

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
Winter 2003



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

346013

Thursday 27 November 2003 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 12 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 diagrams show a liver cell and a type of virus that may infect liver cells.
(The diagrams are not drawn to the same scale.)

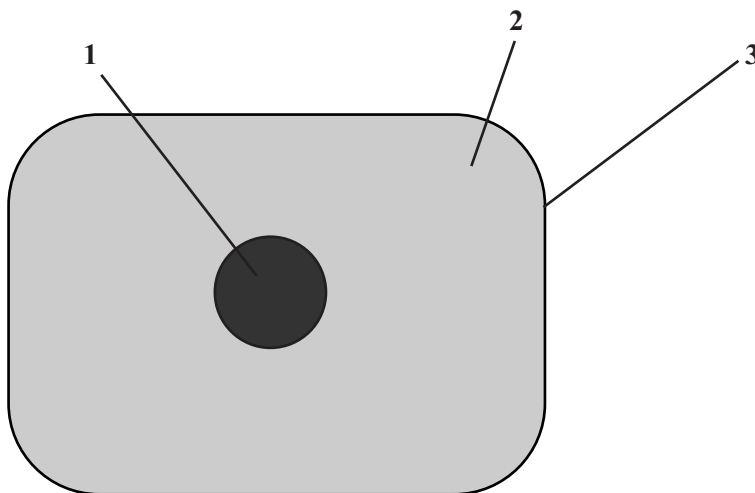
Match words from the list with each of the labels **1–4** on the diagrams.

cell membrane

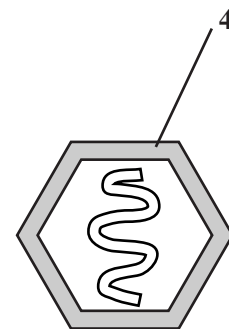
cytoplasm

nucleus

protein coat



Liver cell



Virus

QUESTION TWO

The table is about the functions of organs involved in the removal of waste from the body.

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

bladder

kidney

lung

skin

Organ	Function
1	gets rid of carbon dioxide
2	produces sweat
3	removes excess water from the blood
4	stores urine

QUESTION THREE

Bacteria and viruses are microorganisms which may enter our bodies.

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

cell wall

living cell

nucleus

toxin

A substance released by bacteria and viruses which makes us feel ill is called a **1**

Bacteria contain genes but do not have a distinct **2**

Bacteria are surrounded by a **3**

A virus can only reproduce inside a **4**

Turn over ►

QUESTION FOUR

The table gives information about the functions of parts of the blood.

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

plasma

platelet

red blood cell

white blood cell

Part of blood	Function
1	carries most of the carbon dioxide
2	carries most of the oxygen
3	helps to form blood clots
4	ingests microorganisms

QUESTION FIVE

The table is about the causes of some problem conditions that can occur in the human body.

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

low birth mass of babies

lung and liver damage

slowing down reactions

suffering withdrawal symptoms

Condition	May be caused by
1	breathing in cigarette smoke
2	drinking alcohol
3	going without an addictive drug
4	sniffing solvents

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

Lights at pedestrian crossings often show a green man and give a bleep sound when it is safe to cross.

Which **two** of the following sense organs are used to detect when it is safe to cross?

ear

eye

nose

skin

tongue

QUESTION SEVEN

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

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

drinking only tap water

eating only fresh food

keeping all cuts and grazes covered

keeping cooked food covered

wrapping soiled nappies securely before placing in a dustbin

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 information is from a can of peas.

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

Use this information to help you answer the following questions.

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 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 g
- C 38.5 g
- D 47 g

8.3 During digestion the protein in the fish is broken down into

- A amino acids.
- B glucose.
- C glycerol.
- D urea.

8.4 Digested proteins are absorbed into the blood mainly in the

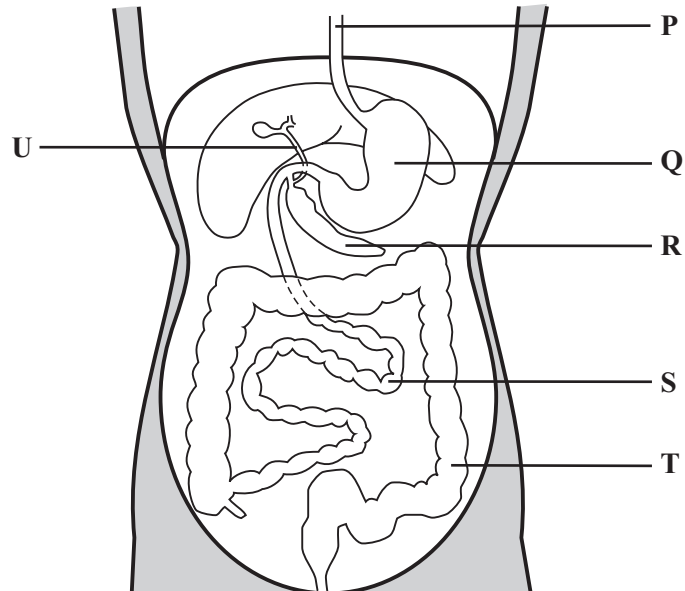
- A large intestine.
- B pancreas.
- C small intestine.
- D stomach.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

The diagram shows part of the digestive system.



9.1 Hydrochloric acid is produced by organ

- A Q
- B R
- C S
- D T

9.2 Which organs produce an enzyme that digests starch?

- A P and T
- B Q and R
- C R and S
- D S and U

9.3 One function of organ **R** is

- A** to digest glycerol.
- B** to produce bile.
- C** to produce fatty acids.
- D** to produce protease.

9.4 What would be the result if the tube **U** was blocked?

- A** Fat would not be emulsified
- B** Food would not leave the stomach
- C** Lipase would not be released
- D** Sugar would not be absorbed

TURN OVER FOR THE NEXT QUESTION

Turn over ►

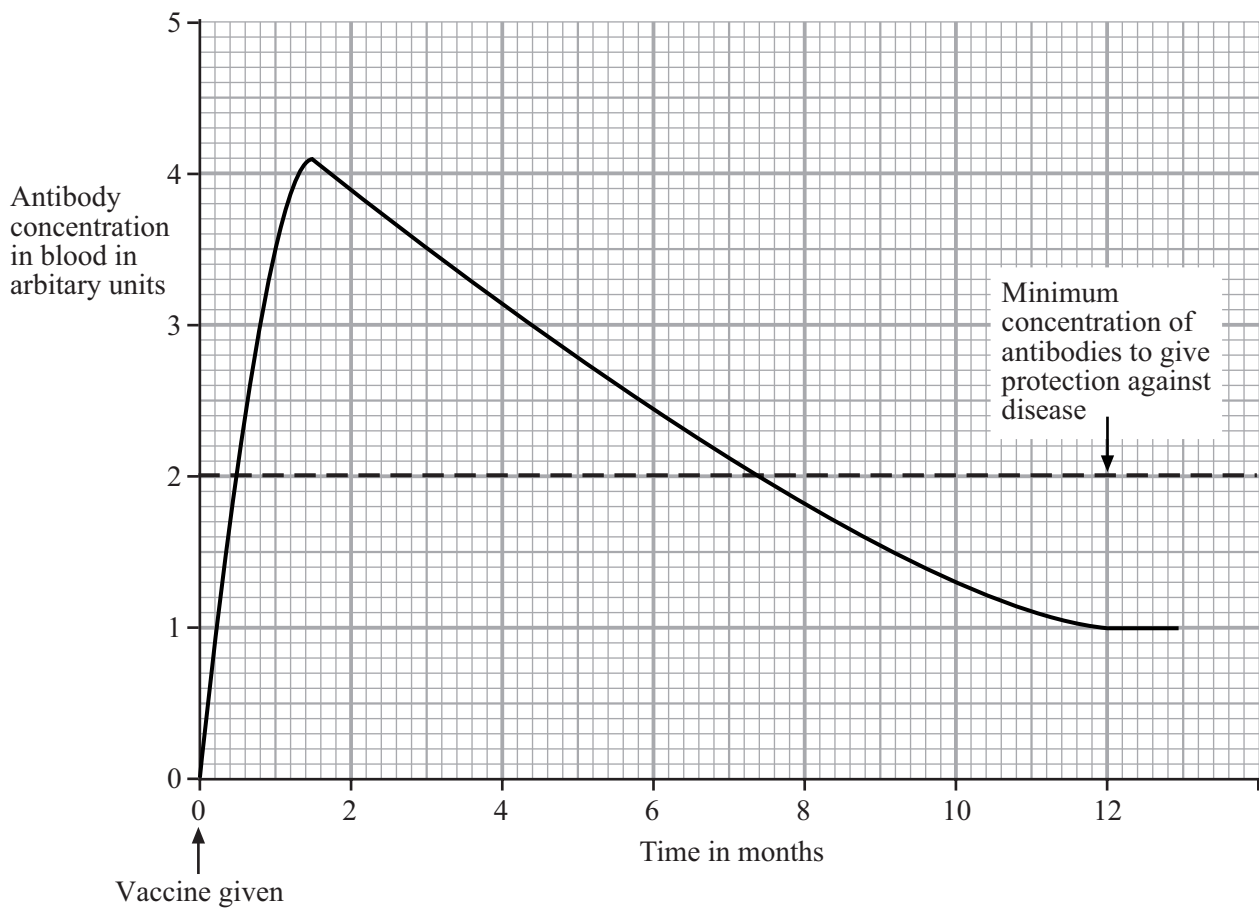
QUESTION TEN

Vaccines protect us against disease.

10.1 A vaccine contains

- A** dead or weakened microorganisms.
- B** enzymes.
- C** platelets.
- D** white blood cells.

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



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 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

10.4 Which of the following does **not** prevent the entry of microorganisms into the body?

- A Blood clots sealing wounds
- B Mucus produced by the breathing organs
- C Surface cells of the skin
- D White blood cells

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

The table is about the causes of some problem conditions that can occur in the human body.

Match words from the list with each of the numbers **1–4** in the table.**low birth mass of babies****lung and liver damage****slowing down reactions****suffering withdrawal symptoms**

Condition	May be caused by
1	breathing in cigarette smoke
2	drinking alcohol
3	going without an addictive drug
4	sniffing solvents

QUESTION TWO

The eye can see near and distant objects.

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

change shape

focus

relax

tighten

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

To do this the ciliary muscles **2**

This makes your suspensory ligaments **3** making the lens **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 and bodies. The flies are attracted to faeces and to human food. Each year, thousands of people in Britain suffer from diarrhoea, caused by eating food containing such bacteria.

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keeping all cuts and grazes covered

keeping cooked food covered

wrapping soiled nappies securely before placing in a dustbin

QUESTION FOUR

Mitochondria are found in living cells.

Which **two** of the following 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

NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

Turn over ►

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

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In each part choose only **one** answer.

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QUESTION FIVE

The information is from a can of peas.

	Amount per 100 g of peas
Energy	500 kJ
Protein	7 g
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Use this information to help you answer the following questions.

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 $\frac{1}{500}$
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5.2 A boy ate a meal of fish, chips and peas.
The total amount of fat in the meal was 40 g.
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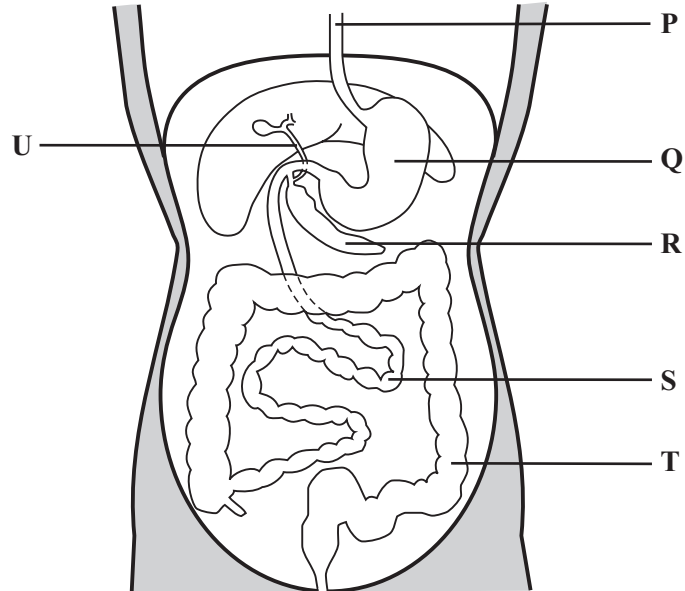
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- B** pancreas.
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TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION SIX

The diagram shows part of the digestive system.



6.1 Hydrochloric acid is produced by organ

- A Q
- B R
- C S
- D T

6.2 Which organs produce an enzyme that digests starch?

- A P and T
- B Q and R
- C R and S
- D S and U

- 6.3** One function of organ **R** is
- A** to digest glycerol.
 - B** to produce bile.
 - C** to produce fatty acids.
 - D** to produce protease.
- 6.4** What would be the result if the tube **U** was blocked?
- A** Fat would not be emulsified
 - B** Food would not leave the stomach
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TURN OVER FOR THE NEXT QUESTION

Turn over ►

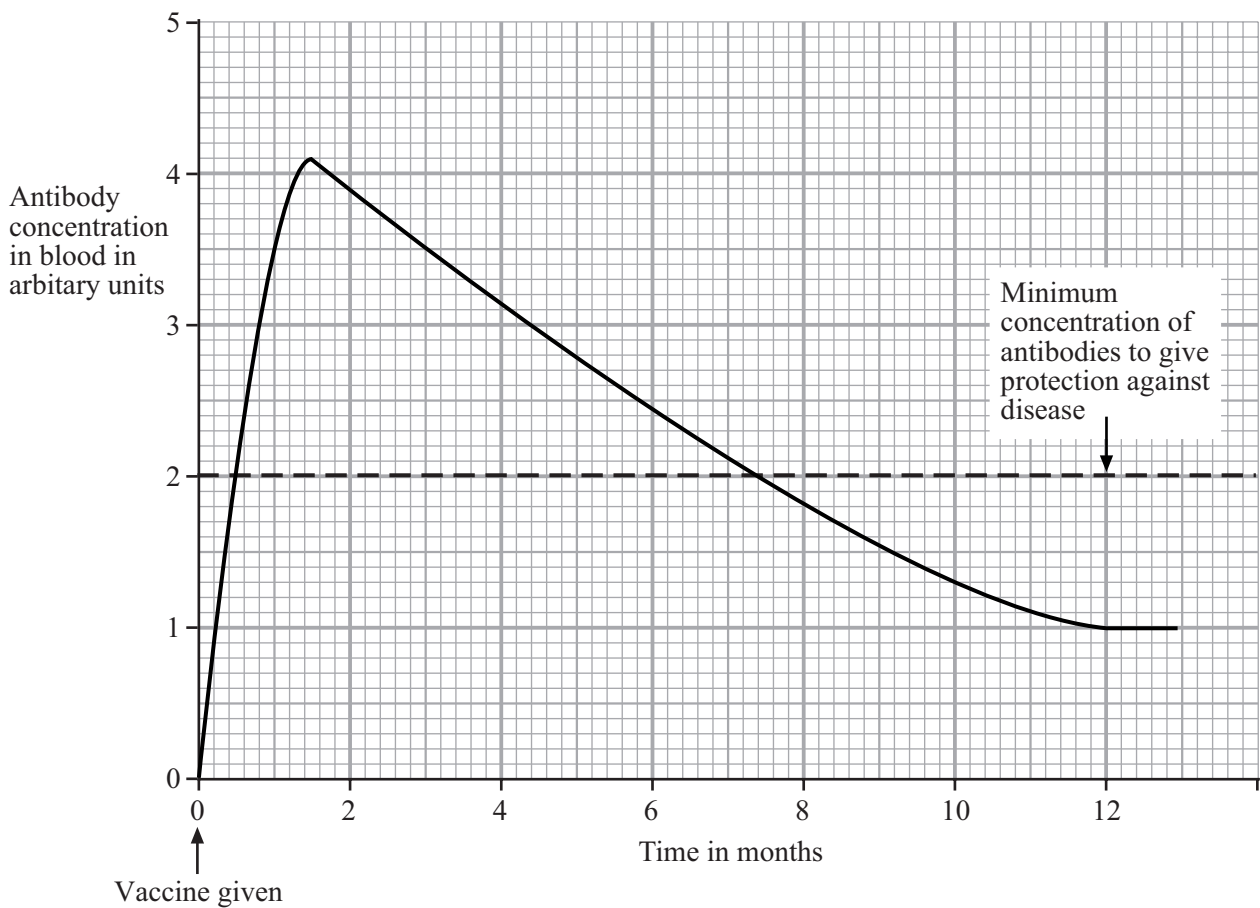
QUESTION SEVEN

Vaccines protect us against disease.

7.1 A vaccine contains

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- B** enzymes.
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- D** white blood cells.

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



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

- A** 1 month.
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- C** 7 months.
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- 7.3** 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
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- 7.4** Which of the following does **not** prevent the entry of microorganisms into the body?
- A** Blood clots sealing wounds
 - B** Mucus produced by the breathing organs
 - C** Surface cells of the skin
 - D** White blood cells

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION EIGHT

The table shows the amounts of substances filtered from the blood by the kidneys, and the amounts appearing in the urine, over a 24 hour period.

Substance	Amount of substance	
	In filtrate produced by kidneys in 24 hours	In urine in 24 hours
Water	180 000 cm ³	1500 cm ³
Ions	1500 g	12 g
Glucose	200 g	0 g
Urea	55 g	30 g

8.1 Which of the substances was completely re-absorbed from the filtrate by the kidneys?

- A Glucose
- B Ions
- C Urea
- D Water

8.2 Only 12 g of the ions in the filtrate appear in the urine.

What percentage of the ions was re-absorbed?

- A 0.8 %
- B 12.5 %
- C 80.0 %
- D 99.2 %

8.3 Urea is produced

- A in the kidneys from excess amino acids.
- B in the kidneys from excess lipids.
- C in the liver from excess amino acids.
- D in the liver from excess lipids.

8.4 On a hot day the volume of urine released in 24 hours is much less than 1500cm^3 .

What causes this reduction in urine volume?

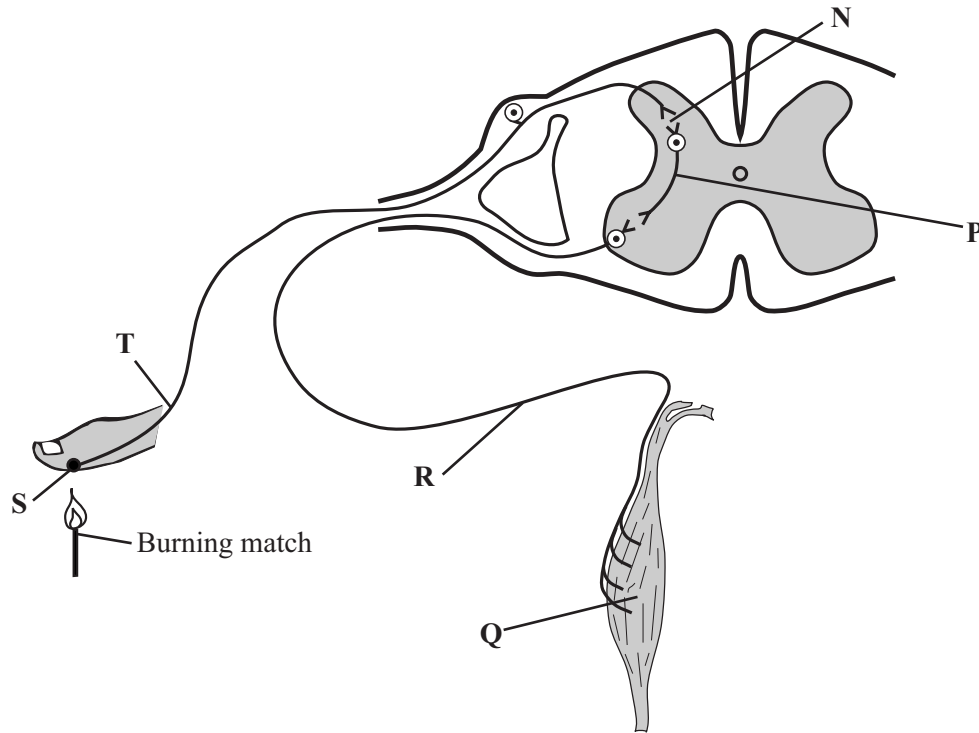
- A** The release of ADH from the pancreas causes less water to be re-absorbed into the blood
- B** The release of ADH from the pancreas causes more water to be re-absorbed into the blood
- C** The release of ADH from the pituitary gland causes less water to be re-absorbed into the blood
- D** The release 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 their hand close to a burning match. Their hand automatically moves away from the flame. The drawing shows the parts involved in this reflex action.



9.1 In this reflex action the sensory neurone is found at

- A P
- B R
- C S
- D T

9.2 In this reflex action the relay neurone is found at

- A P
- B Q
- C R
- D T

9.3 In this reflex action a synapse is found at

- A** N
- B** P
- C** Q
- D** S

9.4 Which of the following describes the path taken by an impulse in this reflex action?

- A** effector → motor neurone → relay neurone → sensory neurone
- B** receptor → sensory neurone → relay neurone → motor neurone
- C** sensory neurone → motor neurone → relay neurone → synapse
- D** synapse → effector → relay neurone → sensory neurone

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION TEN

Blood has many important functions in the body.

10.1 Which part of the blood transports glucose from the intestine to the liver?

- A Plasma
- B Platelets
- C Red blood cells
- D White blood cells

10.2 In which part of the blood, and where in the body, may oxyhaemoglobin split up to form haemoglobin and oxygen?

- A In the plasma, in the lungs
- B In the platelets, in the kidneys
- C In the red blood cells, in the muscles
- D In the white blood cells, at a site of infection

10.3 In some diseases the blood will not clot when a wound occurs. This is most likely to be caused by a shortage of

- A plasma.
- B platelets.
- C red blood cells.
- D white blood cells.

10.4 A blood sample was taken from a person with a disease caused by bacteria.

Compared with before the illness, which change is most likely?

- A A lower number of white blood cells
- B A reduced number of platelets
- C An increase in the antibody content of the plasma
- D An increase in the number of red blood cells

END OF TEST

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE

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