Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
Winter 2005

ASSESSMENT and QUALIFICATIONS ALLIANCE

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

Thursday 24 November 2005 Morning Session

In addition to this paper you will require:
- a black ball-point pen;
- an answer sheet.

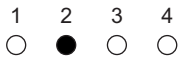
You may use a calculator.

Time allowed: 30 minutes

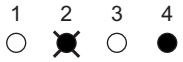
Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title "Maintenance of Life" printed on it.
- Attempt **one Tier only**, **either** the Foundation 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

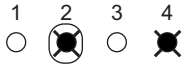
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown:



- 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 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 human head and face.

The human head has organs which contain receptors.

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

contains light receptors

contains receptors sensitive to smells

contains sound receptors

contains temperature receptors

QUESTION TWO

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

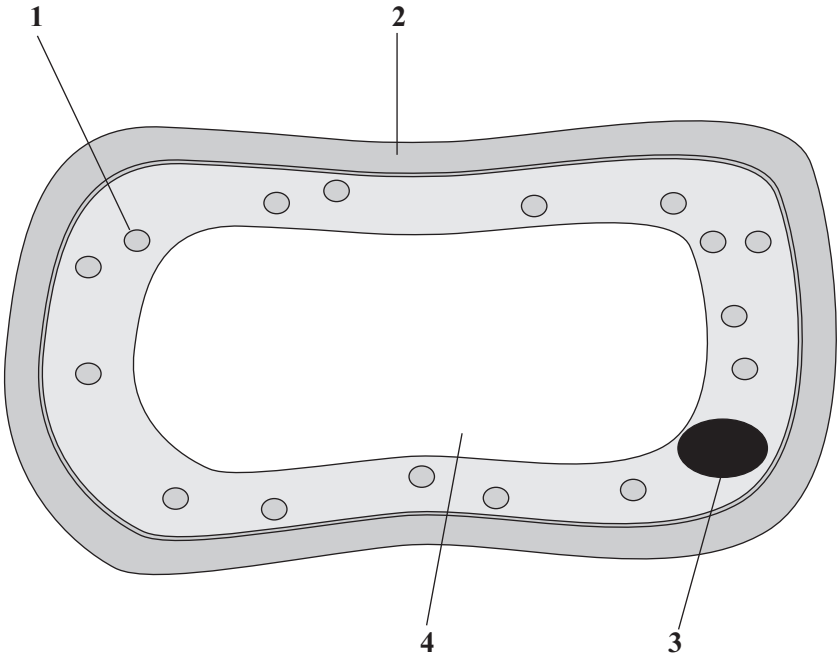
Match words from the list with the labels **1–4** on the diagram.

contains cell sap

controls the activities of the cell

releases oxygen in the light

strengthens the cell



QUESTION THREE

Photosynthesis occurs in green plants.

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

carbon dioxide

glucose

oxygen

water

In photosynthesis, the gas . . . . . **1** . . . . . combines with . . . . . **2** . . . . . .

The products are the gas . . . . . **3** . . . . . and . . . . . **4** . . . . . .

