Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
Spring 2003

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

Wednesday 5 March 2003 Morning Session

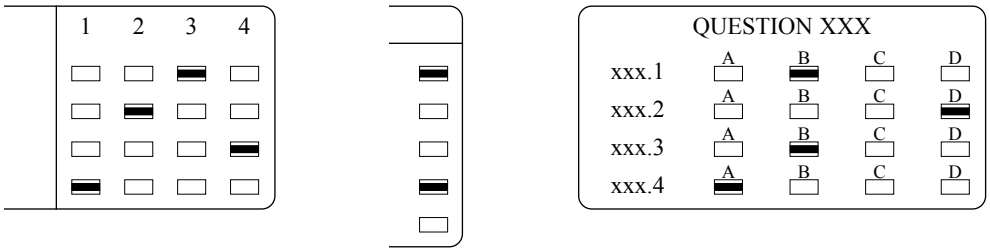
In addition to this paper you will require:
- an HB pencil and a rubber;
- an answer sheet.

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.
- Answer **all** the questions for the Tier you are attempting.
- 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.
- Mark your responses on the separate answer sheet only. Rough work may be done on the question paper.
- Mark the best responses by using a thick pencil stroke to fill in the box. Use an HB pencil. Make sure the pencil stroke does **not** extend beyond the box. Do **not** use ink or ball-point pen. If you wish to change your answer, rub out your first answer completely.
  See below.

Examples:



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 rub 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 12 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 some of the organs in the body.

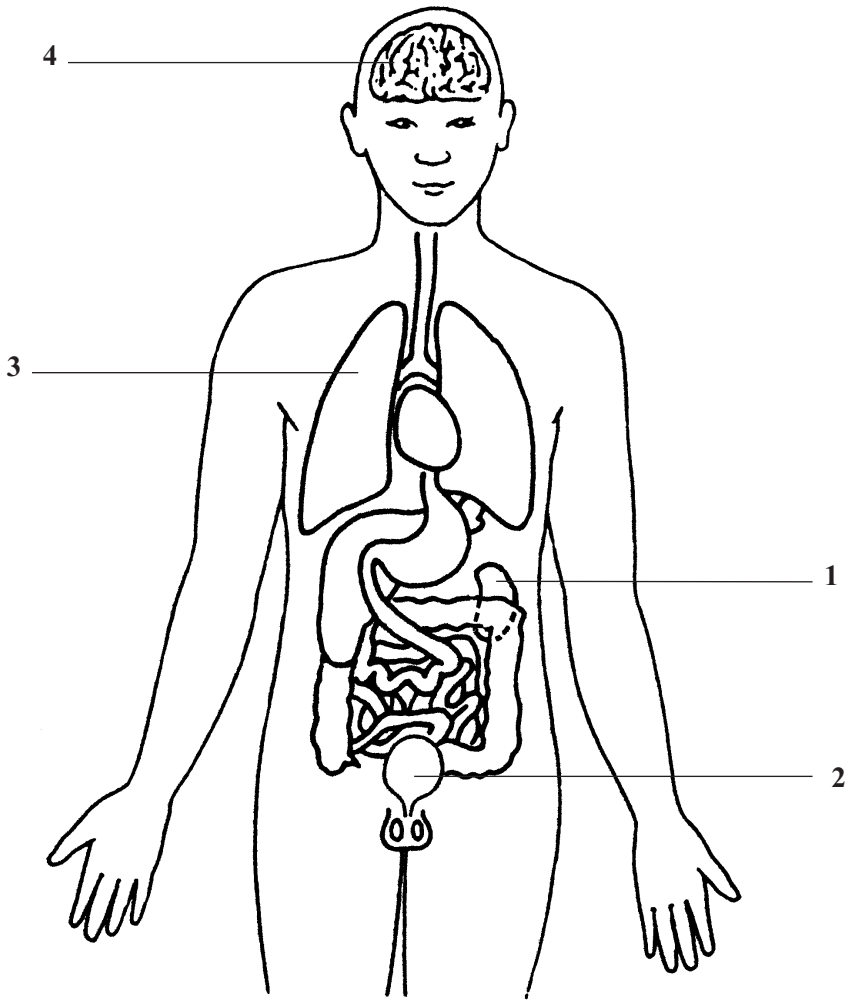
Match words from the list with each of the labels **1–4** in the diagram.

bladder

brain

kidney

lung



QUESTION TWO

The drawing shows a deer.

The deer has organs which contain different receptors.

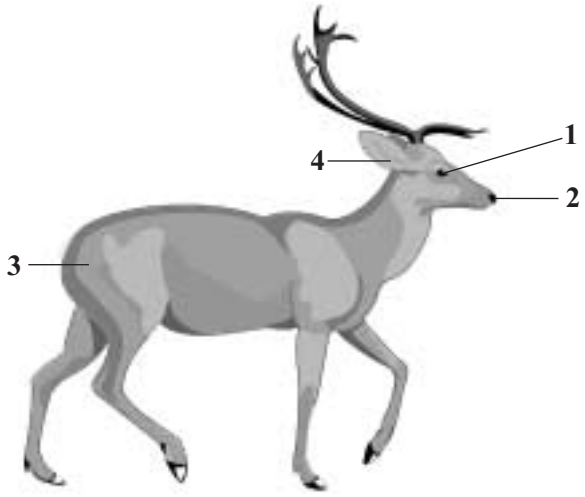
Match words from the list with each of the labels **1–4** in the drawing.

contains light receptors

contains movement receptors

contains receptors sensitive to chemicals

contains temperature receptors



QUESTION THREE

The diagram shows a cell from the leaf of a green plant.

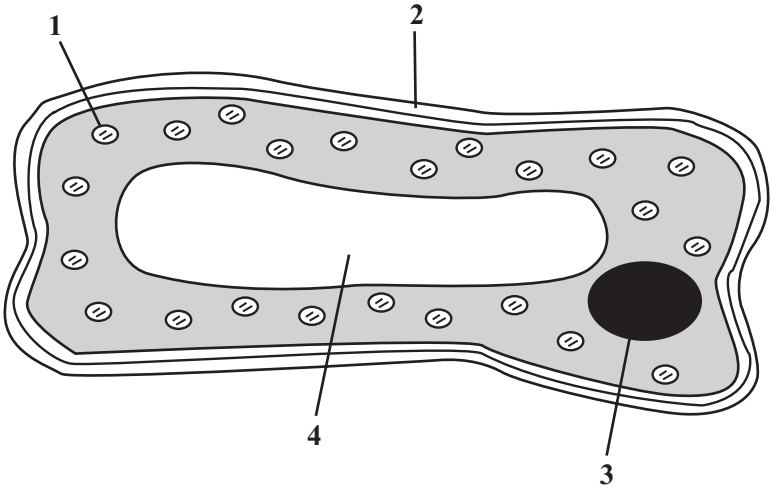
Match words from the list with each of the labels **1–4** on the diagram.

contains cell sap

controls the activities of the cell

releases oxygen in the light

strengthens the cell



QUESTION FOUR

The diagram shows a person who has pulled a hand away after touching a hot pan.

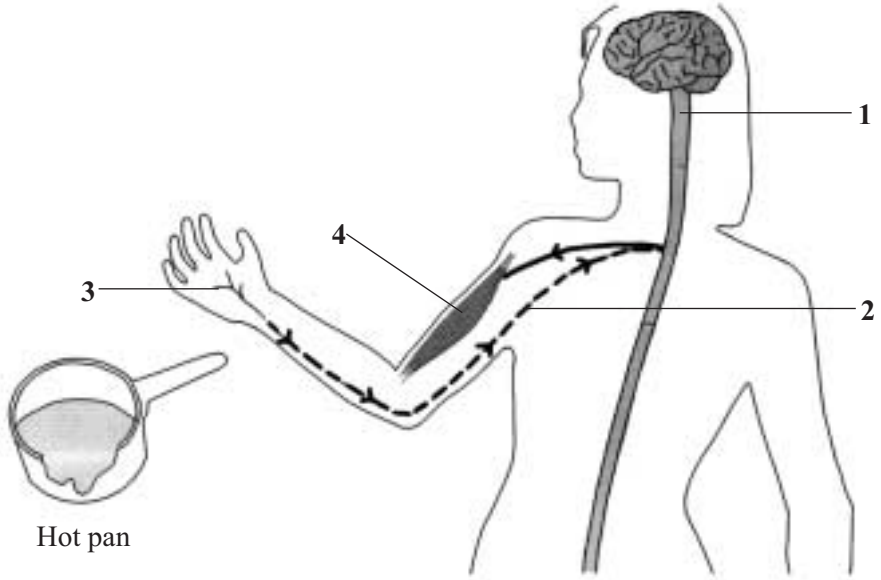
Match words from the list with each of the labels **1–4** on the diagram.

muscle

receptor

sensory neurone

spinal cord



QUESTION FIVE

The drawing shows a section through a leaf.

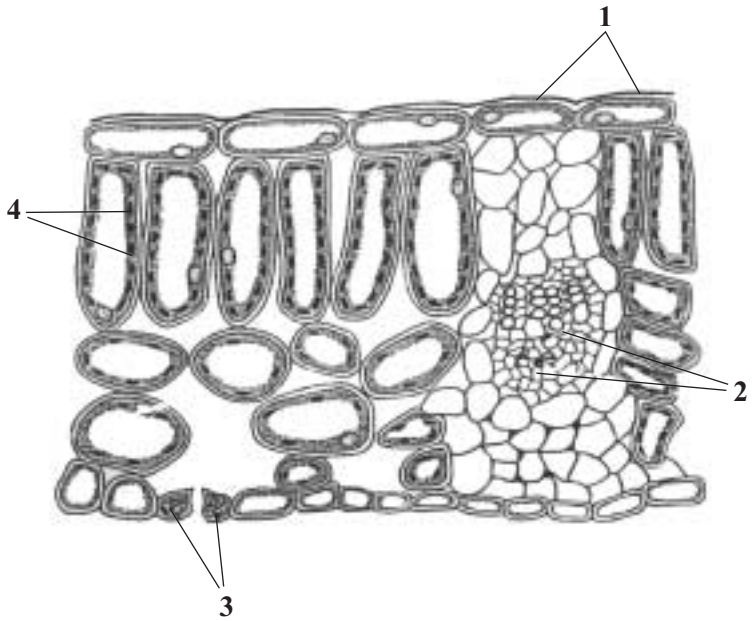
Match words from the list with each of the labels **1–4** on the drawing.

a waxy material

carries sugar away from the leaf

controls water loss from the leaf

where most glucose is produced



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

All living organisms produce waste materials.

Which **two** of the following are waste substances produced by humans?

amino acid

carbon dioxide

carbon monoxide

hormone

urea

QUESTION SEVEN

Plants respond to their surroundings.

Which **two** of the following are plant responses?

roots grow away from moisture

roots grow in the direction of the force of gravity

shoots grow in the direction of the force of gravity

shoots grow towards light

shoots grow towards moisture

SECTION C

Questions **EIGHT** to **TEN**.

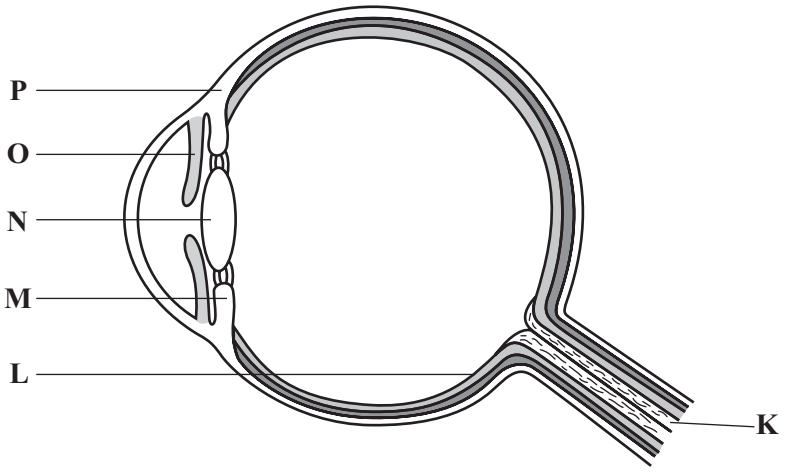
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION EIGHT

The diagram shows a section through an eye.



8.1 Which part of the eye is tough and white in colour?

A **M**

B **N**

C **O**

D **P**

8.2 The function of part **L** is to . . . . .

A control the amount of light entering the eye.

B focus light.

C form electrical impulses.

D protect the eyeball.

8.3 Which of the following parts hold the lens in place?

A Ciliary muscles and iris

B Iris and sclera

C Sclera and suspensory ligaments

D Suspensory ligaments and ciliary muscles

8.4 Which of the following parts are made of muscle?

A **K** and **L**

B **L** and **M**

C **M** and **O**

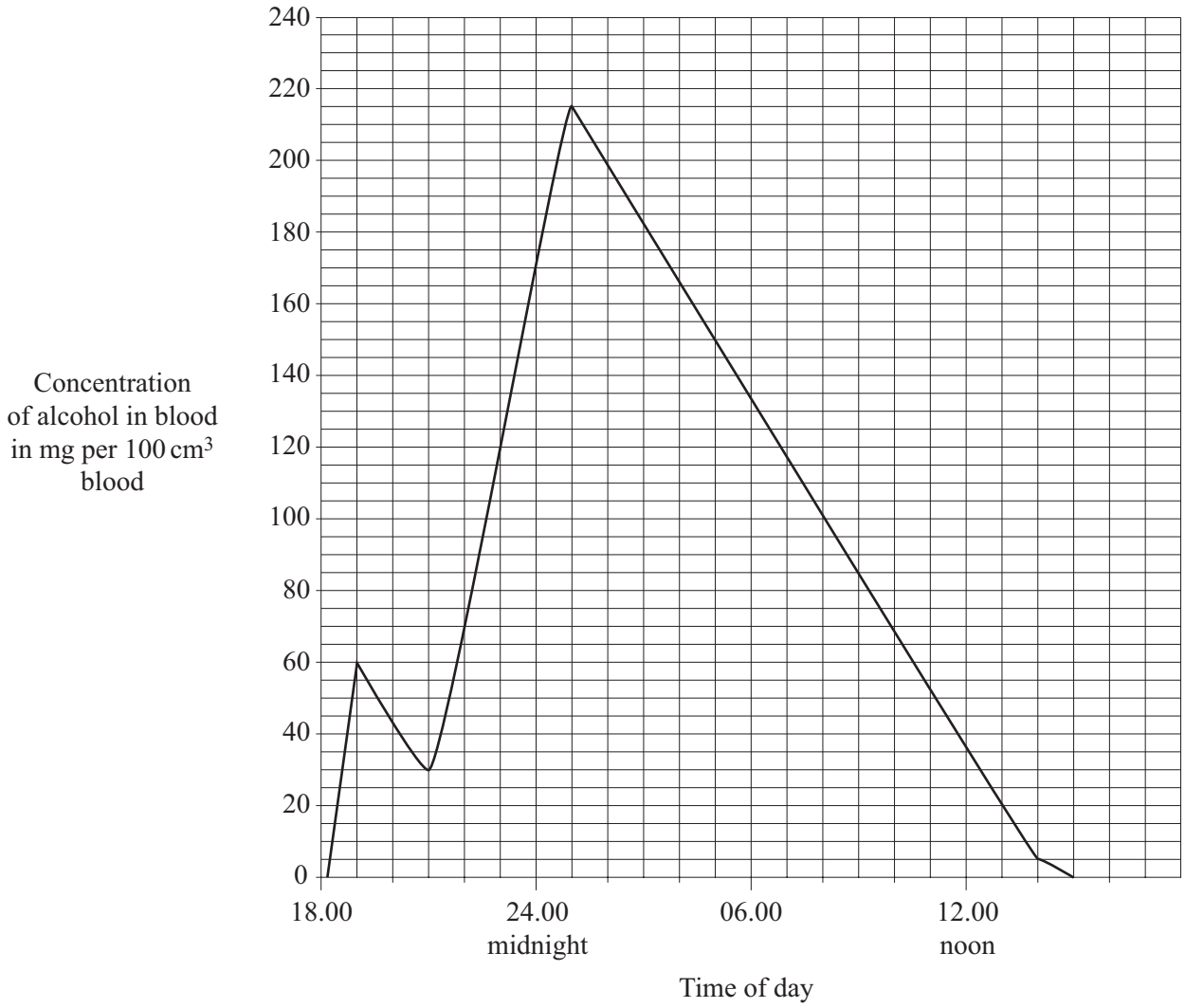
D **O** and **P**

TURN OVER FOR THE NEXT QUESTION

QUESTION NINE

A man had some alcoholic drink at home. Later he went out and had some more alcoholic drink.

The graph shows the concentration of alcohol in the man's blood over this period and the next few hours.



9.1 What was the highest concentration of alcohol in the man's blood?

A 205 mg per 100 cm^3

B 208 mg per 100 cm^3

C 215 mg per 100 cm^3

D 218 mg per 100 cm^3

9.2 The legal limit for driving in Britain is 80 mg alcohol per 100 cm^3 of blood.

During which of the following periods would it be illegal for the man to drive?

A 18.30 to 14.45

B 19.00 to 01.00

C 21.00 to 01.00

D 22.15 to 09.15

9.3 It is dangerous to drive a car after drinking alcohol because . . . . .

A alcohol is addictive.

B alcohol can cause lung cancer.

C alcohol damages the liver.

D alcohol slows reactions.

9.4 Which one of the following is **not** usually caused by smoking tobacco?

A Brain damage

B Bronchitis

C Emphysema

D Heart disease

TURN OVER FOR THE NEXT QUESTION

QUESTION TEN

Plants lose water vapour from the surface of their leaves.

10.1 The loss of water vapour from plant leaves is called . . . . .

A osmosis.

B photosynthesis.

C respiration.

D transpiration.

10.2 The rate of loss of water vapour by a leaf is greatest when the weather is . . . . .

A cool and dry.

B cool and windy.

C hot and damp.

D hot and windy.

The table shows the mass of water that is absorbed by a plant and the mass of water vapour that is lost, at different times during the day.

Time of day	Rate of water absorption in g per hour	Rate of water vapour loss in g per hour
04.00	1.5	0.25
08.00	1.5	2.0
12.00	3.6	5.0
16.00	5.5	7.5
20.00	3.3	2.5
24.00	2.0	0.75

10.3 The net change in mass of the plant due to water uptake and loss at 12.00 is . . . . .

A –1.4 g per hour.

B 0.72 g per hour.

C 8.6 g per hour.

D 18 g per hour.

10.4 At which time is the plant most likely to show signs of wilting?

A 08.00

B 12.00

C 16.00

D 20.00

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 drawing shows a section through a leaf.

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

a waxy material

carries sugar away from the leaf

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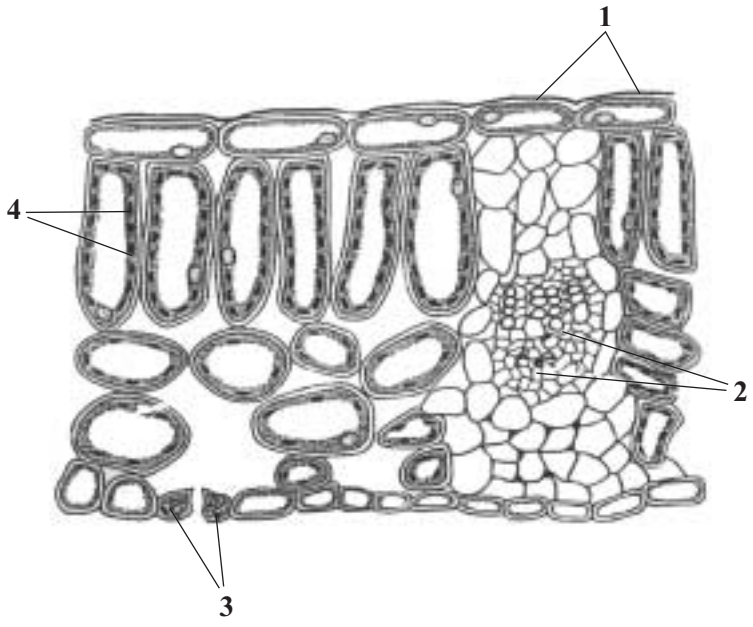
where most glucose is produced



QUESTION TWO

The eye can see near and distant objects.

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

change shape

focus

relax

tighten

When you want to see a distant object clearly, your eye must . . . . . **1** . . . . . .

To do this, the ciliary muscles . . . . . **2** . . . . . .

This makes the suspensory ligaments . . . . . **3** . . . . . causing the lens to . . . . . **4** . . . . . .

TURN OVER FOR THE NEXT QUESTION

SECTION B

Questions **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

Plants respond to their surroundings.

Which **two** of the following are plant responses?

roots grow away from moisture

roots grow in the direction of the force of gravity

shoots grow in the direction of the force of gravity

shoots grow towards light

shoots grow towards moisture

QUESTION FOUR

Substances are filtered from the blood by the kidneys.

