

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
November 2006



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

346002

Thursday 23 November 2006 Morning Session

For this paper you must have:

- a black ball-point pen
- an objective test 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.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers

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

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



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

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



- 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:



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 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 plant cell.

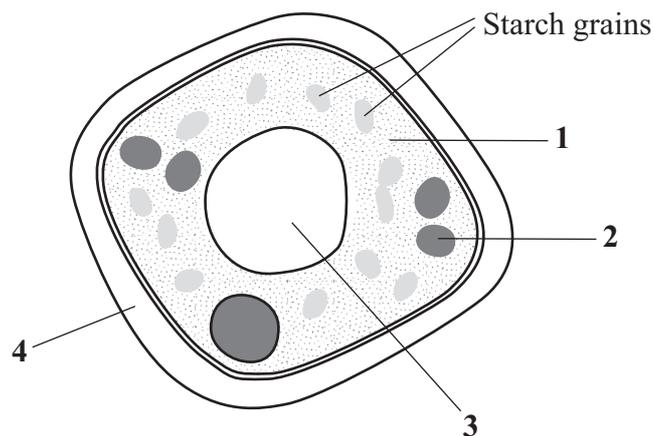
Match words from the list with the labels **1–4** on the diagram.

cell wall

chloroplast

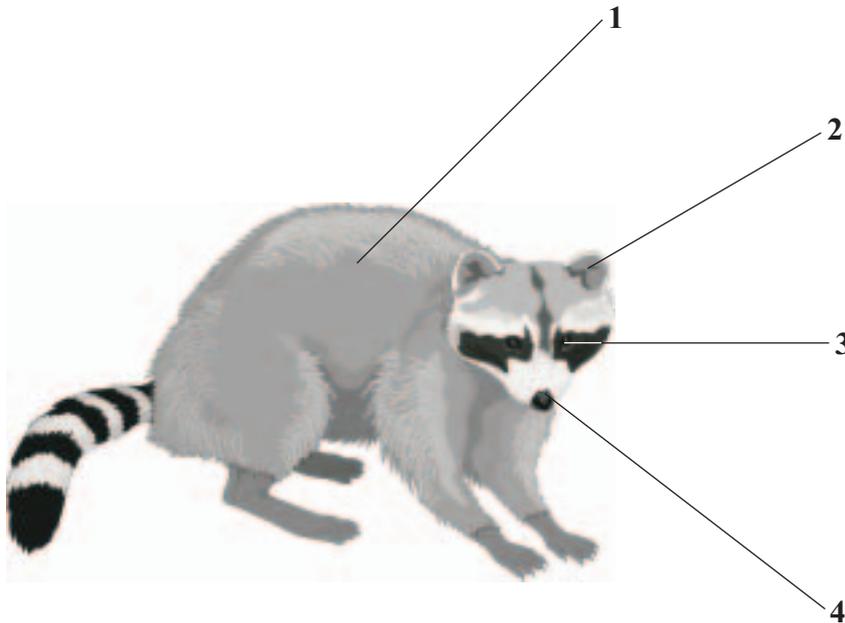
cytoplasm

vacuole



QUESTION TWO

The drawing shows a raccoon. Raccoons feed on crabs, frogs and small fish and are eaten by foxes. The raccoon has organs which contain different types of receptors.



Match words, **J**, **K**, **L** and **M**, from the list with the labels **1 – 4** on the drawing.

- J** contains receptors sensitive to chemicals
- K** contains receptors sensitive to the temperature of water
- L** contains receptors which allow it to hear predators
- M** contains receptors which allow it to see fish

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

QUESTION FOUR

The diagram shows a person who has pulled a hand away after touching a sharp object.