Turn over ▶

QUESTION FOUR

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

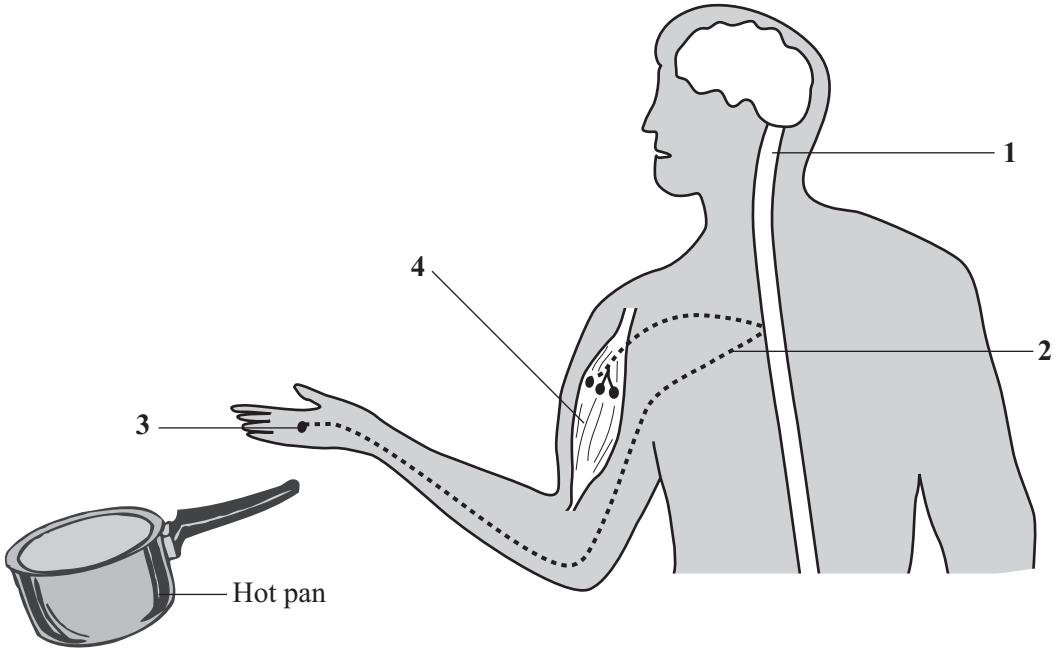
Match words from the list with the labels **1–4** on the diagram.

muscle

receptor

sensory neurone

spinal cord



QUESTION FIVE

The table is about some of the problems that are caused by drugs.

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

affects behaviour when inhaled

makes it difficult to stop smoking

reduces the amount of oxygen in the blood

slows down reactions

Problem	May be caused by
1	alcohol
2	carbon monoxide in tobacco smoke
3	nicotine in tobacco smoke
4	solvent

TURN OVER FOR THE NEXT QUESTION

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

Figure 1 shows two potted plants, **X** and **Y**, of the same age and size.

Figure 1

Plant **X** was placed in the light, but Plant **Y** was placed in a black box with a hole in one side.

Figure 2 shows the plants after 5 days.

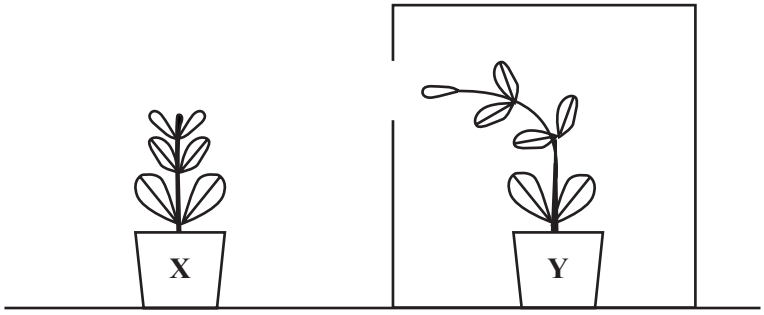


Figure 2

Which **two** of the following statements are correct?

both shoots have grown towards moisture

both shoots have grown in the direction of the force of gravity

only shoot Y has grown away from moisture

shoot Y has grown more than shoot X

shoot Y has grown towards light from one side but shoot X has not

QUESTION SEVEN

Humans produce substances in their bodies.

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

alcohol

amino acids

carbon dioxide

sugar (glucose)

urea

TURN OVER FOR THE NEXT QUESTION

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

An investigation was carried out to find the effect on a person's skin temperature of going from a warm room at 20 °C to a cold room at 8 °C.

Readings were taken for five minutes.

The results are shown in the table.

Time from entering the cold room in minutes	0	1	2	3	4	5
Skin temperature in °C	29.8	29.2	28.4	27.8	27.1	26.6

8.1 The person's blood temperature was 36.9 °C.

What was the difference between their blood temperature and their skin temperature on first entering the room?

