

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
June 2005



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

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 “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. 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 diagram shows part of the digestive system.

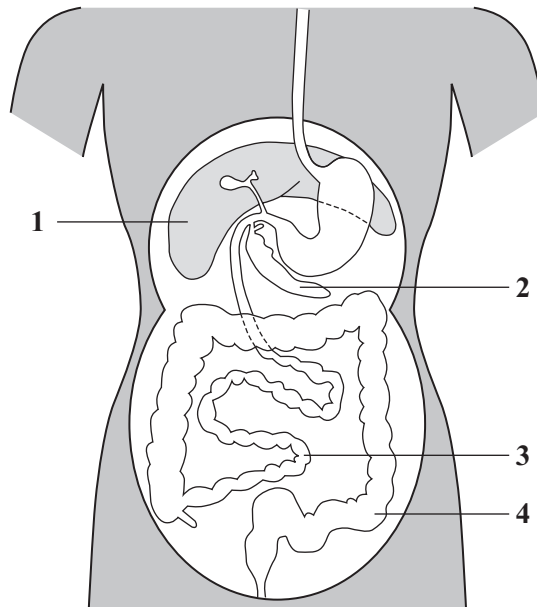
Match words from the list with the labels **1–4** on the diagram.

large intestine

liver

pancreas

small intestine



QUESTION TWO

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)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION THREE

The drawing shows a group of cells from the human female reproductive system. These cells move the egg towards the womb.

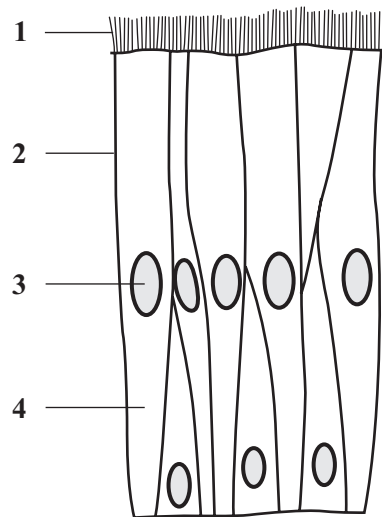
Match words from the list with the labels 1–4 on the drawing.

controls the passage of water into the cell

moves the egg

nucleus

where most chemical reactions occur



QUESTION FOUR

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 FIVE

This question is about the functions of some structures in the body.

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

blood plasma

platelets

stomach wall

the small intestine

Structure	Function
1	absorption of soluble materials
2	blood clotting
3	production of hydrochloric acid
4	transport of carbon dioxide

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

The body is able to defend itself in several ways.

Which **two** of the following help to defend the body against microbes?**antibiotics from the white blood cells****antitoxins from the white blood cells****bile from the liver****red blood cells****the skin****QUESTION SEVEN**Which **two** of the following are features of viruses?**can reproduce outside of living cells****cell membrane****cell wall****protein coat****smaller than bacteria****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?

