AQA

GCSE
BIOLOGY

F

Foundation Tier   Paper 1F

Specimen 2018 (set 2)   Time allowed: 1 hour 45 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 100.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
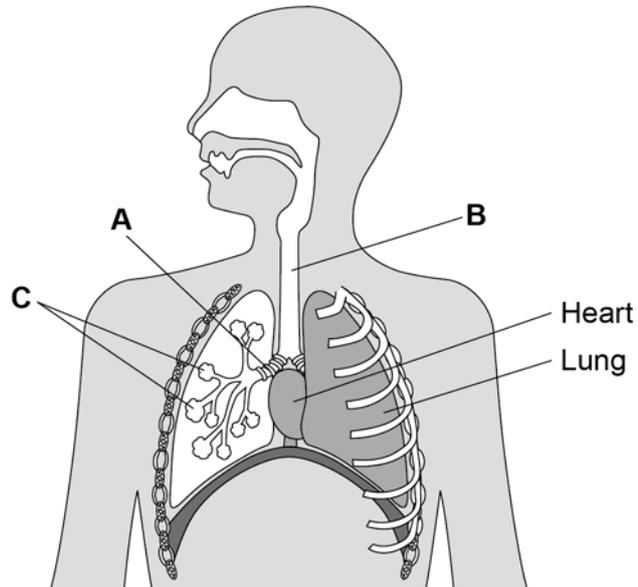- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	

0 1   Animals and plants contain organs and tissues.

Figure 1 shows some organs in the human thorax.

Figure 1

0 1 . 1   Name parts **A**, **B** and **C**.

[3 marks]

A _____

B _____

C _____

| 0 | 1 | . | 2 | Which organ system is the heart part of?

[1 mark]

Tick **one** box.

Breathing system ☐
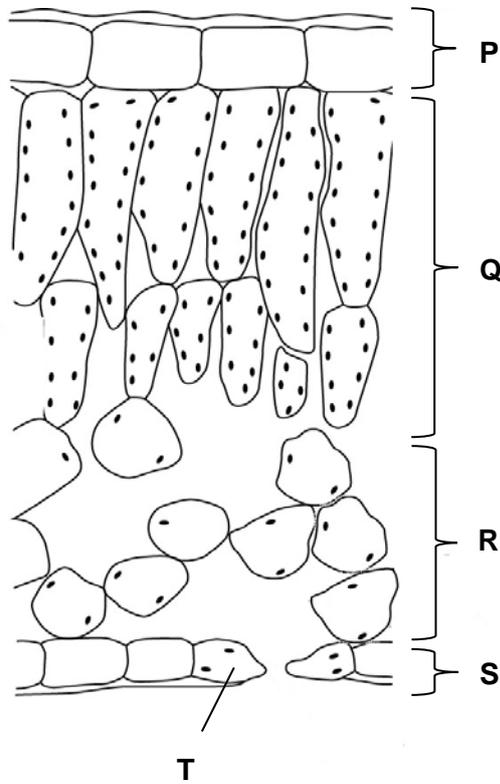
Circulatory system ☐

Digestive system ☐

Excretory system ☐

Question 1 continues on the next page

Turn over ▶

Figure 2 shows a cross section of a leaf.

Figure 2

| 0 | 1 |.| 3 | In which part of the leaf does most photosynthesis take place?

[1 mark]

Tick **one** box.

P ☐   Q ☐   R ☐   S ☐

| 0 | 1 | . | 4 | What is part **T**?

[1 mark]

Tick **one** box.

Guard cell ☐

Phloem ☐

Stoma ☐

Xylem ☐

| 0 | 1 | . | 5 | A leaf is an organ made of tissues.

What is a tissue?

[1 mark]

_____

_____

Question 1 continues on the next page

Turn over ▶

0 1 . 6 Draw **one** line from each tissue to its function.

[3 marks]

Tissue	Function
	Allows diffusion of gases through the leaf
Epidermis	Allows light through to the photosynthesising parts of the leaf
Phloem	Allows water into the leaf
Spongy mesophyll	Transport sugars around the plant
	Transports water around the plant

___
10

0 2 Many diseases can be treated using drugs.

0 2 . 1 Which type of pathogen can be killed by antibiotics?

[1 mark]

Tick **one** box.

Bacteria ☐

Fungi ☐

Protists ☐

Viruses ☐

0 2 . 2 Some drugs were originally extracted from living organisms.

Draw **one** line from each drug to the organism it was originally extracted from.

[2 marks]

Drug

**Organism the drug was
originally extracted from**

A mould

A virus

Foxglove

Aspirin

Rose

Digitalis

Willow Tree

Question 2 continues on the next page

Turn over ▶

0 2 . 3 New drugs must be tested before they can be used.

Give **one** reason why drugs should be tested.

[1 mark]

_____

_____

0 2 . 4 Doctors have developed a new drug.

The new drug has been tested on live animals.

What is the next stage in testing the new drug?

[1 mark]

Tick **one** box.

Testing on animal tissues in a laboratory ☐

Testing on healthy volunteers ☐

Testing on patients with the disease ☐

Testing on the whole human population ☐

0 2 . 5 Vaccination can be used to prevent an illness in a person.