Which **two** of the following substances are actively reabsorbed by the kidneys against a concentration gradient?

dissolved ions

insulin

sugars

urea

water

SECTION C

Questions **FIVE** to **TEN**.

Each of these questions has four parts.

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

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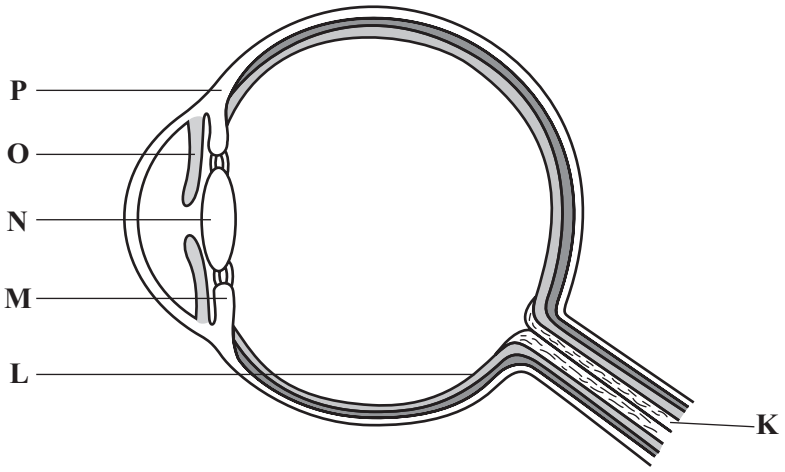
QUESTION FIVE

The diagram shows a section through an eye.



5.1 Which part of the eye is tough and white in colour?

A **M**

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C **O**

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A control the amount of light entering the eye.

B focus light.

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D protect the eyeball.

5.3 Which of the following parts hold the lens in place?

A Ciliary muscles and iris

B Iris and sclera

C Sclera and suspensory ligaments

D Suspensory ligaments and ciliary muscles

5.4 Which of the following parts are made of muscle?

A **K** and **L**

B **L** and **M**

C **M** and **O**

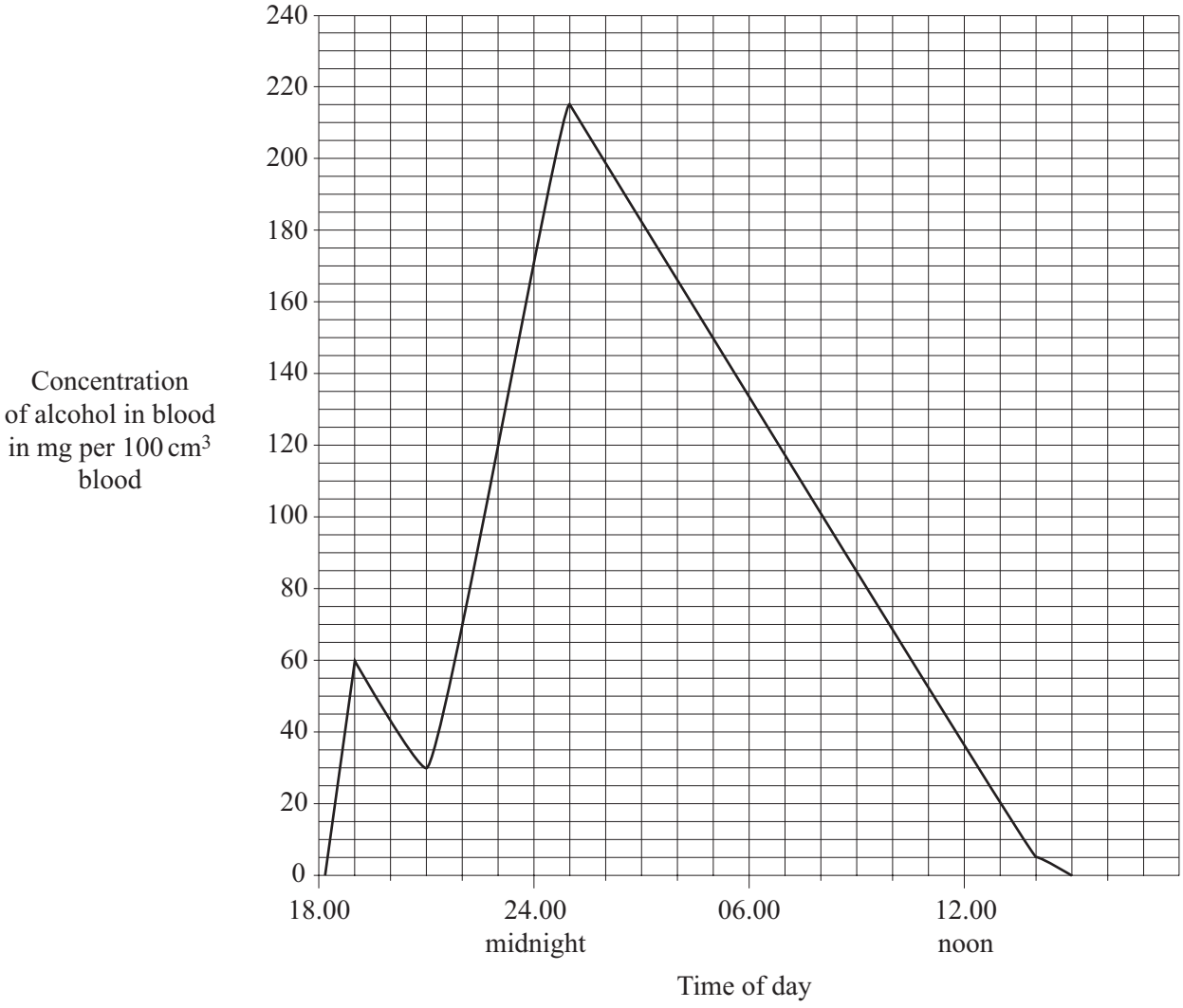
D **O** and **P**

TURN OVER FOR THE NEXT QUESTION

QUESTION SIX

A man had some alcoholic drink at home. Later he went out and had some more alcoholic drink.

The graph shows the concentration of alcohol in the man's blood over this period and the next few hours.



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D Heart disease

TURN OVER FOR THE NEXT QUESTION

QUESTION SEVEN

Plants lose water vapour from the surface of their leaves.

7.1 The loss of water vapour from plant leaves is called . . . . .

A osmosis.

B photosynthesis.

C respiration.

D transpiration.

7.2 The rate of loss of water vapour by a leaf is greatest when the weather is . . . . .

A cool and dry.

B cool and windy.

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7.3 The net change in mass of the plant due to water uptake and loss at 12.00 is . . . . .

A –1.4 g per hour.

B 0.72 g per hour.

C 8.6 g per hour.

D 18 g per hour.

7.4 At which time is the plant most likely to show signs of wilting?

A 08.00

B 12.00

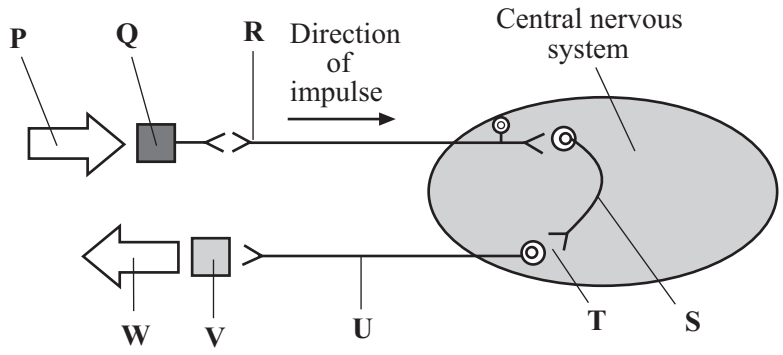
C 16.00

D 20.00

TURN OVER FOR THE NEXT QUESTION

QUESTION EIGHT

If dust gets into our eye, we blink. The diagram represents this reflex action.



8.1 Which part of the diagram represents the effector in this reflex action?

A **P**

B **Q**

C **V**

D **W**

8.2 Which part of the diagram represents a relay neurone?

A **R**

B **S**

C **U**

D **V**

8.3 Part **T** on the diagram represents . . . . .

A the brain.

B a nerve.

C the spinal cord.

D a synapse.

8.4 The effectors in this response are . . . . .

A capillaries.

B glands.

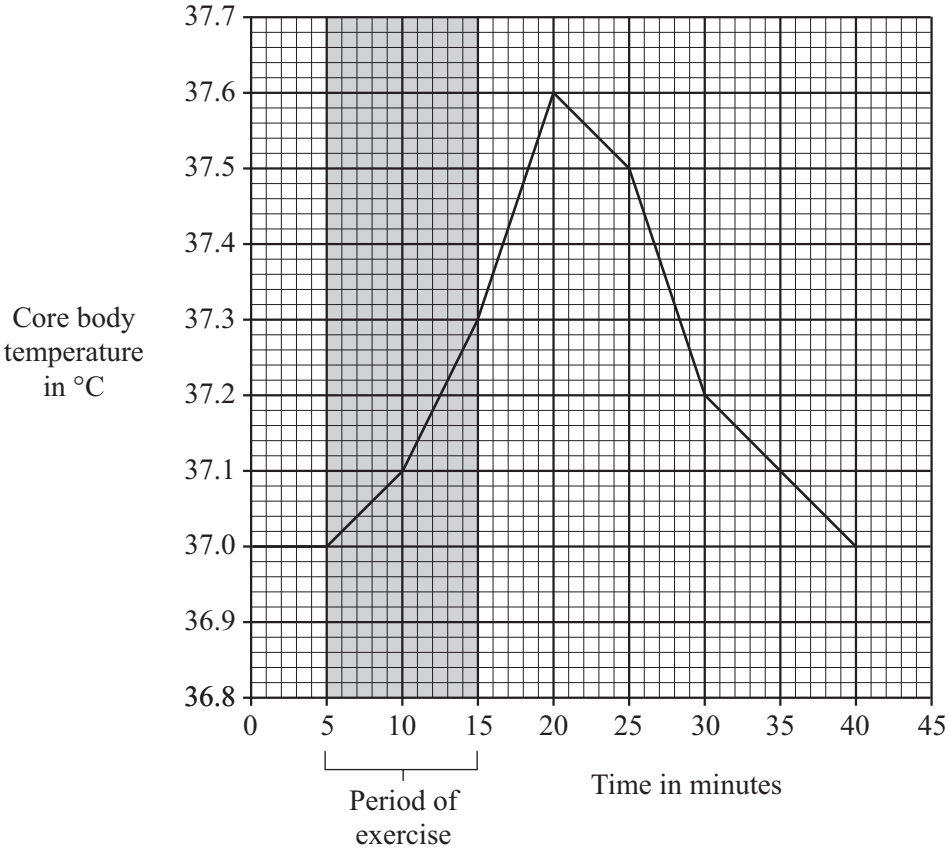
C hormones.

D muscles.

TURN OVER FOR THE NEXT QUESTION

QUESTION NINE

The graph shows the effect of a 10 minute exercise period on the core body temperature of an athlete.



9.1 By how much did the core body temperature continue to rise after the end of the exercise period?

A 0.3 °C

B 0.6 °C

C 5.0 °C

D 37.6 °C

9.2 What was the average rate of fall in body temperature between 20 and 35 minutes?

A 0.008 °C per minute

B 0.033 °C per minute

C 0.1 °C per minute

D 0.5 °C per minute

9.3 When the core body temperature increases, the athlete is likely to . . . . .

A release less sweat and the blood vessels supplying his skin capillaries will constrict.

B release less sweat and the blood vessels supplying his skin capillaries will dilate.

C release more sweat and the blood vessels supplying his skin capillaries will constrict.

D release more sweat and the blood vessels supplying his skin capillaries will dilate.

9.4 Body temperature is kept at about 37 °C because . . . . .

A enzymes work best at this temperature.

B it provides enough energy for sweating to occur.

C muscles contract more powerfully when warm.

D the body needs to be as hot as possible.

TURN OVER FOR THE NEXT QUESTION

QUESTION TEN

Plants produce carbohydrates by photosynthesis. Some of these carbohydrates are converted into other substances.

10.1 Carbohydrates are converted into other substances for storage.

Which one of the following is stored in seeds?

A Amino acids

B Cellulose

C Lipids

D Nitrates

10.2 Plants build up proteins from sugars and . . . . .

A carbon dioxide.

B nitrates.

C phosphate.

D potassium.

10.3 A plant with poor root growth and purple younger leaves is deficient in . . . . .

A carbon dioxide.

B nitrates.

C phosphate.

D potassium.

10.4 A plant that has yellow leaves with dead spots is deficient in . . . . .

A carbon dioxide.

B nitrates.

C phosphate.

D potassium.

END OF TEST