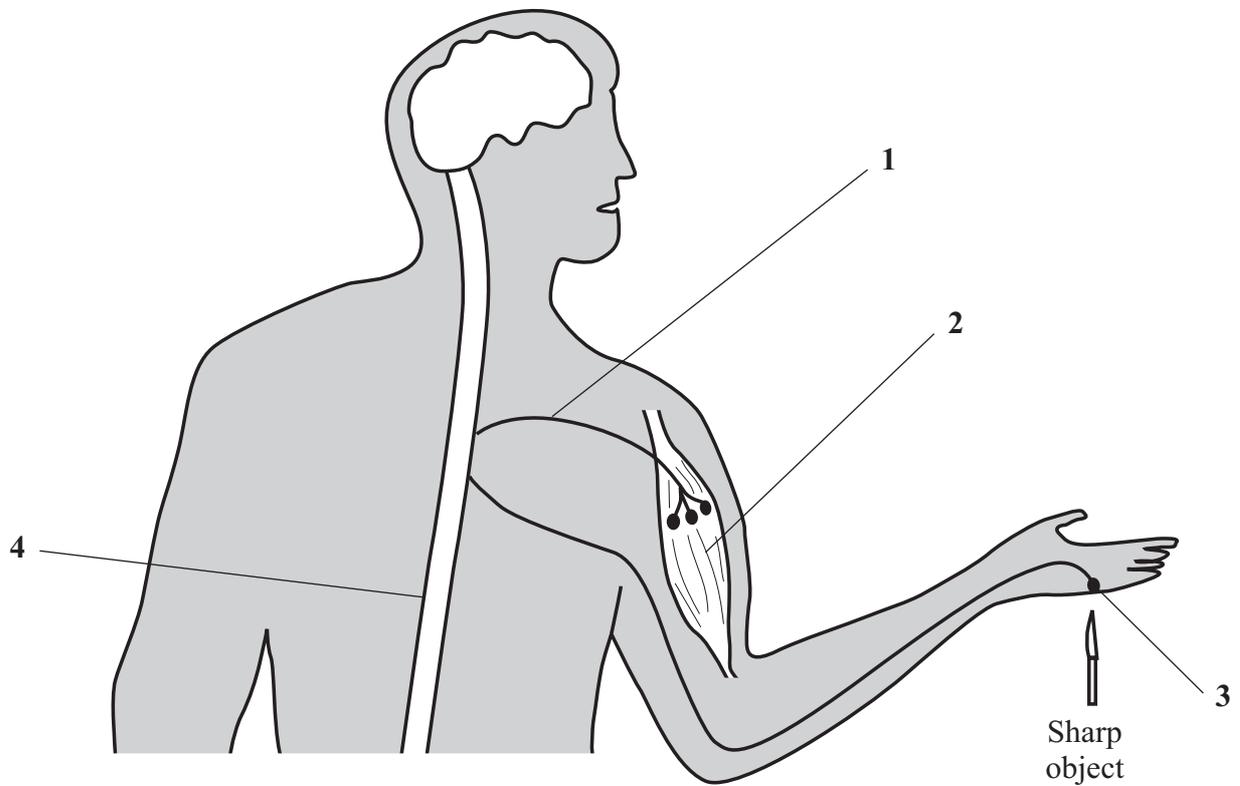
Match words from the list with the labels 1–4 on the diagram.

motor neurone

muscle

receptor

spinal cord



Turn over for the next question

Turn over ►

QUESTION FIVE

The diagram shows a section through a plant leaf.

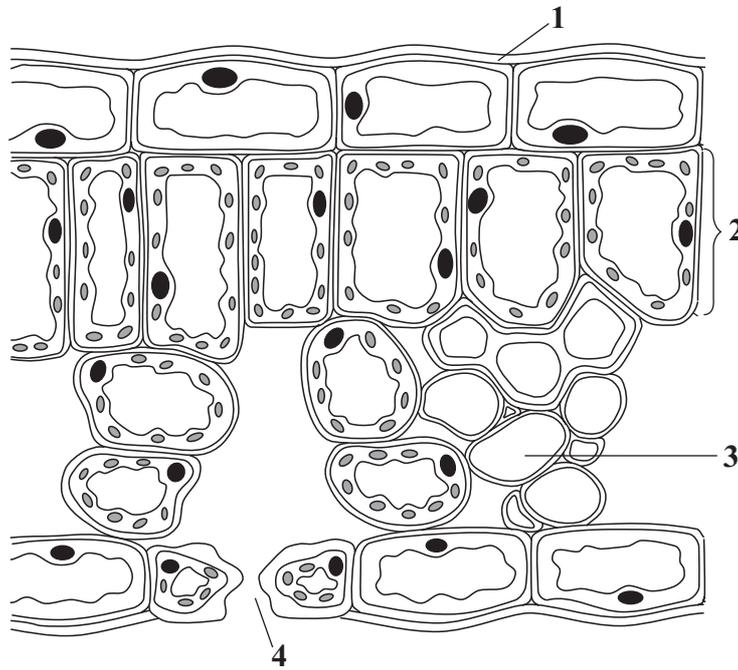
Match words from the list with the labels 1–4 on the diagram.