Explain how a vaccination can prevent an illness.

[4 marks]

_____

_____

_____

_____

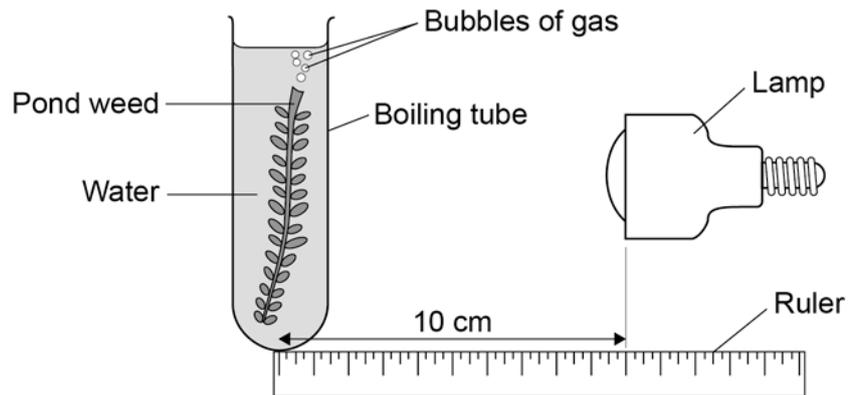_____

_____

_____

_____

9

Turn over for the next question

0 3 A student investigated the effect of light intensity on the rate of photosynthesis.

Figure 3 shows the apparatus the student used.

Figure 3

This is the method used.

1. Set up the apparatus as shown in **Figure 3**.

2. Place the lamp 10 cm from the pondweed.

3. Turn the lamp on and count the number of bubbles produced in one minute.

4. Repeat with the lamp at different distances from the pondweed.

0 3 . 1 Complete the hypothesis for the student's investigation.

[1 mark]

'As light intensity increases, _____

_____ .'

0 3 . 2 What was the independent variable in this investigation?

[1 mark]

Tick **one** box.

Light intensity ☐

Number of bubbles produced ☐

Temperature ☐

Time ☐

0 3 . 3 The teacher suggests putting the boiling tube into a beaker of water during the investigation.

Suggest why this would make the results more valid.

[1 mark]

_____

_____

Question 3 continues on the next page

Turn over ▶

Table 1 shows the student's results.

Table 1

Distance of lamp from pondweed in cm	Number of bubbles produced per minute			
	Trial 1	Trial 2	Trial 3	Mean
10	67	66	69	67
20	61	64	62	62.3
30	53	51	52	**X**
40	30	32	31	31
50	13	15	15	14

0 3 . 4 Calculate value **X** in **Table 1**.

[1 mark]

X = _____ bubbles per minute

0 3 . 5 State **one** error the student has made when completing the results at 20 cm.

[1 mark]

0 3 . 6 What evidence in **Table 1** shows that the data is repeatable?

[1 mark]

Tick **one** box.

The number of bubbles decreases as distance decreases. ☐

The numbers of bubbles at each distance are similar. ☐

The student calculated a mean for each distance. ☐

The student did the experiment three times. ☐

Question 3 continues on the next page

Turn over ▶

Another student investigated the effect of the colour of light on the rate of photosynthesis.
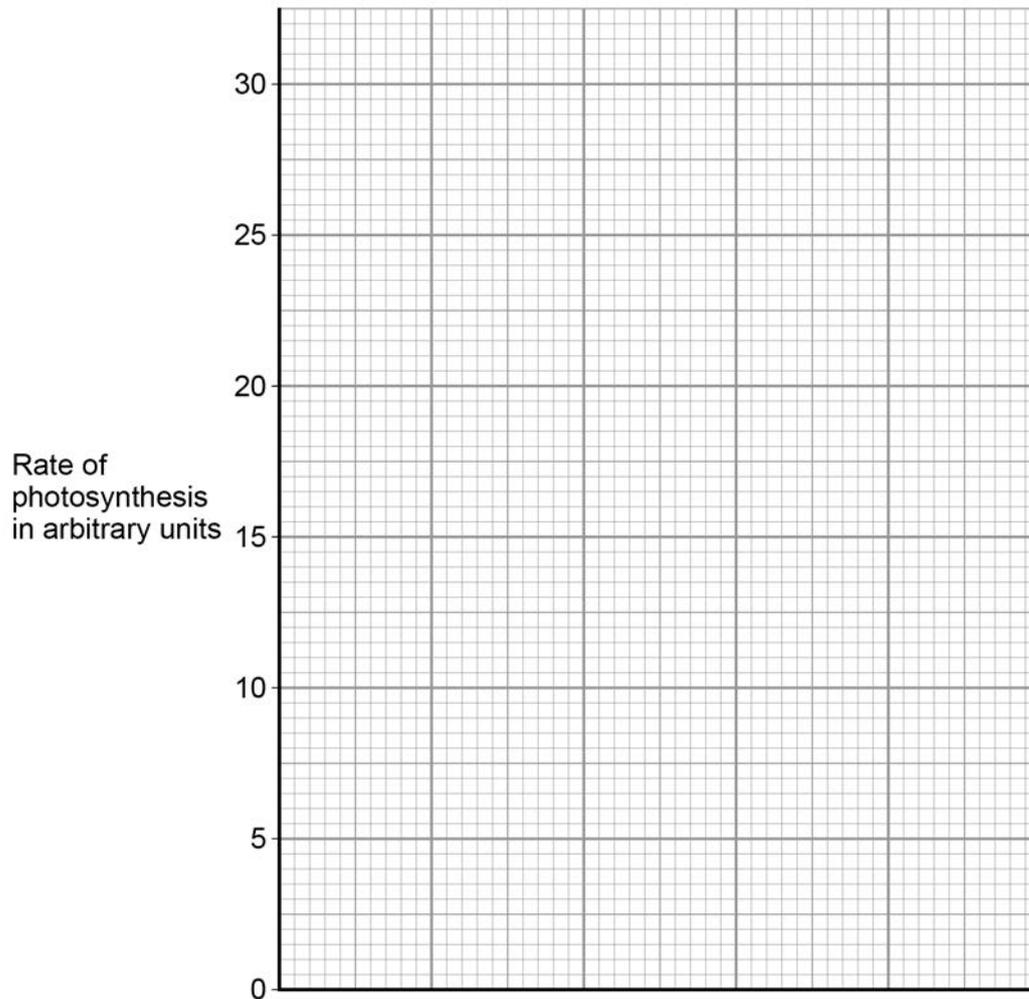
The results are shown in **Table 2**.

Table 2

Colour of light	Rate of photosynthesis in arbitrary units
Blue	24
Green	4
Red	17
Yellow	8

0 3 . 7 Plot the data from **Table 2** on **Figure 4**.

You should label the x-axis.

[3 marks]

Figure 4

0 3 . 8 Give **two** conclusions from your graph in **Figure 4**.

[2 marks]

1 _____

_____

2 _____

_____

Question 3 continues on the next page

Turn over ▶

0 3 . 9 The glucose produced in photosynthesis can be converted into amino acids to make new proteins for the plant.

Complete the sentences.

[3 marks]

The glucose produced in photosynthesis can also be used in other ways.

Glucose can be used in respiration to release _____ .

Glucose can be converted to cellulose to strengthen the _____ .

Glucose can be stored as _____ .

14

0 4 Cells can be classified according to their structure.

0 4 . 1 Complete **Table 3** to show which features each cell type has.
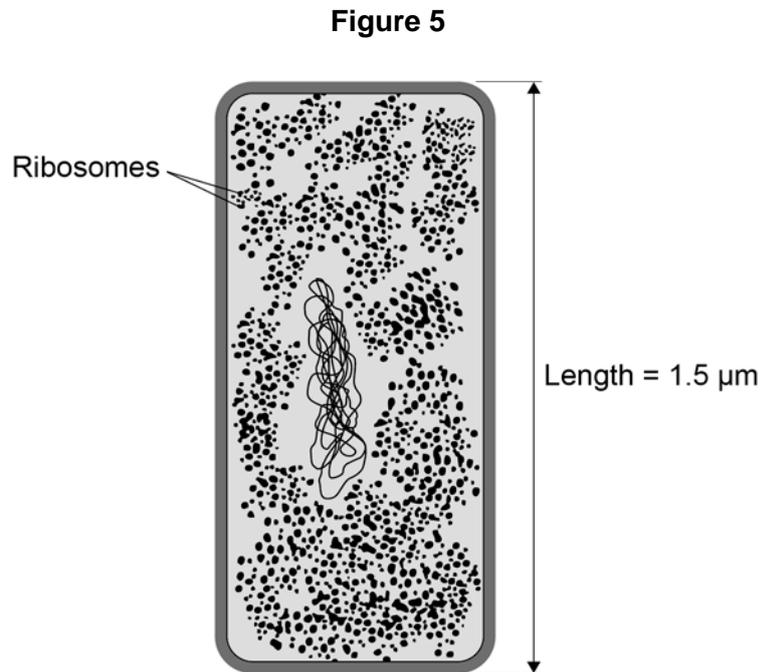
Write a tick or a cross in each box.

[2 marks]

Table 3

	Nucleus	**Plasmids**	**Cytoplasm**
Prokaryotic cell			
Eukaryotic cell			

Question 4 continues on the next page

Turn over ▶

Figure 5 shows a cell.

Figure 5

Ribosomes

Length = 1.5 µm

0 4 . 2 What type of cell is shown in **Figure 5**?

[1 mark]

Tick **one** box.

An animal cell ☐

A bacterial cell ☐

A plant cell ☐

0 4 . 3 The cell in **Figure 5** contains ribosomes.

What is the function of ribosomes?

[1 mark]

_____

_____

0 4 . 4 There are 1000 micrometres (µm) in a millimetre (mm).

The length of the cell in **Figure 5** is 1.5 micrometres (µm).

Give the length of the cell in millimetres (mm).
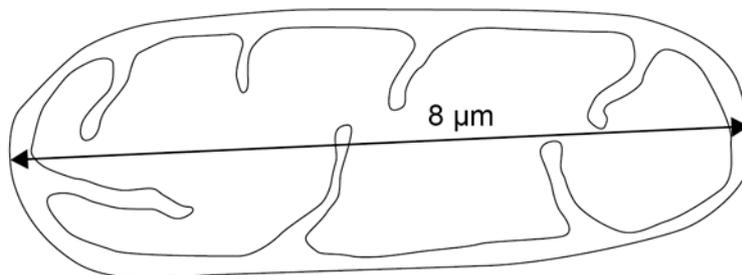
[1 mark]

Length of cell = _____ mm

Figure 6 shows a mitochondrion viewed with a microscope.

Figure 6

8 µm

0 4 . 5 Give **one** reason why the cell in **Figure 5** does **not** contain mitochondria.

Use information from **Figure 5** and **Figure 6.**

[1 mark]

Question 4 continues on the next page

Turn over ►

The cell in **Figure 5** divides once every 30 minutes.

Table 4 shows how many cells are present after a given time.

Table 4

Time in minutes	Number of cells present
0	1
30	2
60	4

| 0 | 4 |. | 6 |

Calculate how many cells will be present after 2 hours.

[2 marks]
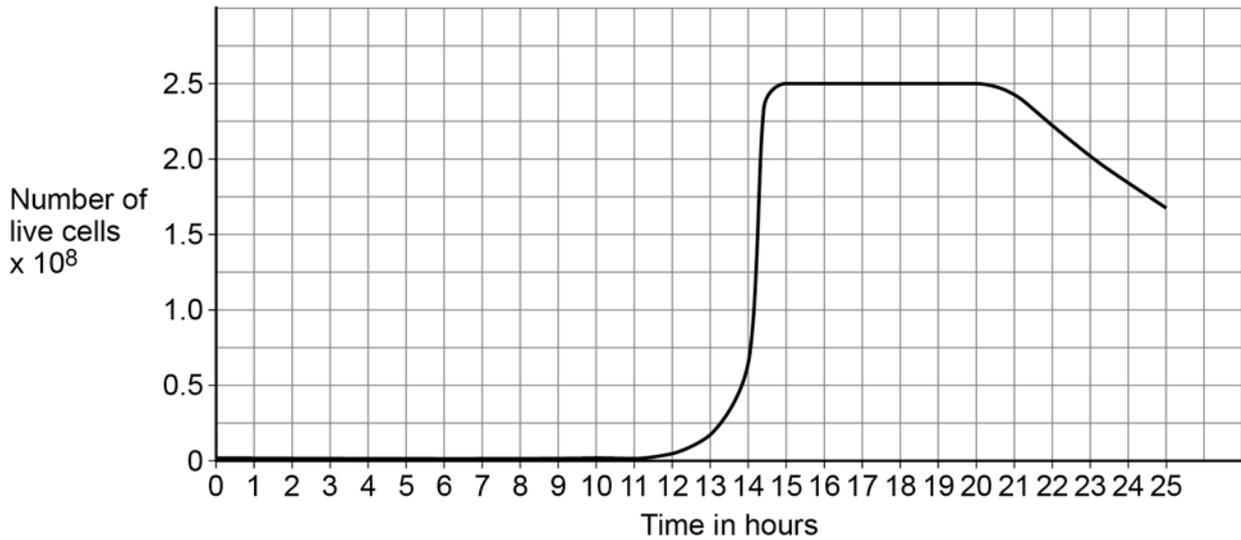
Number of cells = _____

Cells like the one in **Figure 5** are kept in a culture solution for 25 hours.

Figure 7 shows the number of live cells present.

Figure 7

0 4 . 7 Describe the changes in the number of live cells shown in **Figure 7** in the first 20 hours.

Use data from **Figure 7** in your answer.

[3 marks]

_____

_____

_____

_____

_____

_____

0 4 . 8 Suggest **one** reason why the number of live cells decreases after 20 hours.
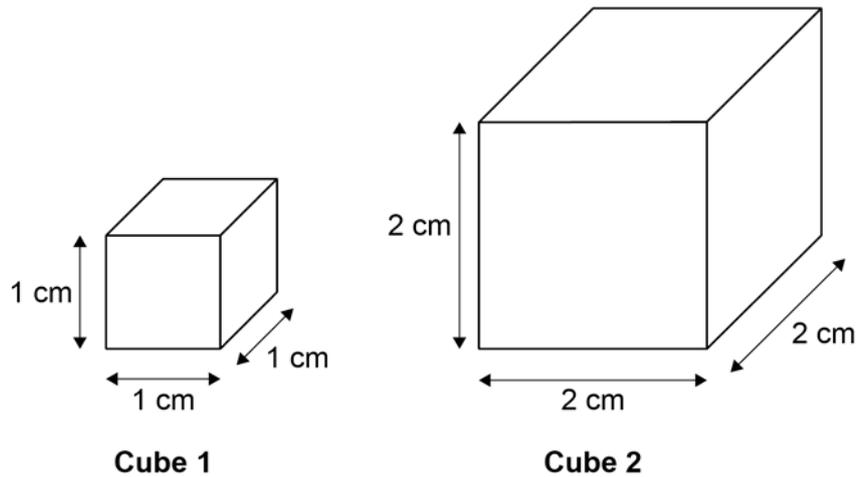
[1 mark]

_____

_____

_____

12

Turn over ▶

0 5 A student used cubes of potato to investigate the effect of surface area and volume on the rate of osmosis.

Figure 8 shows two of the cubes of potato the student used.

Figure 8

The surface area to volume ratio of **cube 1** is 6:1.

0 5 . 1 Calculate the total surface area of **cube 2**.

[1 mark]

Total surface area of **cube 2** = _____ cm^2

0 5 . 2 Calculate the volume of **cube 2**.

[1 mark]

_____

_____

Volume of **cube 2** = _____ cm³

0 5 . 3 Calculate the surface area to volume ratio of **cube 2**.

[1 mark]

Use the equation:

$$\text{surface area to volume ratio} = \frac{\text{surface area}}{\text{volume}}$$

_____

_____

Surface area to volume ratio of **cube 2** = _____ **: 1**

Question 5 continues on the next page

Turn over ▶

This is the method used.

1. Cut two cubes of potato of size 2 cm × 2 cm × 2 cm

   • Cut one of these cubes into 8 cubes of potato of size 1 cm × 1 cm × 1 cm (sample **A**).

   • Do not cut the other cube (sample **B**).

2. Measure the mass of each sample **A** and the mass of sample **B**.

3. Place all the cubes into a beaker of distilled water.

4. Leave for 30 minutes.

5. Remove the cubes from the beaker and dry the surfaces with a paper towel.

6. Measure the mass of each sample of cubes.

0 5 . 4 Why were 8 cubes of size 1 cm × 1 cm × 1 cm but only one cube of size 2 cm × 2 cm × 2 cm cube used?

[1 mark]

_____

_____

0 5 . 5 Why did the student dry the surface of each potato cube in step **5** of the method?

[1 mark]

_____

_____

Table 5 shows the student's results.

Table 5

	Mass at start in g	Mass at end in g	Mass change in g
Sample A **Eight cubes, each measuring 1 cm × 1 cm × 1 cm**	10.4	12.2	1.8
Sample B **One cube, measuring 2 cm × 2 cm × 2 cm**	9.9	10.7	**X**

| 0 | 5 | . | 6 | Calculate mass change **X** in **Table 5**.

[1 mark]

Mass change **X** = _____ g

| 0 | 5 | . | 7 | Explain why the masses of both samples of cubes increased.

[2 marks]

Question 5 continues on the next page

Turn over ►

0 5 . 8 It would be better to calculate percentage change in mass rather than change in mass.

Why is this a more valid method?

[1 mark]

Tick **one** box.

Because it makes it a fair test. ☐

Because it makes the investigation of the samples of cubes more accurate. ☐

Because the samples of cubes were different masses at the start of the investigation. ☐

0 5 . 9 Explain why the mass of the cubes in sample **A** increased more than the mass of the cube in sample **B**.

[2 marks]

_____

_____

_____

_____

11

Turn over for the next question

0 6 Gases enter and leave the blood by diffusion.

0 6 . 1 Define the term diffusion.

[1 mark]

_____

_____

0 6 . 2 Name the main gases that diffuse into and out of the blood **in the lungs**.

[1 mark]
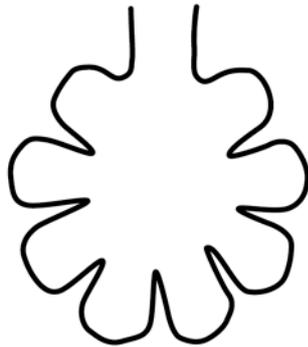
Into the blood _____

Out of the blood _____

Question 6 continues on the next page

Turn over ▶

0 6 . 3 Smoking can cause emphysema.
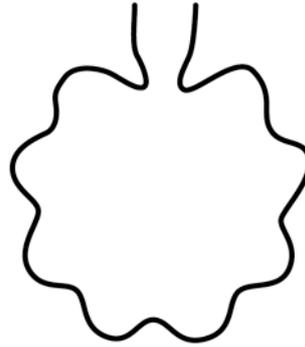
Look at **Figure 9**.

Figure 9

Air sac from person
without emphysema

Air sac from person
with emphysema

Emphysema causes the walls of the air sacs in the lungs to break down

Explain how this will affect the diffusion of gases into and out of the blood.

[2 marks]

_____

_____

_____

_____

Smoking during pregnancy can cause low birth mass in babies.

Table 6 shows the World Health Organisation categories for birth mass.

Table 6

Category	Birth mass in g
Above normal birth mass	> 4500
Normal birth mass	2500–4500
Low birth mass	1500–2499
Very low birth mass	1000–1499
Extremely low birth mass	< 1000

| 0 | 6 | . | 4 | Complete **Table 7**.

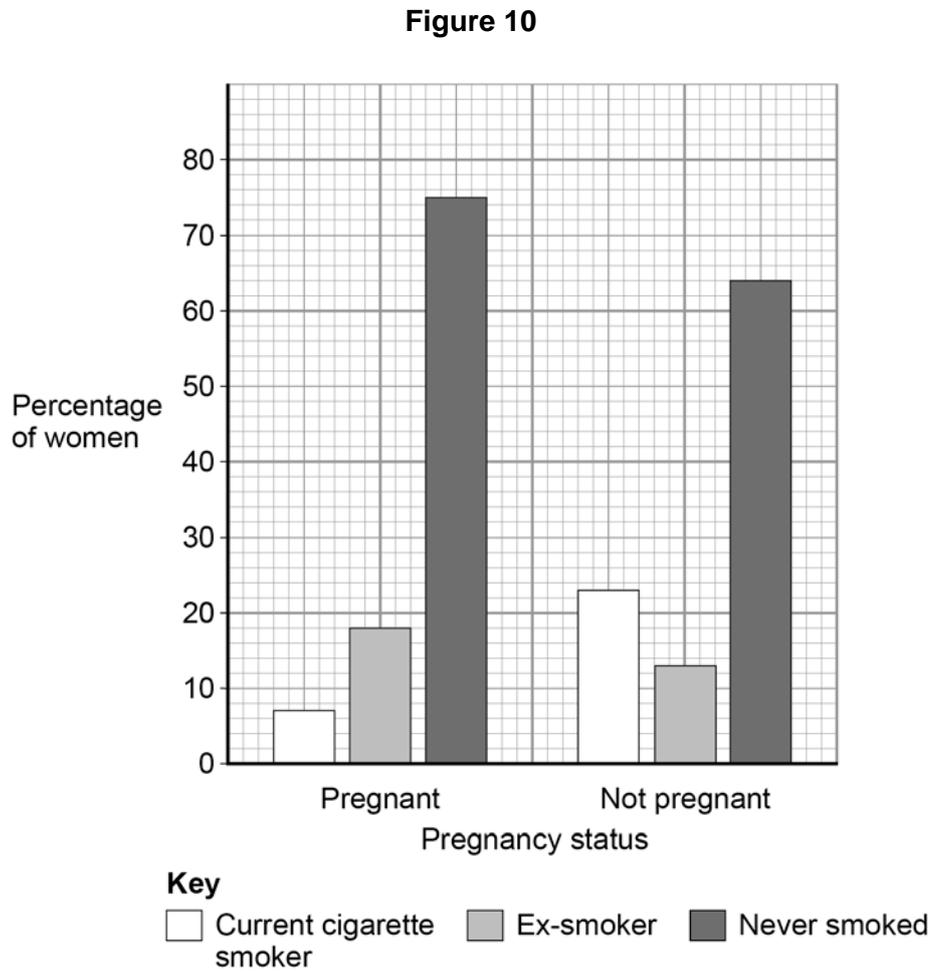Use information in **Table 6**.

[2 marks]

Table 7

Baby	Birth mass in g	Category
A	2678	Normal birth mass
B	1345	
C	991	

Question 6 continues on the next page

Turn over ▶

Figure 10 shows data from a study about pregnancy and smoking in women in the UK.

Figure 10

Key
☐ Current cigarette smoker   ▨ Ex-smoker   ■ Never smoked

| 0 | 6 |.| 5 | Sampling from the whole UK population would **not** be appropriate for this study.

Give **one** reason why.

[1 mark]

_____

_____

0 6 . 6 Give **three** conclusions that can be made about smoking in pregnant women compared with non-pregnant women.

Use information from **Figure 10**.

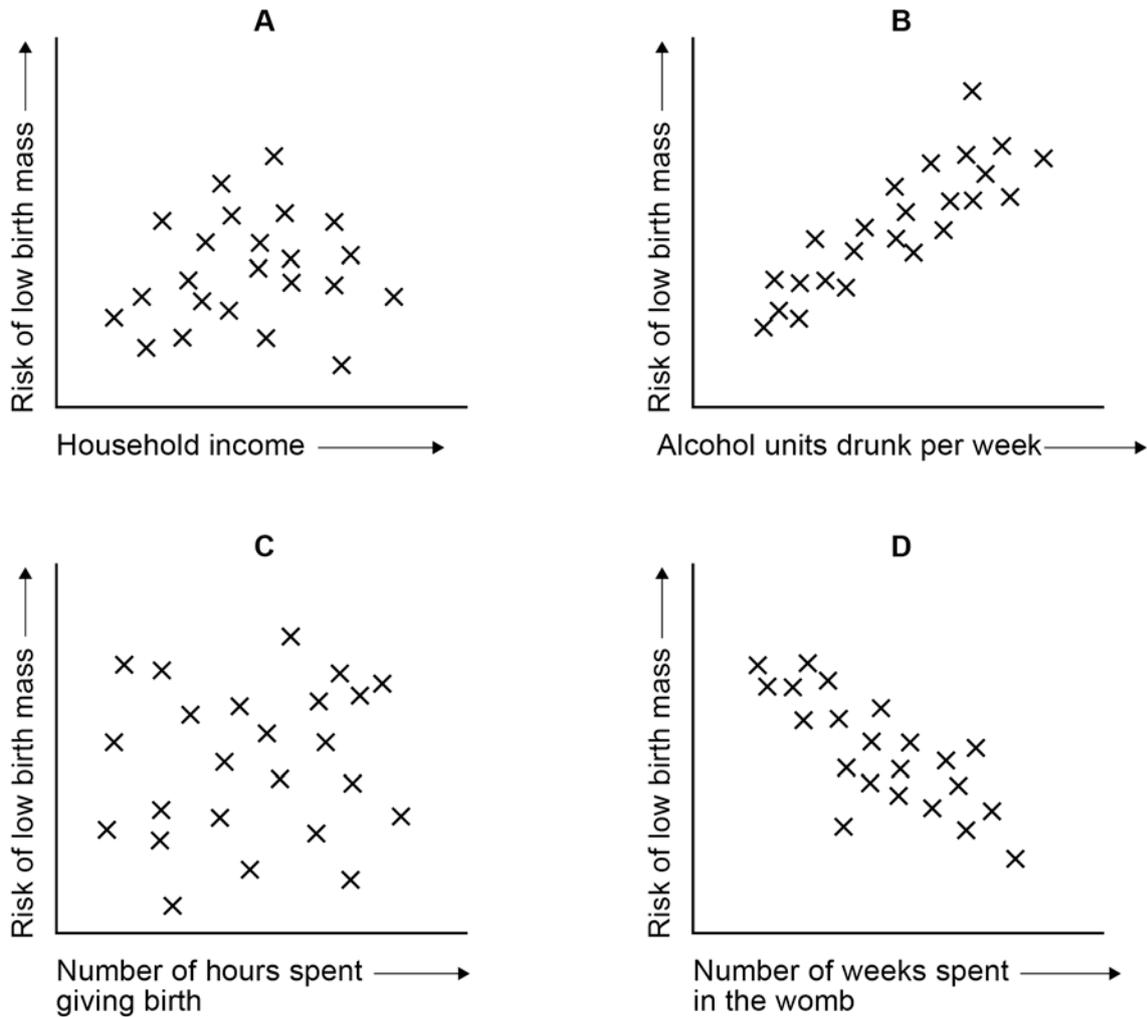**[3 marks]**

1 _____

_____

2 _____

_____

3 _____

_____

Question 6 continues on the next page

Turn over ▶

Do not write outside the box

Other factors can also be linked to low birth mass.

Figure 11 shows the relationship between four of these factors and the risk of low birth mass.

Figure 11

A

Risk of low birth mass ——→

Household income ——→

B

Risk of low birth mass ——→

Alcohol units drunk per week——→

C

Risk of low birth mass ——→

Number of hours spent ——→
giving birth

D

Risk of low birth mass ——→

Number of weeks spent ——→
in the womb

IB/M/SAMs2/8461/1F

0 6 . 7 What type of graph is shown in **Figure 11**?

[1 mark]

Tick **one** box.

Bar graph ☐

Histogram ☐

Line graph ☐

Scatter graph ☐

0 6 . 8 Which of the graphs in **Figure 11** shows a positive correlation?

[1 mark]

Tick **one** box.

A ☐   **B** ☐   **C** ☐   **D** ☐

0 6 . 9 A student concluded that the longer a woman spends giving birth, the greater the risk of low birth mass.

Give **one** reason why the student's conclusion is **not** correct.

Use evidence from **Figure 11**.
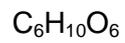
[1 mark]

_____

_____

13

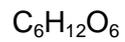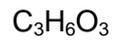**Turn over for the next question**

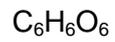**0 7** Glucose is broken down in respiration.

0 7 . 1 What is the chemical formula for glucose?

[1 mark]

Tick **one** box.

$C_6H_6O_6$ ☐

$C_3H_6O_3$ ☐

$C_6H_{12}O_6$ ☐

$C_6H_{10}O_6$ ☐

Figure 12 shows the apparatus a student used to investigate aerobic respiration.

Figure 12

Air in → Lime water — Woodlice — Lime water → To pump
Flask A   Flask B
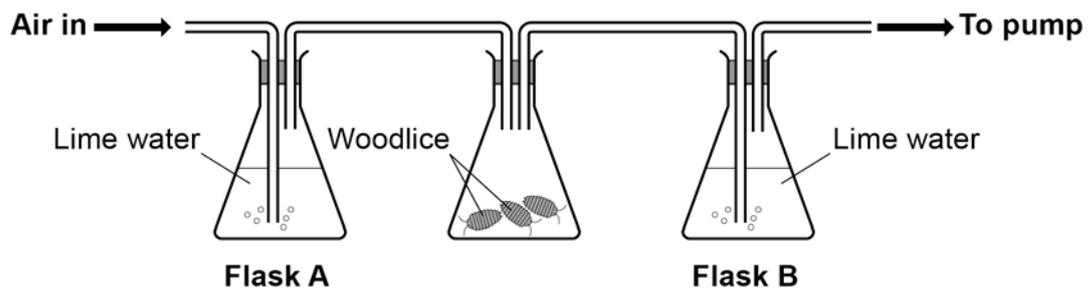
Limewater goes cloudy when carbon dioxide is added to it.

0 7 . 2 After 10 minutes the limewater in flask **B** was cloudy, but the limewater in flask **A** remained colourless.

Explain why.

[2 marks]

_____

_____

_____

_____

0 7 . 3 Flask **A** acts as a control in this investigation.

What is the purpose of a control?

[1 mark]

_____

_____

0 7 . 4 The student repeated the investigation with no woodlice.

Describe the appearance of the limewater in flask **A** and flask **B** after 10 minutes.

[2 marks]

Flask **A** _____

_____

Flask **B** _____

_____

Question 7 continues on the next page

Turn over ▶

Do not write outside the box

Anaerobic respiration is another form of respiration in living organisms.

| 0 7 . 5 | What is produced during anaerobic respiration in humans?

[1 mark]

Tick **one** box.

Carbon dioxide ☐

Carbon dioxide and lactic acid ☐

Lactic acid ☐

Oxygen and water ☐

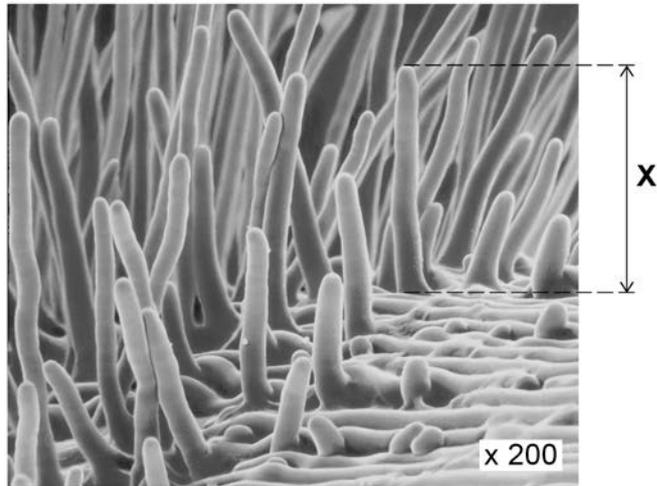| 0 7 . 6 | Complete the equation for anaerobic respiration in yeast.

[1 mark]

glucose ⟶ carbon dioxide + _____

___

8

IB/M/SAMs2/8461/1F

| 0 | 8 | **Figure 13** shows part of a root from a cress plant.

Figure 13

| 0 | 8 |.| 1 | What type of microscope was used to create the image in **Figure 13**?

[1 mark]

| 0 | 8 |.| 2 | The magnification of the cress root in **Figure 13** is × 200.

There are 1000 micrometres (μm) in a millimetre (mm).

Calculate the real length of the root hair, **X**.

[2 marks]

Give your answer in micrometres (μm).

Real length **X** = _____ μm

Question 8 continues on the next page

Turn over ▶

0 8 . 3 Root hair cells take up water from the soil.

Explain **one** way in which the root hair cell is adapted to this function.

[2 marks]

_____

_____

_____

_____

Table 8 shows the water uptake by a plant's roots on two different days.

Table 8

	Mean water uptake in cm^3 per hour
Cold day	1.8
Hot day	3.4

0 8 . 4 Explain why the mean rate of water uptake is higher on a hot day than on a cold day.

[3 marks]

_____

_____

_____

_____

_____

_____

0 8 . 5 The concentration of mineral ions in the soil is lower than in root hair cells.

Root hair cells take up mineral ions from the soil.

Root hair cells contain mitochondria.

Explain why root hair cells contain mitochondria.

[4 marks]

_____

_____

_____

_____

_____

_____

_____

_____

12

Turn over for the next question

Turn over ▶

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
**ANSWER IN THE SPACES PROVIDED**

0 9 Rose black spot is a disease of roses.

0 9 . 1 What type of microorganism causes rose black spot?

[1 mark]

Tick **one** box.

A bacterium ☐

A fungus ☐

A protist ☐

A virus ☐

0 9 . 2 Explain how different **types of organism** defend themselves against microorganisms.

[6 marks]

_____

_____

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_____

_____

_____

_____

_____

_____

Question 9 continues on the next page

Turn over ▶

0 9 . 3 A student tried to grow some bacteria in the laboratory.

Figure 14 shows some of the apparatus used.

Figure 14

Inoculating loop
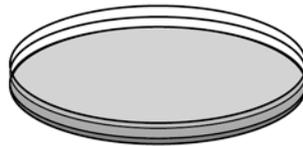
Petri dish
containing agar

Agar — Bacteria growing on agar
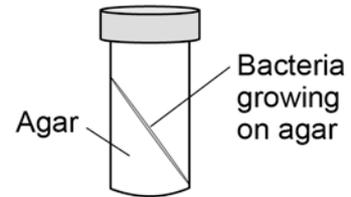
Bottle containing
the bacteria

This is the method used.

1. Remove the lid of the Petri dish.

2. Remove the lid of the bottle containing the bacteria.

3. Use the inoculating loop to remove some of the bacteria from the bottle.

4. Spread the bacteria over the agar using the inoculating loop.

5. Put the lid back on the Petri dish.

6. Put the Petri dish into an incubator at 25 °C for 24 hours.

Steps 1−5 could cause the sample of the bacteria on the petri dish to be contaminated.

Give **three** improvements to the method to prevent contamination.

[3 marks]

1 _____

_____

2 _____

_____

3 _____

_____

0 9 . 4 Why did the student grow the bacteria at 25 °C rather than at 40 °C?

[1 mark]

Tick **one** box.

So the bacteria grew more quickly ☐

So the bacteria grew more slowly ☐

To prevent the growth of a harmful pathogen ☐

To save money ☐

END OF QUESTIONS

11

Turn over ►

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED