

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
Winter 2003



**SCIENCE: DOUBLE AWARD (MODULAR)
BIOLOGY (MODULAR)
Humans as Organisms (Module 01)**

346001

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 “Humans as Organisms” 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 diagrams show a liver cell and a type of virus that may infect liver cells.
(The diagrams are not drawn to the same scale.)

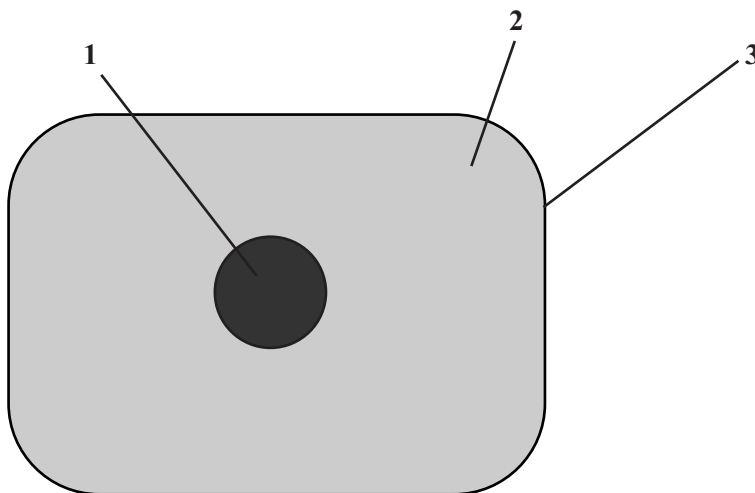
Match words from the list with each of the labels **1–4** on the diagrams.

cell membrane

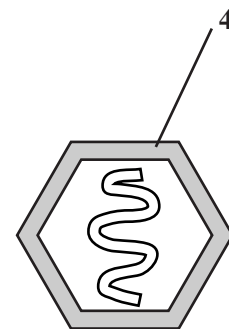
cytoplasm

nucleus

protein coat



Liver cell



Virus

QUESTION TWO

The drawing shows some of the structures in the upper part of the body.

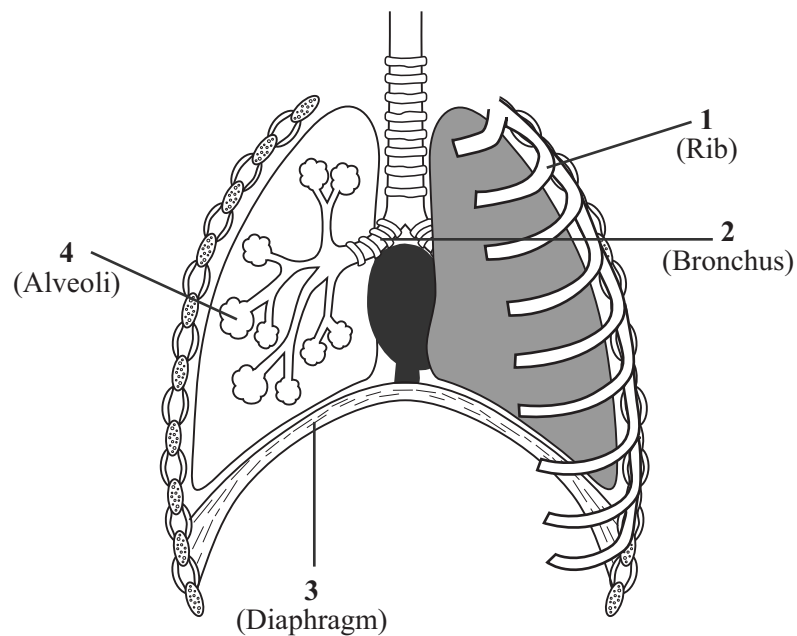
Match words from the list with each of the labels 1–4 on the drawing.

divides to form many bronchioles

protects the lungs

separates the thorax from the abdomen

where carbon dioxide diffuses from blood



TURN OVER FOR THE NEXT QUESTION

Turn over ►

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**

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 diagram shows a section through the heart.