a waxy material

absorbs most light energy

carries sugars to the fruits

where gases enter and leave the leaf



SECTION B

Questions **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 make food during photosynthesis.

To carry out photosynthesis plants need substances. Other substances are made during photosynthesis.

Which **two** of the lines, **V**, **W**, **X**, **Y** and **Z**, in the table are correct?

	Needed for photosynthesis	Made during photosynthesis
V	carbon dioxide	glucose
W	glucose	oxygen
X	oxygen	water
Y	starch	glucose
Z	water	oxygen

QUESTION SEVEN

Plant hormones affect the way in which plants grow.

Which **two** are **not** effects of plant hormones?

controlling the ripening of fruits

disruption of normal growth of the plants

shoots growing in the direction of the force of gravity

the growth of roots away from water

the growth of roots from cuttings

Turn over ►

SECTION C

Questions **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

A student visited an optician for an eyesight test.

During the test the optician shone a light into the student's eye and looked inside his eye for any sign of disease.

8.1 Which is the transparent layer that allows light into the eye?

- A Cornea
- B Iris
- C Retina
- D Sclera

8.2 Which is the layer at the back of the eye that the optician was checking for disease?

- A Iris
- B Pupil
- C Retina
- D Sclera

8.3 When the optician shone the light into the student's eye there was a change in the size of the . . .

- A ciliary muscles and suspensory ligaments.
- B cornea and sclera.
- C iris and pupil.
- D retina and optic nerve.

8.4 The student did not need glasses. The parts that produce the image on the retina were working correctly.

These parts are the . . .

- A** brain and optic nerve.
- B** cornea and lens.
- C** iris and pupil.
- D** sensory neurones and motor neurones.

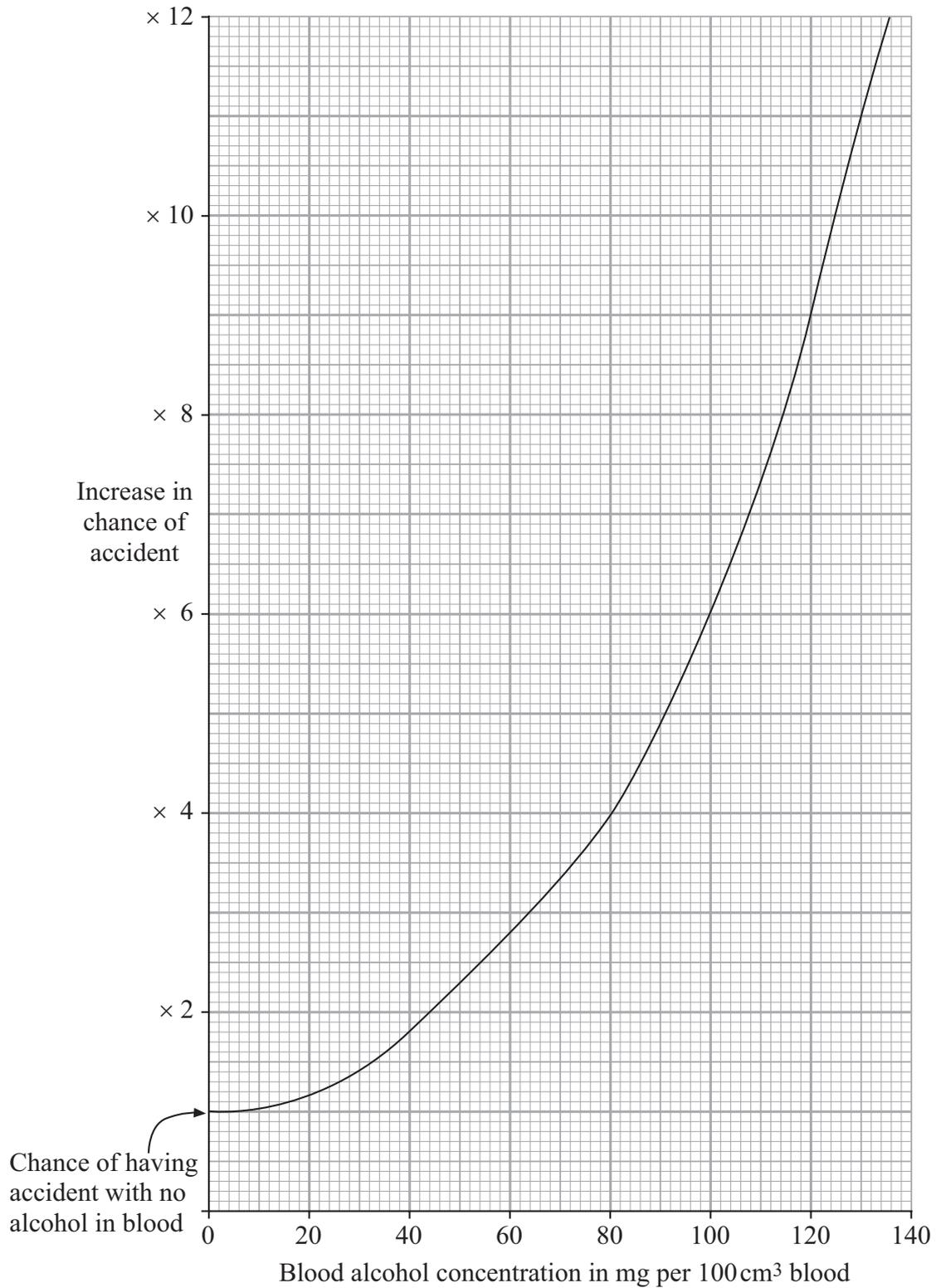
Turn over for the next question

Turn over ►

QUESTION NINE

Alcohol can affect how people drive a car.

The graph shows the effect of blood alcohol on the chance of a person having an accident when driving.



-
- 9.1** What blood alcohol concentration is likely to increase the chance of a car accident by three times?
- A 32 mg per 100 cm³ of blood
 - B 52 mg per 100 cm³ of blood
 - C 64 mg per 100 cm³ of blood
 - D 74 mg per 100 cm³ of blood
- 9.2** Drinking wine raises the blood alcohol concentration by 20 mg per 100 cm³ of blood for each glass drunk.
- What is the increase in the chance of an accident if the person drinks five glasses of wine?
- A 4 times
 - B 6 times
 - C 30 times
 - D 100 times
- 9.3** Why is alcohol in the blood likely to increase the chance of an accident?
- A Alcohol brings about withdrawal symptoms.
 - B Alcohol is addictive.
 - C Alcohol reduces the amount of oxygen that the blood can carry.
 - D Alcohol slows down reactions.
- 9.4** Which of the following organs is most likely to be damaged by drinking alcohol?
- A Heart
 - B Liver
 - C Lungs
 - D Pancreas

Turn over for the next question

Turn over ►

QUESTION TEN

Leafy shoots of two different species of plant, **P** and **Q**, were cut from the plants. The water losses from these shoots were measured.

The results are shown in the table.

Time in minutes	Mass of shoot in grams	
	Species P	Species Q
0	310	310
30	294	302
60	284	296
90	276	290
120	269	285
150	264	282
180	261	279

10.1 During the first 120 minutes, Species **P** lost . . .

- A** 8 grams more mass than Species **Q**.
- B** 14 grams more mass than Species **Q**.
- C** 16 grams more mass than Species **Q**.
- D** 18 grams more mass than Species **Q**.

10.2 The mean rate of loss of mass from Species **Q** during the 180 minutes was . . .

- A** 10.3 g per hour.
- B** 12.5 g per hour.
- C** 14.0 g per hour.
- D** 16.3 g per hour.

10.3 The water loss from Species **P** in the first 90 minutes was . . .

- A** 8 grams greater than during the second 90 minutes.
- B** 15 grams greater than during the second 90 minutes.
- C** 19 grams greater than during the second 90 minutes.
- D** 34 grams greater than during the second 90 minutes.

10.4 For both species, the rate of water loss was lower during the second 90 minutes than during the first 90 minutes.

What is the most likely explanation for this?

- A** Some stomata on the leaves had closed.
- B** The air temperature had increased after the first 90 minutes.
- C** The air was drier during the second 90 minutes.
- D** The leaf had developed a thicker waxy layer.

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 words in the list with the numbers.

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

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QUESTION ONE

The diagram shows a section through a plant leaf.

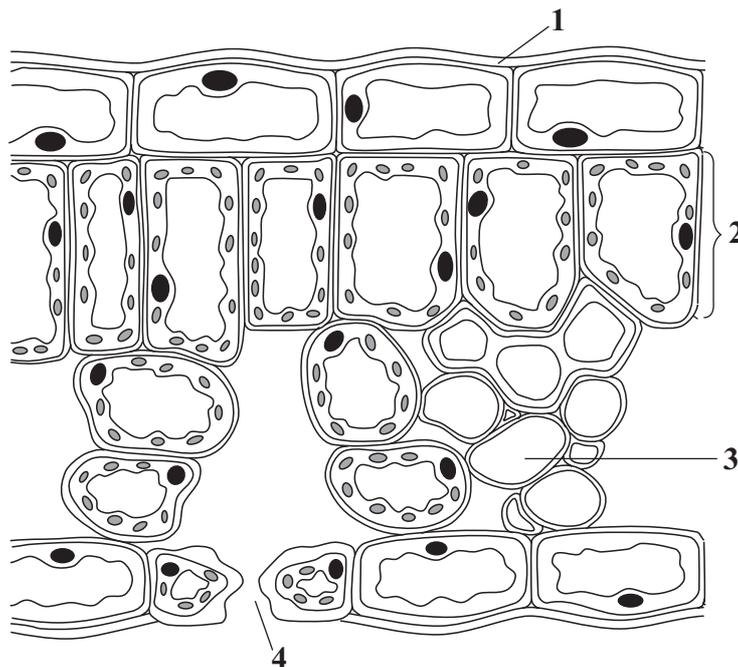
Match words from the list with the labels **1–4** on the diagram.

a waxy material

absorbs most light energy

carries sugars to the fruits

where gases enter and leave the leaf



QUESTION TWO

The body controls the concentration of sugar in the blood.

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

glucagon

glucose

glycogen

insulin

When there is a very high concentration of sugar in the blood, ... **1** ... is secreted into the blood by the pancreas.

This stimulates the liver to convert ... **2** ... into ... **3**

When there is a very low concentration of sugar in the blood, ... **4** ... is secreted into the blood by the pancreas.

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

Plant hormones affect the way in which plants grow.

Which **two** are **not** effects of plant hormones?**controlling the ripening of fruits****disruption of normal growth of the plants****shoots growing in the direction of the force of gravity****the growth of roots away from water****the growth of roots from cuttings****QUESTION FOUR**

Osmosis is an important process in plants.

Which **two** are features of osmosis?**it brings about the movement of mineral ions****it can result in an increase in pressure in the cells of a plant****it is the diffusion of water from a dilute to a more concentrated solution****it occurs only in the root hairs of plants****it requires energy from respiration**

Turn over for the next question

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

A student visited an optician for an eyesight test.

During the test the optician shone a light into the student's eye and looked inside his eye for any sign of disease.

5.1 Which is the transparent layer that allows light into the eye?

- A Cornea
- B Iris
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5.2 Which is the layer at the back of the eye that the optician was checking for disease?

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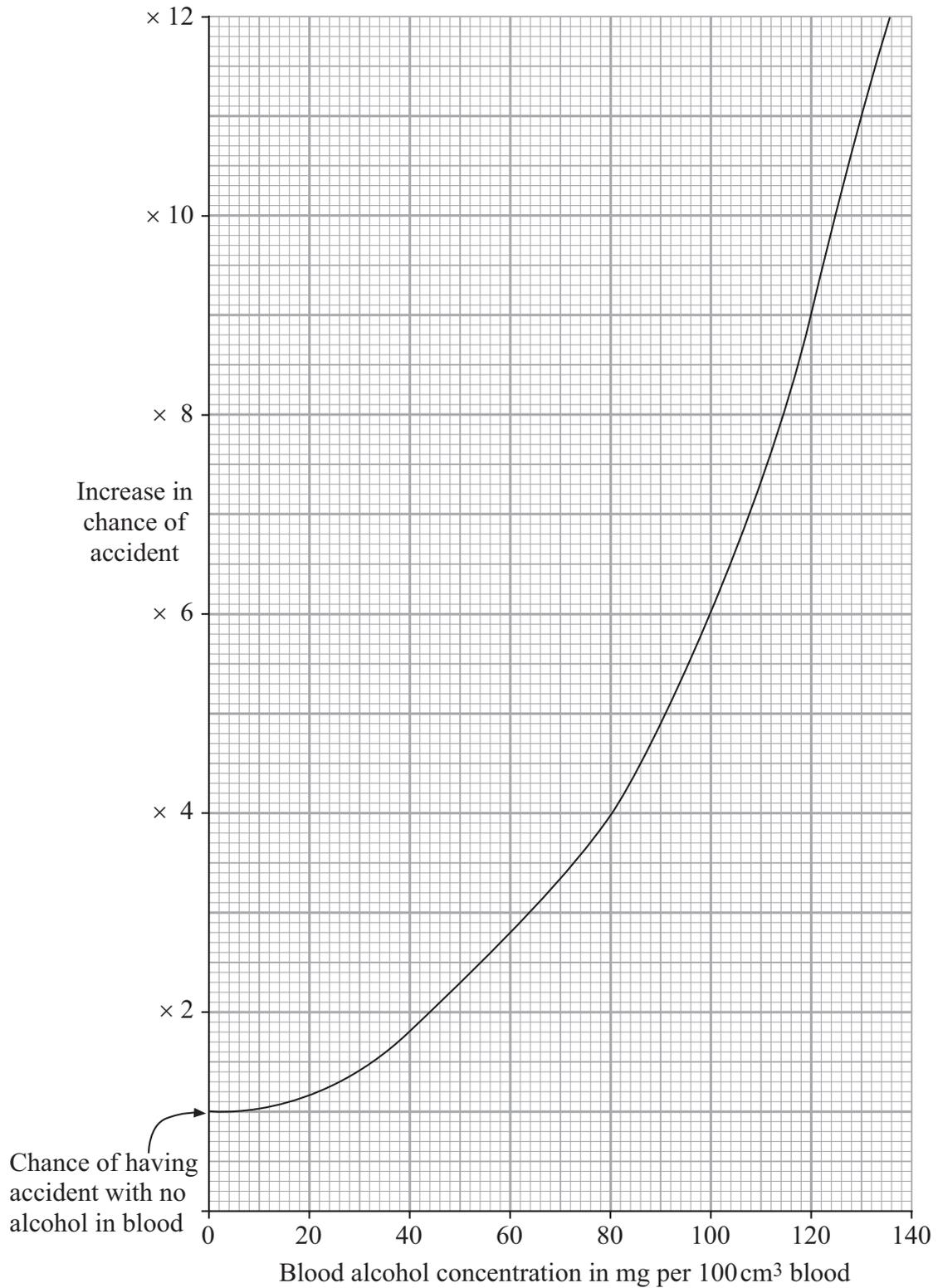
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Turn over ►

QUESTION SIX

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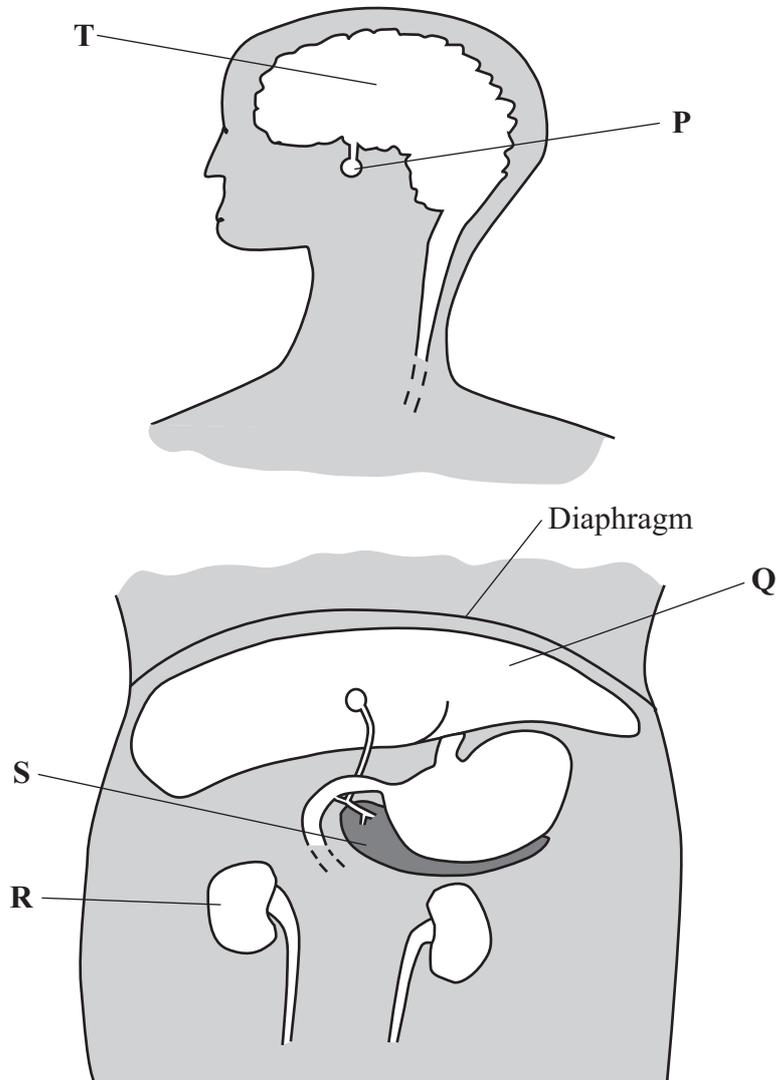
- A** Some stomata on the leaves had closed.
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- D** The leaf had developed a thicker waxy layer.

Turn over for the next question

Turn over ►

QUESTION EIGHT

The diagrams show the positions of some organs that help to keep the conditions in the body fairly constant.



8.1 Organ **S** secretes the hormones that control blood sugar level.

These hormones are most likely to be . . .

- A** released into the intestine along with enzymes from Organ **S**.
- B** transmitted along motor neurones to their target organ.
- C** transported by blood to their target organ.
- D** used to neutralise the acidic stomach contents entering the small intestine.

8.2 One function of Organ **Q** is to . . .

- A** break down excess amino acids.
- B** produce urine.
- C** reabsorb dissolved ions into the blood.
- D** release excess heat from the blood.

8.3 Organ **R** . . .

- A** helps to cool the body by releasing water.
- B** produces dilute urine when a person is sweating.
- C** reabsorbs urine if it becomes too dilute.
- D** reabsorbs useful ions from the liquid filtered from the blood.

8.4 If the concentration of water in the blood is too high, . . .

- A** less ADH is released by Organ **P**, resulting in a more dilute urine.
- B** less ADH is released by Organ **S**, resulting in a more dilute urine.
- C** more ADH is released by Organ **P**, resulting in a more concentrated urine.
- D** more ADH is released by Organ **T**, resulting in a more dilute urine.

Turn over for the next question

Turn over ►

QUESTION NINE

A girl passes a baker's shop.

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

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

- 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** The response is brought about by . . .
- 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 capillaries.
- D the rain water had caused his skin to wrinkle.

10.3 The boy's core 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