

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
November 2006



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

346013

Thursday 23 November 2006 Morning Session

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

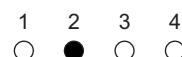
Instructions

- 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

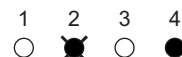
- Use a **black ball-point pen**.

- For each answer **completely fill in the circle** as shown:

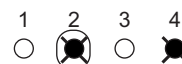


- Do **not** extend beyond the circles.

- 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.

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

SECTION A

Questions **ONE** to **FIVE**.

In these questions match words in 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, a virus, a bacterium and a sperm cell. (The diagrams are not to scale.)

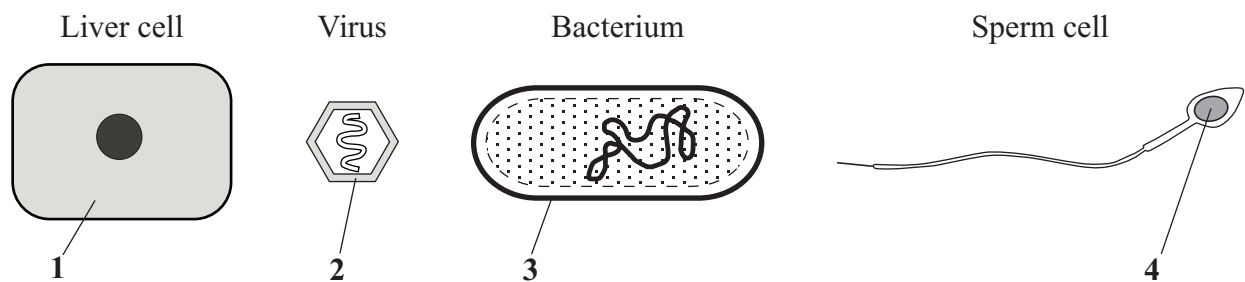
Match words from the list with the labels **1–4** on the diagrams.

cell wall

cytoplasm

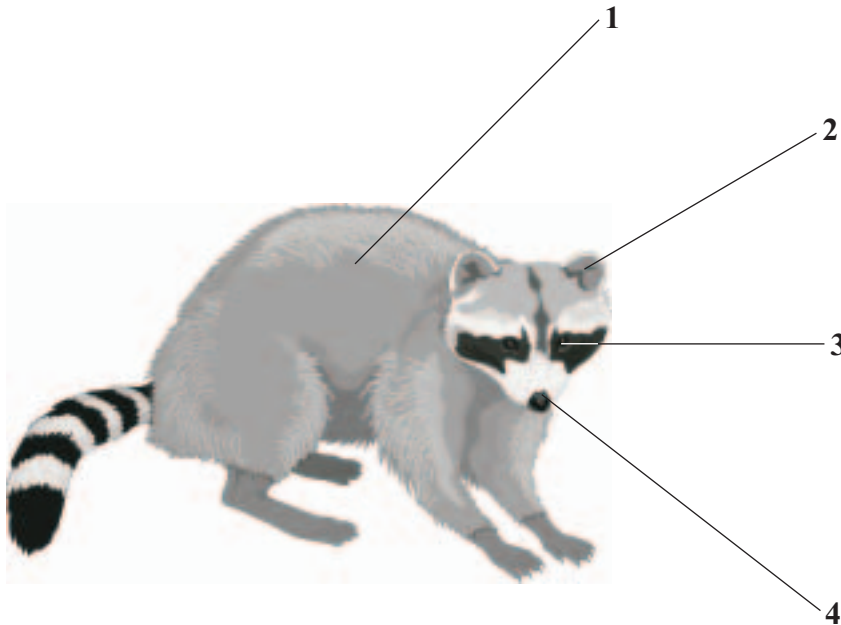
nucleus

protein coat



QUESTION TWO

The drawing shows a raccoon. Raccoons feed on crabs, frogs and small fish and are eaten by foxes. The raccoon has organs which contain different types of receptors.



Match words, **J**, **K**, **L** and **M**, from the list with the labels **1–4** on the drawing.

- J** contains receptors sensitive to chemicals
- K** contains receptors sensitive to the temperature of water
- L** contains receptors which allow it to hear predators
- M** contains receptors which allow it to see fish

Turn over for the next question

Turn over ►

QUESTION THREE

Waste materials are produced by the body.

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

carbon dioxide

ions

urea

urine

Waste	Information
1	excess lost via the kidneys
2	lost from body when we breathe out
3	produced mainly by the liver
4	stored in the bladder

QUESTION FOUR

The diagram shows some parts of the blood.

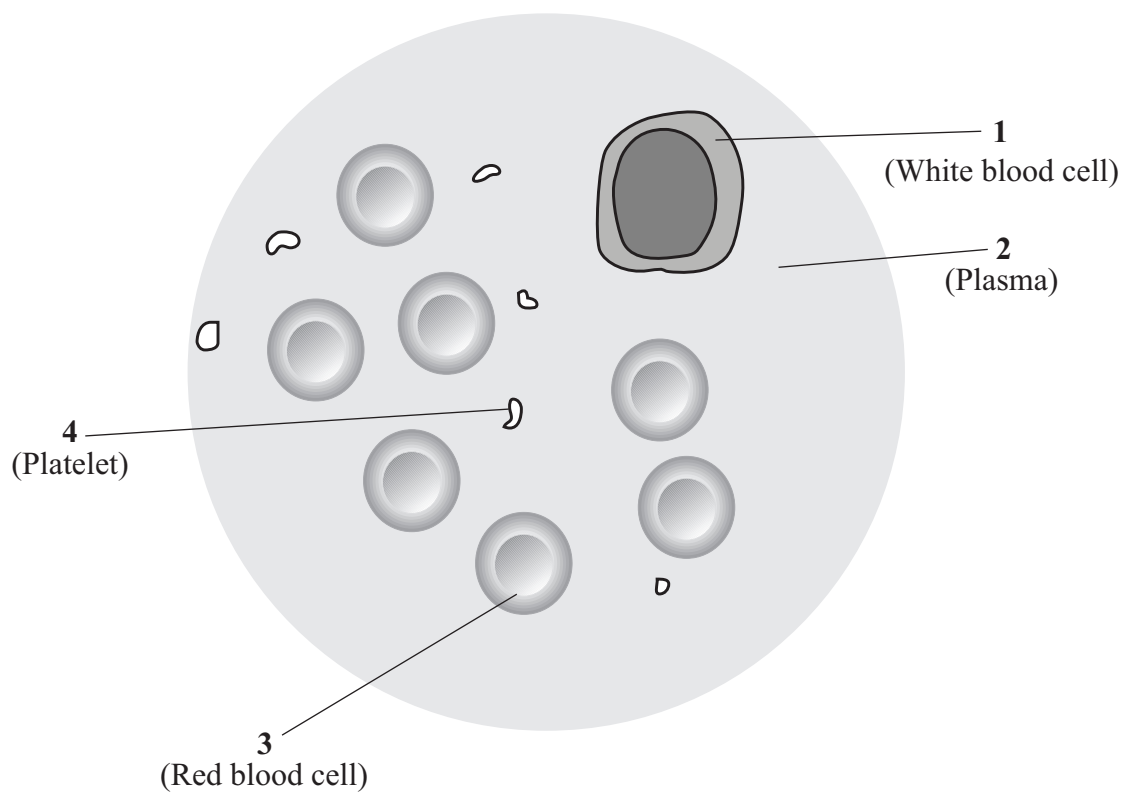
Match words, **J**, **K**, **L** and **M**, from the list with the labels **1–4** on the diagram.

J carries carbon dioxide from the organs to the lungs

K carries oxygen to the organs from the lungs

L helps blood to clot

M produces antitoxins



Turn over for the next question

Turn over ►

QUESTION FIVE

The table is about some of the substances that are released into the digestive system.

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

amylase

bile

lipase

protease

Substance	Information
1	breaks down fats into tiny droplets
2	digests fats
3	may work best in acid conditions
4	produced in the salivary glands

Turn over for the next question

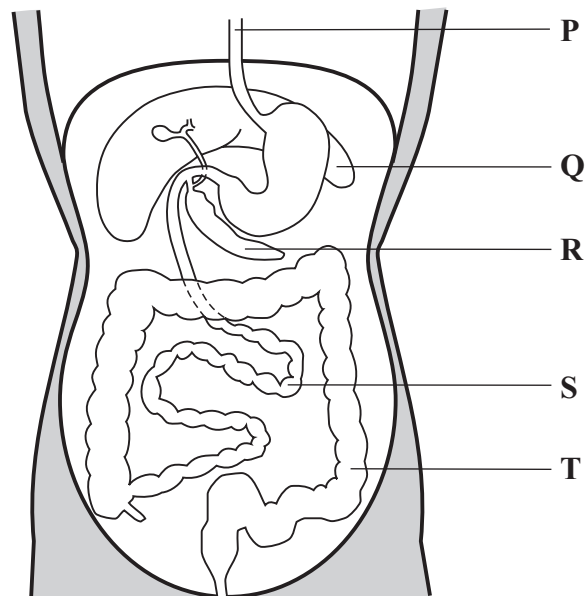
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SECTION BQuestions **SIX** and **SEVEN**.In these questions choose the best **two** answers.Do **not** choose more than two.Mark your choices on the answer sheet.

QUESTION SIX

The digestive system has a number of different organs with different functions.

The diagram shows some of the parts of the digestive system.

In which **two** parts does absorption take place?

P

Q

R

S

T

QUESTION SEVEN

Houseflies carry bacteria on their feet. The flies are attracted to faeces and human food. Each year, thousands of people in Britain get food poisoning caused by eating food containing such bacteria.

Which **two** of the following actions are most likely to give protection against infection caused by the bacteria carried by houseflies?

drinking only fresh tap water

eating only fresh food

keeping all cuts and grazes covered

keeping cooked food covered

wrapping dirty nappies in plastic bags

Turn over for the next question

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

A student visited an optician for an eyesight test.

During the test the optician shone a light into the student's eye and looked inside his eye for any sign of disease.

8.1 Which is the transparent layer that allows light into the eye?

- A Cornea
- B Iris
- C Retina
- D Sclera

8.2 Which is the layer at the back of the eye that the optician was checking for disease?

- A Iris
- B Pupil
- C Retina
- D Sclera

8.3 When the optician shone the light into the student's eye there was a change in the size of the . . .

- A ciliary muscles and suspensory ligaments.
- B cornea and sclera.
- C iris and pupil.
- D retina and optic nerve.

8.4 The student did not need glasses. The parts that produce the image on the retina were working correctly.

These parts are the . . .

- A** brain and optic nerve.
- B** cornea and lens.
- C** iris and pupil.
- D** sensory neurones and motor neurones.

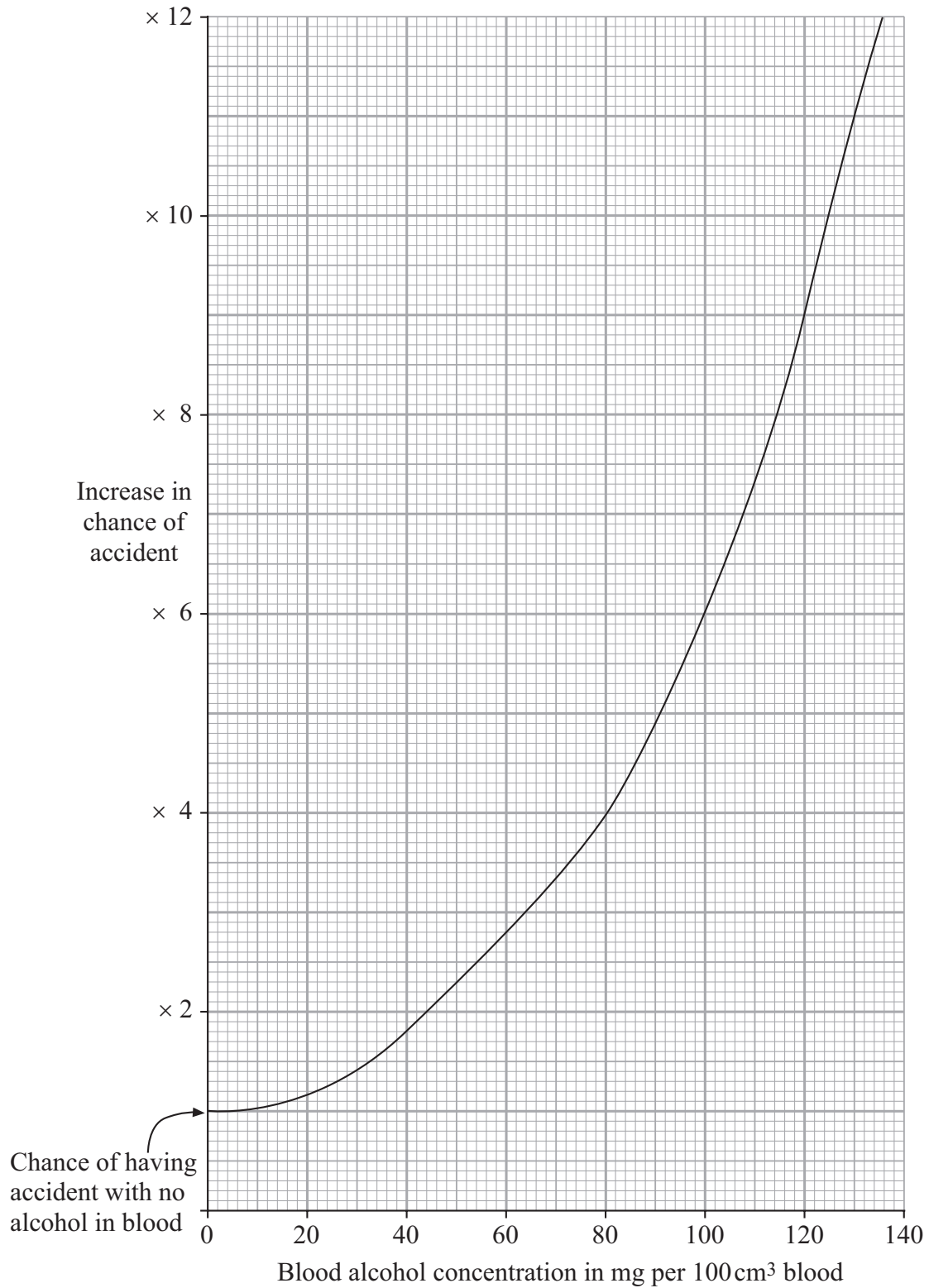
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QUESTION NINE

Alcohol can affect how people drive a car.

The graph shows the effect of blood alcohol on the chance of a person having an accident when driving.



9.1 What blood alcohol concentration is likely to increase the chance of a car accident by three times?

- A 32 mg per 100 cm³ of blood
- B 52 mg per 100 cm³ of blood
- C 64 mg per 100 cm³ of blood
- D 74 mg per 100 cm³ of blood

9.2 Drinking wine raises the blood alcohol concentration by 20 mg per 100 cm³ of blood for each glass drunk.

What is the increase in the chance of an accident if the person drinks five glasses of wine?

- A 4 times
- B 6 times
- C 30 times
- D 100 times

9.3 Why is alcohol in the blood likely to increase the chance of an accident?

- A Alcohol brings about withdrawal symptoms.
- B Alcohol is addictive.
- C Alcohol reduces the amount of oxygen that the blood can carry.
- D Alcohol slows down reactions.

9.4 Which of the following organs is most likely to be damaged by drinking alcohol?

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

Turn over for the next question

Turn over ►

QUESTION TEN

People can be vaccinated against some diseases.

10.1 When people are vaccinated, they are injected with . . .

- A** dead or weakened microbes.
- B** drugs to destroy the microbes.
- C** microbes to destroy toxins.
- D** white blood cells.

The table shows the concentration of antibodies in the blood of a person after a first and second injection of vaccine. The first injection was given at the start (0 weeks) and the second injection (booster dose) at a later time during the 12 weeks.

The person was immune when the antibody concentration exceeded 34 arbitrary units.

Time in weeks	Antibody concentration in arbitrary units
0	0
1	2
2	5
3	15
4	9
5	20
6	50
7	65
8	60
9	58
10	56
11	54
12	52

10.2 It takes more than 2 weeks after the first injection for the concentration of antibodies to become higher than 5 arbitrary units.

This is because . . .

- 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.

10.3 The most likely time when the second injection was given was . . .

- A** during week 2.
- B** during week 4.
- C** during week 7.
- D** during week 12.

10.4 How many weeks after week 12 is it likely to take for the antibody concentration to reach the minimum level necessary for immunity? (Assume that the rate of fall of antibody concentration remains constant.)

- A** 6 weeks after week 12
- B** 9 weeks after week 12
- C** 17 weeks after week 12
- D** 21 weeks after week 12

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 in the list with the numbers.

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QUESTION ONE

The table is about some of the substances that are released into the digestive system.

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

amylase

bile

lipase

protease

Substance	Information
1	breaks down fats into tiny droplets
2	digests fats
3	may work best in acid conditions
4	produced in the salivary glands

QUESTION TWO

Red blood cells transport most of the oxygen around the body.

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

haemoglobin

nucleus

oxygen

oxyhaemoglobin

Red blood cells have no ... **1**

They are packed with a pigment called ... **2**

This pigment combines with ... **3** ... in the lungs to form ... **4**

Turn over for the next question

Turn over ►

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

Houseflies carry bacteria on their feet. The flies are attracted to faeces and human food. Each year, thousands of people in Britain get food poisoning caused by eating food containing such bacteria.

Which **two** of the following actions are most likely to give protection against infection caused by the bacteria carried by houseflies?

- drinking only fresh tap water**
- eating only fresh food**
- keeping all cuts and grazes covered**
- keeping cooked food covered**
- wrapping dirty nappies in plastic bags**

QUESTION FOUR

Mitochondria are found in living cells.

Which **two** are features of mitochondria?

- they are needed for diffusion**
- they are present in the cytoplasm**
- they contain a nucleus**
- they digest starch in the intestines**
- they release energy in respiration**

Turn over for the next question

Turn over ►

SECTION CQuestions **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

A student visited an optician for an eyesight test.

During the test the optician shone a light into the student's eye and looked inside his eye for any sign of disease.

5.1 Which is the transparent layer that allows light into the eye?

- A** Cornea
- B** Iris
- C** Retina
- D** Sclera

5.2 Which is the layer at the back of the eye that the optician was checking for disease?

- A** Iris
- B** Pupil
- C** Retina
- D** Sclera

5.3 When the optician shone the light into the student's eye there was a change in the size of the . . .

- A** ciliary muscles and suspensory ligaments.
- B** cornea and sclera.
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5.4 The student did not need glasses. The parts that produce the image on the retina were working correctly.

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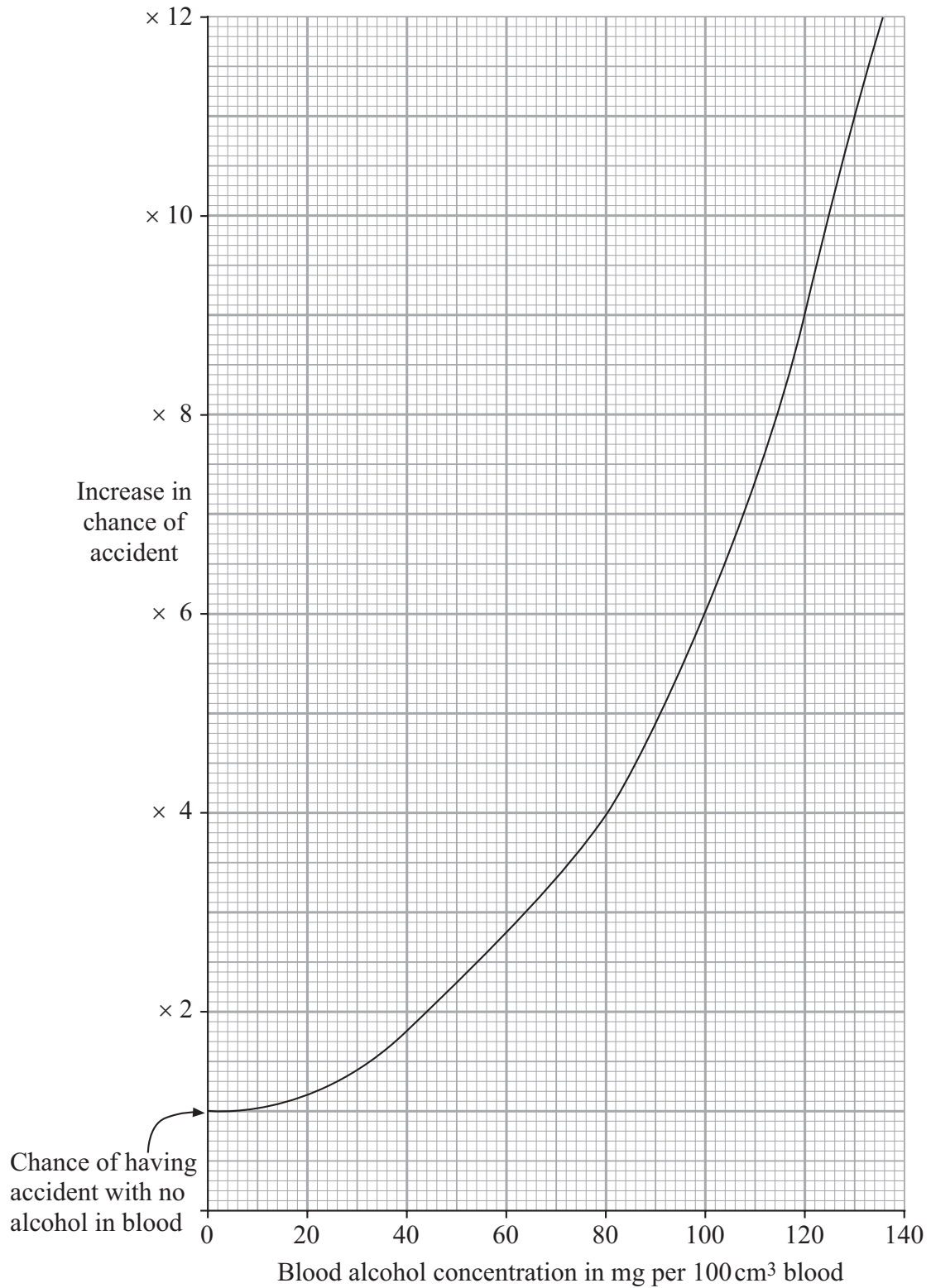
Turn over for the next question

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QUESTION SIX

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-
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QUESTION SEVEN

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This is because . . .

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7.3 The most likely time when the second injection was given was . . .

- A** during week 2.
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- D** during week 12.

7.4 How many weeks after week 12 is it likely to take for the antibody concentration to reach the minimum level necessary for immunity? (Assume that the rate of fall of antibody concentration remains constant.)

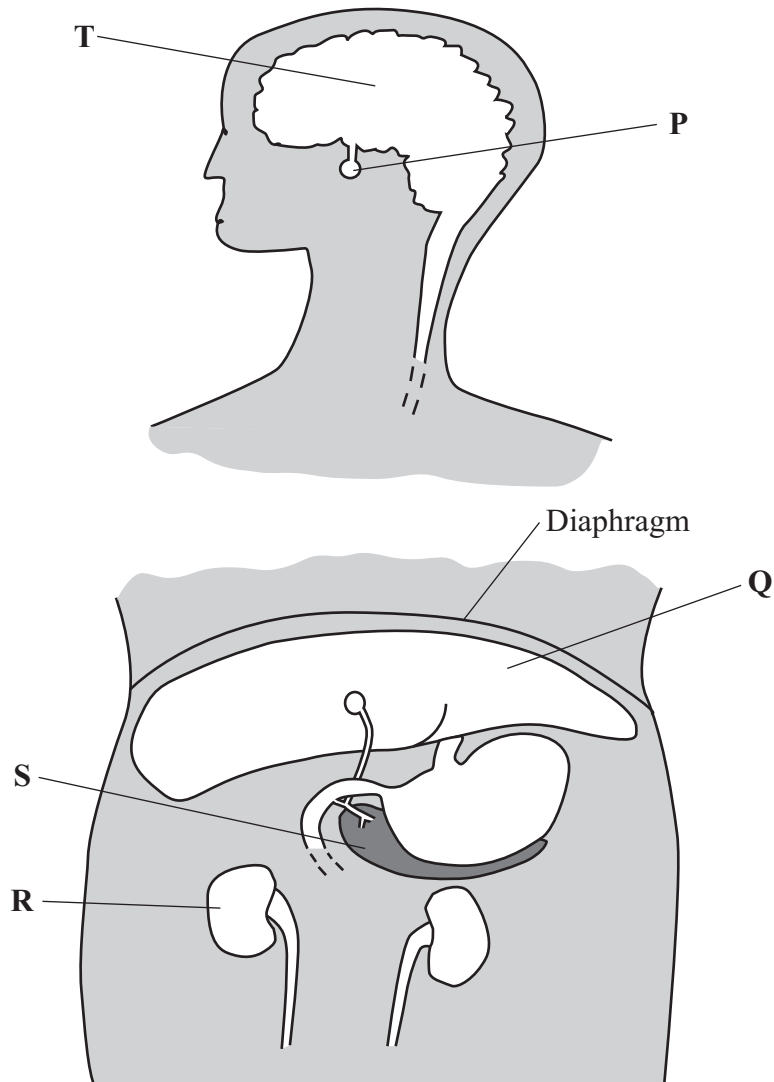
- A** 6 weeks after week 12
- B** 9 weeks after week 12
- C** 17 weeks after week 12
- D** 21 weeks after week 12

Turn over for the next question

Turn over ►

QUESTION EIGHT

The diagrams show the positions of some organs that help to keep the conditions in the body fairly constant.



8.1 Organ **S** secretes the hormones that control blood sugar level.

These hormones are most likely to be . . .

- A** released into the intestine along with enzymes from Organ **S**.
- B** transmitted along motor neurones to their target organ.
- C** transported by blood to their target organ.
- D** used to neutralise the acidic stomach contents entering the small intestine.

8.2 One function of Organ **Q** is to . . .

- A** break down excess amino acids.
- B** produce urine.
- C** reabsorb dissolved ions into the blood.
- D** release excess heat from the blood.

8.3 Organ **R** . . .

- A** helps to cool the body by releasing water.
- B** produces dilute urine when a person is sweating.
- C** reabsorbs urine if it becomes too dilute.
- D** reabsorbs useful ions from the liquid filtered from the blood.

8.4 If the concentration of water in the blood is too high, . . .

- A** less ADH is released by Organ **P**, resulting in a more dilute urine.
- B** less ADH is released by Organ **S**, resulting in a more dilute urine.
- C** more ADH is released by Organ **P**, resulting in a more concentrated urine.
- D** more ADH is released by Organ **T**, resulting in a more dilute urine.

Turn over for the next question

Turn over ►

QUESTION NINE

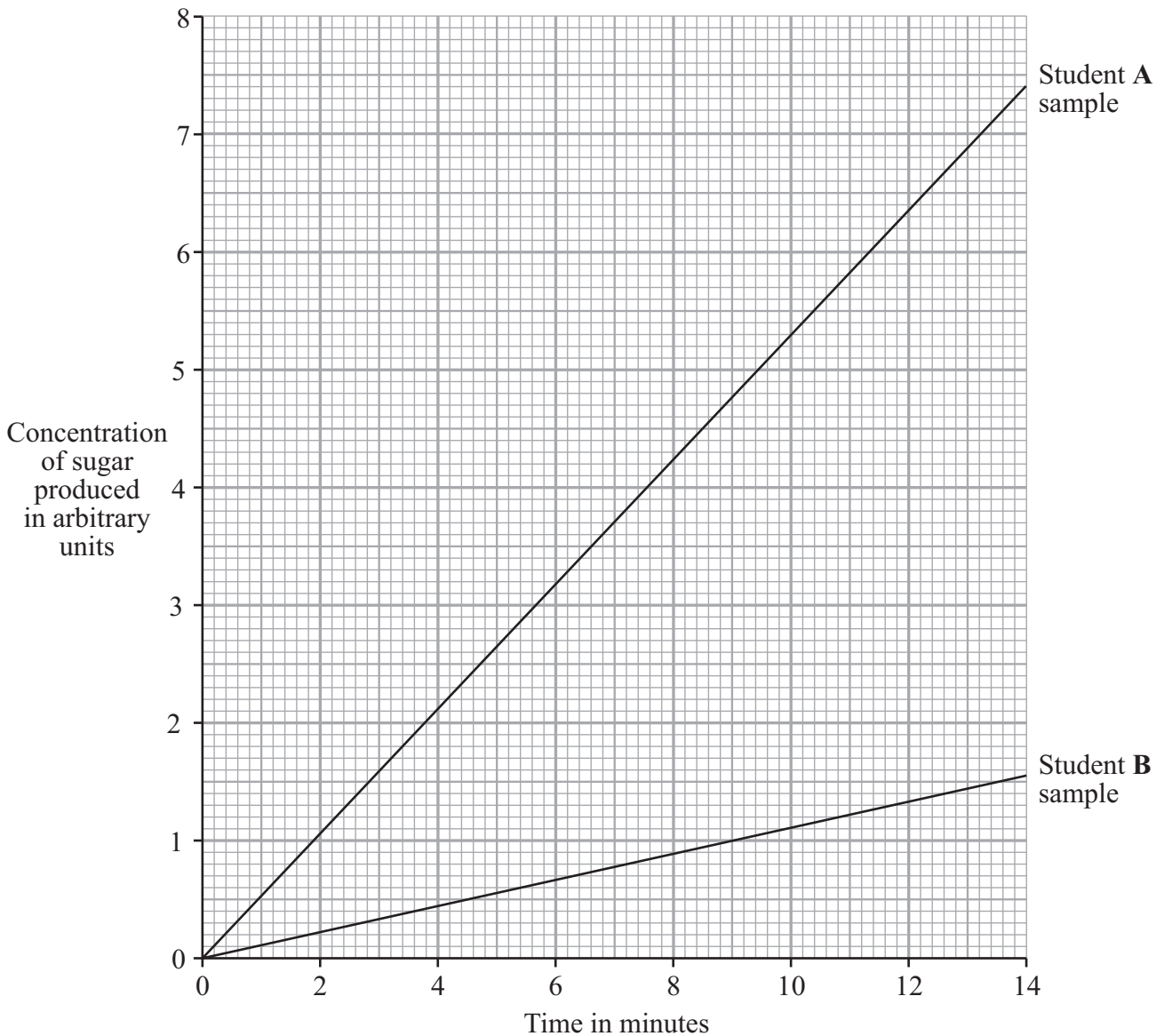
An investigation was carried out to compare the effectiveness of samples of saliva on the breakdown of starch. Saliva samples, of equal volume, were collected from Student **A** and Student **B**.

The saliva samples and two tubes containing 10 cm^3 of starch solution were kept in a water bath at 40°C for 20 minutes.

Each saliva sample was then added to a tube containing starch solution and the mixtures were kept in the water bath.

The concentration of sugar produced was measured every two minutes for 14 minutes.

The results are shown in the graph.



-
- 9.1** After 10 minutes the difference in the concentration of sugar between the two samples was . . .
- A** 4.2 arbitrary units.
 - B** 5.3 arbitrary units.
 - C** 5.9 arbitrary units.
 - D** 6.4 arbitrary units.
- 9.2** The rate of production of sugar by the saliva from Student **B** was . . .
- A** 0.11 arbitrary units per minute.
 - B** 0.53 arbitrary units per minute.
 - C** 1.89 arbitrary units per minute.
 - D** 52.80 arbitrary units per minute.
- 9.3** What is the most likely reason for the differences in the rate of sugar production between the two samples?
- A** Student **A**'s saliva contains a higher concentration of amylase than Student **B**'s saliva.
 - B** Student **A**'s sample had been kept at a warmer temperature.
 - C** Student **B**'s saliva used up the starch more rapidly.
 - D** The temperature of the water bath was too low for amylase to work effectively.
- 9.4** What change in conditions should be used to break down starch in an experiment like this if enzymes from the pancreas are used instead of saliva?
- A** Bile should be added.
 - B** The mixture should be made more acidic.
 - C** The mixture should be made more alkaline.
 - D** No change in conditions should be made.

Turn over for the next question

Turn over ►

QUESTION TEN

During his summer holiday, a boy was caught in a rain shower.
His wet clothes felt cool against his skin as they dried in the breeze.
He also began to feel cold.
He noticed that his fingers looked pale and he began to shiver.

10.1 The boy began to feel cold because . . .

- A more blood was flowing to his pituitary gland.
- B the breeze had caused sweating to increase.
- C the breeze had caused water to evaporate from his skin and clothes.
- D the rain water had caused the blood vessels in his skin to constrict.

10.2 His fingers looked pale because . . .

- A sweat glands in the skin had released more salt on to the skin surface.
- B the blood vessels had moved deeper into his skin.
- C the blood vessels in the skin had constricted, reducing the blood flow to the skin capillaries.
- D the rain water had caused his skin to wrinkle.

10.3 The boy's core body temperature is monitored and controlled by . . .

- A a regulatory centre in the brain.
- B cells in the spinal cord.
- C hormones secreted by the pancreas.
- D receptor cells in the skin.

10.4 Shivering helps to raise the boy's core body temperature by . . .

- A increasing the respiration rate in his muscles.
- B keeping blood away from his skin.
- C making blood flow more rapidly through the capillaries in his skin.
- D releasing more sweat on to his skin surface.

END OF TEST

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