A 6.1 °C

B 7.1 °C

C 7.7 °C

D 8.1 °C

8.2 What effect did the cold conditions have on the skin temperature?

A A decrease of 0.8 °C every minute

B An average decrease of 0.9 °C per minute

C An overall decrease of 2.2 °C

D An overall decrease of 3.2 °C

8.3 In which time period did the skin temperature drop the most?

A 0 – 1 minutes

B 1 – 2 minutes

C 2 – 3 minutes

D 4 – 5 minutes

8.4 What other effect would the cold room have on the person during this investigation?

A Less water would be lost in urine

B Sweat production would fall

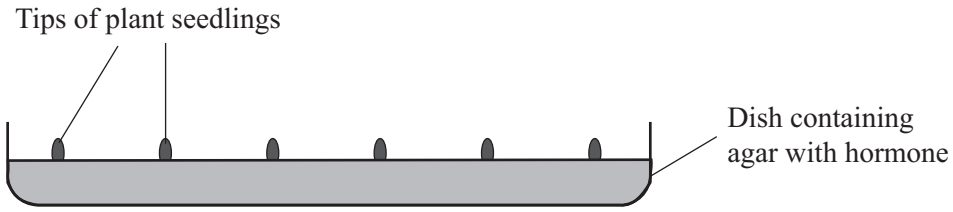
C Sweat production would rise and then fall

D The person would get thirsty

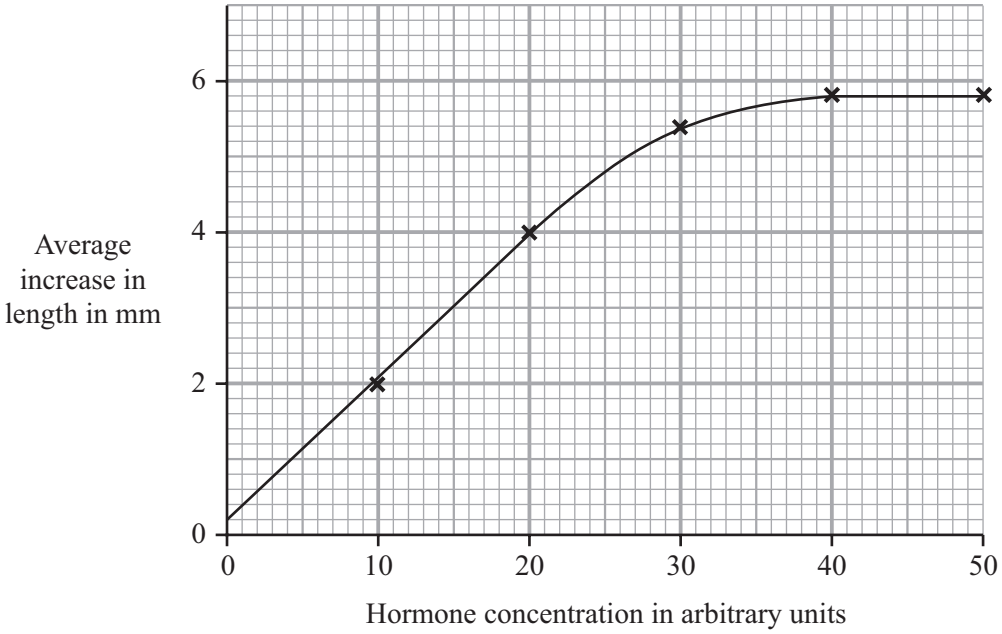
TURN OVER FOR THE NEXT QUESTION

QUESTION NINE

An investigation was carried out to find out the effect of a hormone on tips of plant seedlings.
The tips of seedlings were cut off and placed in dishes containing agar with different concentrations of hormone.



The tips continued to grow and the increase in length was measured. The results are shown in the graph.



9.1 A seedling tip measured 10 mm at the start of the investigation. It was placed in a dish containing 20 arbitrary units of hormone.

What would its length be at the end of the investigation?

A 2 mm

B 4 mm

C 14 mm

D 20 mm

9.2 What average increase in length would occur if a hormone concentration of 25 arbitrary units was used?

A 3.0 mm

B 4.0 mm

C 4.8 mm

D 5.8 mm

9.3 Which of the following statements most accurately describes the effect of this hormone on the growth of the seedling tips?

A Growth occurs only at high hormone concentration

B More growth occurs as the hormone concentration increases

C More growth occurs as the hormone concentration increases up to 40 arbitrary units

D This hormone does not affect growth

9.4 In which way can plant hormones be used by farmers?

A To help plants grow in very wet soil

B To kill weeds

C To prevent wilting

D To speed up the absorption of carbon dioxide

TURN OVER FOR THE NEXT QUESTION

QUESTION TEN

A freshly cut shoot was placed in a tube containing water, as shown in **Figure 1**. The surface of the water was covered with a layer of oil. The mass of the apparatus was recorded at intervals for 200 minutes.

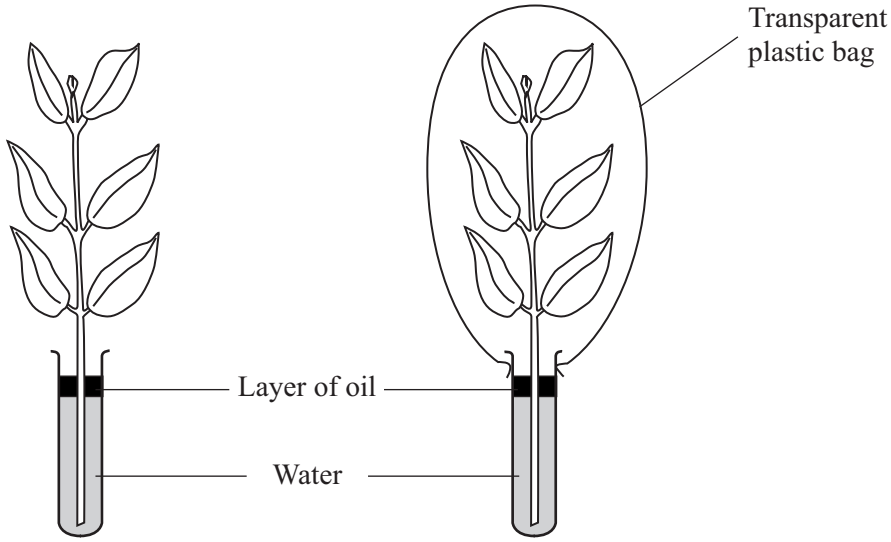
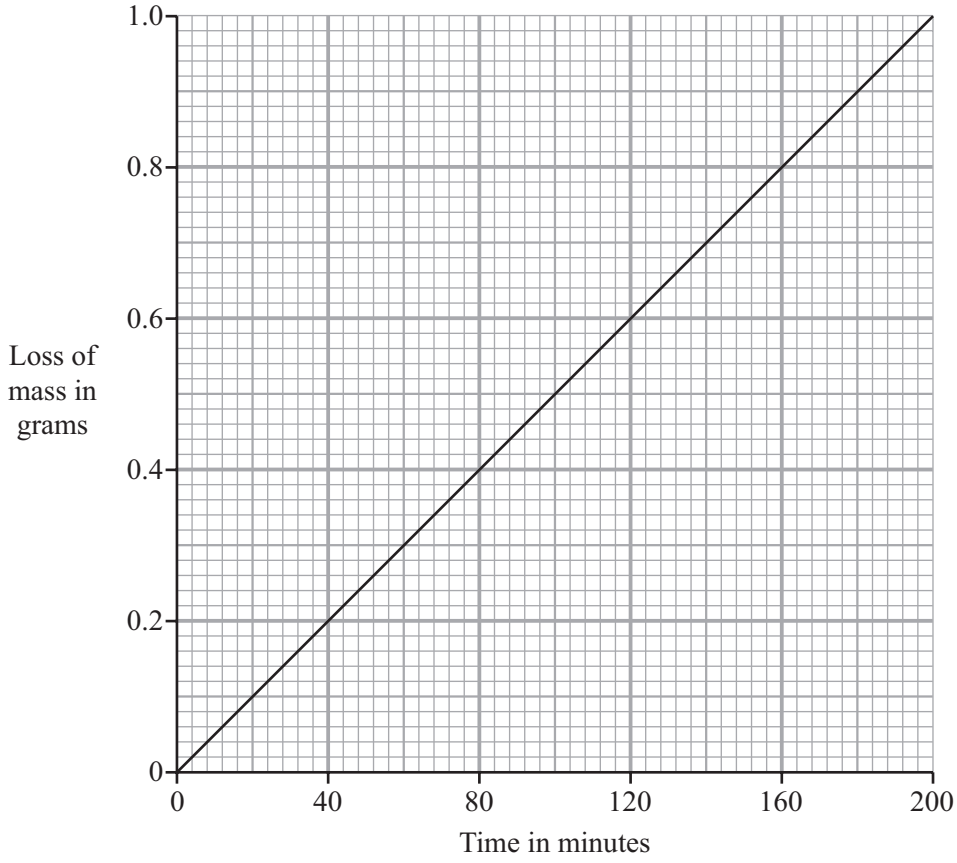


Figure 1
(Uncovered)

Figure 2
(Covered with plastic bag)

The apparatus was then placed in a transparent plastic bag, as shown in **Figure 2**.
The mass of the apparatus was again recorded for the same length of time.
During both investigations the apparatus was kept in bright light at 15 °C.

The graph shows the results of the investigation when the shoot was uncovered.



10.1 At what rate was mass lost from the uncovered shoot?

A 0.15 g per hour

B 0.30 g per hour

C 0.75 g per hour

D 200 g per hour

10.2 The covered shoot did not appear to lose mass.

This is probably because . . . . .

A no more water was left in the tube.

B no water vapour could escape from the apparatus.

C the carbon dioxide concentration had increased.

D the shoot had stopped photosynthesising.

10.3 Most water vapour is lost from plant leaves through the . . . . .

A phloem tissue.

B stomata.

C waxy cuticle.

D xylem tissue.

10.4 The loss of water vapour 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 table is about some of the problems that are caused by drugs.

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

affects behaviour when inhaled

makes it difficult to stop smoking

reduces the amount of oxygen in the blood

slows down reactions

Problem	May be caused by
1	alcohol
2	carbon monoxide in tobacco smoke
3	nicotine in tobacco smoke
4	solvent

QUESTION TWO

The eye can see near and distant objects.

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

change shape

contract

focus

slacken

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

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

This makes the suspensory ligaments . . . . . **3** . . . . . , allowing 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

Humans produce substances in their bodies.

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

alcohol

amino acids

carbon dioxide

sugar (glucose)

urea

QUESTION FOUR

Which **two** of the following occur when the blood glucose concentration is too low?

insulin is released from the pancreas

the liver converts glycogen to glucose

the liver releases glycogen into the blood

the pancreas releases glucose into the blood

the pancreas secretes glucagon

NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

SECTION C

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

Each of these questions has four parts.

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QUESTION FIVE

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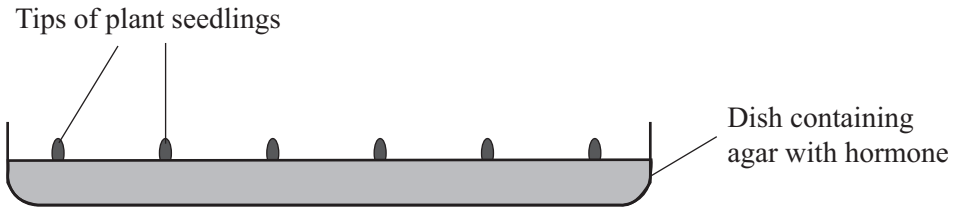

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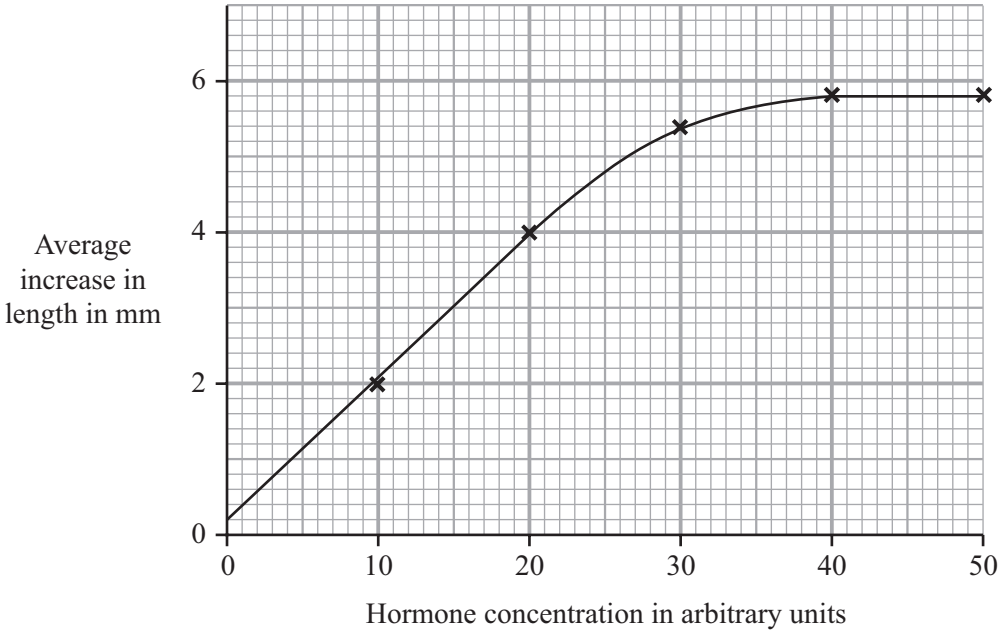

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6.4 In which way can plant hormones be used by farmers?

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B To kill weeds

C To prevent wilting

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TURN OVER FOR THE NEXT QUESTION

QUESTION SEVEN

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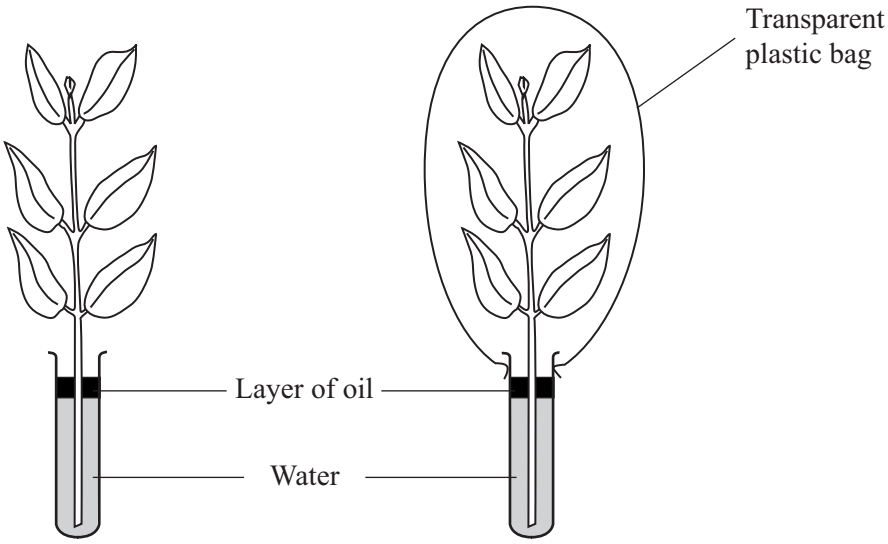

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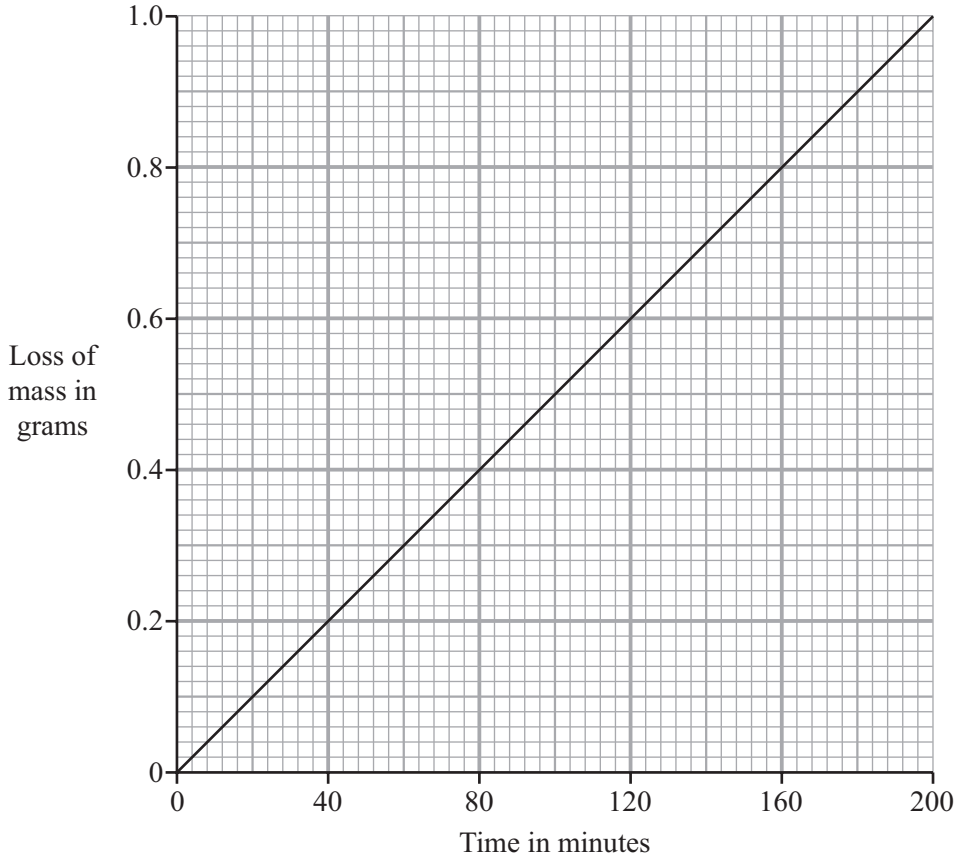

7.1 At what rate was mass lost from the uncovered shoot?

A 0.15 g per hour

B 0.30 g per hour

C 0.75 g per hour

D 200 g per hour

7.2 The covered shoot did not appear to lose mass.

This is probably because . . . . .

A no more water was left in the tube.

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7.3 Most water vapour is lost from plant leaves through the . . . . .

A phloem tissue.

B stomata.

C waxy cuticle.

D xylem tissue.

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

A diffusion.

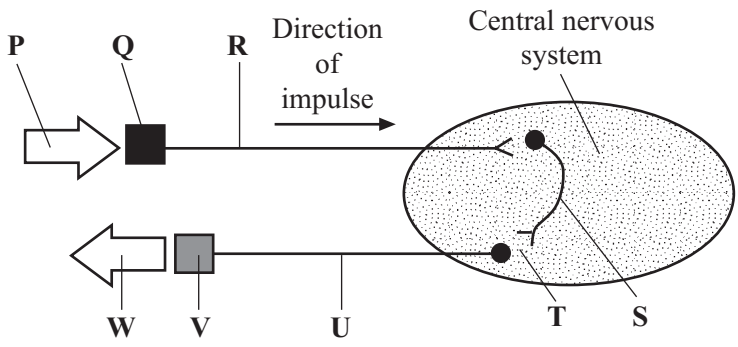
B osmosis.

C transpiration.

D wilting.

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 The gap **T** on the diagram represents . . . . .

A a nerve.

B a synapse.

C the brain.

D the spinal cord.

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

A capillaries.

B hormones.

C ligaments.

D muscles.

TURN OVER FOR THE NEXT QUESTION

QUESTION NINE

Water is lost from the body in several ways.
The volume of water lost varies with the activity of the person.
The table shows the water loss from the body of an athlete when he is 'not in training' and when he is 'in training'.

	Water loss in cm^3 per day	
Source of water loss	**when not in training**	**when in training**
Urine	1400	500
Skin	500	5300
Faeces	200	200
Lungs	400	550

9.1 The increase in water loss per day as a result of training is . . . . .

A 2500 cm^3

B 4050 cm^3

C 4500 cm^3

D 6550 cm^3

9.2 The proportion of water lost via the athlete's skin when he is not in training is . . . . .

A $\frac{1}{53}$ (1.89 %)

B $\frac{1}{50}$ (2 %)

C $\frac{1}{25}$ (4 %)

D $\frac{1}{5}$ (20 %)

9.3 Why is more water lost from the athlete's skin when he is in training?

A It ensures that salt is released onto the skin

B It helps to maintain the correct working temperature for enzymes

C It prevents too much blood from entering the capillaries of the skin

D It removes excess water from the body

9.4 Why does the athlete produce less urine when in training?

A Faeces are moving faster through the digestive system

B More urea is produced during exercise

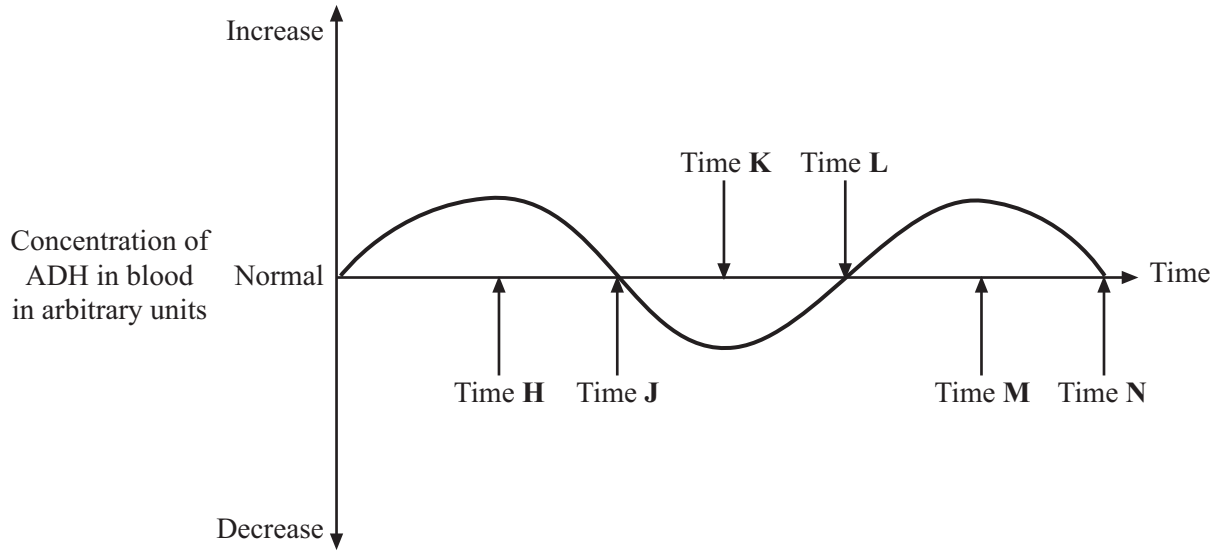
C The blood plasma of the athlete is more dilute

D The water lost through the skin has not been replaced quickly enough

TURN OVER FOR THE NEXT QUESTION

QUESTION TEN

The graph shows changes in the concentration of ADH in the blood of a person during part of a day.



10.1 When is the person producing the most dilute urine?

A At time **H**

B At time **K**

C At time **L**

D At time **N**

10.2 When was the person likely to be losing most water through sweating?

A From time **H** to **K**

B From time **J** to **L**

C From time **K** to **M**

D From time **L** to **N**

10.3 Which of the following are true of ADH?

	Produced by the	**Has its effect on the . . . . .**
A	kidney	bladder
B	liver	kidney
C	pituitary gland	brain
D	pituitary gland	kidney

10.4 What effect does ADH have in the body?

A Increases the reabsorption of sugar

B Maintains the oxygen content of the blood

C Reduces the ion content of the blood

D Regulates the water content of the blood

END OF TEST

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE

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