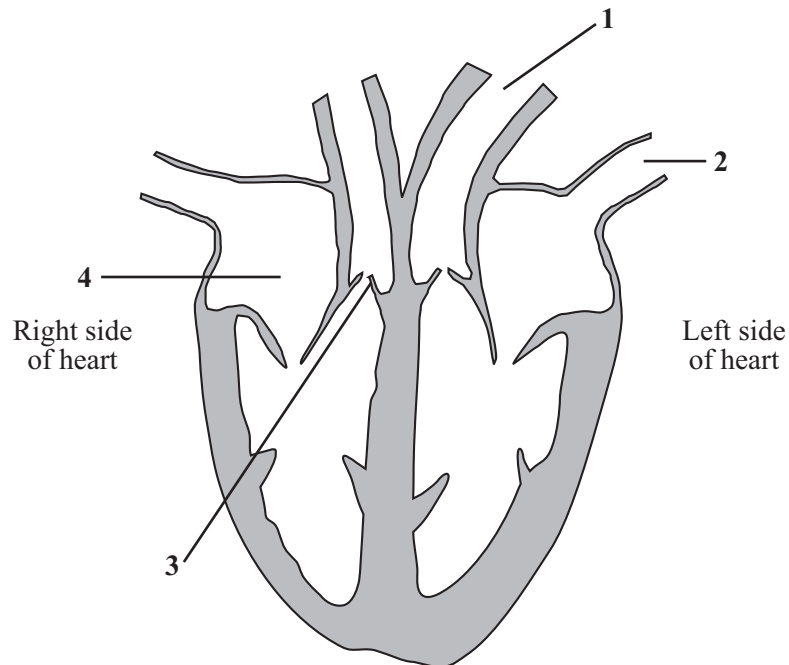
Match words from the list with each of the labels 1–4 on the diagram.

an artery carrying oxygenated blood

carries blood from the lungs to the heart

prevents backflow of blood

receives blood returning from the arms



TURN OVER FOR THE NEXT QUESTION

Turn over ►

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

Energy is released from food by aerobic respiration.

Which **two** of the following substances are produced during aerobic respiration?**carbon dioxide****glucose****lactic acid****oxygen****water****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**

NO QUESTIONS APPEAR ON THIS PAGE

TURN OVER FOR THE NEXT QUESTION

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

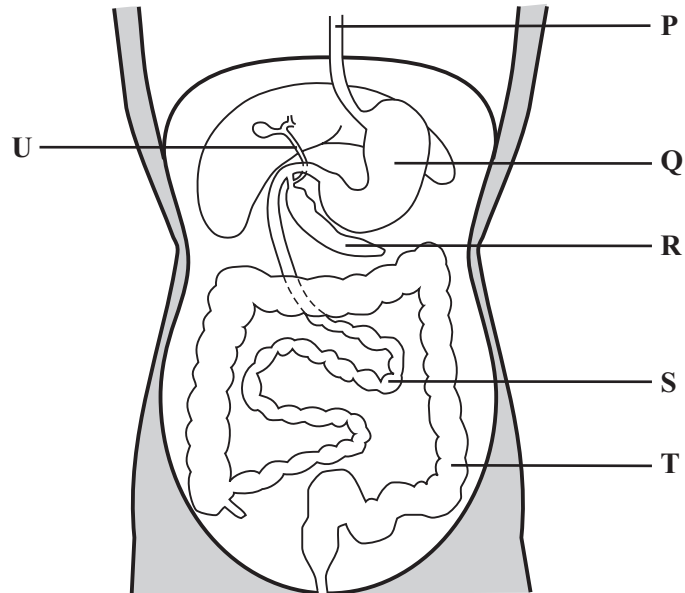
- A large intestine.
- B pancreas.
- C small intestine.
- D stomach.

