Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
March 2007

SCIENCE: SINGLE AWARD A (MODULAR)   346013
Life and Living Processes (Module 13)

Wednesday 7 March 2007   Morning Session

AQA
ASSESSMENT and
QUALIFICATIONS
ALLIANCE

> **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 'Life and Living Processes' 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.

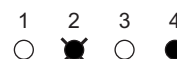**Instructions for recording answers**

- 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.

346013

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 from the list with the numbers.

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

Mark your choices on the answer sheet.

QUESTION ONE

The diagrams show a liver cell and a virus.
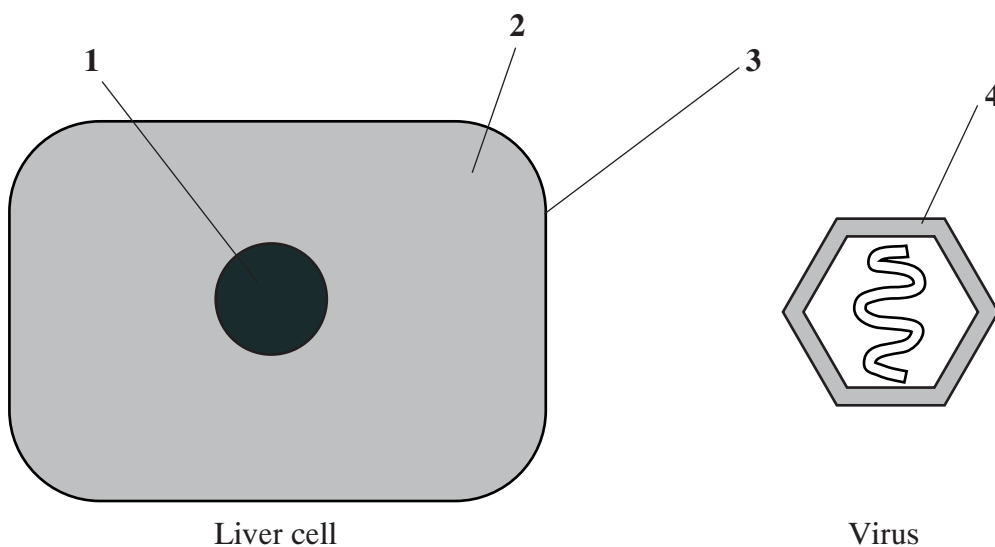(The diagrams are not drawn to the same scale.)

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

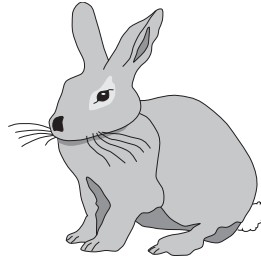**cell membrane**

cytoplasm

nucleus

protein coat

Liver cell   Virus

QUESTION TWO

The drawing shows a rabbit.

The table is about the stimuli that the rabbit detects.

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

ear

eye

nose

skin

Sense organ	Stimulus it detects
1	chemicals given off by cut grass
2	temperature of the air
3	the position of its body when it jumps in the air
4	the shape of a flower

Turn over for the next question

Turn over ▶

QUESTION THREE

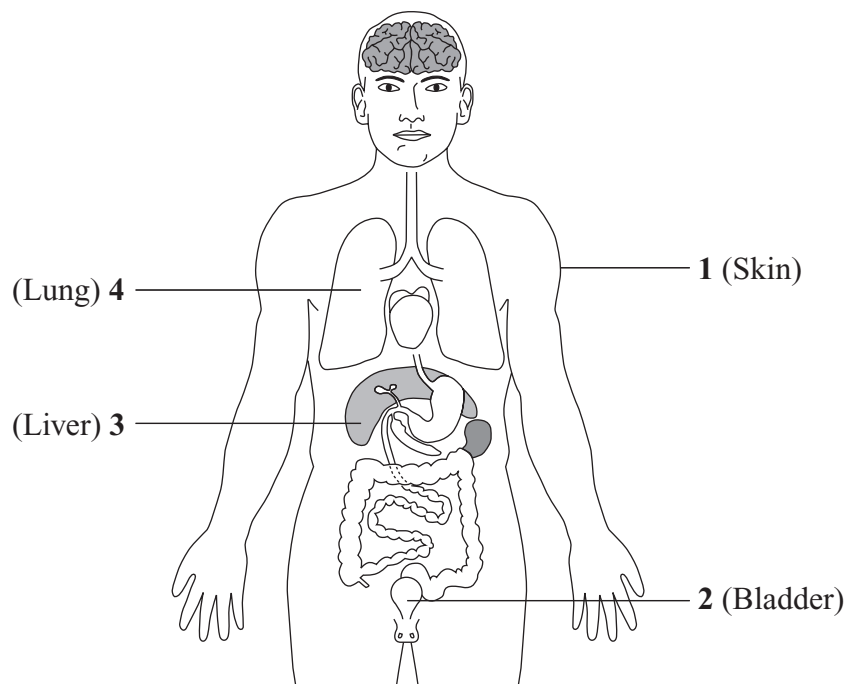The diagram shows some of the organs that are involved with waste products.

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

gets rid of carbon dioxide

produces sweat

where urea is produced

where urine is stored

QUESTION FOUR

The body is able to defend itself against microorganisms.

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

blood clot

mucus in the breathing organs

skin covering the body

stomach acid

Feature	How it defends the body
1	kills bacteria in food
2	stops bacteria from entering a cut
3	stops bacteria from entering the body
4	stops bacteria from reaching the lungs

Turn over for the next question

QUESTION FIVE

This question is about the functions of some parts of the body.

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

> **blood plasma**
>
> **large intestine**
>
> **liver**
>
> **small intestine**

Structure	Function
1	carries urea
2	where bile is made
3	where most water from food is absorbed
4	where sugars are absorbed

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

Parts of the eye have different functions.

Which **two** parts of the eye hold the lens in position?

ciliary muscles

cornea

optic nerve

sclera

suspensory ligaments

QUESTION SEVEN

Drugs may harm the body.

Which **two** conditions may be caused by drinking alcohol?

a raised level of carbon monoxide in the blood

emphysema

heart disease

increased reaction time

lack of self-control

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

The information is from a tin of peas.

	Amount per 100 g of peas
Energy	500 kJ
Protein	7 g
Carbohydrate	16 g
Fat	3 g

8.1 The recommended daily intake of energy for a 16 year-old girl is 10 000 kJ.

What fraction of her daily energy need is provided by 100 g of peas?

A $\frac{1}{500}$

B $\frac{1}{20}$

C $\frac{1}{5}$

D $\frac{1}{2}$

8.2 A small tin contains 225 g of peas. A large tin contains 375 g of peas.

What is the difference between the amount of carbohydrate in a small tin of peas and that in a large tin of peas?

A 12 g

B 24 g

C 28 g

D 36 g

8.3 A boy ate a meal of fish, chips and peas.
The total amount of fat in the meal was 40 g.
There were 50 g of peas in the meal.

How much fat was in the fish and chips?

A 1.5 g

B 37.0 g

C 38.5 g

D 47.0 g

8.4 During digestion, the protein in the meal is broken down into . . .
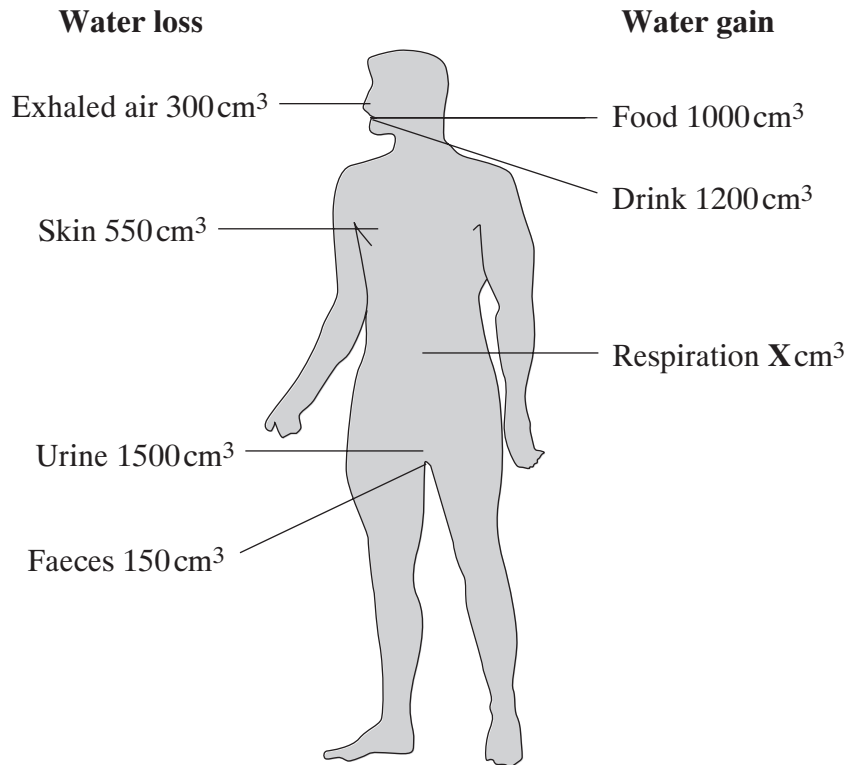
A amino acids.

B glucose.

C glycerol.

D urea.

Turn over for the next question

Turn over ▶

QUESTION NINE

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

Water loss   **Water gain**

Exhaled air 300 cm³

Food 1000 cm³

Drink 1200 cm³

Skin 550 cm³

Respiration **X** cm³

Urine 1500 cm³

Faeces 150 cm³

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 in 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 What is most likely to happen when the air temperature increases?

A More water will be lost in faeces.

B The amount of water lost in both sweat and urine will increase.

C The amount of water lost in sweat will increase and the amount of water gained in respiration will decrease.

D The amount of water lost in sweat will increase and the amount of water lost in urine will decrease.

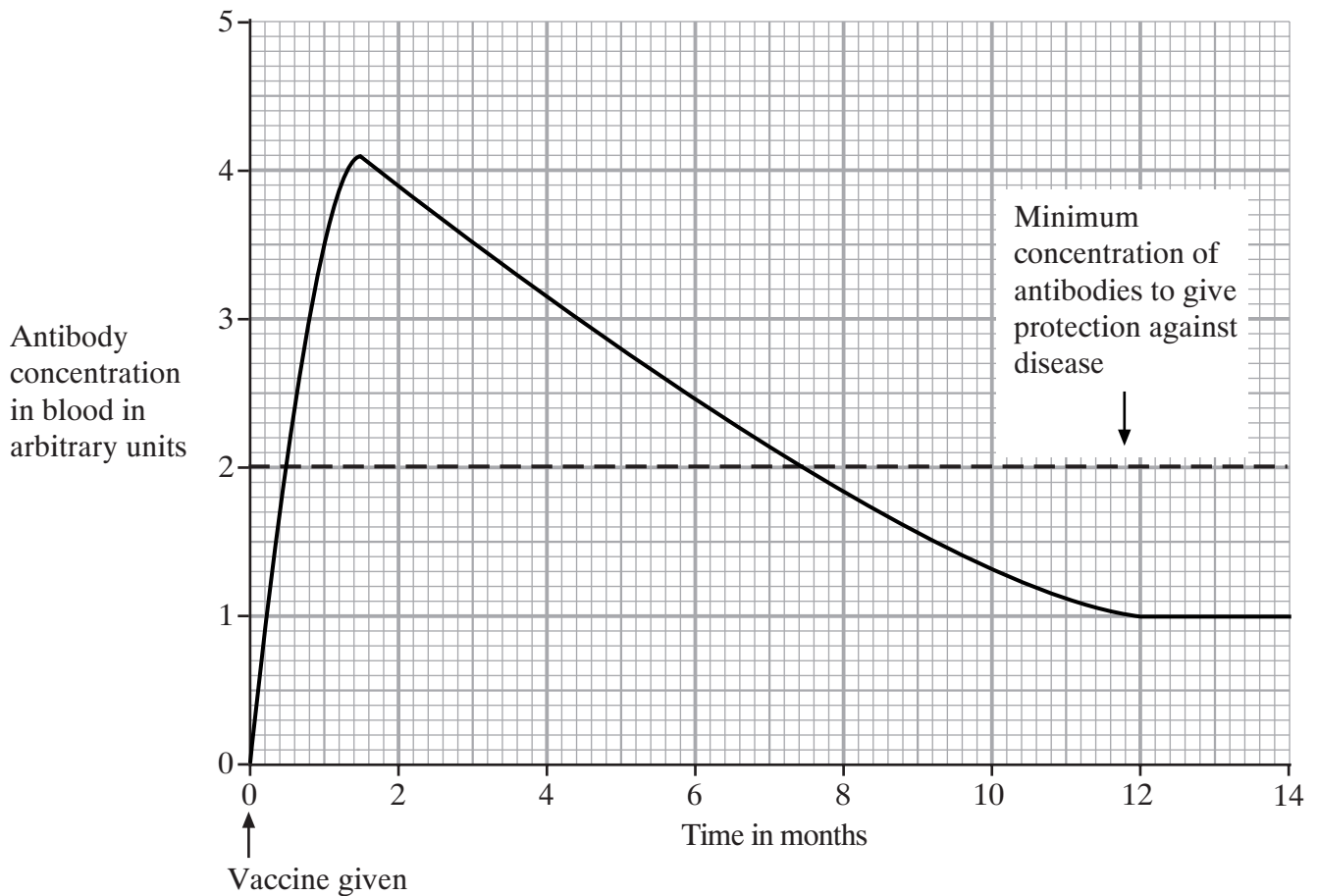**Turn over for the next question**

QUESTION TEN

Vaccines protect us from disease.

10.1 A vaccine contains . . .

    A   dead or weakened microorganisms.

    B   enzymes.

    C   platelets.

    D   white blood cells.

The graph shows the concentration of antibodies in a person's blood after a vaccination.

10.2 To remain immune to the disease, this person will need a second (booster) dose of vaccine after . . .

    A   1 month.

    B   2 months.

    C   7 months.

    D   11 months.

10.3 What happens to the level of antibodies between months 1 and 5?

    A   Decreases by 1.4 arbitrary units

    B   Decreases by 1.8 arbitrary units

    C   Increases by 0.6 arbitrary units and then falls by 1.3 arbitrary units

    D   Increases by 1.1 arbitrary units and then falls by 1.3 arbitrary units

10.4 Why does it take a few days after vaccination for the concentration of antibodies in the blood to reach its maximum level?

    A   It takes time for the white blood cells to produce the antibodies.

    B   Microorganisms are increasing rapidly in the blood.

    C   Platelets destroy antibodies.

    D   Toxins are being produced to destroy poisons.

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 from the list with the numbers.

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

Mark your choices on the answer sheet.

QUESTION ONE

This question is about the functions of some parts of the body.

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

      blood plasma

      large intestine

      liver

      small intestine

Structure	Function
1	carries urea
2	where bile is made
3	where most water from food is absorbed
4	where sugars are absorbed

QUESTION TWO

The body breathes in gases that affect respiration.

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

carbon monoxide

haemoglobin

mitochondria

oxygen

The cytoplasm of a cell contains structures called . . .**1** . . . , which release energy during respiration.

Breathing in . . . **2** . . . is dangerous because it causes less . . . **3** . . . gas to combine

with . . . **4** . . . in the blood.

Turn over for the next question

Turn over ▶

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

Drugs may harm the body.

Which **two** conditions may be caused by drinking alcohol?

a raised level of carbon monoxide in the blood

emphysema

heart disease

increased reaction time

lack of self-control

QUESTION FOUR

Bile is released into the digestive system.

In which **two** ways does bile speed up the digestion of fats?

it contains enzymes that emulsify fats

it increases the surface area of fat droplets for lipase action

it makes small droplets of fats into larger droplets

it makes the contents of the small intestine more acidic

it neutralises the contents of the small intestine

Turn over for the next question

SECTION C

Questions **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

The information is from a tin of peas.

	Amount per 100 g of peas
Energy	500 kJ
Protein	7 g
Carbohydrate	16 g
Fat	3 g

5.1 The recommended daily intake of energy for a 16 year-old girl is 10 000 kJ.

What fraction of her daily energy need is provided by 100 g of peas?

A $\frac{1}{500}$

B $\frac{1}{20}$

C $\frac{1}{5}$

D $\frac{1}{2}$

5.2 A small tin contains 225 g of peas. A large tin contains 375 g of peas.

What is the difference between the amount of carbohydrate in a small tin of peas and that in a large tin of peas?

A   12 g

B   24 g

C   28 g

D   36 g

5.3 A boy ate a meal of fish, chips and peas.
The total amount of fat in the meal was 40 g.
There were 50 g of peas in the meal.

How much fat was in the fish and chips?

A   1.5 g

B   37.0 g

C   38.5 g

D   47.0 g

5.4 During digestion, the protein in the meal is broken down into . . .
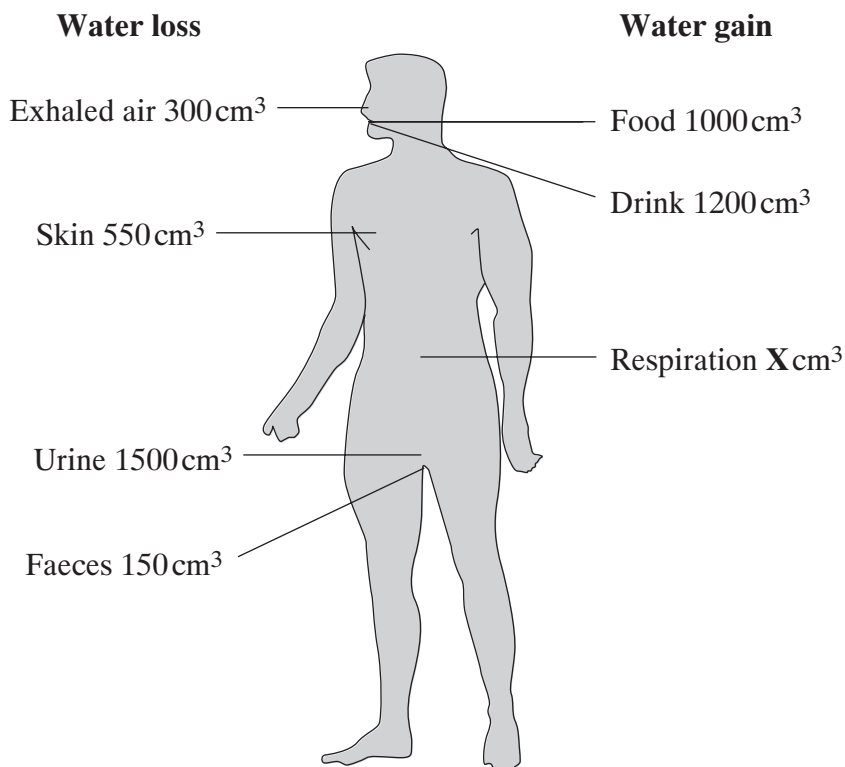
A   amino acids.

B   glucose.

C   glycerol.

D   urea.

Turn over for the next question

Turn over ▶

QUESTION SIX

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

Water loss

Exhaled air $300 \, cm^3$

Skin $550 \, cm^3$

Urine $1500 \, cm^3$

Faeces $150 \, cm^3$

Water gain

Food $1000 \, cm^3$

Drink $1200 \, cm^3$

Respiration $\mathbf{X} \, cm^3$

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

A $30 \, cm^3$

B $200 \, cm^3$

C $300 \, cm^3$

D $2500 \, cm^3$

6.2   What proportion of the total water loss was in 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 What is most likely to happen when the air temperature increases?

    A   More water will be lost in faeces.

    B   The amount of water lost in both sweat and urine will increase.

    C   The amount of water lost in sweat will increase and the amount of water gained in respiration will decrease.

    D   The amount of water lost in sweat will increase and the amount of water lost in urine will decrease.

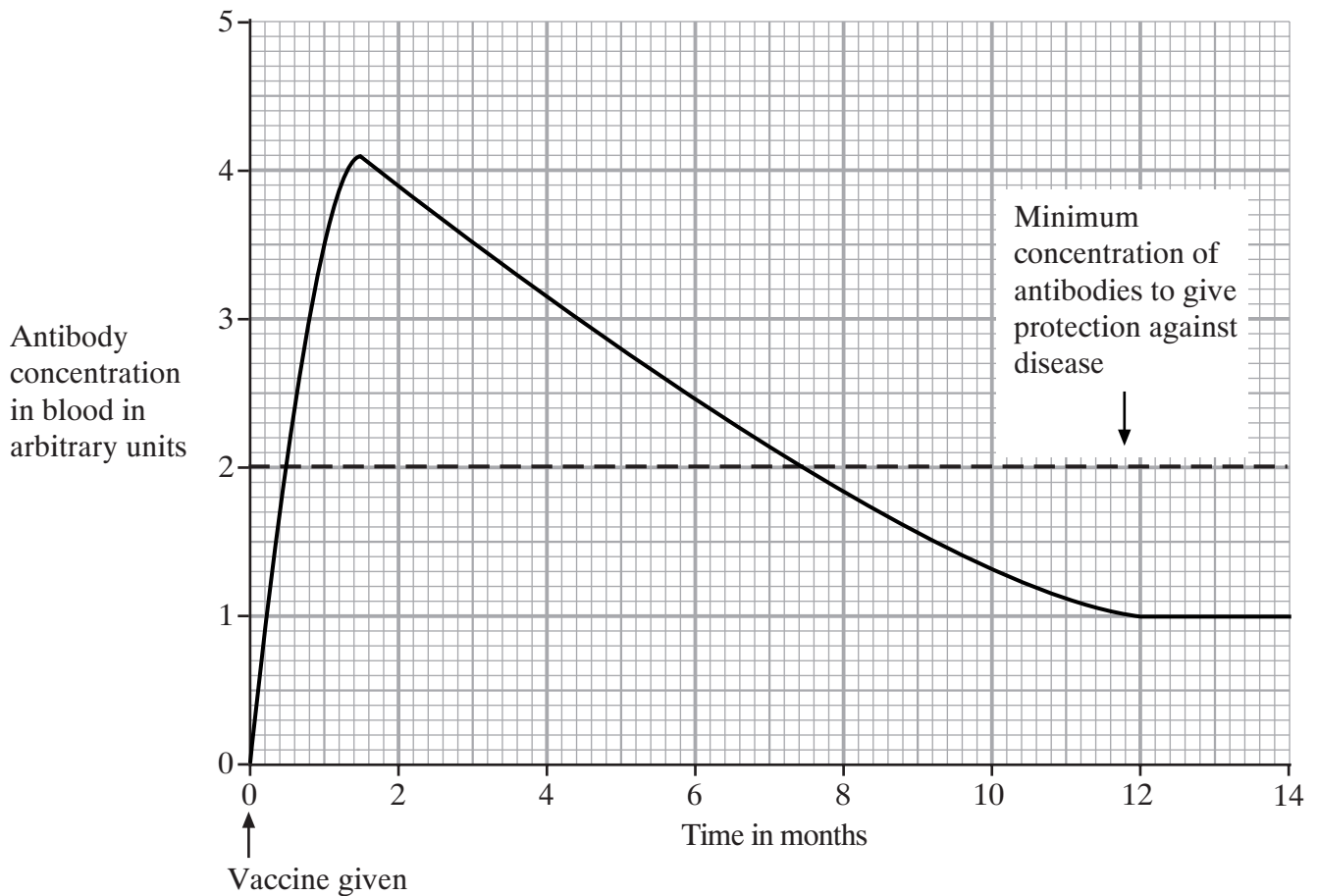**Turn over for the next question**

Turn over ▶

QUESTION SEVEN

Vaccines protect us from disease.

7.1   A vaccine contains . . .

      A   dead or weakened microorganisms.

      B   enzymes.

      C   platelets.

      D   white blood cells.

The graph shows the concentration of antibodies in a person's blood after a vaccination.

7.2 To remain immune to the disease, this person will need a second (booster) dose of vaccine after . . .

    A   1 month.

    B   2 months.

    C   7 months.

    D   11 months.

7.3 What happens to the level of antibodies between months 1 and 5?

    A   Decreases by 1.4 arbitrary units

    B   Decreases by 1.8 arbitrary units

    C   Increases by 0.6 arbitrary units and then falls by 1.3 arbitrary units

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7.4 Why does it take a few days after vaccination for the concentration of antibodies in the blood to reach its maximum level?

    A   It takes time for the white blood cells to produce the antibodies.

    B   Microorganisms are increasing rapidly in the blood.

    C   Platelets destroy antibodies.

    D   Toxins are being produced to destroy poisons.

Turn over for the next question

Turn over ▶

QUESTION EIGHT

The bar chart shows the mass of substances filtered from the blood by the kidneys and the mass appearing in the urine over a 24-hour period.
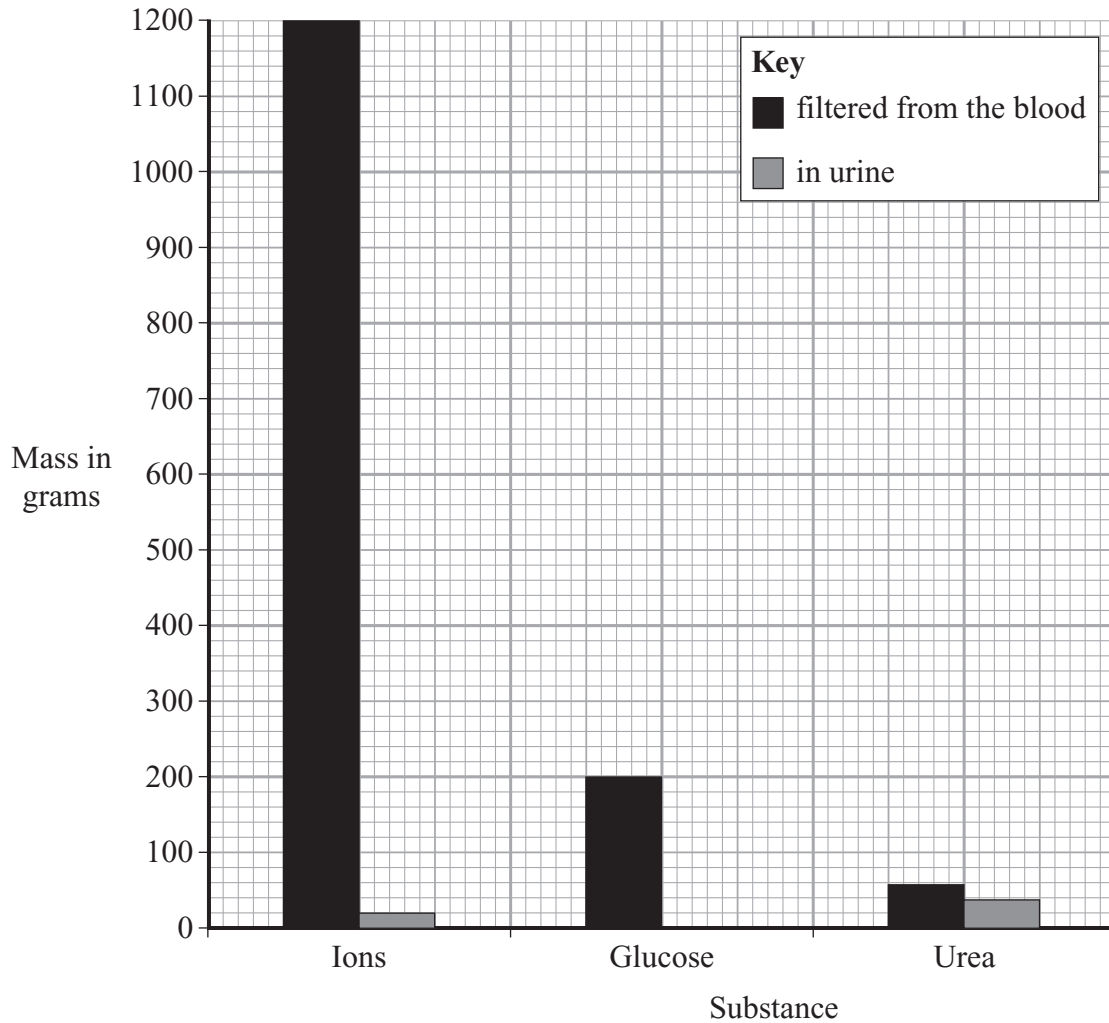
8.1 What mass of ions was filtered from the blood by the kidney each hour?

A 24 g

B 50 g

C 120 g

D 1200 g

8.2 What percentage of the ions was re-absorbed?

A   1.6%

B   20%

C   60%

D   98.3%

8.3 Urea is produced . . .

A   in the kidneys from excess amino acids.

B   in the kidneys from excess proteins.

C   in the liver from excess amino acids.

D   in the liver from excess lipids.

8.4 The average volume of water released in urine over a 24-hour period is 1500 cm^3.
On a hot day the volume of water released is much less.

What causes this reduction in the volume of urine?

A   The release of ADH from the pancreas causes less water to be re-absorbed into the blood.

B   The release of ADH from the pancreas causes more water to be re-absorbed into the blood.

C   The release of ADH from the pituitary gland causes less water to be re-absorbed into the blood.

D   The release of ADH from the pituitary gland causes more water to be re-absorbed into the blood.

Turn over for the next question

Turn over ▶

QUESTION NINE

A person accidentally puts his hand close to a burning match. His hand automatically moves away from the flame. The drawing shows the parts involved in this reflex action.
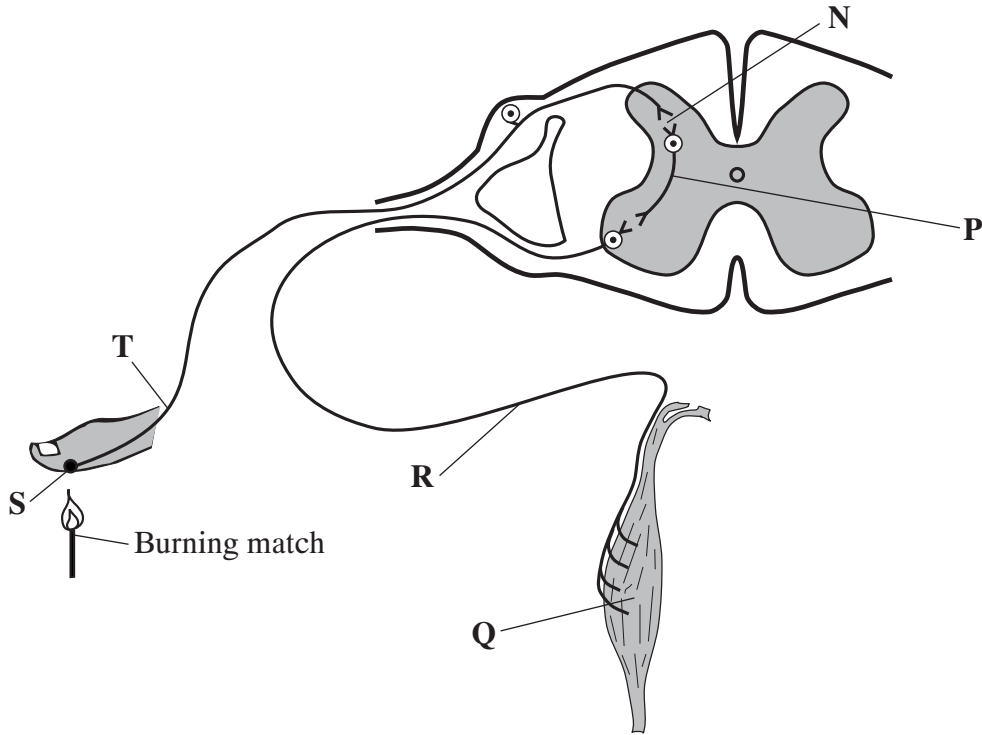
9.1   Which of the following represents the pathway of the impulses in this reflex action?

A   P   →   T   →   S   →   R   →   Q

B   Q   →   R   →   P   →   S   →   T

C   S   →   T   →   P   →   R   →   Q

D   S   →   T   →   R   →   P   →   Q

9.2   There are three neurones involved in this reflex action.

Which line in the table is correct?

	Sensory neurone	Motor neurone	Relay neurone
A	T	R	P
B	R	P	T
C	T	P	R
D	R	T	P

9.3   The synapse is found . . .

    A   at **N**.

    B   at **P**.

    C   at **S**.

    D   between **S** and **T**.

9.4   Which of the following is true of reflex actions?
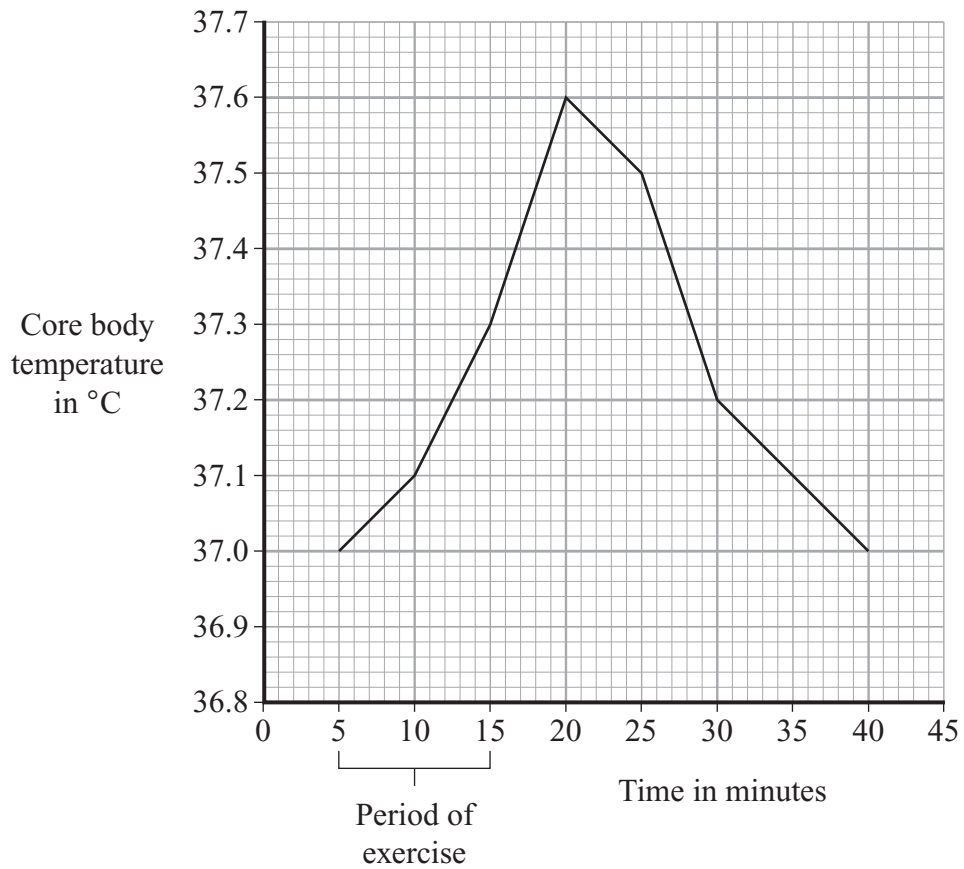
    A   The brain always coordinates the responses.

    B   They all involve muscles.

    C   They all involve the spinal cord.

    D   They are always automatic.

Turn over for the next question

Turn over ▶

QUESTION TEN

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

10.1 After the end of the period of exercise, the core body temperature rose by . . .

    A   0.3 °C

    B   0.6 °C

    C   5.0 °C

    D   37.6 °C

10.2 An average rate of fall in core body temperature of 0.033 °C per minute occurred between 20 minutes and . . .

  A   25 minutes.

  B   30 minutes.

  C   35 minutes.

  D   40 minutes.

10.3 When the core body temperature increases, the person is likely to . . .

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

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

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

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

10.4 Why is the core body temperature kept at about 37 °C?

  A   Enzymes work best at this temperature.

  B   Less energy is needed to keep the body warm.

  C   The body must be kept as hot as possible.

  D   The muscles can contract more powerfully.

END OF TEST

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