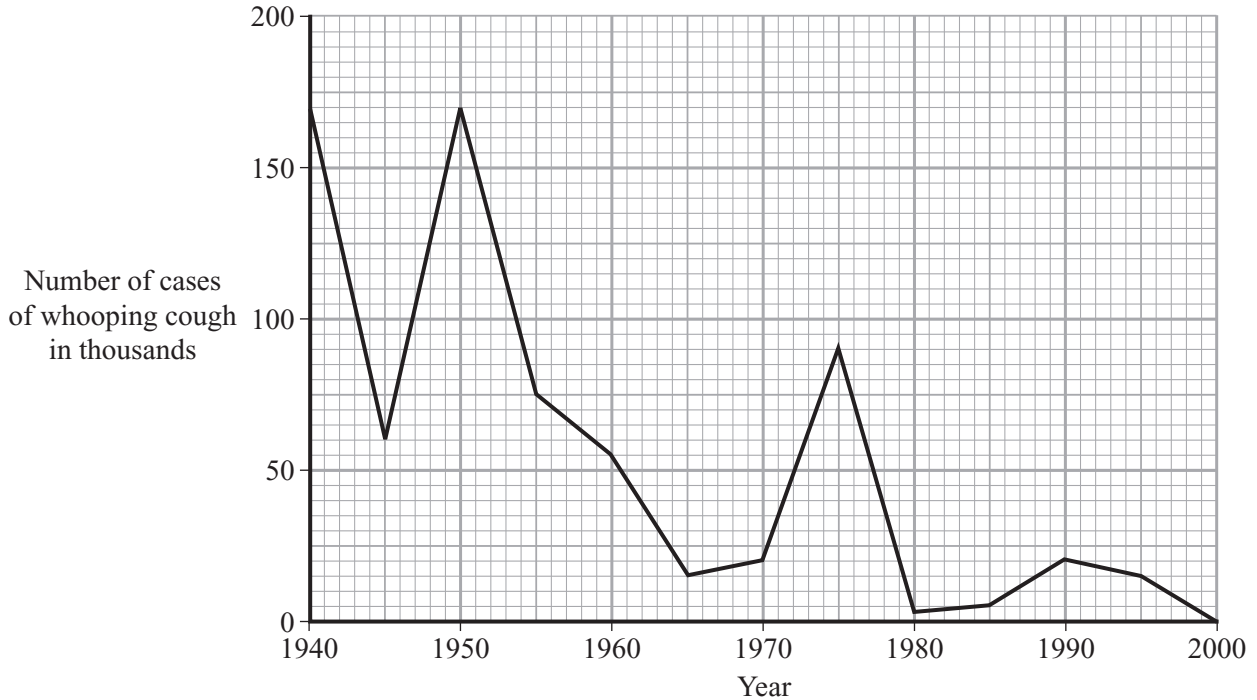
- A Carbon dioxide
- B Carbon monoxide
- C Nicotine
- D Nitrogen

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

The graph shows the number of cases of whooping cough between 1940 and 2000.



9.1 The largest fall in the number of cases was between

- A 1940 and 1945
- B 1950 and 1955
- C 1960 and 1965
- D 1975 and 1980

9.2 What was the number of cases of whooping cough in 1955?

- A 75
- B 750
- C 7 500
- D 75 000

9.3 Whooping cough is caught by breathing in the bacteria which cause the disease. The breathing organs produce mucus which covers the lining of these organs.

How does the mucus help to prevent whooping cough?

- A** It closes the entrance to the alveoli
- B** It prevents the bacteria getting oxygen
- C** It slows down the growth of the bacteria
- D** It traps the bacteria and prevents them entering the lungs

9.4 How does the body respond to a vaccination?

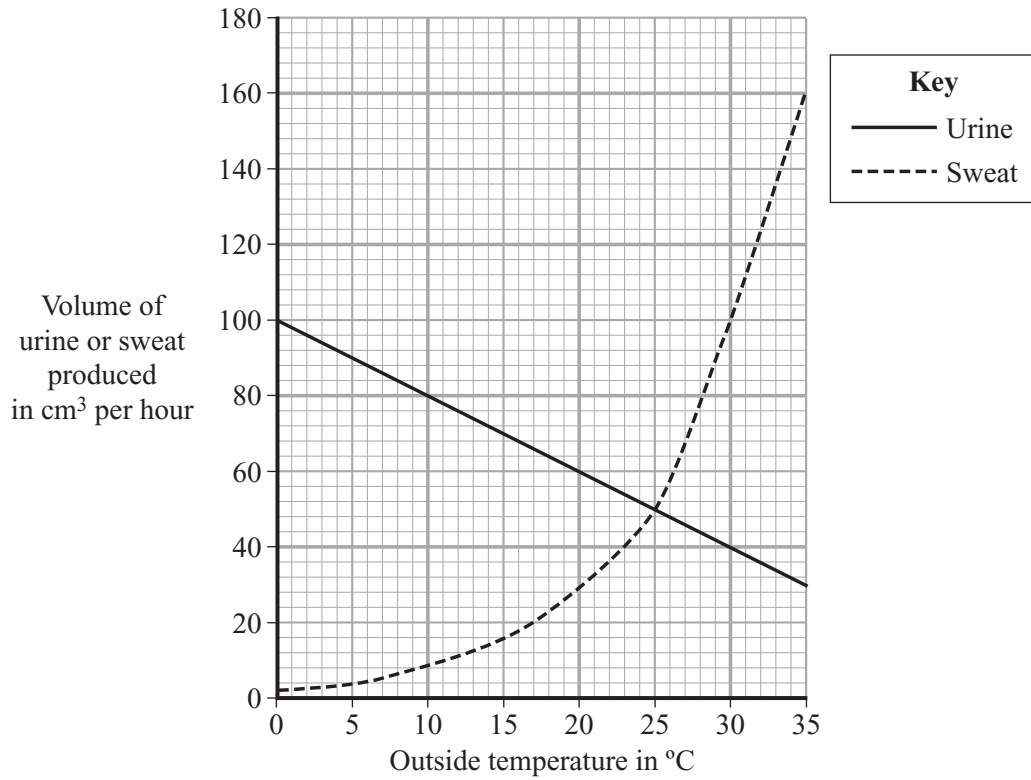
- A** More platelets are produced
- B** More red blood cells are produced
- C** Platelets begin to form clots
- D** White blood cells produce antibodies

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**.

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

This question is about the functions of some structures in the body.

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

blood plasma

platelets

stomach wall

the small intestine

Structure	Function
1	absorption of soluble materials
2	blood clotting
3	production of hydrochloric acid
4	transport of carbon dioxide

QUESTION TWO

The digestive system produces a number of different substances.

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

amylase

bile

hydrochloric acid

lipase

Substance	Function
1	digests fats into fatty acids and glycerol
2	digests starch into sugars
3	increases the surface area of fats
4	makes the conditions in the stomach suitable for the action of protease

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

Which **two** of the following are features of viruses?

can reproduce outside of living cells

cell membrane

cell wall

protein coat

smaller than bacteria

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

NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

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SECTION CQuestions **FIVE** to **TEN**.

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

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- B Liver
- C Lungs
- D Stomach

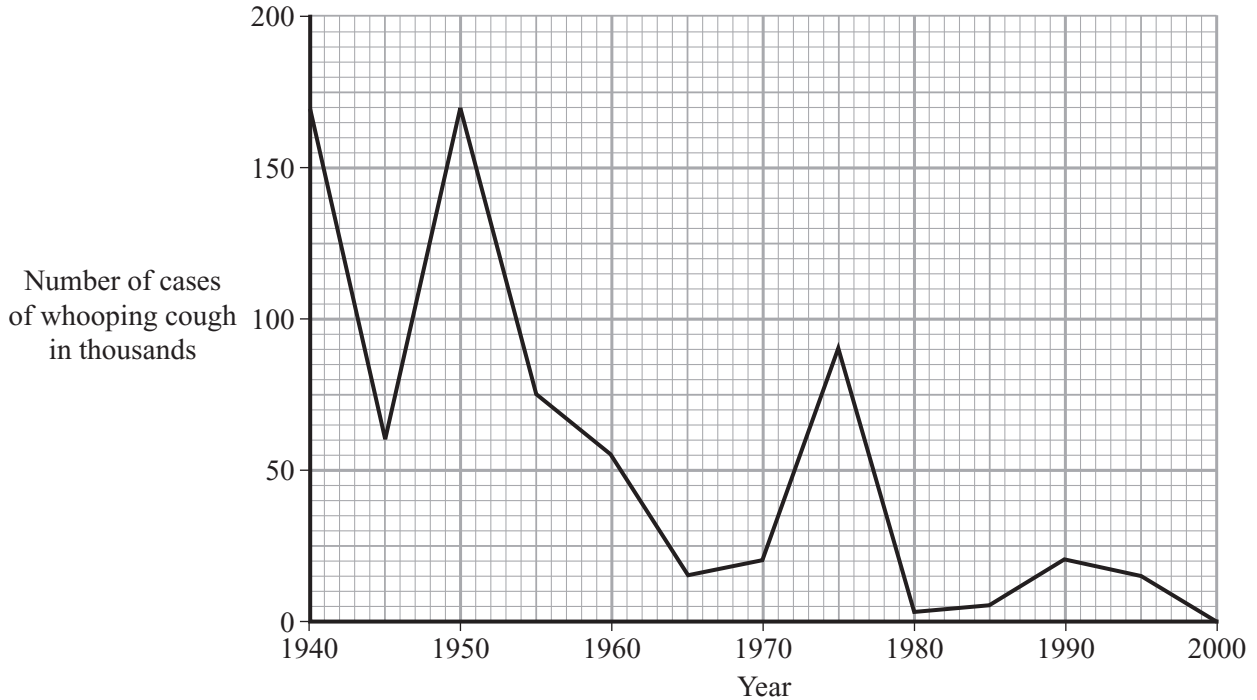
- 5.2** The ratio of alcohol-related deaths to the amount of alcohol consumed was the highest in
- A** France.
 - B** Germany.
 - C** Iceland.
 - D** Spain.
- 5.3** One effect of alcohol on the body is to
- A** cause a reduction in the oxygen carrying capacity of the blood.
 - B** cause lung damage.
 - C** lead to lack of self control.
 - D** shorten reaction time.
- 5.4** Which substance in cigarette smoke is addictive?
- A** Carbon dioxide
 - B** Carbon monoxide
 - C** Nicotine
 - D** Nitrogen

TURN OVER FOR THE NEXT QUESTION

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QUESTION SIX

The graph shows the number of cases of whooping cough between 1940 and 2000.



- 6.1** The largest fall in the number of cases was between
- A** 1940 and 1945
 - B** 1950 and 1955
 - C** 1960 and 1965
 - D** 1975 and 1980
- 6.2** What was the number of cases of whooping cough in 1955?
- A** 75
 - B** 750
 - C** 7 500
 - D** 75 000

6.3 Whooping cough is caught by breathing in the bacteria which cause the disease. The breathing organs produce mucus which covers the lining of these organs.

How does the mucus help to prevent whooping cough?

- A It closes the entrance to the alveoli
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6.4 How does the body respond to a vaccination?

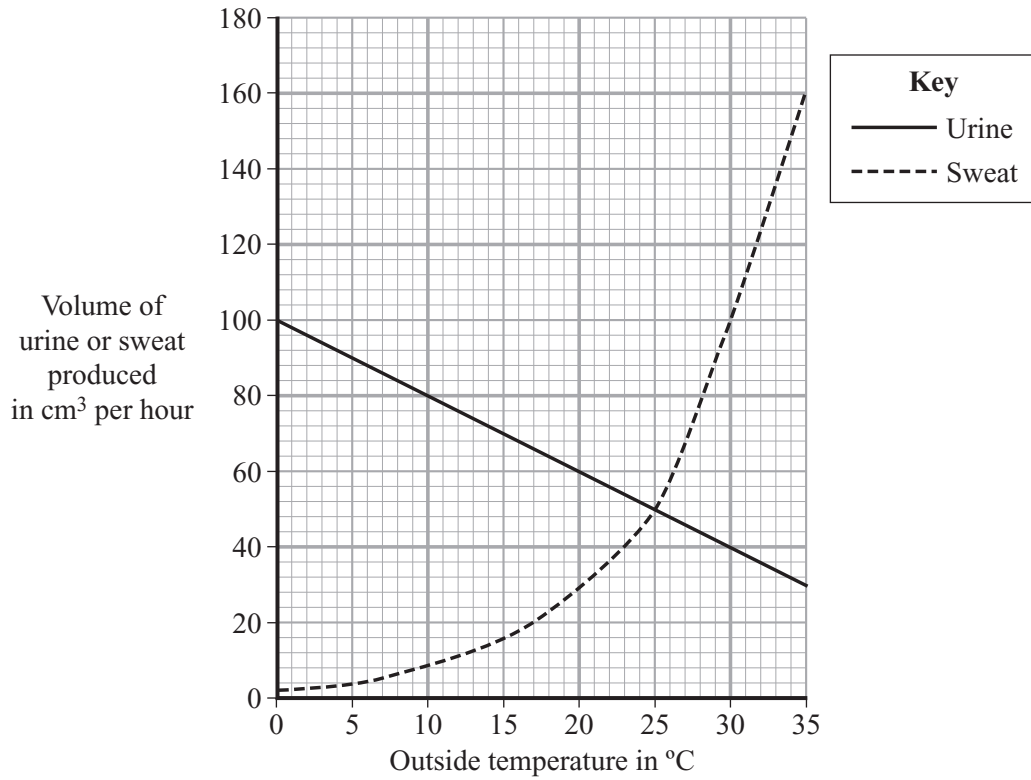
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TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION SEVEN

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 - C 22 °C
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- 7.2 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
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7.3 Urine is produced in the

- A** bladder.
- 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.

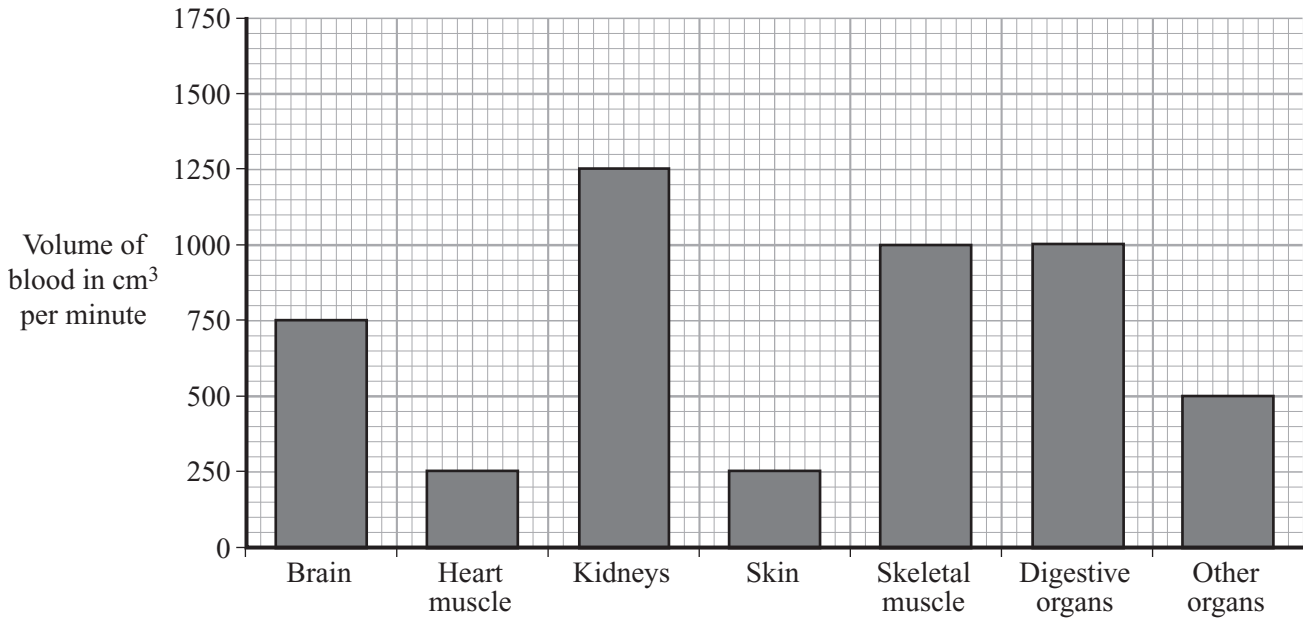
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TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

The bar chart shows the volume of blood flowing to different organs when a person is at rest.



9.1 What is the total volume of blood flowing through the kidneys and skin in one hour?

- A 300 cm³
- B 1 500 cm³
- C 9 000 cm³
- D 90 000 cm³

9.2 The total volume of blood in the body is 5 000 cm³.

How many times would the total blood volume pass through the brain in one hour?

- A 6 times
- B 9 times
- C 12 times
- D 18 times

9.3 If the person exercises, the volume of blood flowing through the heart muscle increases to 600 cm^3 per minute.

At the same time, the volume of blood flowing to the skeletal muscles increases to $5\,000 \text{ cm}^3$ per minute.

This means that

- A** the amount of blood flowing to the lungs decreases to allow more blood to flow to the muscles.
- B** the blood flow to some parts of the body stops until the exercise finishes.
- C** the heart is beating more often.
- D** the total amount of blood in the body has increased.

9.4 During exercise, the total volume of blood flowing to the digestive organs is reduced.

One result of this is that

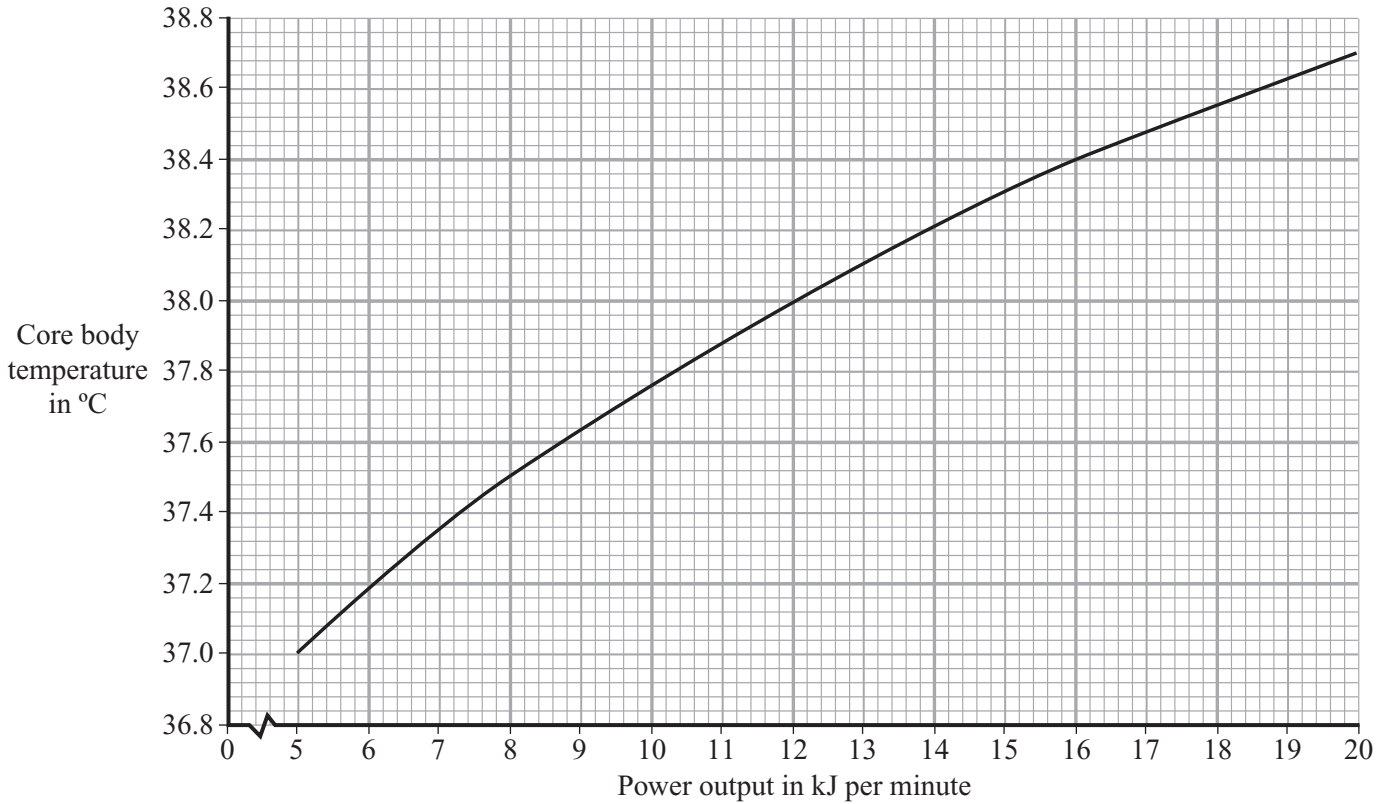
- A** the intestines stop making enzymes.
- B** the rate of absorption of soluble food decreases.
- C** the surface area of the small intestine decreases.
- D** the temperature of the stomach falls.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION TEN

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



- 10.1** 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
- 10.2** 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.

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

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

10.4 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.

END OF TEST

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