

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
June 2004



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

Tuesday 29 June 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 diagram shows a section through the human eye.

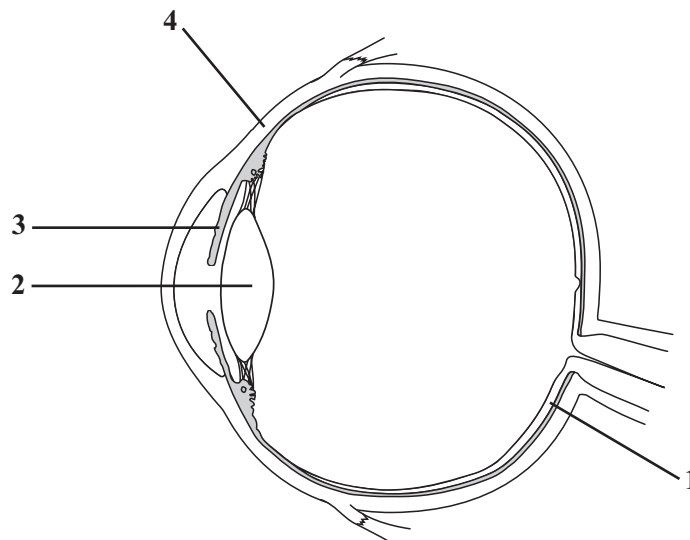
Match words from the list with the labels **1–4** on the diagram.

iris

lens

retina

sclera



QUESTION TWO

The drawing shows a horse.

The horse has organs which contain different receptors.

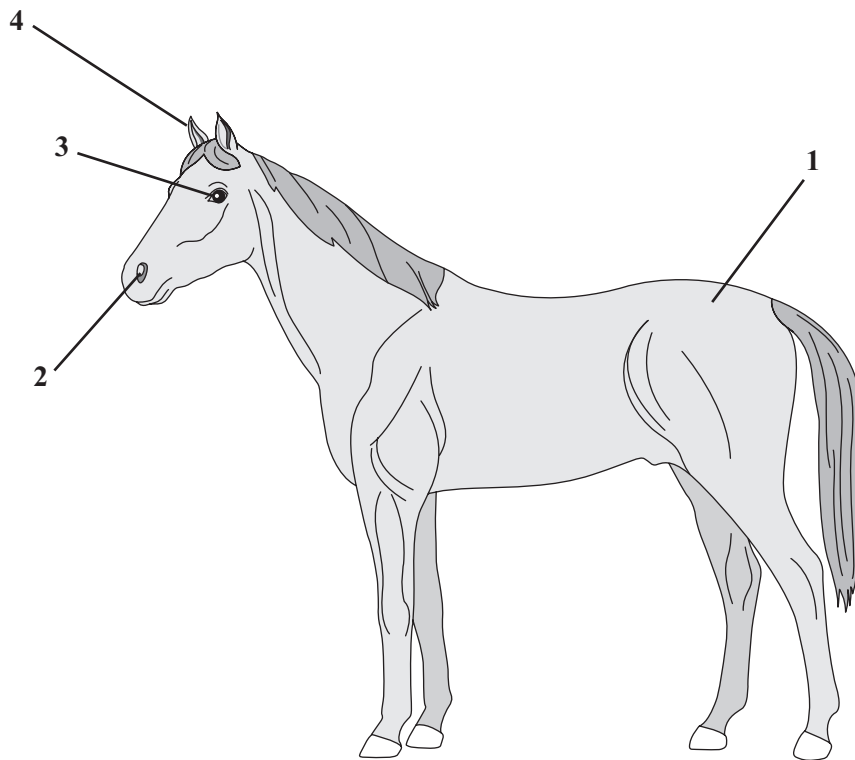
Match words from the list with the labels **1–4** on the drawing.

contains light receptors

contains receptors sensitive to chemicals

contains sound receptors

contains temperature receptors



TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION THREE

Waste materials are produced by the body.

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

carbon dioxide

ions

urea

urine

Waste	Information
1	lost from body when we breathe out
2	produced mainly by the liver
3	stored in the bladder
4	excess lost via the kidneys

QUESTION FOUR

The diagram shows a cell from the outer region of a green flower stalk.

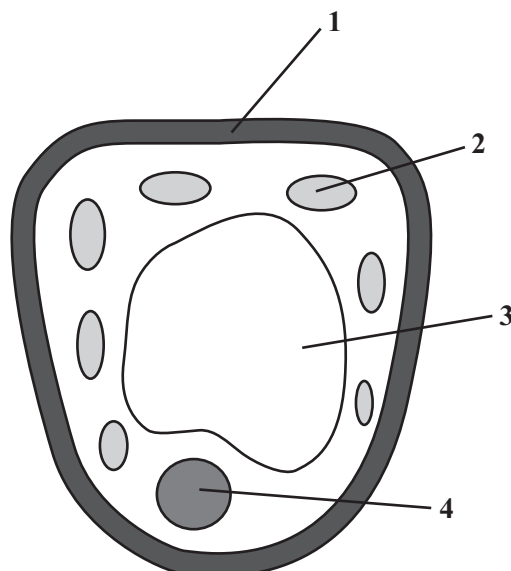
Match words from the list with the labels 1–4 on the diagram.

contains chlorophyll

controls the activities of the cell

filled with cell sap

strengthens the cell



QUESTION FIVE

The diagram shows a section through a plant leaf.

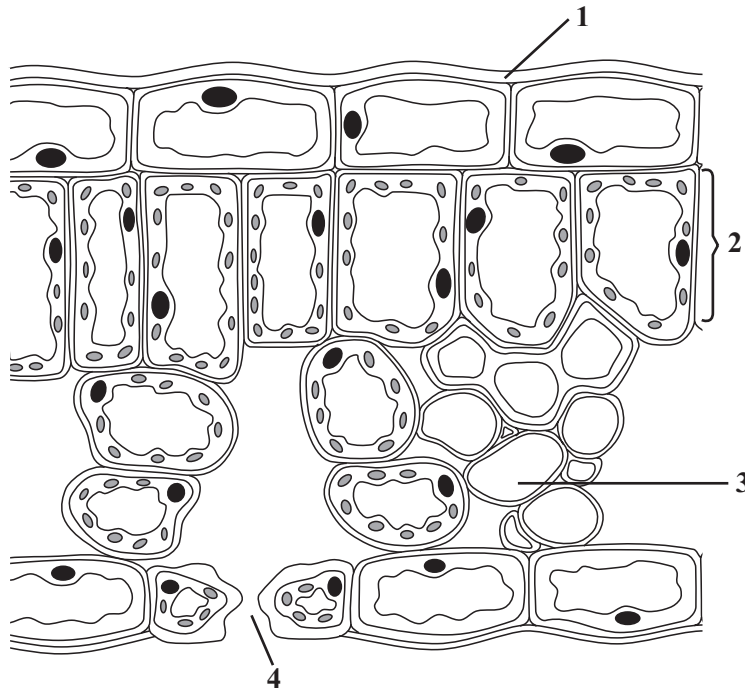
Match words from the list with the labels 1–4 on the diagram.

absorbs most light energy

carries sugars to the fruits

a waxy material

where gases enter and leave the leaf



TURN OVER FOR THE NEXT QUESTION

Turn over ►

NO QUESTIONS APPEAR ON THIS PAGE

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

Plants carry out photosynthesis.

Which **two** of the following are produced by photosynthesis?**carbon dioxide****glucose****light energy****oxygen****water****QUESTION SEVEN**

Drinking alcohol and sniffing solvents can harm the body.

Which **two** of the following are most likely to be caused by alcohol and solvents?**abnormal behaviour****damage to the heart****damage to the liver****diseases of the blood vessels****emphysema**

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

Glucose and amino acids are important substances that are present in just the right amounts in the blood of a healthy person.

8.1 The hormones that control blood glucose level are produced by the

- A brain.
- B liver.
- C pancreas.
- D stomach.

8.2 In humans, hormones travel to their target organs mainly via the

- A blood system.
- B excretory system.
- C nervous system.
- D respiratory system.

8.3 In a diabetic, a dangerously high blood glucose level is likely to be

- A caused by eating too much fat.
- B reduced by the injection of insulin.
- C the result of losing too much water by sweating.
- D the result of not producing enough glucagon.

8.4 Excess amino acids in the blood are

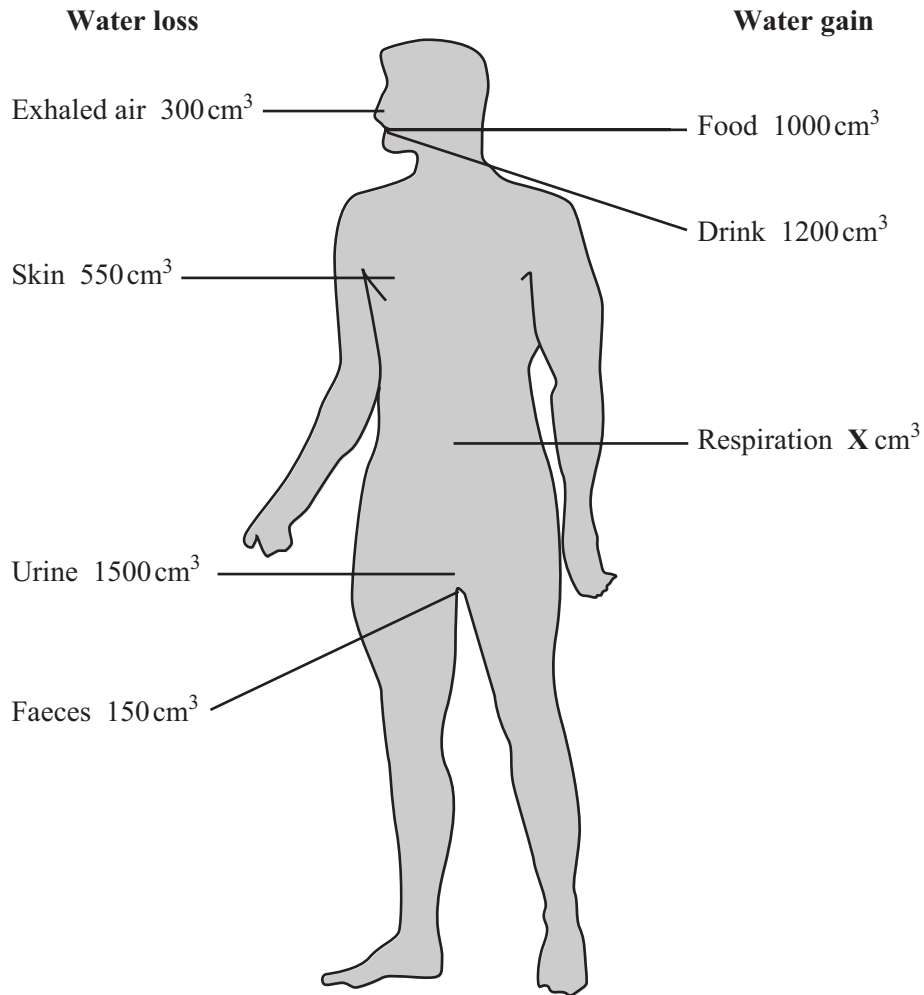
- A** broken down to urea in the bladder.
- B** broken down to urea in the liver.
- C** broken down to urine in the bladder.
- D** broken down to urine in the liver.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

The drawing shows the daily gain and loss of water for an adult. The total water loss is equal to the total water gain.



9.1 How much water (**X**) did the person gain from respiration?

- A 30 cm³
- B 200 cm³
- C 300 cm³
- D 2500 cm³

9.2 What proportion of the total water loss was via urine?

- A $\frac{1}{10}$ (10%)
- B $\frac{3}{10}$ (30%)
- C $\frac{1}{2}$ (50%)
- D $\frac{3}{5}$ (60%)

9.3 Which organ maintains the correct amount of water in the body?

- A Bladder
- B Kidney
- C Liver
- D Skin

9.4 Sweat contains water and

- A amino acids.
- B glycerol.
- C ions.
- D urine.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION TEN

The water vapour lost from plant leaves is replaced by the uptake of water from the soil.

10.1 The loss of water vapour from plant leaves is called

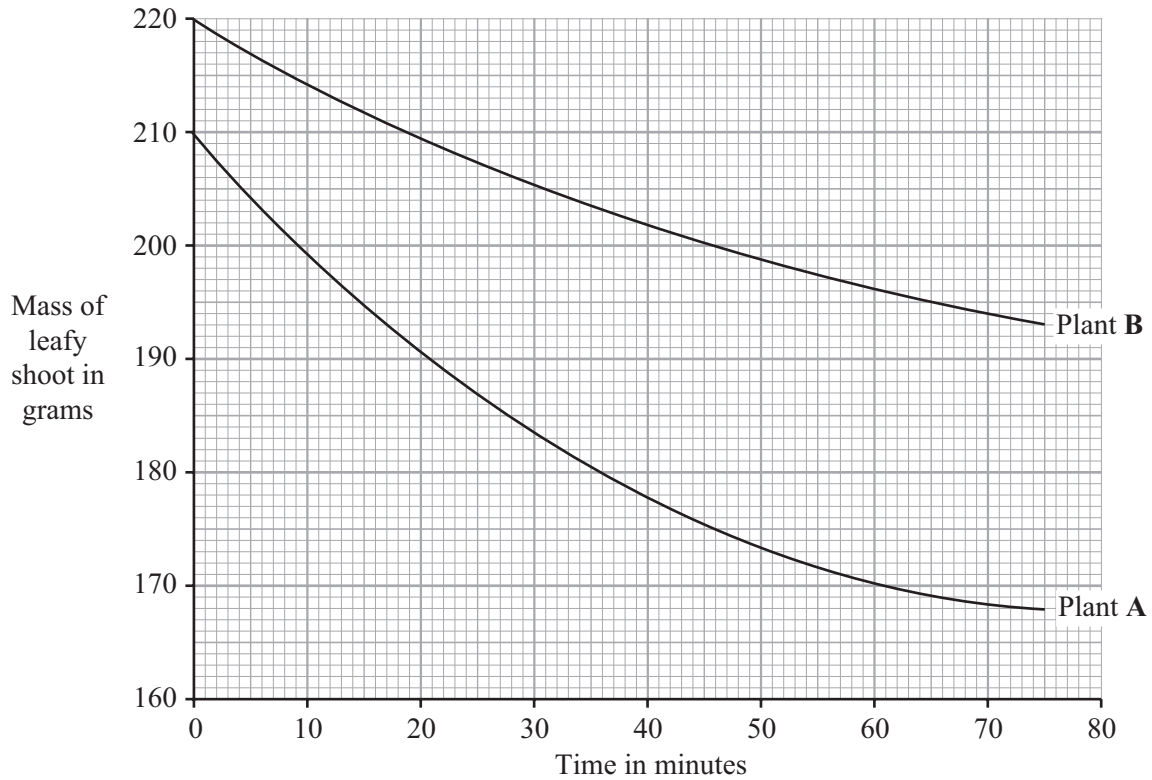
- A osmosis.
- B photosynthesis.
- C respiration.
- D transpiration.

10.2 Water is transported from the roots to the leaves in the

- A chloroplasts.
- B guard cells.
- C phloem tissue.
- D xylem tissue.

An investigation was carried out into water loss from leafy shoots.
A shoot was cut from two different types of plant.
The shoots were kept in identical conditions for 75 minutes.

The change in mass of the shoots over this time is shown in the graph.



10.3 During the 75 minutes of the investigation,

- A plant A lost 15 grams more water than plant B.
- B plant A lost 25 grams more water than plant B.
- C plant A lost 27 grams more water than plant B.
- D plant A lost 42 grams more water than plant B.

10.4 The most likely reason that plant B loses less water than plant A is that

- A plant A has a thicker cuticle.
- B plant A has wilted.
- C the leaves of plant B have fewer stomata than the leaves of plant A.
- D the mass of plant A was less than the mass of plant B at the start.

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**.

Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows a section through a plant leaf.

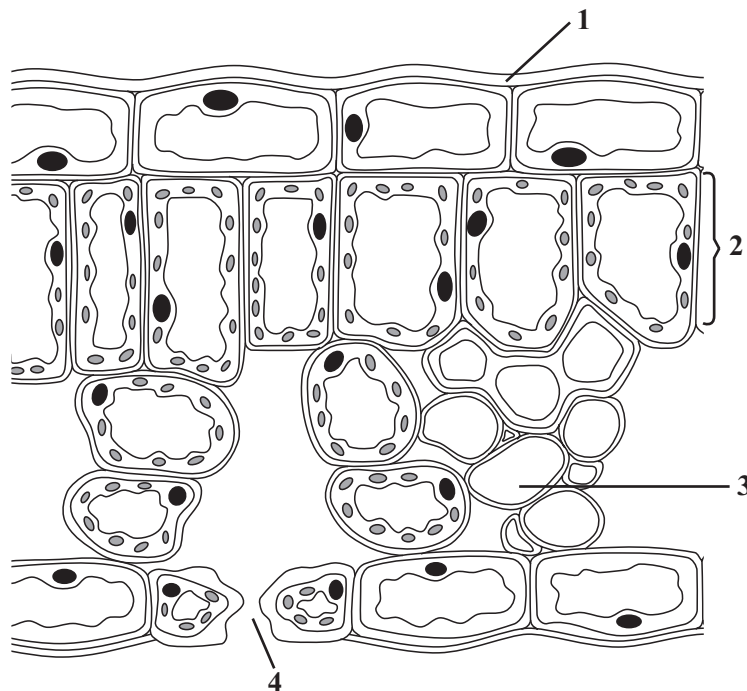
Match words from the list with the labels 1–4 on the diagram.

absorbs most light energy

carries sugars to the fruits

a waxy material

where gases enter and leave the leaf



QUESTION TWO

The table is about chemicals that affect the body.

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

ADH

carbon monoxide

glucagon

nicotine

Chemical	Feature
1	causes the liver to convert glycogen to glucose
2	increases the water reabsorption by the kidneys
3	is the addictive substance in tobacco smoke
4	may lead to a reduced growth rate in a fetus

TURN OVER FOR THE NEXT QUESTION

Turn over ►

NO QUESTIONS APPEAR ON THIS PAGE

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 most likely to be caused by alcohol and solvents?**abnormal behaviour****damage to the heart****damage to the liver****diseases of the blood vessels****emphysema****QUESTION FOUR**

The kidneys filter many substances from the blood.

Which **two** of the following substances are reabsorbed by the kidneys?**ADH****carbon dioxide****dissolved ions****sugars****urea****Turn over ►**

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

Each of these questions has four parts.

In each part choose only **one** answer.Mark your choices on the answer sheet.

QUESTION FIVE

Glucose and amino acids are important substances that are present in just the right amounts in the blood of a healthy person.

5.1 The hormones that control blood glucose level are produced by the

- A brain.
- B liver.
- C pancreas.
- D stomach.

5.2 In humans, hormones travel to their target organs mainly via the

- A blood system.
- B excretory system.
- C nervous system.
- D respiratory system.

5.3 In a diabetic, a dangerously high blood glucose level is likely to be

- A caused by eating too much fat.
- B reduced by the injection of insulin.
- C the result of losing too much water by sweating.
- D the result of not producing enough glucagon.

5.4 Excess amino acids in the blood are

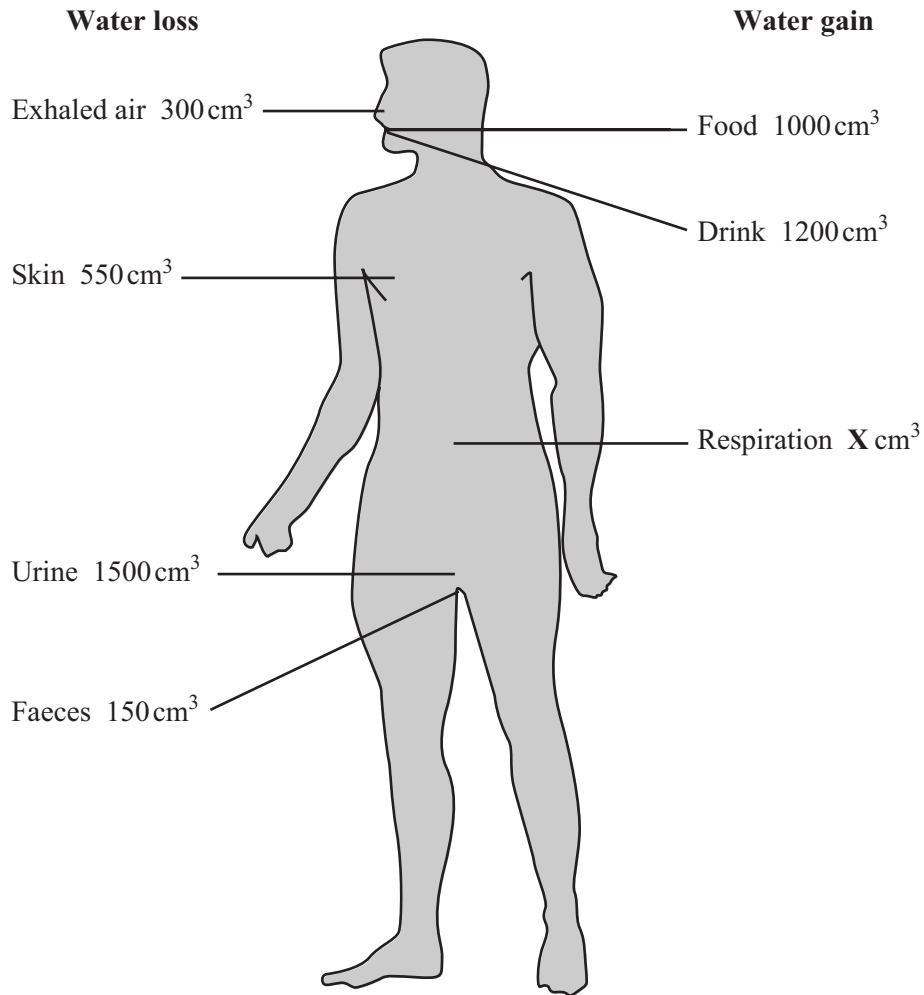
- A** broken down to urea in the bladder.
- B** broken down to urea in the liver.
- C** broken down to urine in the bladder.
- D** broken down to urine in the liver.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION SIX

The drawing shows the daily gain and loss of water for an adult. The total water loss is equal to the total water gain.



6.1 How much water (**X**) did the person gain from respiration?

- A 30 cm³
- B 200 cm³
- C 300 cm³
- D 2500 cm³

6.2 What proportion of the total water loss was via urine?

- A $\frac{1}{10}$ (10%)
- B $\frac{3}{10}$ (30%)
- C $\frac{1}{2}$ (50%)
- D $\frac{3}{5}$ (60%)

6.3 Which organ maintains the correct amount of water in the body?

- A Bladder
- B Kidney
- C Liver
- D Skin

6.4 Sweat contains water and

- A amino acids.
- B glycerol.
- C ions.
- D urine.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION SEVEN

The water vapour lost from plant leaves is replaced by the uptake of water from the soil.

7.1 The loss of water vapour from plant leaves is called

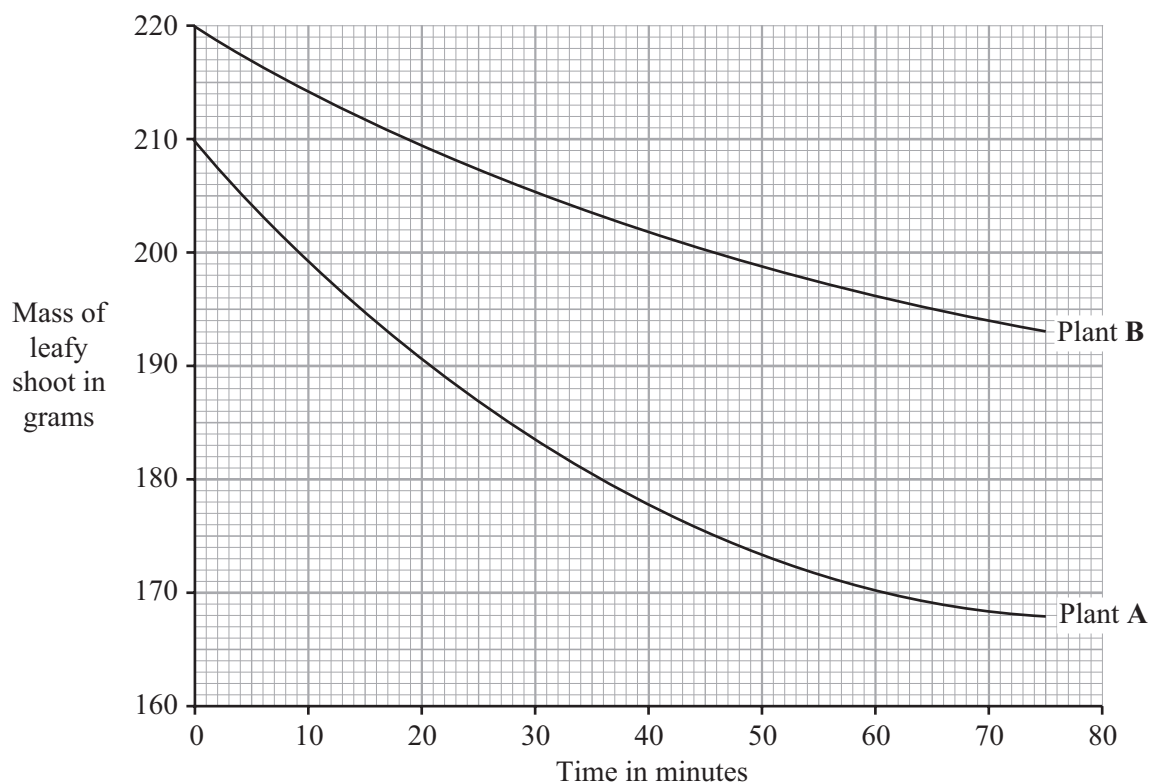
- A** osmosis.
- B** photosynthesis.
- C** respiration.
- D** transpiration.

7.2 Water is transported from the roots to the leaves in the

- A** chloroplasts.
- B** guard cells.
- C** phloem tissue.
- D** xylem tissue.

An investigation was carried out into water loss from leafy shoots.
A shoot was cut from two different types of plant.
The shoots were kept in identical conditions for 75 minutes.

The change in mass of the shoots over this time is shown in the graph.



7.3 During the 75 minutes of the investigation,

- A plant A lost 15 grams more water than plant B.
- B plant A lost 25 grams more water than plant B.
- C plant A lost 27 grams more water than plant B.
- D plant A lost 42 grams more water than plant B.

7.4 The most likely reason that plant B loses less water than plant A is that

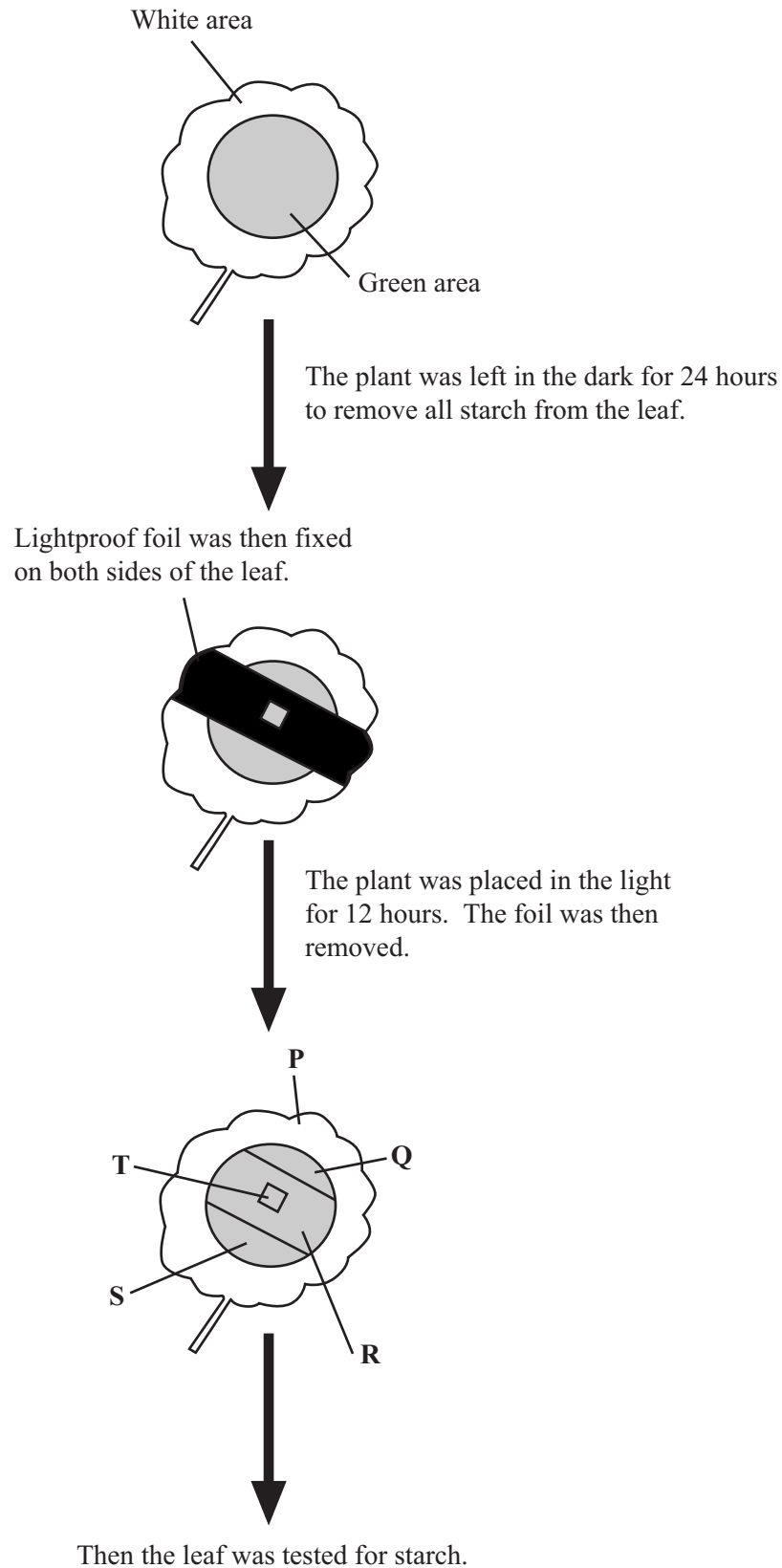
- A plant A has a thicker cuticle.
- B plant A has wilted.
- C the leaves of plant B have fewer stomata than the leaves of plant A.
- D the mass of plant A was less than the mass of plant B at the start.

Turn over ►

QUESTION EIGHT

Some plants have leaves that are partly green and partly white.

Such a leaf was treated as shown in the diagrams.



-
- 8.1** The green substance missing from the white area of the leaf is
- A chlorophyll.
 - B chloroplast.
 - C cytoplasm.
 - D phosphate.
- 8.2** During the 24 hours the leaf is kept in the dark, some of the starch is converted into glucose and used
- A in photosynthesis.
 - B in respiration.
 - C in the diffusion of carbon dioxide.
 - D in transpiration.
- 8.3** When the leaf is tested, starch is most likely to be found at
- A P and Q.
 - B P and R.
 - C R and S.
 - D Q, S and T.
- 8.4** Plants also need to make proteins so that they can grow.
To make proteins, the plant requires
- A cellulose and nitrate.
 - B cellulose and potassium.
 - C nitrate and sugars.
 - D lipids and sugars.

Turn over ►

QUESTION NINE

A girl passes a baker's shop.

She detects the smell of freshly baked bread in the air.

Shortly afterwards, she notices that the amount of saliva in her mouth has increased considerably.

- 9.1** This automatic response is called
- A** a motor action.
 - B** a reflex action.
 - C** a relay action.
 - D** a stimulus.
- 9.2** In this response the smell of freshly baked bread is
- A** the co-ordinator.
 - B** the effector.
 - C** the receptor.
 - D** the stimulus.
- 9.3** In this response the effector is
- A** the brain.
 - B** the central nervous system.
 - C** the nose.
 - D** the salivary gland.
- 9.4** A chemical is released when impulses are sent
- A** across the gap between a sensory neurone and a relay neurone.
 - B** along a sensory neurone.
 - C** from a motor neurone to a relay neurone.
 - D** from one end of a relay neurone to the other.

QUESTION TEN

During his summer holiday, a boy was caught in a rain shower.
His wet clothes felt cool against his skin as they dried in the breeze.
He also began to feel cold.
He noticed that his fingers looked pale and he began to shiver.

10.1 The boy began to feel cold because

- A more blood was flowing to his pituitary gland.
- B the breeze had caused sweating to increase.
- C the breeze had caused water to evaporate from his skin and clothes.
- D the rain water had caused the blood vessels in his skin to constrict.

10.2 His fingers looked pale because

- A sweat glands in the skin had released more salt on to the skin surface.
- B the blood vessels had moved deeper into his skin.
- C the blood vessels in the skin had constricted, reducing the blood flow to the skin surface.
- D the rain water had caused his skin to wrinkle.

10.3 The boy's body temperature is monitored and controlled by

- A a regulatory centre in the brain.
- B cells in the spinal cord.
- C hormones secreted by the pancreas.
- D receptor cells in the skin.

10.4 Shivering helps to raise the boy's core body temperature by

- A increasing the respiration rate in his muscles.
- B keeping blood away from his skin.
- C making blood flow more rapidly through the capillaries in his skin.
- D releasing more sweat on to his skin surface.

END OF TEST

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE