

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
Winter 2004



SCIENCE: DOUBLE AWARD A (MODULAR) 346002
BIOLOGY A (MODULAR)
Maintenance of Life (Module 02)

Thursday 18 November 2004 Morning Session

In addition to this paper you will require:

- a black ball-point pen;
- an answer sheet.

You may use a calculator.

Time allowed: 30 minutes

Instructions

- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title “Maintenance of Life” printed on it.
- Attempt **one Tier only, either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only. Rough work may be done on the question paper.

Instructions for recording answers

- Use a **black ball-point pen**.

- For each answer **completely fill in the circle** as shown:

1	2	3	4
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

- Do **not** extend beyond the circles.

- If you want to change your answer, **you must** cross out your original answer, as shown:

1	2	3	4
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown:

1	2	3	4
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Information

- The maximum mark for this paper is 36.

Advice

- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 14 of this booklet.

FOUNDATION TIER

SECTION A

Questions **ONE** to **FIVE**.

In these questions match the words in the list with the numbers.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

The table is about different receptors in the body of a rabbit.

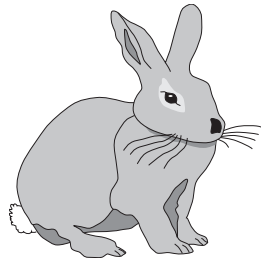
Match words from the list with the numbers **1–4** in the table.

ear

eye

skin

tongue



Part of body	Contains receptors which allow the rabbit to
1	feel the side of the burrow with its thighs.
2	hear a fox approaching.
3	see other rabbits.
4	taste chemicals in the grass.

QUESTION TWO

The diagram shows the position of some organs in the body.

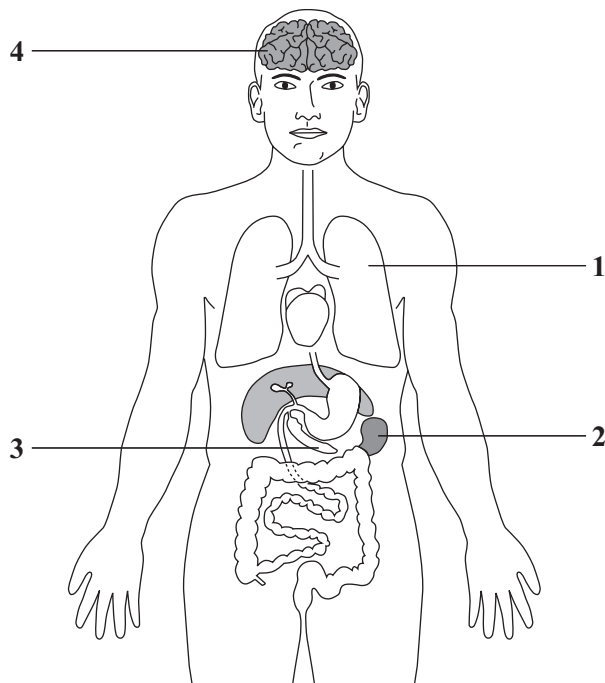
Match words from the list with the labels 1–4 on the diagram.

brain

kidney

lung

pancreas



TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION THREE

The table is about some structures in the body.

Match words from the list with the numbers 1–4 in the table.

blood

cytoplasm

liver

motor neurone

Structure	What it does
1	Carries hormones around the body
2	Produces urea
3	Carries impulses to muscles
4	Where most chemical reactions in a cell take place

QUESTION FOUR

The diagram shows a cell from the root of a plant.

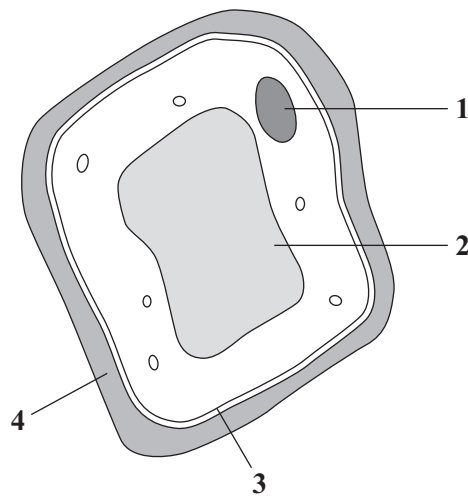
Match words from the list with the labels 1–4 on the diagram.

cell membrane

cell wall

controls the activities of the cell

filled with cell sap



TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION FIVE

The diagram shows a section through the eye.

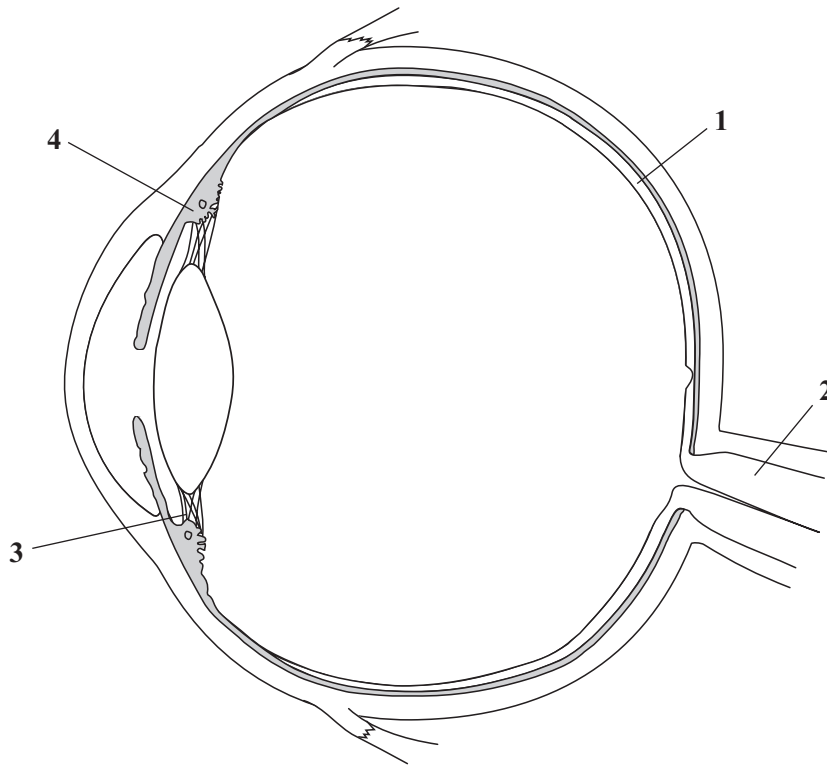
Match words from the list with the labels 1–4 on the diagram.

carries impulses to the brain

ciliary muscle

contains light sensitive cells

suspensory ligament



SECTION BQuestions **SIX** and **SEVEN**.In these questions choose the best **two** answers.Do **not** choose more than two.Mark your choices on the answer sheet.

QUESTION SIX

Sugar is made by plants during photosynthesis.

Which **two** of the following are used as the raw materials for making sugar (glucose) during photosynthesis?**carbon dioxide****nitrate****oxygen****starch****water****QUESTION SEVEN**

Drinking alcohol and sniffing solvents can harm the body.

Which **two** of the following are caused by both alcohol and solvents?**changes in the working of the nervous system****damage to the digestive system****damage to the liver****diabetes****heart attacks**

Turn over ►

SECTION CQuestions **EIGHT** to **TEN**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION EIGHT

The table shows the daily gain and loss of water for an adult.

The total water loss is equal to the total water gain.

Water gain in cm ³		Water loss in cm ³	
Food	900	Exhaled	365
Drink	1200	Skin	480
Respiration	X	Urine	1395
		Faeces	160

8.1 How much water is gained by respiration in one day (**X**)?

- A 200 cm³
- B 295 cm³
- C 300 cm³
- D 3000 cm³

8.2 What percentage of the water loss is through the skin?

- A 5 %
- B 19 %
- C 20 %
- D 25 %

8.3 In addition to water, respiration also produces

- A amino acids.
- B carbon dioxide.
- C oxygen.
- D sugar.

8.4 Ions are lost from the body

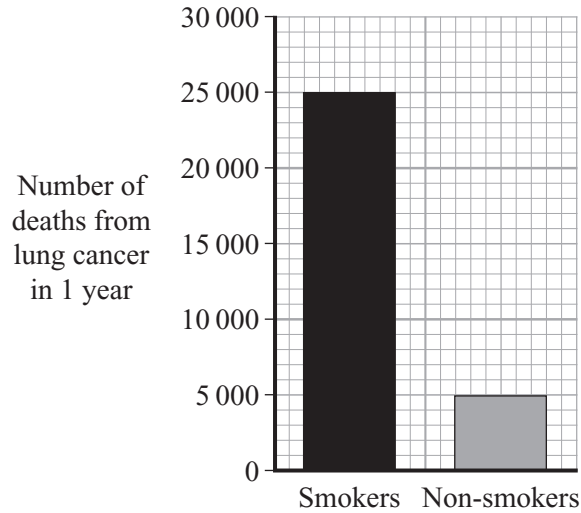
- A in both sweat and urine.
- B only in faeces.
- C only in sweat.
- D only in urine.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

The chart shows the number of smokers and non-smokers who died from lung cancer in one year in one country.



9.1 What fraction of all the deaths from lung cancer were of people who were smokers?

- A $\frac{1}{6}$
- B $\frac{3}{4}$
- C $\frac{4}{5}$
- D $\frac{5}{6}$

9.2 Which disease is **not** caused by cigarette smoking?

- A Bronchitis
- B Diabetes
- C Emphysema
- D Lung cancer

9.3 The addictive substance in cigarette smoke is

- A** carbon dioxide.
- B** carbon monoxide.
- C** nicotine.
- D** tar.

9.4 Cigarette smoking causes

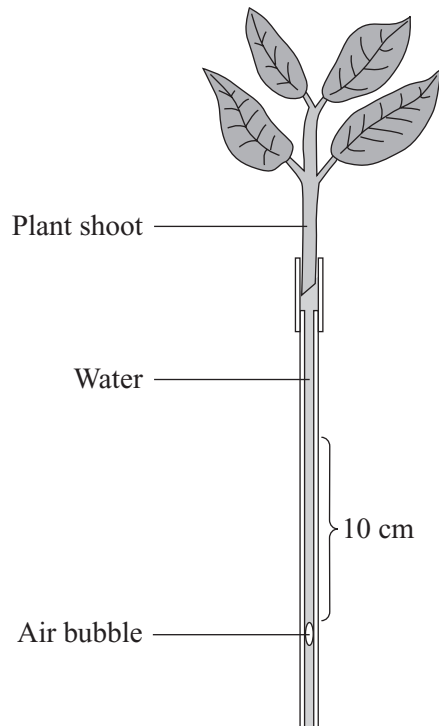
- A** an increase in the concentration of oxygen in the blood.
- B** lack of self-control.
- C** low birth masses for babies.
- D** slow reactions.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

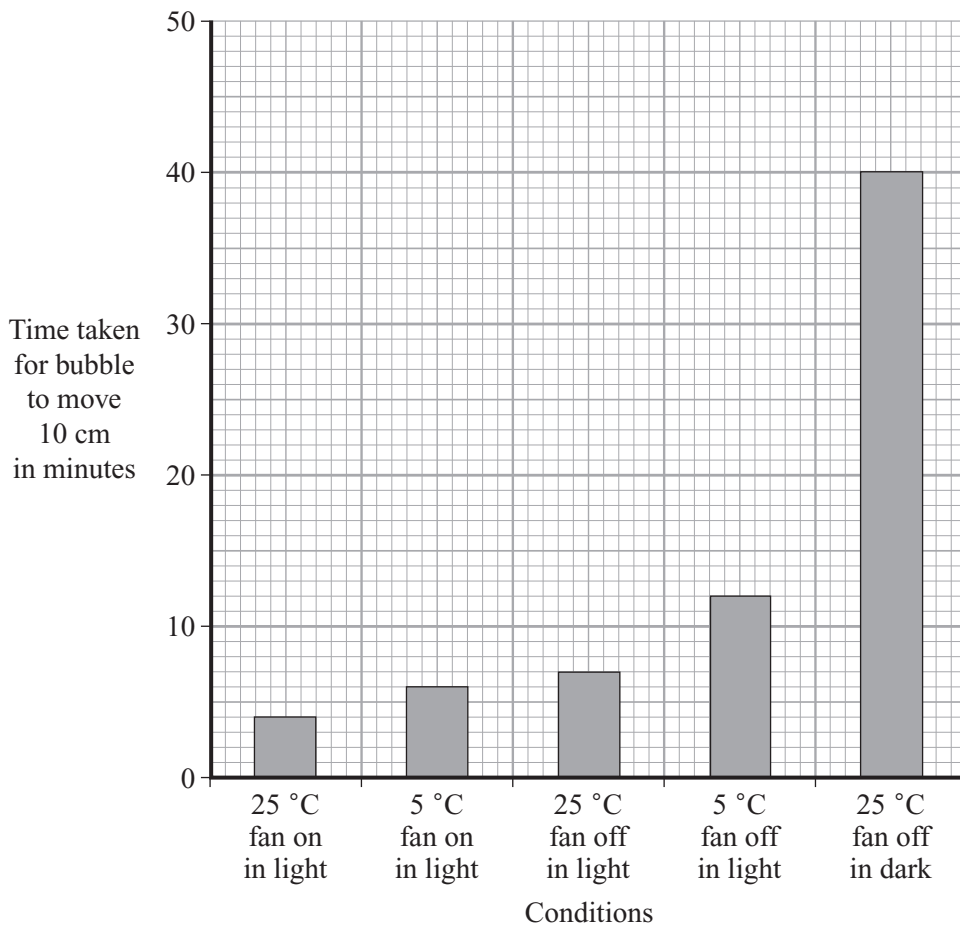
QUESTION TEN

The diagram shows the apparatus used in an investigation to compare the rate of water loss from a plant shoot in different conditions.



A fan was used to produce windy conditions.

The results are shown in the chart.



10.1 A reading for the chart was taken with the plant in the light, at 25 °C without any wind. Then the fan was switched on and another reading was taken.

The time taken for the bubble to move 10 cm

- A decreased by one minute.
- B decreased by three minutes.
- C increased by four minutes.
- D increased by five minutes.

10.2 Which change in conditions causes the greatest increase in the rate of water loss from this plant?

- A Changing from dark to light
- B Changing from light to dark
- C Changing from windy to still
- D Increasing temperature from 5 °C to 25 °C

10.3 Most water is lost from plant leaves through the

- A phloem tissue.
- B stomata.
- C waxy cuticle.
- D xylem tissue.

10.4 Loss of water from plant leaves is called

- A diffusion.
- B osmosis.
- C transpiration.
- D wilting.

END OF TEST

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

SECTION A

Questions **ONE** and **TWO**.

In these questions match the words in the list with the numbers.

Use **each** answer only **once**.

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QUESTION ONE

The diagram shows a section through the eye.

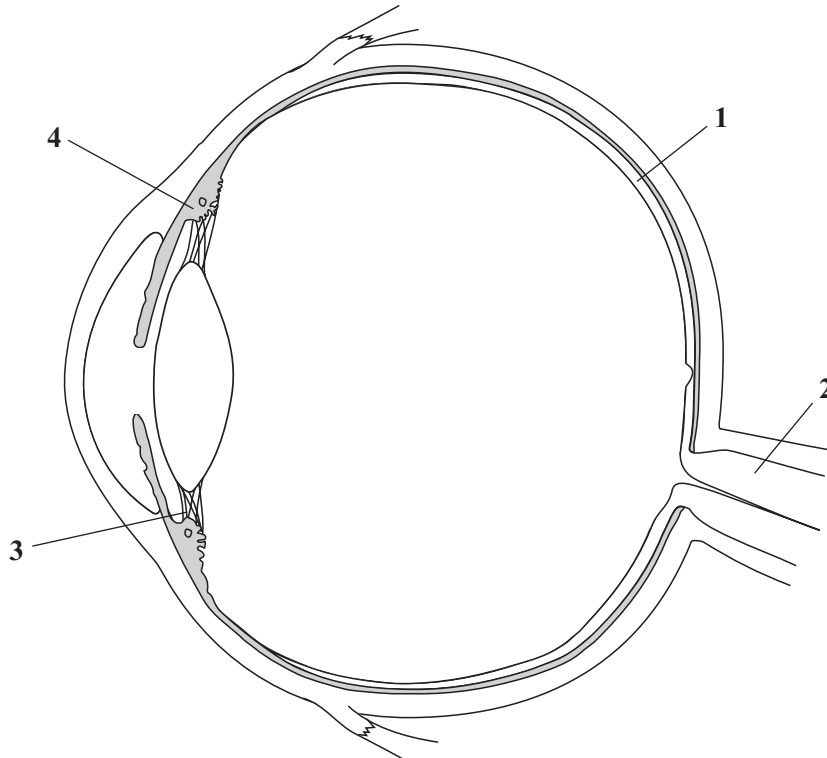
Match words from the list with the labels **1–4** on the diagram.

carries impulses to the brain

ciliary muscle

contains light sensitive cells

suspensory ligament



QUESTION TWO

The table is about conditions that affect plants.

Match words from the list with the numbers 1–4 in the table.

soil deficient in nitrate ions

soil deficient in phosphate ions

soil deficient in potassium ions

unequal distribution of hormones in the stem

Condition	Effect on plants
1	Stunted growth and yellow older leaves
2	Poor root growth and purple younger leaves
3	Bending of stem
4	Yellow leaves with dead spots

TURN OVER FOR THE NEXT QUESTION

Turn over ►

SECTION BQuestions **THREE** and **FOUR**.In these questions choose the best **two** answers.Do **not** choose more than two.Mark your choices on the answer sheet.

QUESTION THREE

Drinking alcohol and sniffing solvents can harm the body.

Which **two** of the following are caused by both alcohol and solvents?**changes in the working of the nervous system****damage to the digestive system****damage to the liver****diabetes****heart attacks****QUESTION FOUR**

Active transport is an important process in plants and animals.

Which **two** of the following are features of active transport?**it allows gases to enter and leave the leaf****it enables plants to absorb ions from dilute solutions in the soil****it involves the movement of water from a dilute to a concentrated solution****it is the same as diffusion****it needs energy from the process of respiration**

NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

Turn over ►

SECTION CQuestions **FIVE** to **TEN**.

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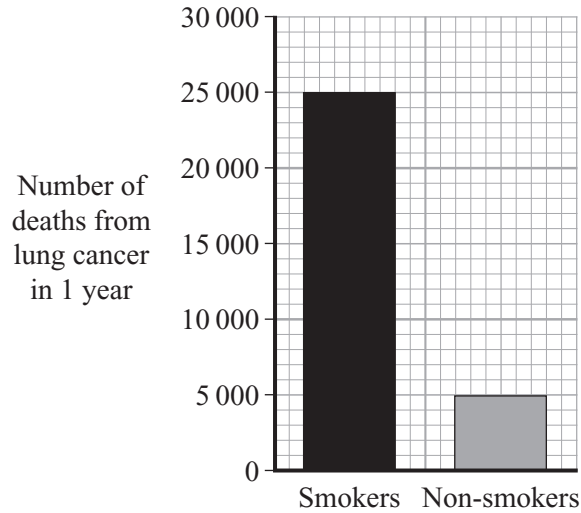
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TURN OVER FOR THE NEXT QUESTION

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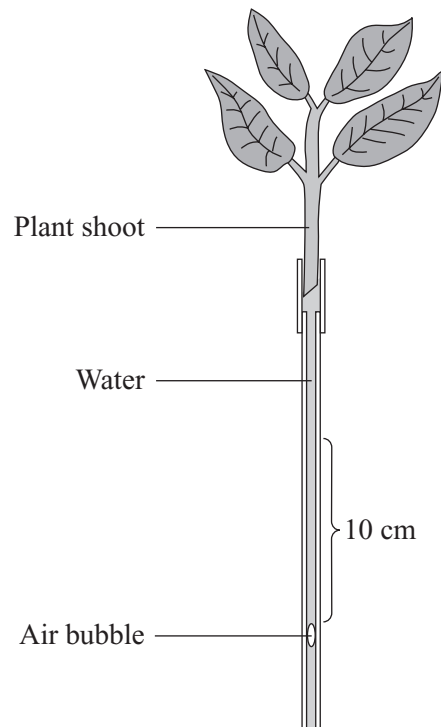
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TURN OVER FOR THE NEXT QUESTION

Turn over ►

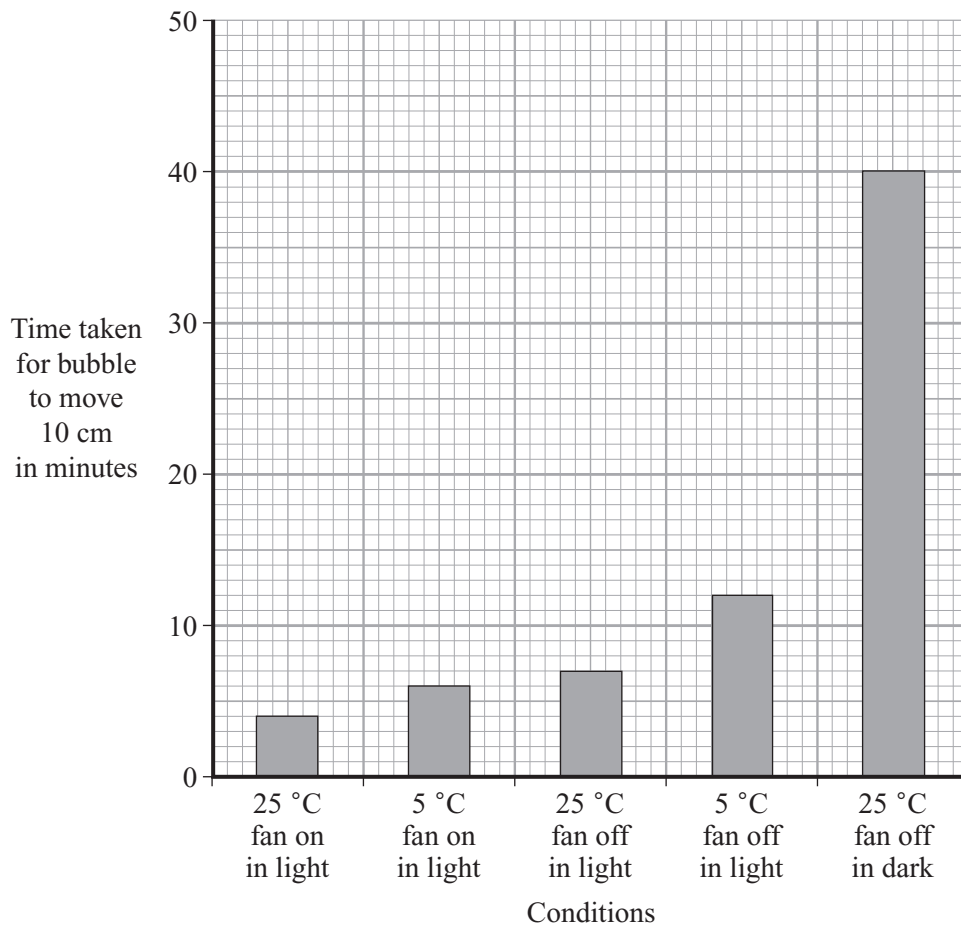
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7.4 Loss of water from plant leaves is called

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- B osmosis.
- C transpiration.
- D wilting.

Turn over ►

QUESTION EIGHT

A student working in a laboratory accidentally touched a hot tripod. He automatically pulled his hand rapidly away from the tripod.

8.1 In this response the hot tripod is

- A the co-ordinator.
- B the effector.
- C the receptor.
- D the stimulus.

8.2 In this response the receptor is in

- A the brain.
- B the muscle.
- C the skin.
- D the spinal cord.

8.3 In this response the effector is

- A a gland.
- B a motor neurone.
- C a muscle.
- D a relay neurone.

8.4 Chemicals released at synapses are involved in

- A sending information across the gap between a sensory neurone and a relay neurone.
- B sending information along sensory neurones.
- C sending information from a motor neurone to a relay neurone.
- D sending information from one end of a relay neurone to the other.

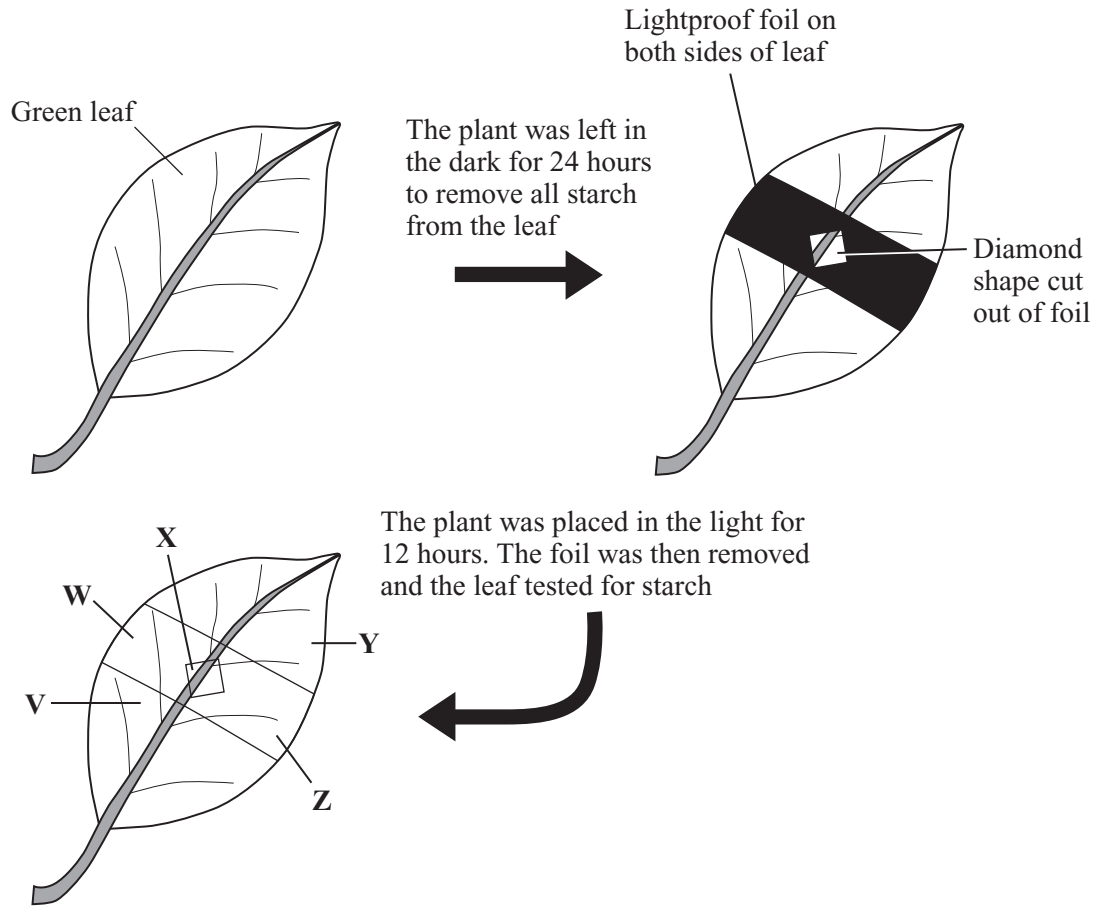
NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

A leaf on a green plant was treated as shown in the diagram.



9.1 The green substance in the leaf is

- A chlorophyll.
- B chloroplast.
- C cytoplasm.
- D phosphate.

9.2 During the 24 hours that the leaf is kept in the dark, the leaf cells use some of the starch.

The rest is moved to other parts of the plant

- A as nitrates through the phloem.
- B as nitrates through the xylem.
- C as starch through the xylem.
- D as sugar through the phloem.

9.3 At the end of the experiment, starch is most likely to be found at

- A V, X and Y.
- B W and Z.
- C W, X and Z.
- D X only.

9.4 Plants need to make cellulose for cell walls.

To make cellulose the plant requires

- A glucagon.
- B glycogen.
- C starch.
- D sugars.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION TEN

The kidney removes waste products from the blood. The table shows the amounts of some of the substances that are:

- filtered from the blood;
- re-absorbed into the blood;
- passed out of the body in urine

during 24 hours.

Substance	Amount		
	Filtered from the blood	Re-absorbed into the blood	Passed out of the body in urine
Glucose in arbitrary units	800	800	0
Sodium ions in arbitrary units	25 200	25 050	150
Urea in arbitrary units	56	28	28
Water in litres	180	178.5	1.5

10.1 What percentage of the filtered water is re-absorbed?

- A 0.83
- B 86.0
- C 99.17
- D 178.5

10.2 The amount of water re-absorbed by the kidneys is controlled by a hormone from the

- A kidney.
- B liver.
- C pancreas.
- D pituitary gland.

10.3 What happens if there is too much water in the blood?

- A** Less water is re-absorbed and the urine becomes more concentrated
- B** Less water is re-absorbed and the urine becomes more dilute
- C** More water is filtered and more water is re-absorbed
- D** More water is re-absorbed and the urine becomes more dilute

10.4 Water is lost from the body in sweat.

Why does sweating cool the body?

- A** Energy is needed to evaporate the sweat
- B** It makes blood capillaries dilate
- C** It makes blood capillaries constrict
- D** Sweat is warmer than blood

END OF TEST