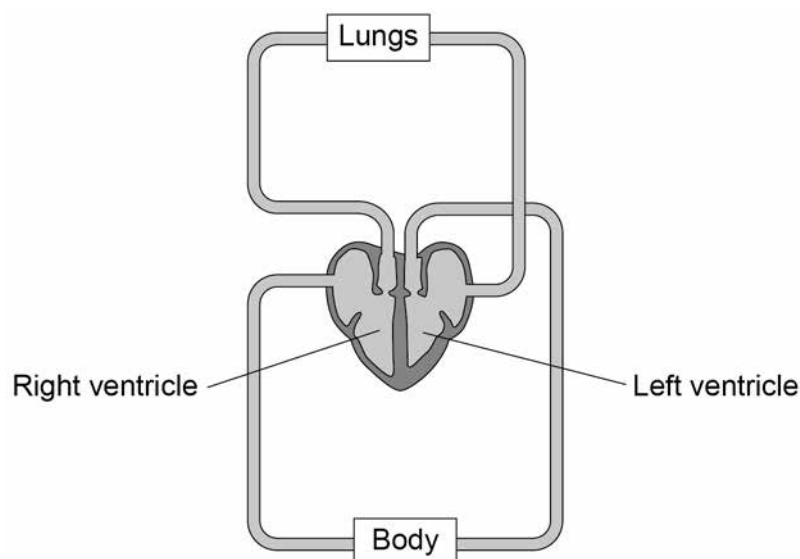
0 4 . 2 Explain why the breathing rate changes when doing different activities.

[3 marks]

Breathing rate changes during different activities because the body's demand of oxygen increases with physical exercise. while doing exercises like jogging muscles require more oxygen to generate energy

Figure 9 shows the heart in the circulatory system.

Figure 9



0 4 . 3 The heart is a double pump.

Describe what this means.

Use Figure 9 to help you.

[2 marks]

The heart is a double pump, meaning it pumps blood to two separate areas. The right side of the heart pumps deoxygenated blood to the lungs, while left side pumps oxygenated blood to body



0 4 . 4 The wall of the left ventricle is much thicker than the wall of the right ventricle.

Suggest **one** reason for this.

[1 mark]

it needs to pump blood at a higher pressure to reach the rest of the body, whereas the right ventric le

only pumps blood to nearby lungs

0 4 . 5 People are encouraged to exercise after recovering from a heart attack.

Suggest **one** reason why.

[1 mark]

Exercise helps to strengthen the heart muscle, improving its efficiency and reducing the risk of further heart problems

10

Turn over for the next question

Turn over ►



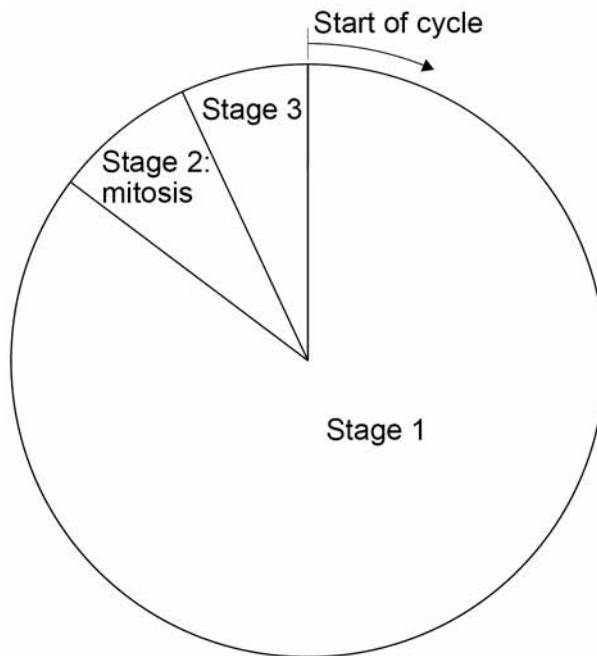
0 5

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

Stage 2 of the cycle is mitosis.

Figure 10 shows a simplified cell cycle for a human body cell.

Figure 10



0 5

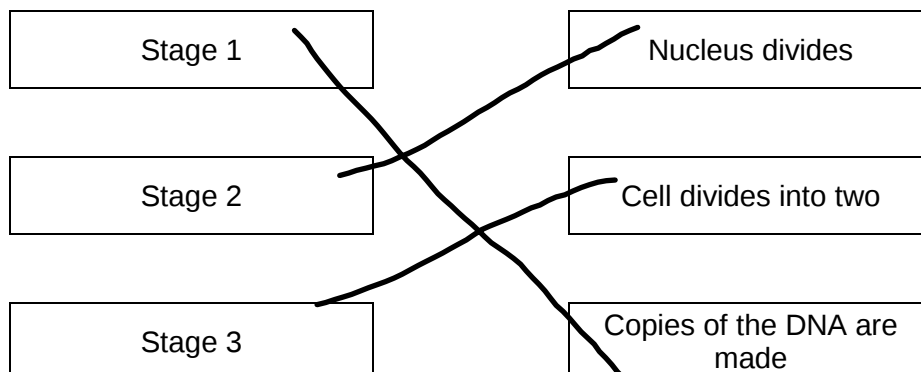
1

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

[2 marks]

Stage in the cell cycle

What happens during that stage



0 5 . 2

The mass of DNA in a human body cell at the start of the cell cycle is 6 picograms.

What mass of DNA will be in each of the new cells produced by this cell division?

[1 mark]

Tick **one** box.

3 picograms

☐

6 picograms

☒

9 picograms

☐

12 picograms

☐

0 5 . 3

Stem cells are undifferentiated cells.

Which statement about stem cells is correct?

[1 mark]

Tick **one** box.

Animal stem cells are found in meristems

☐

Animal stem cells divide by meiosis

☐

Meristem cells in plants can differentiate throughout the life of the plant

☒

Meristem cells in plants can only differentiate into one type of cell

☐

Question 5 continues on the next page

Turn over ►



Stem cells from human embryos can differentiate into most types of human cell.

Research is being done into the use of embryonic stem cells in medical treatments.

The long-term effects of using embryonic stem cells in patients are not well understood.

In therapeutic cloning, human embryos are produced using a donated human egg cell and a cell from the patient.

- The embryo produced contains the same genetic information as the patient.
- Stem cells are taken from the embryo and stimulated to divide to form cells the patient needs.
- The embryo is then destroyed.

0 5 . 4 Suggest **two** advantages of therapeutic cloning.

[2 marks]

1 reduce risk of rejection
2 ability to produce specific cells

0 5 . 5 Suggest **two** disadvantages of therapeutic cloning.

[2 marks]

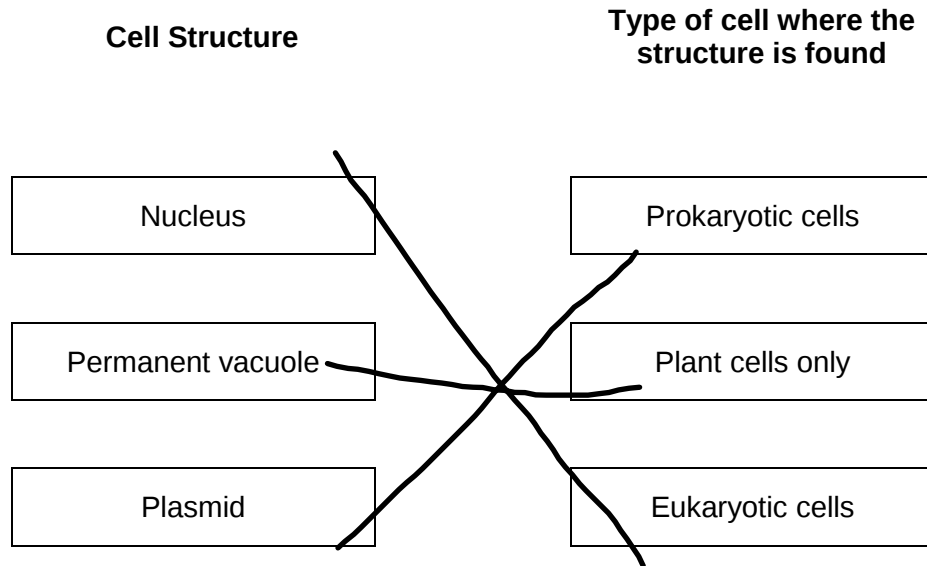
1 destruction of human embryos
2 high risk of uncontrolled cell growth



0 6

This question is about cell structures.

0 6 . 1

Draw **one** line from each cell structure to the type of cell where the structure is found.**[2 marks]**

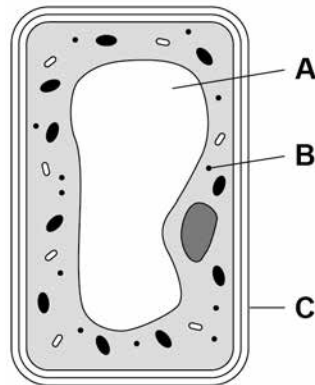
Question 6 continues on the next page

Turn over ►



0 6 . 2 Figure 11 shows a plant cell.

Figure 11



What are the names of structures **A**, **B** and **C**?

[1 mark]

Tick **one** box.

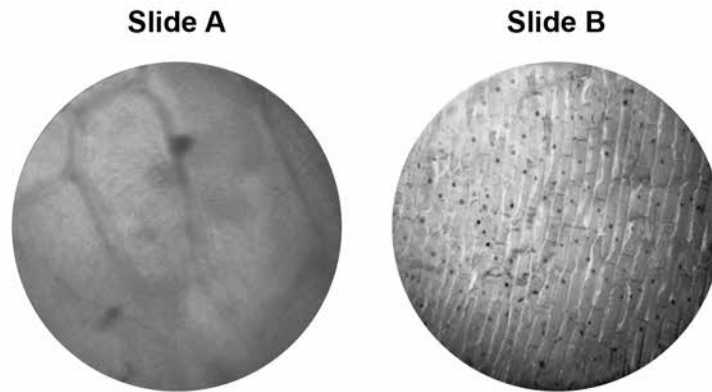
Structure A	Structure B	Structure C
Chloroplast	Vacuole	Cell wall
Nucleus	Chloroplast	Cell membrane
Vacuole	Mitochondrion	Cell membrane
Vacuole	Ribosome	Cell wall

☐
☐
☐
☒


A student observed slides of onion cells using a microscope.

Figure 12 shows two of the slides the student observed.

Figure 12



The cells on the slides are **not** clear to see.

- 0 6 . 3** Describe how the student should adjust the microscope to see the cells on **Slide A** more clearly.

[1 mark]

increase magnification by turning
objective lens to high power

- 0 6 . 4** Describe how the student should adjust the microscope to see the cells on **Slide B** more clearly.

[2 marks]

Adjust the focus by turning the coarse
and fine adjustment knobs to bring the
image into sharp focus

Question 6 continues on the next page

Turn over ►

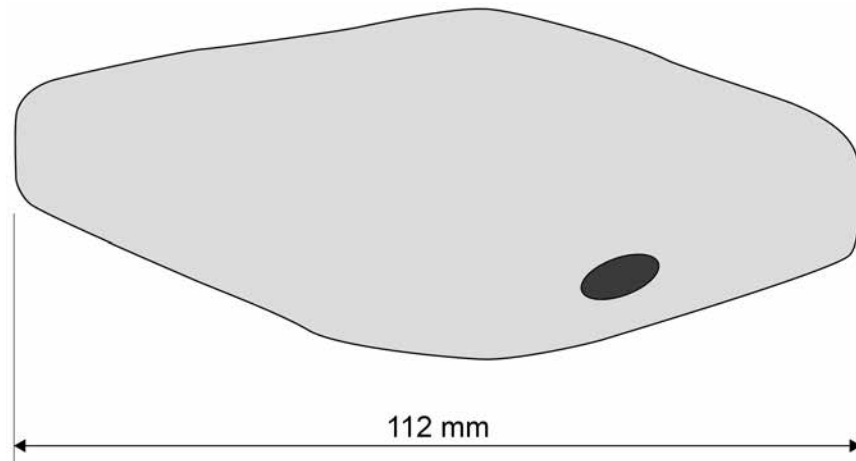


0 6 . 5

The student made the necessary adjustments to get a clear image.

Figure 13 shows the student's drawing of one of the cells.

Figure 13



The real length of the cell was 280 micrometres (μm).

Calculate the magnification of the drawing.

[3 marks]

$$280 \mu\text{m} = 0.28 \text{ mm}$$

$$x = \text{image length} \div \text{real length}$$

$$x = 112 \div 0.28$$

$$\text{Magnification} = \times 400$$



0 7

Coronary heart disease (CHD) is a non-communicable disease.

CHD is caused when fatty material builds up in the coronary arteries.

0 7

1

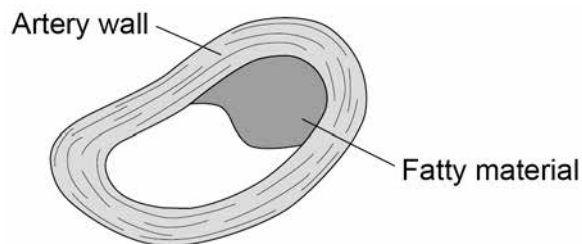
Explain what a non-communicable disease is.

[2 marks]

which is not caused by a bacteria or virus
and can not be transformed from person
to person

Figure 14 shows a coronary artery of someone with CHD.

Figure 14



0 7

2

Explain how CHD can cause a heart attack.

[3 marks]

fatty material builds up in coronary artery
forming plaques these plaques narrow
artery reducing
blood flow to heart . when artery rupture
a blood clot is formed causing heart
attack

Question 7 continues on the next page

Turn over ►



0 7 3

Explain how lifestyle and medical risk factors increase the chance of developing CHD.

[6 marks]

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smoking increases the chance of developing CHD
 physical inactivity and poor diet can also lead to
 development of CHD these lifestyle activities are
 dangerous to health

high cholesterol, diabetes and family history are
 medical risk factors that can lead to causing
 CHD

11

END OF QUESTIONS

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