

SECTION A

Answer **all** the questions.

You should spend a maximum of 20 minutes on this section.

1 Which of the following structures are found in both plant and animal cells?

A Cell membrane, cytoplasm, mitochondria

B Cell membrane, chloroplast, nucleus

C Cell wall, cytoplasm, mitochondria

D Cell wall, cytoplasm, nucleus

Your answer

[1]

2 Which structure controls the movement of substances in or out of the cell?

A Cell membrane

B Chloroplast

C Mitochondria

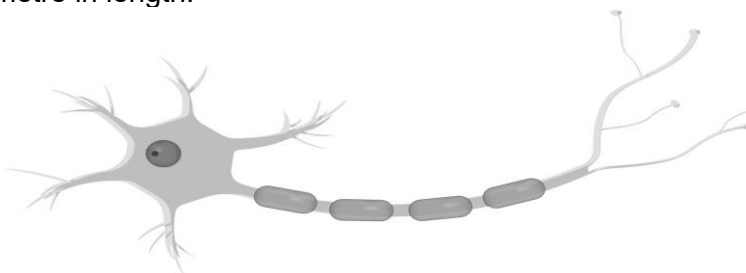
D Nucleus

Your answer

[1]

3

- 3 Neurones are specialised cells.
They can be over a metre in length.



Which statement best explains why some neurones are over a metre long?

- A Neurones join synapses together.
- B Neurones pull on muscles to make them contract.
- C Neurones transmit nerve impulses from one part of the body to another.
- D Neurones carry digested food from the gut to all the different parts of the body.

Your answer

[1]

- 4 Look at the table of data.

It shows the effectiveness of different types of contraception.

Method	Pregnancies per 100 couples each year.
The pill	8
Condom	18
Diaphragm	16
IUD	1
Withdrawal	27

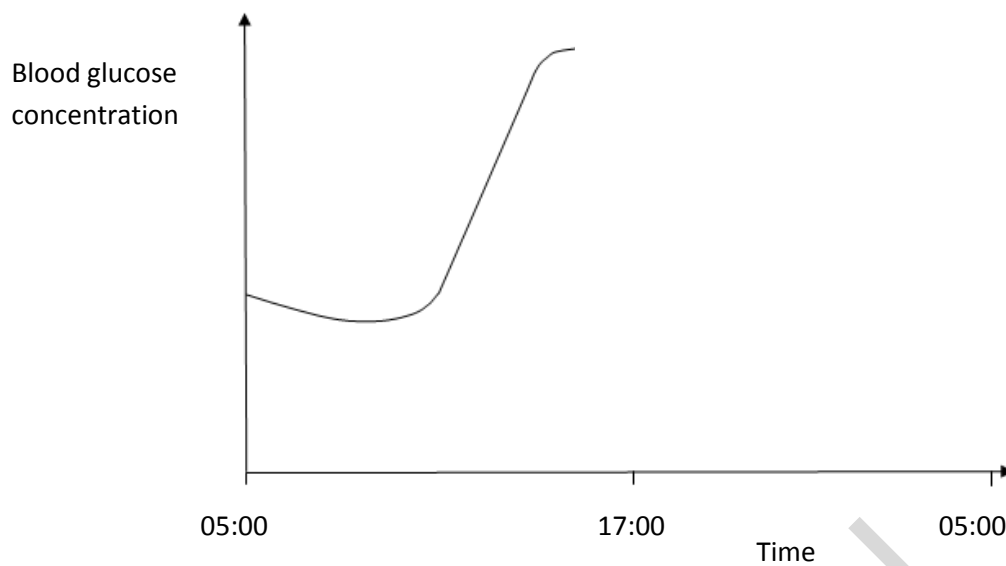
Using data from the table, which of these statements is correct?

- A Withdrawal is the most effective method of birth control.
- B The condom is 10% more effective than the pill.
- C Using a diaphragm gives a 16% chance of pregnancy each year.
- D The IUD is 100% effective in birth control.

Your answer

[1]

- 5 The graph below shows the changes in blood glucose level of a diabetic.



At 17:00, the diabetic injects insulin.

What would happen to the blood glucose level immediately after this?

- A It would decrease noticeably.
- B It would remain constant.
- C It would increase then immediately decrease.
- D It would increase gradually.

Your answer

[1]

- 6 A tomato grower investigated how changing the percentage of carbon dioxide in the air inside a glasshouse affected his tomato crop.

Look at the table of results.

carbon dioxide in glasshouse air (%)	0.06	0.08	0.10	0.12
mass of tomatoes (kg)	105	125	150	150

Adding carbon dioxide to the glasshouse costs the grower money.

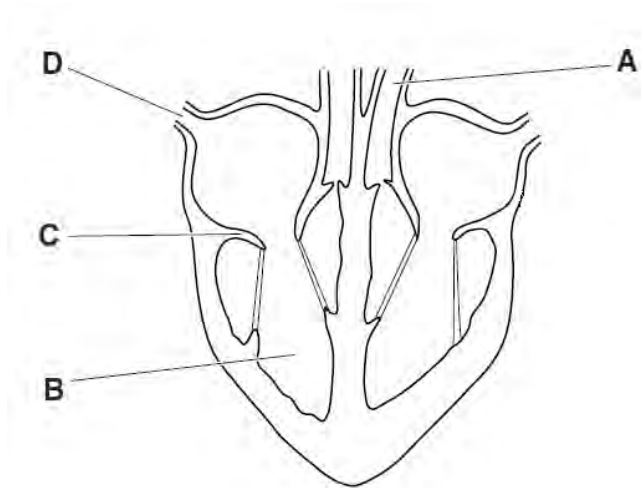
What would be the **best** percentage of carbon dioxide for the grower to use in his glasshouse?

- A 0.06%
- B 0.08%
- C 0.10%
- D 0.12%

Your answer

[1]

7 Look at the diagram of the heart.



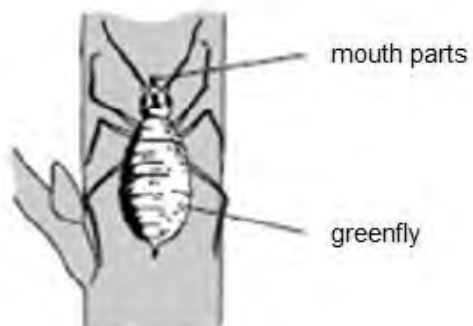
Which part **A**, **B**, **C** or **D** prevents backflow of blood?

Your answer

[1]

SPECIMEN

- 8 The picture shows a greenfly feeding from the stem of a tomato plant.



The greenfly has piercing mouth parts.

It pierces a tissue inside the plant and removes a sugary substance from this tissue during feeding.

What is the name of the tissue?

- A Cuticle
- B Epidermis
- C Phloem
- D Xylem

Your answer

[1]

- 9 Animals can respire by anaerobic or aerobic respiration.

Which row in the table correctly describes aerobic and anaerobic respiration?

	an exothermic reaction	makes lactic acid
A	anaerobic only	both
B	both	aerobic only
C	aerobic only	anaerobic only
D	both	anaerobic only

Your answer

[1]

- 10 The table shows the number of mitochondria in different types of cell.

type of cell	number of mitochondria
liver	1500
heart muscle	5000
skin	100

Which statement best explains the data in the table?

- A** Heart muscle cells produce more protein than other types of cell.
- B** Skin cells need large amounts of energy.
- C** Liver cells only respire using anaerobic respiration.
- D** Muscle contraction requires large amounts of energy.

Your answer

[1]

SECTION B

Answer **all** the questions.

11

- (a) Insulin is a hormone.

Write down the job of insulin.

..... [1]

- (b) Hormones are involved in an important process called homeostasis.

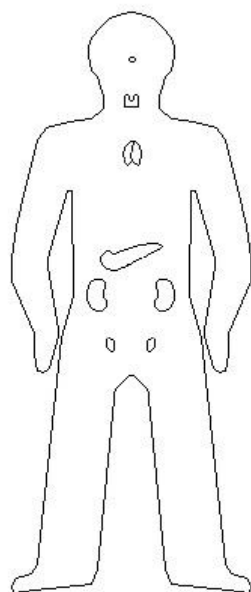
What is homeostasis?

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..... [2]

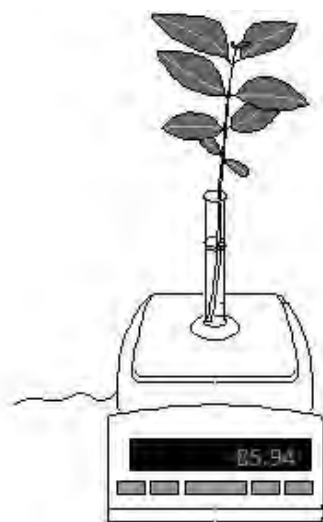
- (c) Changes happen in a female during the menstrual cycle.

The changes happen because of hormones.

- (i) Label the diagram to show where follicle stimulating hormone (FSH), oestrogen and progesterone are made. [3]



- 12 The picture shows equipment used to estimate the rate of transpiration from a plant cutting



Method

1. Take a cutting which has several leaves from a plant, and place in a measuring cylinder.
2. Adjust the water level to 6 cm^3 .
3. Add about 1 cm^3 of oil to the measuring cylinder, so that the oil sits on top of the water and record the mass.
4. Repeat for two other cuttings from the same plant. Take readings at timed intervals over the next two days.

- (a) Why is the water level in the measuring cylinder adjusted to 6 cm^3 each time?

.....
 [1]

- (b) Suggest **one** reason why oil was added to the measuring cylinder.

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 [1]

(c) It is important to have a table to record the results of the investigation.

Suggest the measurements that should be recorded in the table.

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[3]

SPECIMEN

- (d) The table shows the results obtained by four different groups after **two** days.

Group	Volume of water lost (mm ³)
1	117
2	174
3	232
4	225

- (i) The actual rate of transpiration for this plant should be 115.2 mm³ per day.

Group 3 has the most accurate estimate. How can you tell?

.....
 [1]

- (ii) The groups all did their investigations at the same time, in the same conditions. Suggest reasons why some estimates are not as accurate as others.

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 [2]

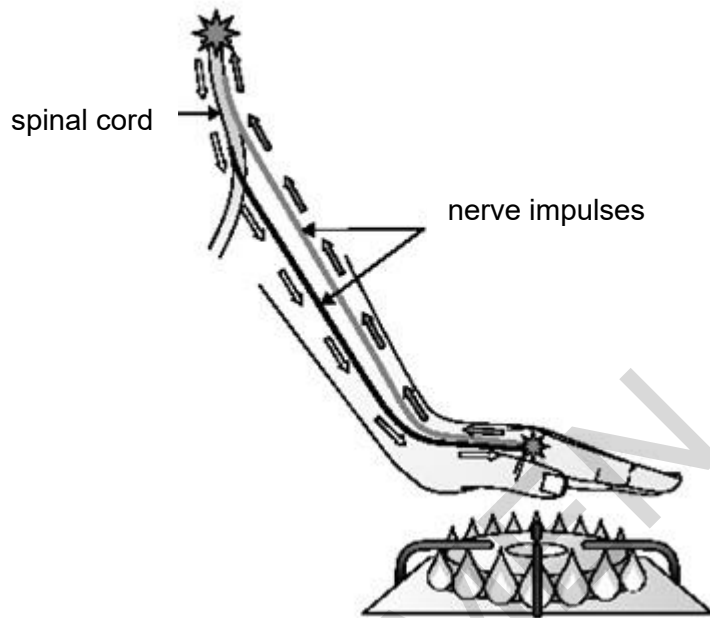
- (iii) Suggest **one** change that could improve the experiment.

Explain why this would be an improvement.

.....

 [2]

- 13** If a hand touches a hotplate the person's hand pulls quickly away.
This is caused by a flexor (withdrawal) reflex.



- (a)** What is a reflex?

..... [1]

- (b)** Describe the path a nerve impulse takes through the nervous system during the flexor (withdrawal) reflex.

Suggest why this reflex would not happen in a person with an artificial hand.

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..... [4]

(c) Nerve impulses can travel at speeds of between 0.5 and 120 m/s.

- (i) Calculate the speed of impulse in the flexor reflex if the distance covered is 1.2 metres and the time taken is 0.01 seconds

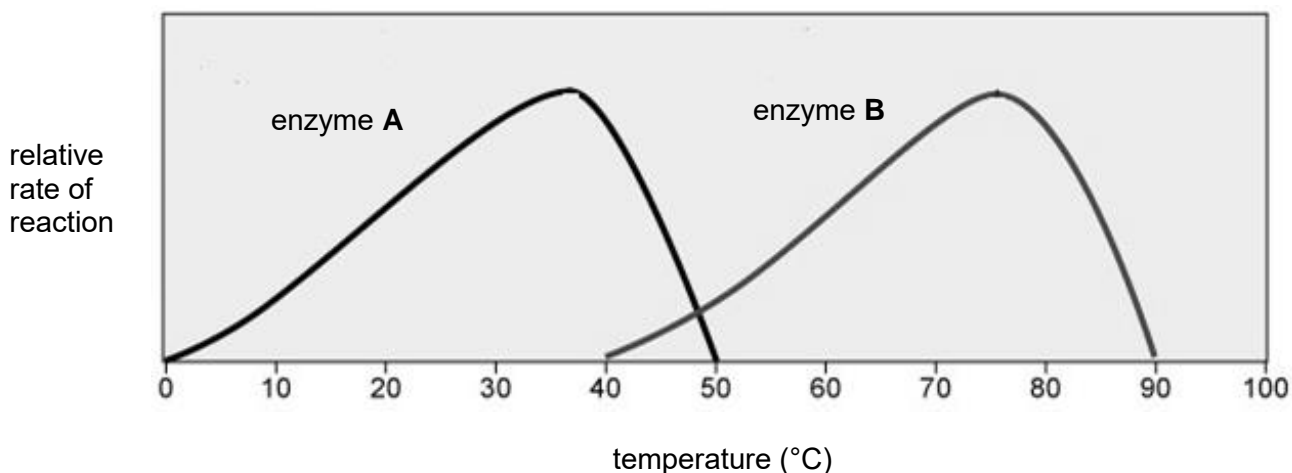
Answer =m/s **[2]**

- (ii) Why is it important that the impulse travels at this speed in the flexor reflex?

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

SPECIMEN

14 The graph shows how two different enzymes are affected by temperature.



(a) At what temperature does enzyme **A** stop working?

..... [1]

(b) Both enzyme **A** and enzyme **B** digest protein.

They can be added to washing powder to help clean stains from clothes.

Washing instructions advise a temperature of 45°C.

Describe what is happening to the rates of enzyme **A** and enzyme **B** between 40°C and 50°C.

Use the shape of the graph and values from the X axis to suggest why enzyme **A** would be the best to use in washing powder at 45°C.

Give reasons for your answer.

.....

 [4]

(c) Which enzyme could work in humans?

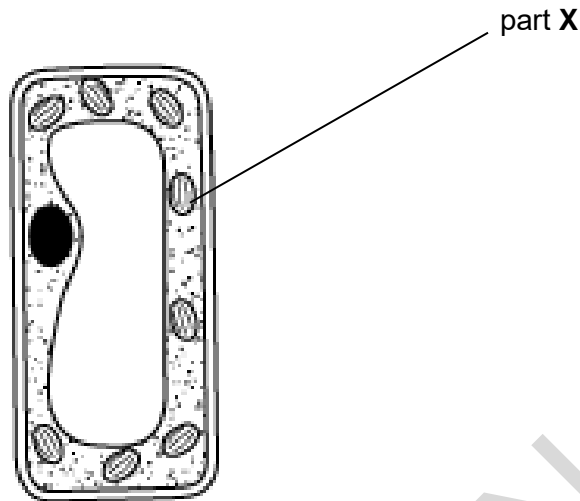
Explain why.

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..... [2]

SPECIMEN

- 15 Look at the palisade cell from a leaf.
It is important for photosynthesis.

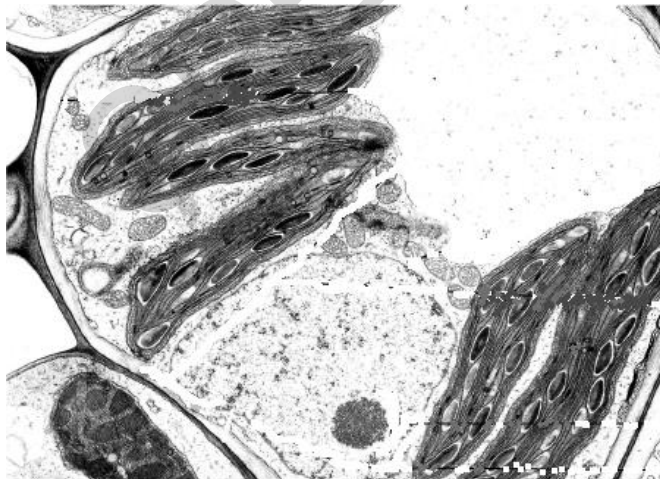


- (a) Part X is where the chemical reactions of photosynthesis takes place.

Write down the name of the part X.

..... [1]

- (b) Look at the picture.
It is an electron micrograph of another cell found in the leaf.



Explain how using electron microscopy has improved the understanding of structures inside cells.

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..... [2]

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SPECIMEN

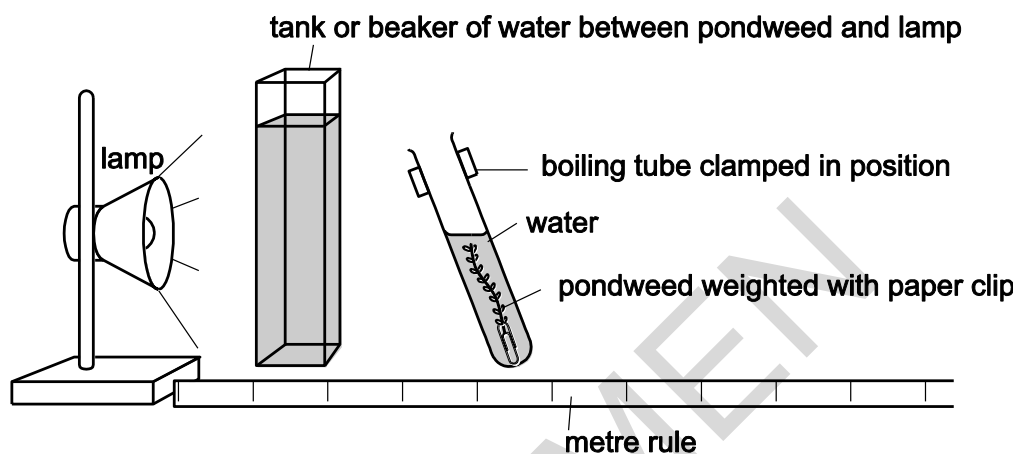
- (c) Complete the chemical equation for photosynthesis.



[2]

- (d) Look at the diagram.

It shows a set of apparatus that can be used to investigate the rate of photosynthesis.



Method

- Set up the apparatus and look for a stream of bubbles coming from the cut end of the pond weed.
- Count the number of bubbles produced in 1 minute. Repeat for a second minute. Repeat for a third minute.
- Change the distance that the lamp is from the pondweed to investigate the effect on the rate of photosynthesis.
- Leave for 2 minutes, then count the number of bubbles produced in one minute. Repeat for a second minute. Repeat for a third minute.
- Change the distance again, and repeat instruction **d**.

Students followed this method to investigate the effect of light intensity on photosynthesis.

The table shows results from their experiment.

Distance between light and pondweed in metres	Number of bubbles counted in 1 minute			Mean
	Trial 1	Trial 2	Trial 3	
1.0	8	6	7	7
0.5	28	32	30	30
0.25	105	106	104	105
0.125	105	104	109

- (i) Calculate the mean for the distance 0.125 metres and write it in the table

[1]

- (ii) Plot a graph to show the effect of the distance of light from the pondweed on the mean number of bubbles produced.



[3]

(iii) Describe the effect of light intensity on photosynthesis.

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..... [1]

(iv) Suggest **one** source of error in the method for measuring the amount of gas given off.

Explain how this method could be improved.

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

END OF QUESTION PAPER

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