

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
June 2005



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

Tuesday 28 June 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:

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 polar bear which lives in a cold climate.



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

ear

eye

nose

skin

Part of body	Contains receptors which allow the polar bear to
1	see the movement of other animals
2	feel how cold the water is
3	smell the presence of its cubs (young)
4	hear the calls of its cubs (young)

QUESTION TWO

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

amino acids

liver

lungs

respiration

Urea is formed in the **1**

Urea is formed from the breakdown of excess **2**

Carbon dioxide is formed during **3**

Carbon dioxide leaves the body through the **4**

QUESTION THREE

A number of factors affect the growth of plants.

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

force of gravity

hormones

light

moisture

Factor	Plant activity
1	roots grow towards it
2	shoots grow against it
3	shoots grow towards it
4	stimulate the growth of roots from cuttings

Turn over ►

QUESTION FOUR

The table is about some parts of a plant.

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

phloem tissue

roots

stomata

xylem tissue

Part	Description
1	absorb mineral salts
2	carries sugars in the plant
3	carries water and minerals from the roots
4	most water is lost through these

QUESTION FIVE

This question is about the functions of parts of the eye.

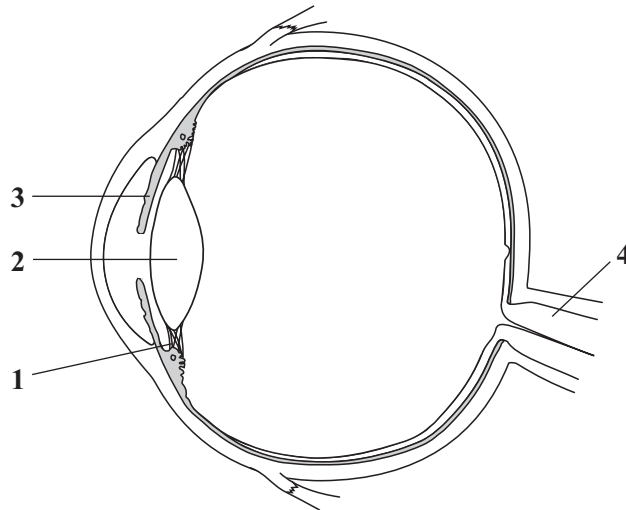
Match words from the list with the numbers 1–4 on the diagram.

controls the size of the pupil

focuses the light

holds the lens in position

carries impulses to the brain



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 lose water to the atmosphere through transpiration.

A gardener growing plants in a garden needs to prevent his plants losing too much water.

Which **two** of the following pairs of conditions would cause the most water loss?**cold and dry conditions****cold and moist conditions****hot and dry conditions****hot and moist conditions****hot and windy conditions****QUESTION SEVEN**

Plant cells are different from animal cells.

Which **two** of the following are **not** true of animal cells?**they contain a nucleus****they contain cell sap****they contain cytoplasm****they have a cell membrane****they use chlorophyll to trap light**

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 gives information about the amount of alcohol consumed and the number of alcohol-related deaths in some countries.

Country	Average amount of alcohol consumed per person per year in litres	Number of alcohol-related deaths per 100 000 people per year
England	8	4
France	17	34
Germany	13	29
Iceland	4	1
Spain	15	22
Sweden	6	12

8.1 Which of these organs is most likely to be damaged by drinking alcohol?

- A Heart
- B Liver
- C Lungs
- D Stomach

8.2 The ratio of alcohol-related deaths to the amount of alcohol consumed was the highest in

- A France.
- B Germany.
- C Iceland.
- D Spain.

8.3 One effect of alcohol on the body is to

- A cause a reduction in the oxygen carrying capacity of the blood.
- B cause lung damage.
- C lead to lack of self control.
- D shorten reaction time.

8.4 Which substance in cigarette smoke is addictive?

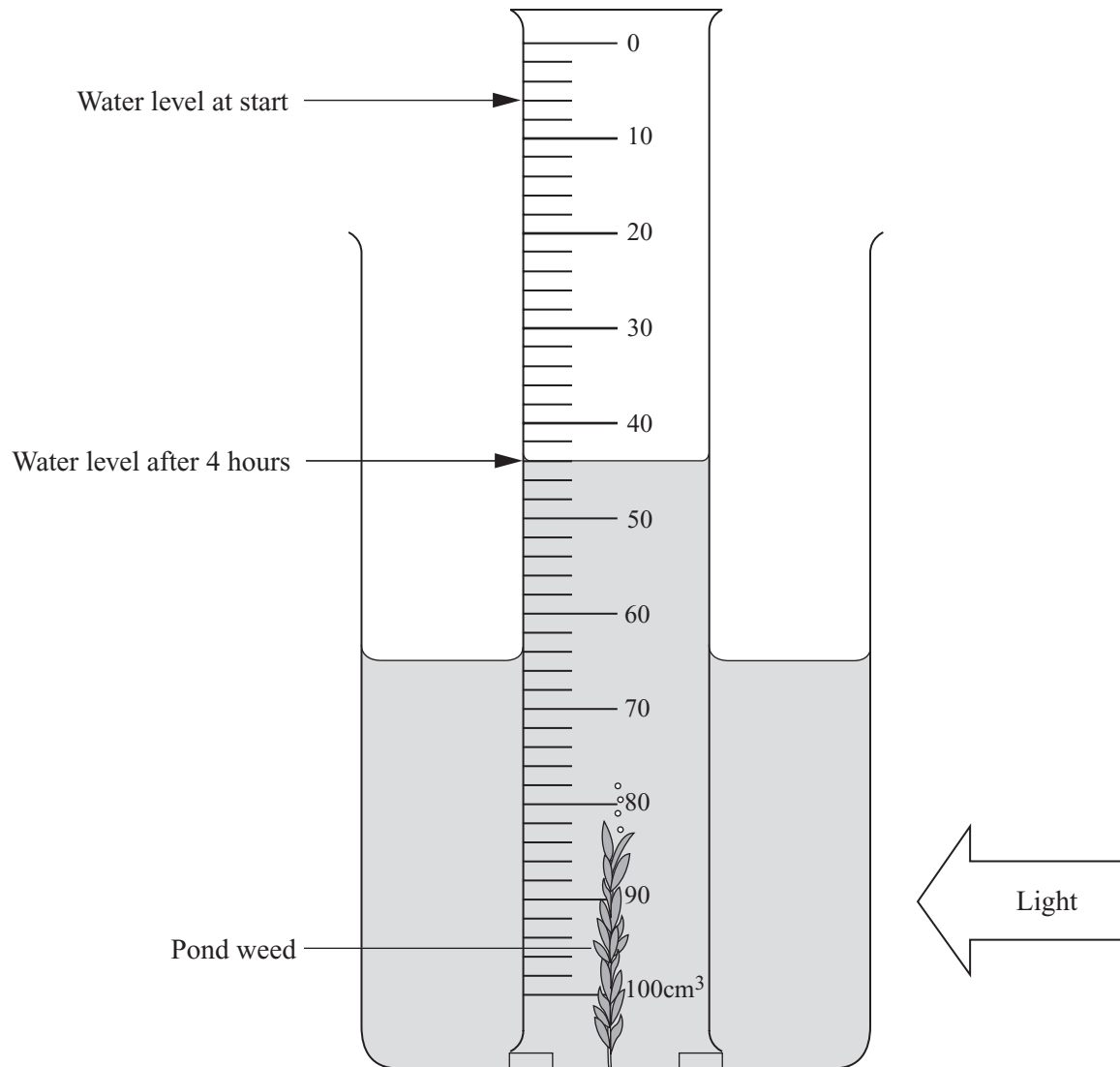
- A Carbon dioxide
- B Carbon monoxide
- C Nicotine
- D Nitrogen

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

The apparatus shown in the diagram was set up to investigate the process of photosynthesis in a water plant. The apparatus was kept in bright light.



9.1 How much gas was given off during the 4 hours of the experiment?

- A 19 cm³
- B 34 cm³
- C 38 cm³
- D 40 cm³

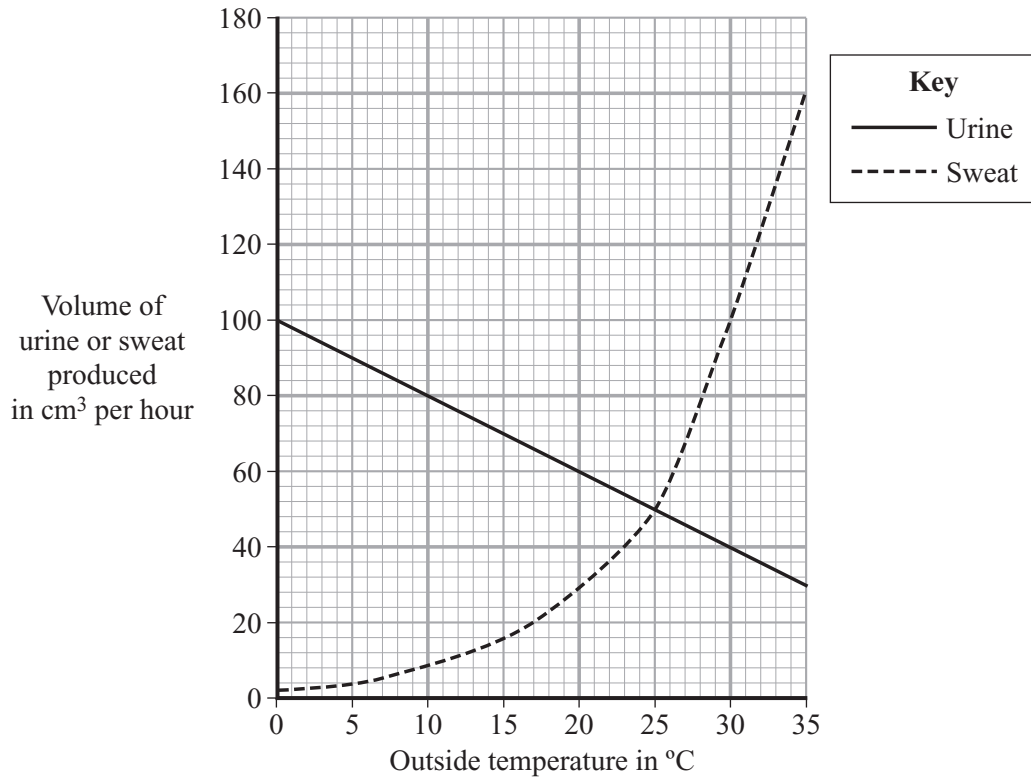
- 9.2** The gas given off by the pond weed and collected in the tube is
- A** air.
 - B** carbon dioxide.
 - C** nitrogen.
 - D** oxygen.
- 9.3** If the level of light is reduced by 50 %, what will happen to the rate at which the gas is produced?
- A** It will decrease and then continue slowly
 - B** It will decrease very rapidly and then stop
 - C** It will increase at first and then decrease
 - D** It will increase very rapidly
- 9.4** If the light is turned off, the plant
- A** will cease carrying out respiration.
 - B** will cease to photosynthesise.
 - C** will start producing sugar.
 - D** will start to respire and use up sugar.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION TEN

The graph shows the volumes of urine and sweat produced by a person when the outside temperature varied.



10.1 At what temperature are the amounts of urine and sweat produced the same?

- A 15 °C
- B 20 °C
- C 22 °C
- D 25 °C

10.2 What is the combined loss of fluid, through urine and sweat, by a person who is kept at 30 °C for 6 hours?

- A 40 cm³
- B 140 cm³
- C 600 cm³
- D 840 cm³

10.3 Urine is produced in the

- A bladder.
- B kidney.
- C liver.
- D pancreas.

10.4 How is sweat useful to the body?

- A It helps to cool the body
- B It keeps the skin supple
- C It keeps the skin warm
- D It makes the blood warmer

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**.

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QUESTION ONE

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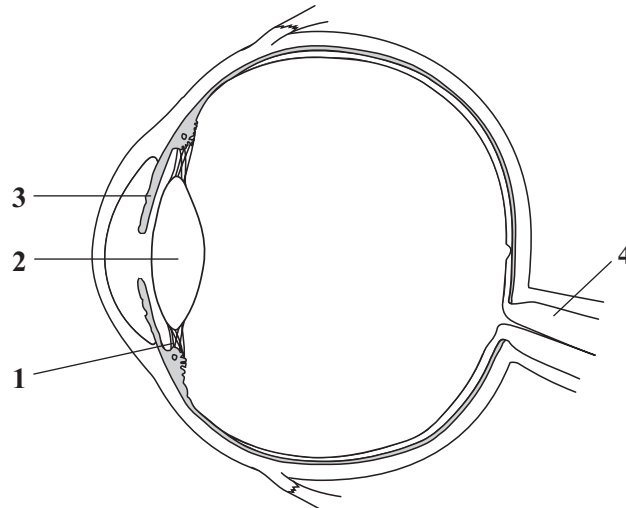
Match words from the list with the numbers **1–4** on the diagram.

controls the size of the pupil

focuses the light

holds the lens in position

carries impulses to the brain



QUESTION TWO

This question is about maintaining the concentration of sugar in the blood.

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

glucagon

glycogen

insulin

pancreas

Blood sugar concentration is monitored by the **1**

If the blood sugar concentration is too high, **2** is secreted into the blood.

This stimulates the liver to convert glucose into **3**

If the blood sugar concentration is too low, **4** is secreted into the blood.

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

Plant cells are different from animal cells.

Which **two** of the following are **not** true of animal cells?**they contain a nucleus****they contain cell sap****they contain cytoplasm****they have a cell membrane****they use chlorophyll to trap light****QUESTION FOUR**

Tobacco smoke contains carbon monoxide, which is dangerous.

In which **two** ways is carbon monoxide dangerous to humans?**it can cause lung cancer****it combines irreversibly with haemoglobin****it combines with oxygen to form carbon dioxide****it dissolves in water to form an acid****it stops red blood cells carrying oxygen**

Turn over ►

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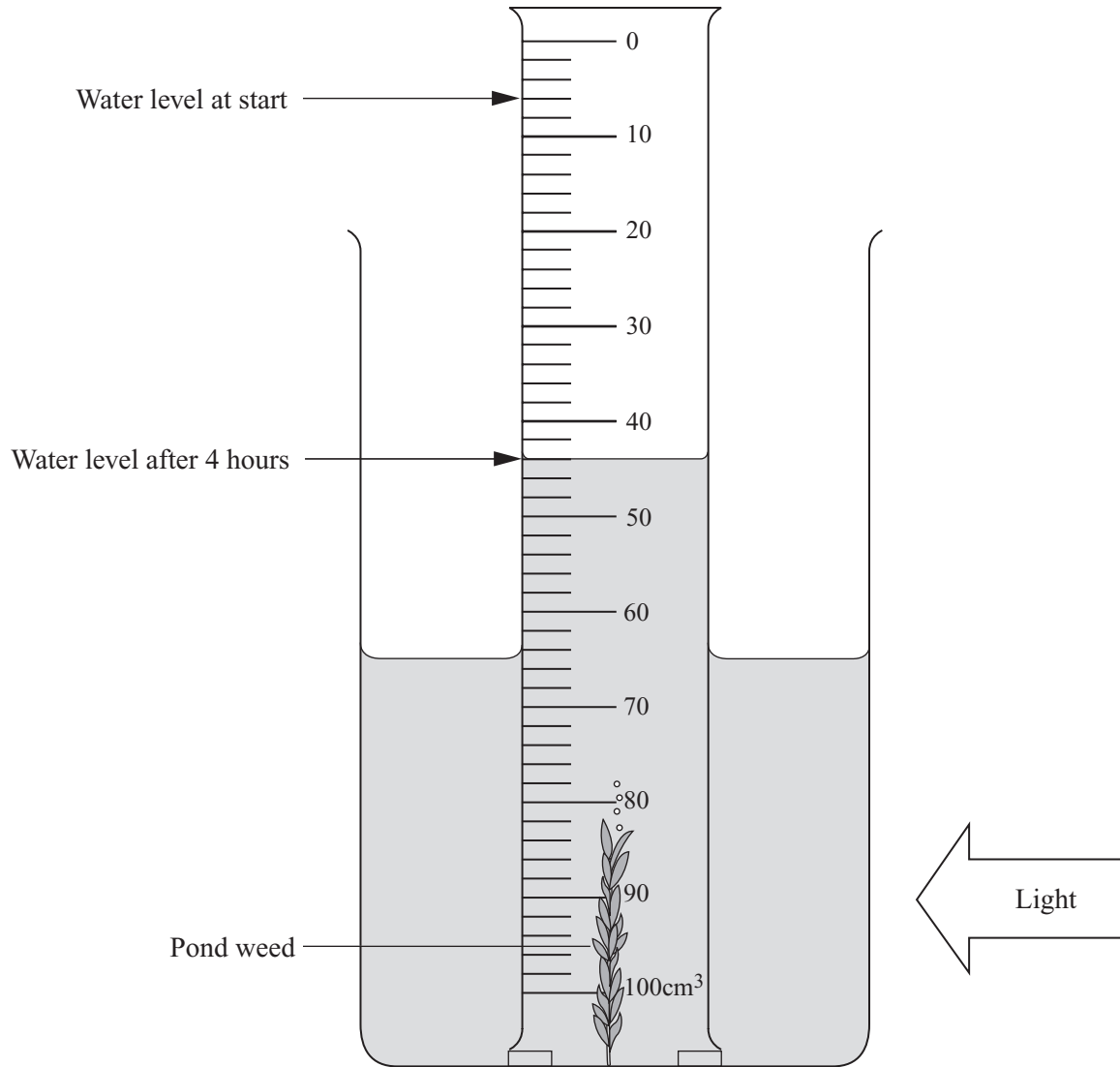
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- 5.3** One effect of alcohol on the body is to
- A** cause a reduction in the oxygen carrying capacity of the blood.
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 - C** lead to lack of self control.
 - D** shorten reaction time.
- 5.4** Which substance in cigarette smoke is addictive?
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 - B** Carbon monoxide
 - C** Nicotine
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Turn over ►

QUESTION SIX

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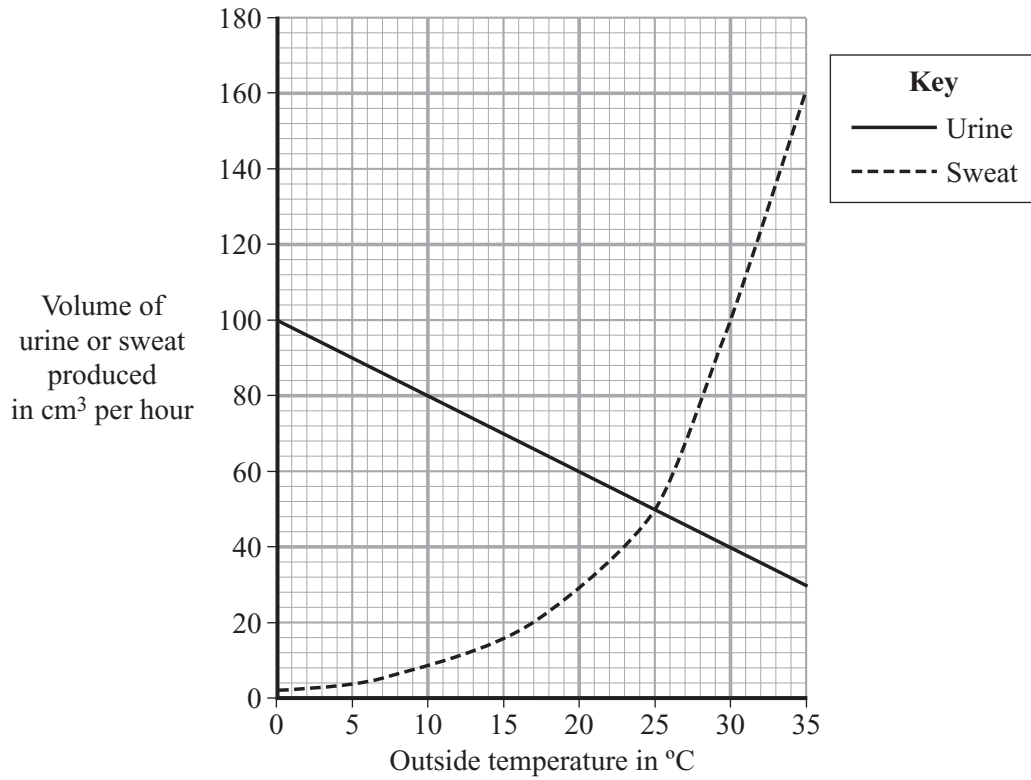
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QUESTION SEVEN

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7.3 Urine is produced in the

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- B** kidney.
- C** liver.
- D** pancreas.

7.4 How is sweat useful to the body?

- A** It helps to cool the body
- B** It keeps the skin supple
- C** It keeps the skin warm
- D** It makes the blood warmer

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION EIGHT

This question is about the body's nervous system.

- 8.1** Which of the following represents a reflex pathway?
- A response → effector → coordinator → receptor → stimulus
 - B response → receptor → coordinator → effector → stimulus
 - C stimulus → effector → coordinator → receptor → response
 - D stimulus → receptor → coordinator → effector → response
- 8.2** The central nervous system is made up of
- A motor, sensory and relay neurones.
 - B only the brain.
 - C receptor cells.
 - D the brain and the spinal cord.
- 8.3** In a reflex action, effectors are
- A always glands.
 - B always muscles.
 - C either muscles or glands.
 - D muscles, glands and the brain.
- 8.4** A nerve impulse is transmitted from a sensory neurone to a relay neurone by
- A a chemical.
 - B a wave.
 - C an electrical impulse.
 - D muscular action.

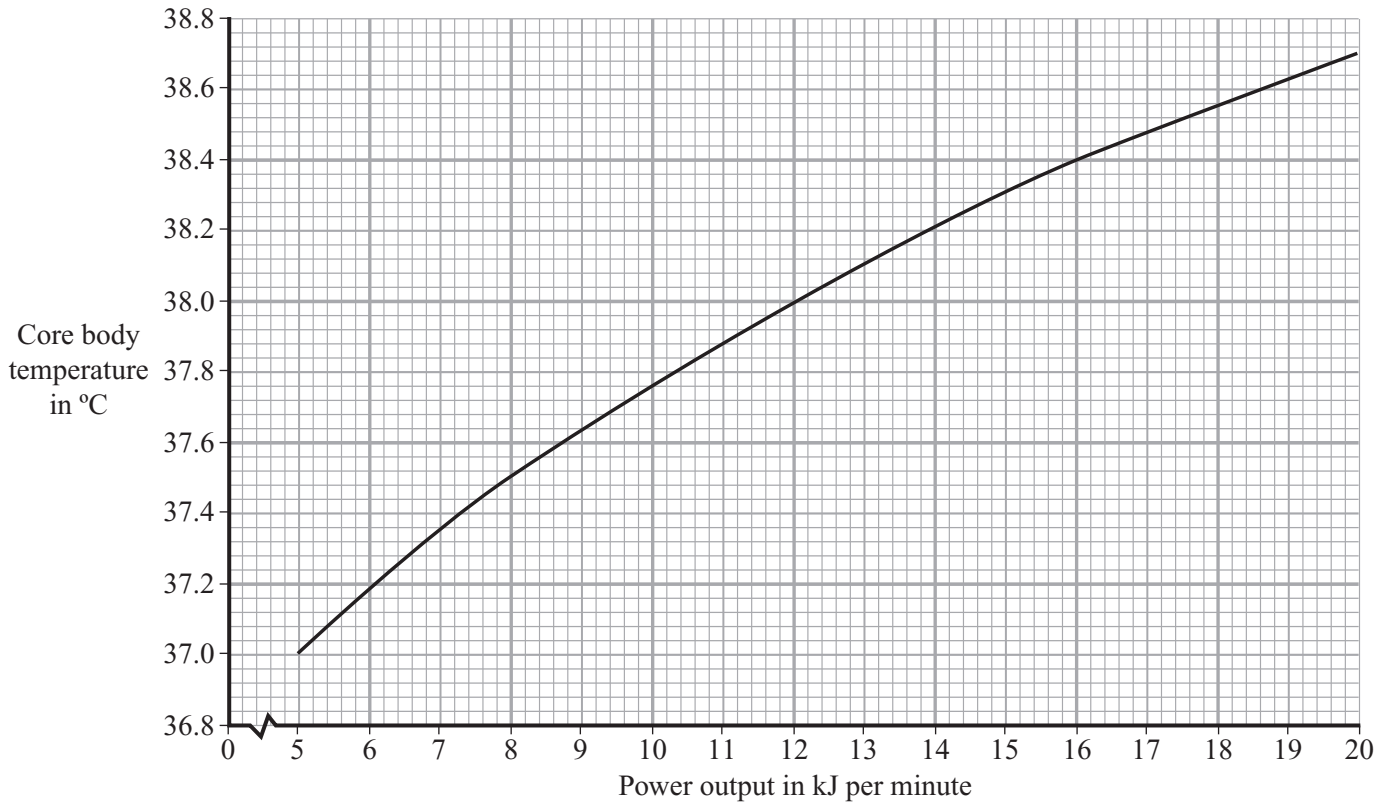
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TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

The graph shows how core body temperature changes as power output increases during exercise.



- 9.1** By how much does the core body temperature change, when power output increases from 5 to 11 kJ per minute?
- A** 0.08 °C
B 0.88 °C
C 0.98 °C
D 8.80 °C
- 9.2** When core body temperature increases from 38.0 °C to 38.4 °C, the power output increases by
- A** less than a third.
B a third.
C half.
D more than half.

9.3 The rise in core body temperature is detected by receptors in the

- A brain.
- B heart.
- C pituitary gland.
- D skin.

9.4 When core body temperature falls too low,

- A capillaries move away from the skin surface.
- B less blood passes through the skin capillaries.
- C muscles relax.
- D skin capillaries dilate.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION TEN

The amount of grain produced by wheat plants is called the yield. The yield can be affected by many factors, including how much nitrate there is in the soil and how many weeds are growing amongst the wheat plants.

Weeds compete with wheat plants for the resources.

The table shows the results of an investigation into the effects of nitrate fertiliser levels and weeding on the grain yield of wheat plants.

Weeding activity	Yield of wheat in grams of wheat grain per square metre		
	no fertiliser	low fertiliser	high fertiliser
Crop kept weed free	245	284	324
No weeding	196	203	248

10.1 The greatest increase in yield caused by weeding is

- A 49 grams per square metre.
- B 76 grams per square metre.
- C 81 grams per square metre.
- D 128 grams per square metre.

10.2 One way to kill the weeds is to spray them with hormones.

These hormones kill the weeds by

- A causing them to produce more seeds.
- B disrupting their growth pattern.
- C preventing them absorbing water from the soil.
- D preventing them producing chlorophyll.

10.3 One of the mineral ions taken in by the plants is nitrate.

Plants use the mineral ion, nitrate, to

- A make cellulose for cell walls.
- B make fats and oils.
- C make proteins.
- D make starch for storage in the roots.

10.4 What symptoms are shown by a plant growing in conditions where potassium ions are deficient?

- A Poor root growth and purple younger leaves
- B Purple roots and yellow older leaves
- C Stunted growth and yellow older leaves
- D Yellow leaves with dead spots

END OF TEST

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