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 ►

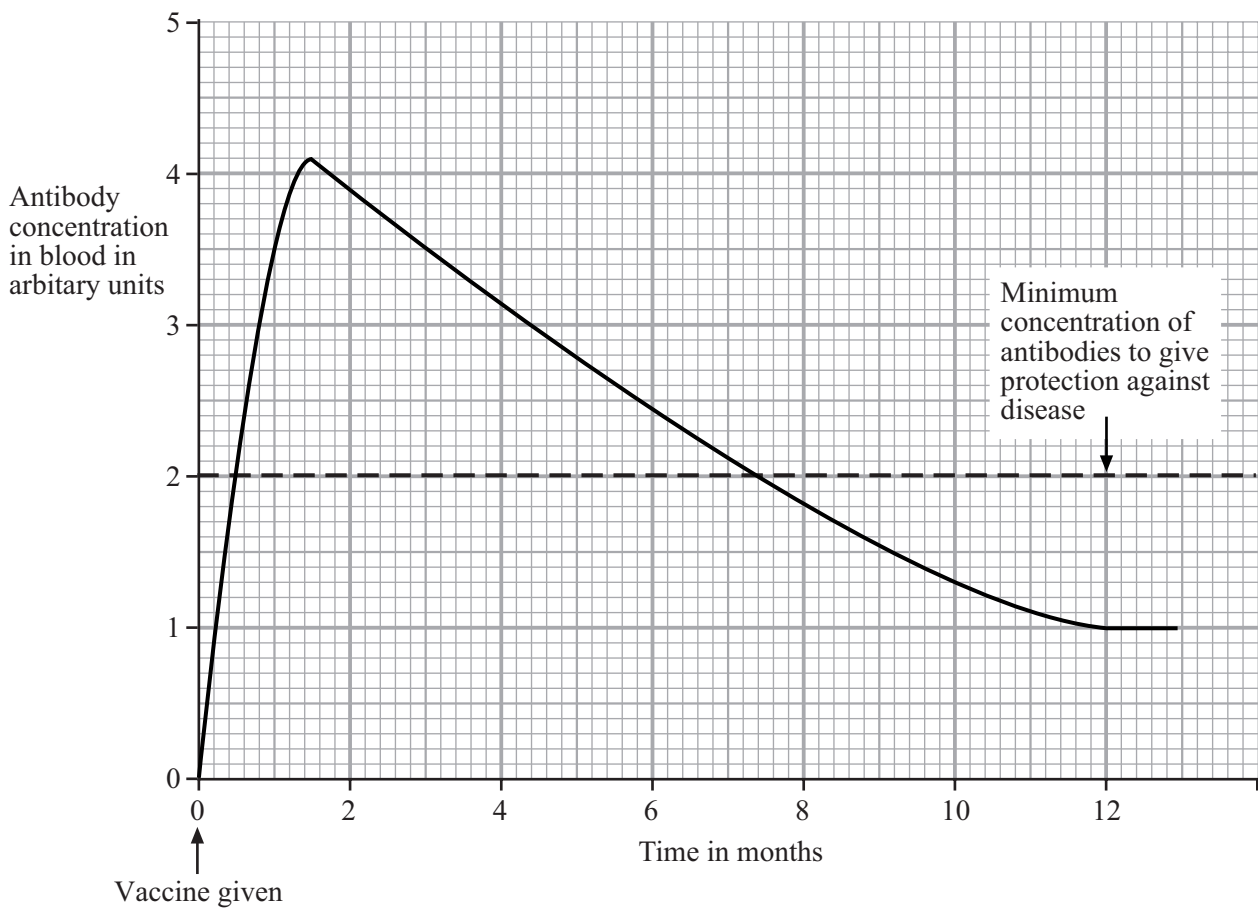
QUESTION TEN

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.

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Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows a section through the heart.

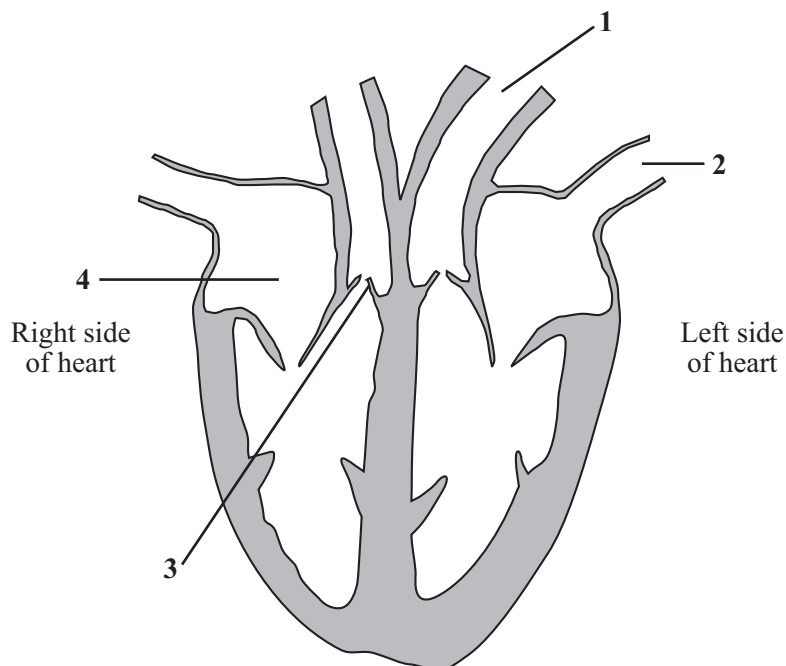
Match words from the list with each of the labels **1–4** on the diagram.

an artery carrying oxygenated blood

carries blood from the lungs to the heart

prevents backflow of blood

receives blood returning from the arms



QUESTION TWO

The diagram shows some of the structures in the thorax.

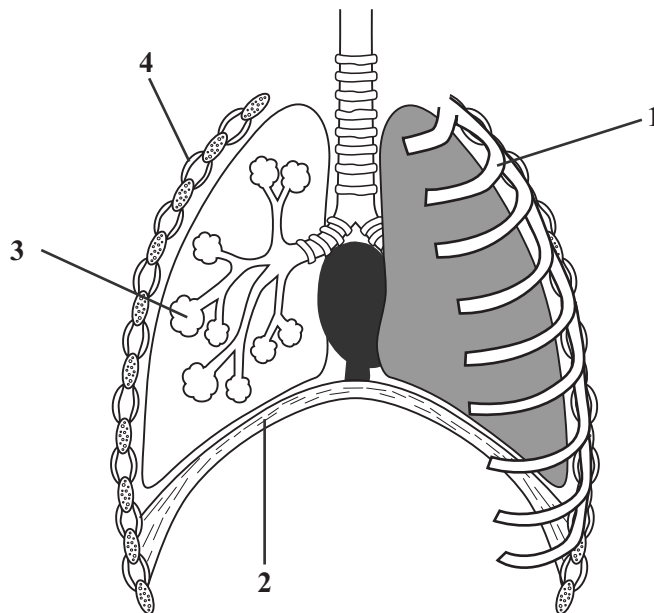
Match words from the list with each of the labels 1–4 on the diagram.

contracts to pull the ribs upwards

has a moist lining for gas exchange

moves down to lower pressure in the thorax

moves down to reduce volume of the thorax



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.

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

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

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

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QUESTION FIVE

The information is from a can of peas.

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Use this information to help you answer the following questions.

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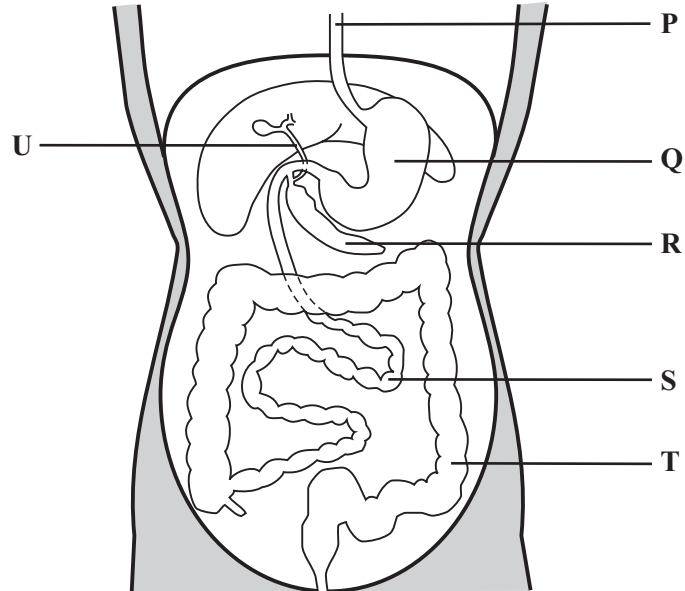
- A** large intestine.
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QUESTION SIX

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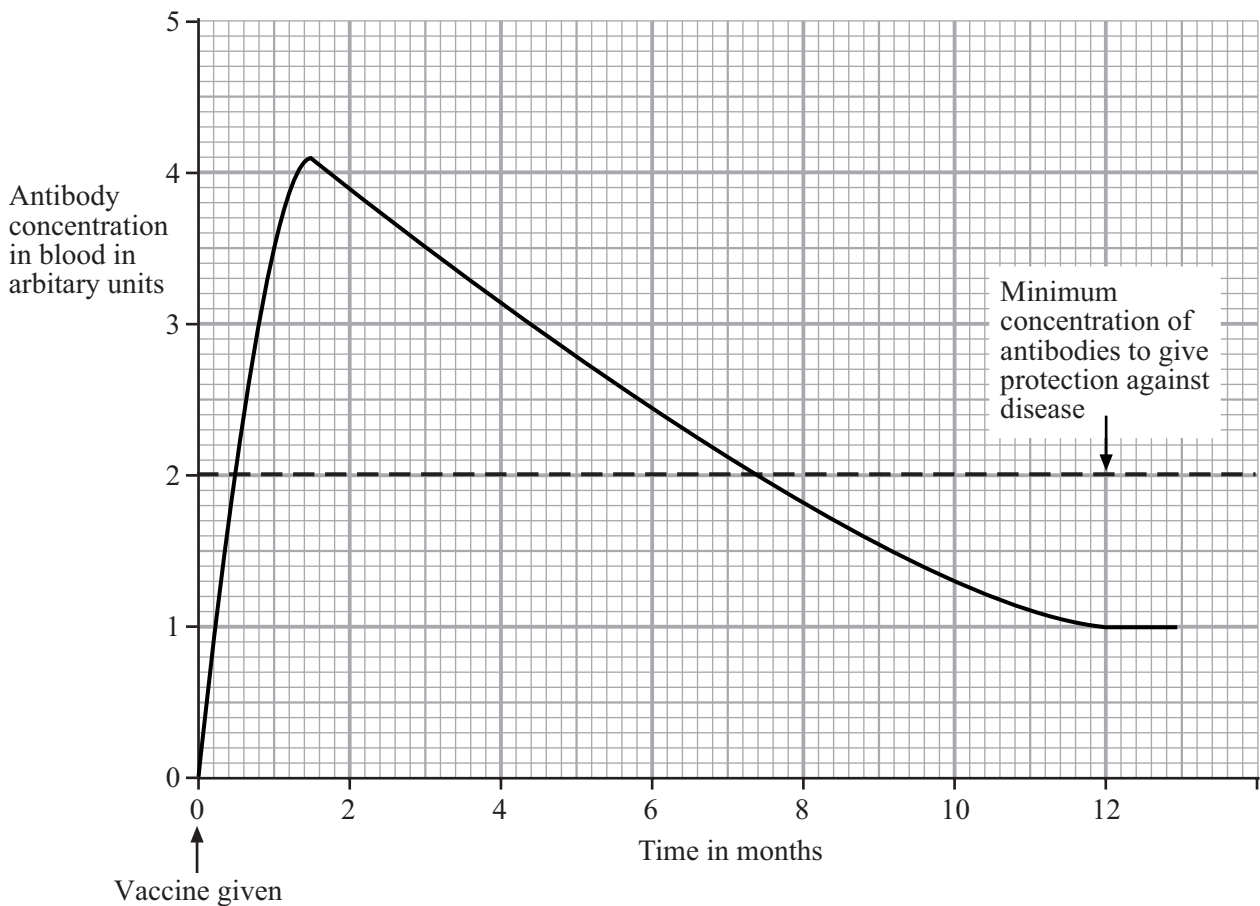
QUESTION SEVEN

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

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 - 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

Blood has many important functions in the body.

8.1 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

8.2 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

8.3 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.

8.4 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

QUESTION NINE

It is more efficient to release energy using aerobic respiration than using anaerobic respiration. During a 100 metre sprint an athlete hardly has time to breathe. When sprinting, only about 10% of the energy needed by the muscles comes from aerobic respiration. An oxygen debt builds up during sprinting.

9.1 What is the most likely reason for the build up of an oxygen debt by the sprinter?

- A** Carbon dioxide is removed too quickly from the lungs
- B** Muscles cannot use oxygen for respiration
- C** The amount of oxygen needed cannot be carried to the muscles quickly enough
- D** There are no mitochondria in muscle cells

9.2 Why is aerobic respiration considered to be more efficient than anaerobic respiration?

- A** Aerobic respiration does not produce carbon dioxide
- B** Aerobic respiration releases more energy
- C** Anaerobic respiration does not release any heat energy
- D** Anaerobic respiration does not use glucose

9.3 The sprinter's body builds up an oxygen debt during the sprint.

Which of the following is formed as the oxygen debt builds up?

- A** Amino acids
- B** Glucose
- C** Hydrochloric acid
- D** Lactic acid

9.4 Which of the following occurs as the oxygen debt is repaid?

- A** Amino acids combine with glycerol
- B** Glucose is broken down into carbon dioxide and water
- C** Hydrochloric acid is neutralised
- D** Lactic acid is oxidised

Turn over ►

QUESTION TEN

The heart pumps blood around the body through blood vessels.

10.1 A ventricle pumps out 90 cm^3 of blood each time it contracts. It contracts 72 times every minute.

How much blood does this ventricle pump out during one minute?

- A 72 cm^3
- B 162 cm^3
- C 4320 cm^3
- D 6480 cm^3

10.2 When blood returns to the heart from the lungs, it contains more oxygen than it had when it went to the lungs.

Which of the following best explains this change?

- A All aerobic respiration occurs in the lungs
- B Carbon dioxide has left the blood in the lungs allowing more space in the plasma for oxygen
- C Oxygen diffuses from the high concentration in the alveoli into the blood that flows through the lungs
- D We need oxygen for respiration

10.3 The table shows the volume of blood present in different types of blood vessel in the body of a woman.

Type of blood vessel	Total volume of blood in cm^3
Arteries	450
Capillaries	250
Veins	2800

The percentage of blood present in the arteries is

- A 4.5%
- B 7.1%
- C 12.9%
- D 16.1%

10.4 There are many more capillaries in the woman's body than there are veins. Veins, however, contain most of the blood in her body.

What is the most likely reason for this?

- A Blood in veins carries more oxygen than blood in capillaries
- B The valves in veins push blood through them faster than they push blood through capillaries
- C Veins carry blood away from the heart
- D Veins have a much greater diameter than capillaries

END OF TEST

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE