AQA GCSE Biology | 8461

SPECIFICATION POINT 4.2.2.3

Blood

Past-paper questions

Tier	**Foundation**
Question groups	**35**
Available paper years	**2007–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.2.2.3 Blood

Question 01

January 2007 | BLY1F | Original Q4 | Legacy

4 (a) Use words from the box to complete the sentences about curing disease.

antibiotics	**antibodies**	**antitoxins**	**painkillers**	**statins**

The substances made by white blood cells to kill pathogens are called ..... .

The substances made by white blood cells to counteract poisons produced by pathogens are called ..... .

Medicines which kill bacteria are called ..... .

(3 marks)

(b) The MMR vaccine protects people against three diseases.

Write down the names of **two** of these diseases.

1 .....

2 .....

(2 marks)

(c) All vaccinations involve some risk.

The table shows the risk of developing harmful effects:

- from the disease if a child is **not** given the MMR vaccine;
- if a child **is** given the MMR vaccine.

Harmful effect	**Risk of getting the harmful effect from the disease (if not vaccinated)**	**Risk of getting the harmful effect from MMR vaccine**
Convulsions	1 in 200	1 in 1000
Meningitis	1 in 3000	Less than 1 in 1 000 000
Brain damage	1 in 8000	0

4.2.2.3 Blood

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A mother is considering if she should have her child vaccinated with the MMR vaccine.

Use information from the table to persuade the mother that she should have her child vaccinated.

.....

.....

.....

.....

(2 marks)

(d) The vaccine used to protect us from the Hepatitis B virus is produced by genetic engineering.

Yeast cells are used to produce the vaccine.

Use words from the box to complete the sentence.

chromosomes	**drugs**	**enzymes**	**genes**	**hormones**

To produce the vaccine ..... are used to cut out .....

from the Hepatitis B virus which are then inserted into the yeast cells.

(2 marks)

9

4.2.2.3 Blood

Question 02

January 2008 | BLY1F | Original Q6 | Legacy

6 Polio is a disease caused by a virus. In the UK, children are given polio vaccine to protect them against the disease.

(a) In the sentences below, draw a ring around the correct words in each box.

(i) It is difficult to kill the polio virus inside the body

because the virus

is not affected by drugs
lives inside cells
produces antitoxins

.

(1 mark)

(ii) The vaccine contains an

active
infective
inactive

form of the polio virus.

(1 mark)

(iii) The vaccine stimulates the white blood cells to

produce

antibiotics
antibodies
drugs

which destroy the virus.

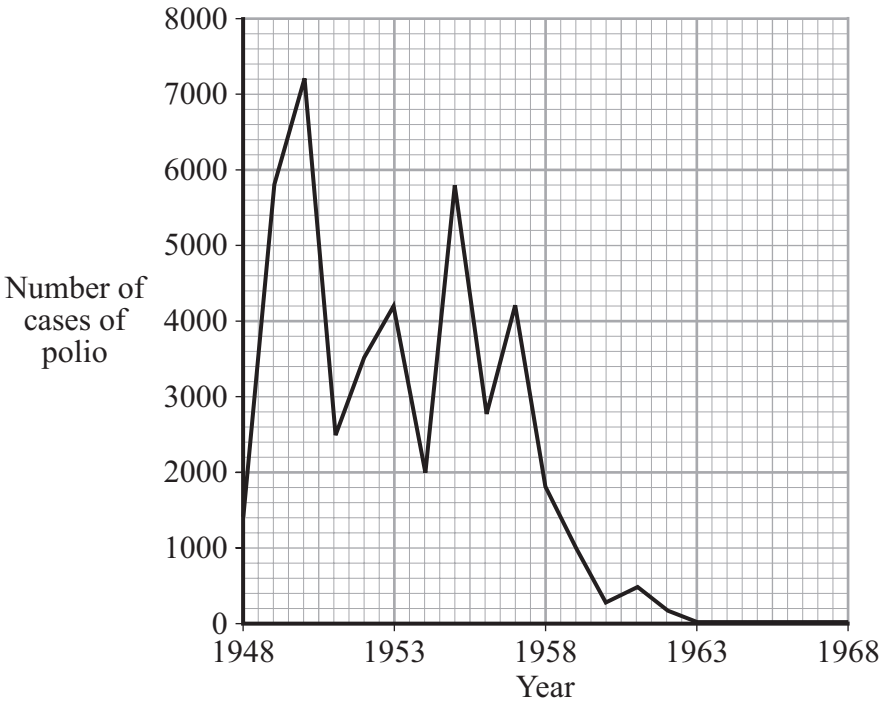
(1 mark)

4.2.2.3 Blood

Question 02 · continued

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(b) The graph shows the number of cases of polio in the UK between 1948 and 1968.



(i) In which year was the number of cases of polio highest?

.....

(1 mark)

(ii) Polio vaccination was first used in the UK in 1955.

How many years did it take for the number of cases of polio to fall to zero?

.....

(1 mark)

(iii) There have been no cases of polio in the UK for many years. But children are still vaccinated against the disease.

Suggest **one** reason for this.

.....

.....

(1 mark)

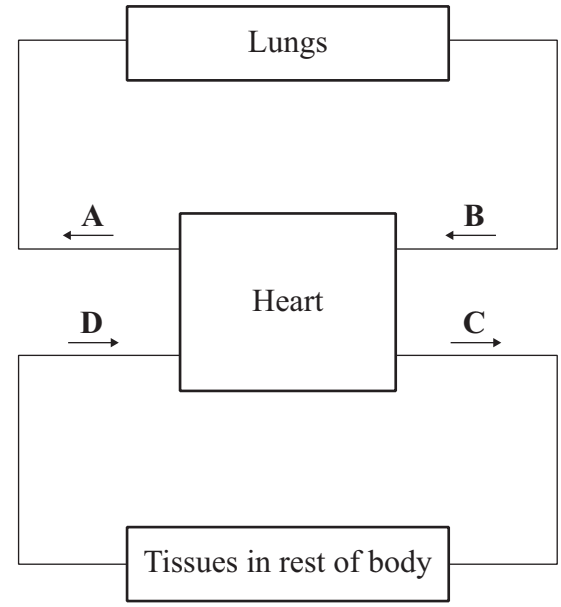
6

4.2.2.3 Blood

Question 03

January 2008 | BLY3F | Original Q2 | Legacy

2 The diagram represents the human blood circulation system.



(a) **A**, **B**, **C** and **D** are blood vessels.

(i) Give the letter of **one** blood vessel that is an artery. .....
(1 mark)

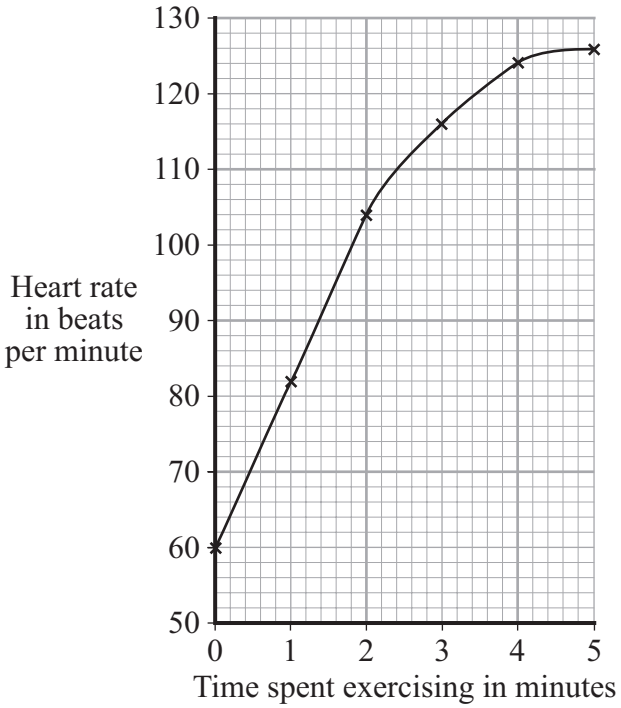
(ii) Give the letter of **one** blood vessel that is a vein. .....
(1 mark)

4.2.2.3 Blood

Question 03 · continued

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(b) A student pedalled an exercise cycle at constant speed for 5 minutes. The student's heart rate was recorded at one-minute intervals during the exercise.
The results are shown in the graph.



(i) What was the student's heart rate before the exercise began?

..... per minute
(1 mark)

(ii) How long was it before the student's heart rate reached 124 beats per minute?

..... minutes
(1 mark)

(c) Which of the following parts of the blood carries most oxygen?

Draw a circle around **one** answer.

plasma **red blood cells** **white blood cells**

(1 mark)

5

4.2.2.3 Blood

Question 04

January 2008 | BLY3F | Original Q6 | Legacy

6 (a) (i) Urine is made in the kidneys and stored for a few hours before being released from the body.

In which organ of the body is urine stored? Draw a circle around **one** answer.

bladder **large intestine** **liver**

(1 mark)

(ii) Which **two** of the following substances are **not** found in the urine of a healthy person?

Tick (✓) **two** boxes.

glucose ☐

mineral ions ☐

protein ☐

urea ☐

(2 marks)

(b) A person with kidney disease may be treated by dialysis or by having a kidney transplant.

Read the information about dialysis and kidney transplants.

- A person needs 3 dialysis sessions a week, each lasting about 8 hours.
- Intake of protein and salt in the food is kept low between dialysis sessions.
- For each patient, dialysis costs £30 000 per year.
- The use of a general anaesthetic can sometimes cause brain damage.
- Drugs to suppress the immune system are given after a kidney transplant.
- A transplant costs £20 000 in the first year plus £6500 in each of the following years for drugs.

4.2.2.3 Blood

Question 04 · continued

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Use this information to answer the questions.

(i) Give **two** advantages of treatment by having a kidney transplant rather than treatment by dialysis.

1 .....

.....

2 .....

.....

(2 marks)

(ii) Give **one** disadvantage of treatment by having a kidney transplant.

.....

.....

(1 mark)

(c) The table shows the amounts of some substances in the blood of one patient before dialysis and after dialysis.

Substance	Concentration in blood plasma in grams per dm^3	
	Before dialysis	After dialysis
Sodium ions	2.88	3.00
Potassium ions	0.22	0.14
Urea	4.50	0.30

During dialysis, substances are removed from the blood.

(i) Which substance in the table decreased in concentration the most during dialysis?

.....

(1 mark)

(ii) By how much did the concentration of this substance decrease?

..... grams per dm^3

(1 mark)

8

4.2.2.3 Blood

Question 05

June 2008 | BLY1AP | Original Q6 | Legacy

QUESTION SIX

Our bodies defend themselves naturally against infections. We also use other methods to protect ourselves against infections and to relieve the symptoms of disease.

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A antibiotics

B painkillers

C antibodies

D vaccines

1	given to people to provide immunity
2	medicines that kill bacteria
3	produced by white blood cells
4	relieve symptoms of disease

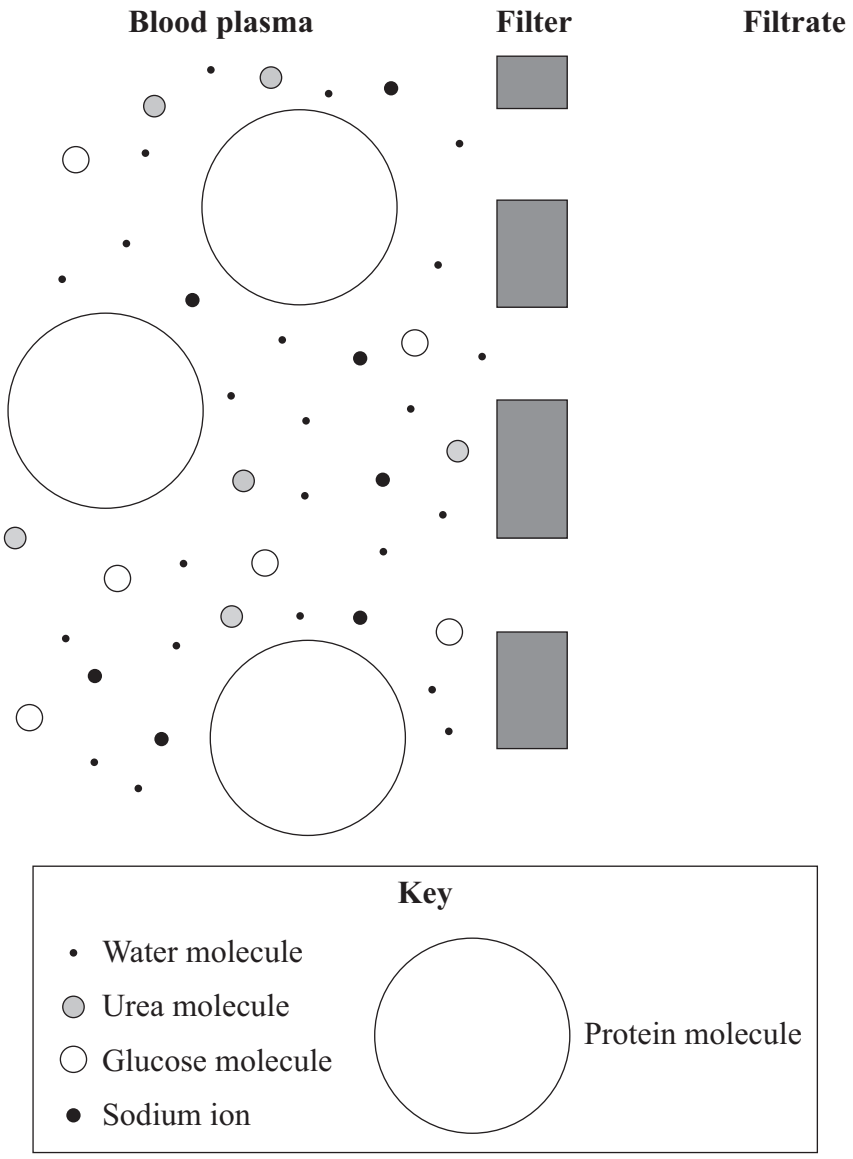
4.2.2.3 Blood

Question 06

June 2008 | BLY3F | Original Q2 | Legacy

2 The kidneys filter the blood.

The diagram shows the site of filtration in the kidney.



4.2.2.3 Blood

Question 06 · continued

for mark

2 (a) Use information from the diagram to answer this question.

Put a tick (✓) in the box next to every substance that will pass through the filter from the blood plasma into the filtrate.

One has been done for you.

glucose	✓
urea	
water	
sodium ions	
protein	

(2 marks)

2 (b) Proteins and glucose are not present in the urine of a healthy person.

2 (b) (i) Use information from the diagram to explain why protein is not found in the urine of a healthy person.

.....

.....

(1 mark)

2 (b) (ii) Complete the sentence by drawing a ring around the correct answer.

After filtration, all the glucose is [reabsorbed / released / respired] .

(1 mark)

Question 2 continues on the next page

4.2.2.3 Blood

Question 06 · continued

for mark

2 (c) An athlete trained on a hot day and on a cold day. On each day, he did the same amount of exercise and drank the same volume of water.

Complete the sentences by drawing a ring around the correct answer.

2 (c) (i) On the hot day, the athlete would produce [less / more / the same amount of] urine.

(1 mark)

2 (c) (ii) This is because he would produce [less / more / the same amount of] sweat.

(1 mark)

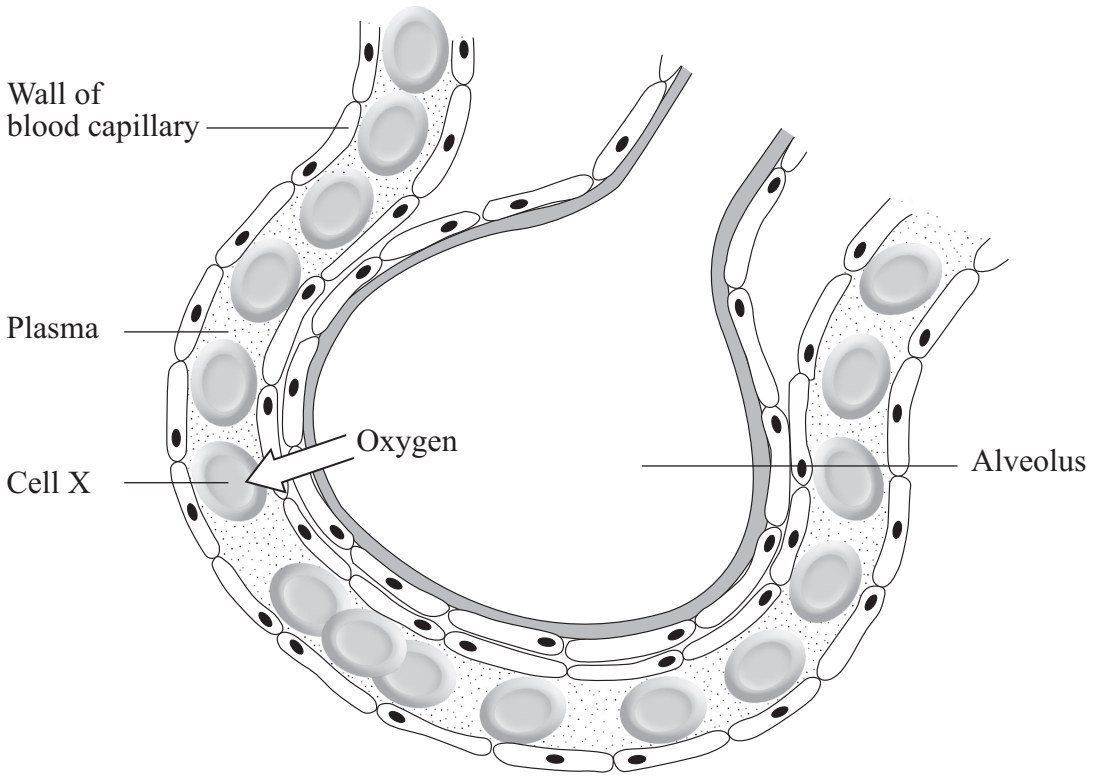
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4.2.2.3 Blood

Question 07

June 2008 | BLY3F | Original Q4 | Legacy

4 The diagram shows a small part of a lung.



4 (a) The arrow on the diagram shows the movement of oxygen from the air in the alveolus to cell **X**.

Complete the sentences by drawing a ring around the correct answer.

4 (a) (i) Cell **X** is a platelet / red cell / white cell .

(1 mark)

4 (a) (ii) Oxygen moves from the air in the alveolus into cell **X** by diffusion / filtration / respiration .

(1 mark)

4 (a) (iii) The substance in cell **X** that combines with oxygen is called glycogen / haemoglobin / lactic acid .

(1 mark)

4.2.2.3 Blood

Question 07 · continued

for mark

4 (a) (iv) Cell **X** does **not** have

a cell membrane
cytoplasm
a nucleus

.

(1 mark)

4 (b) **On the diagram**, draw an arrow to show the movement of carbon dioxide during gas exchange. *(1 mark)*

5

4.2.2.3 Blood

Question 08

January 2009 | BLY1F | Original Q7 | Legacy

7 The MMR vaccine is used to protect children against measles, mumps and rubella.

7 (a) Complete the sentences about vaccination.

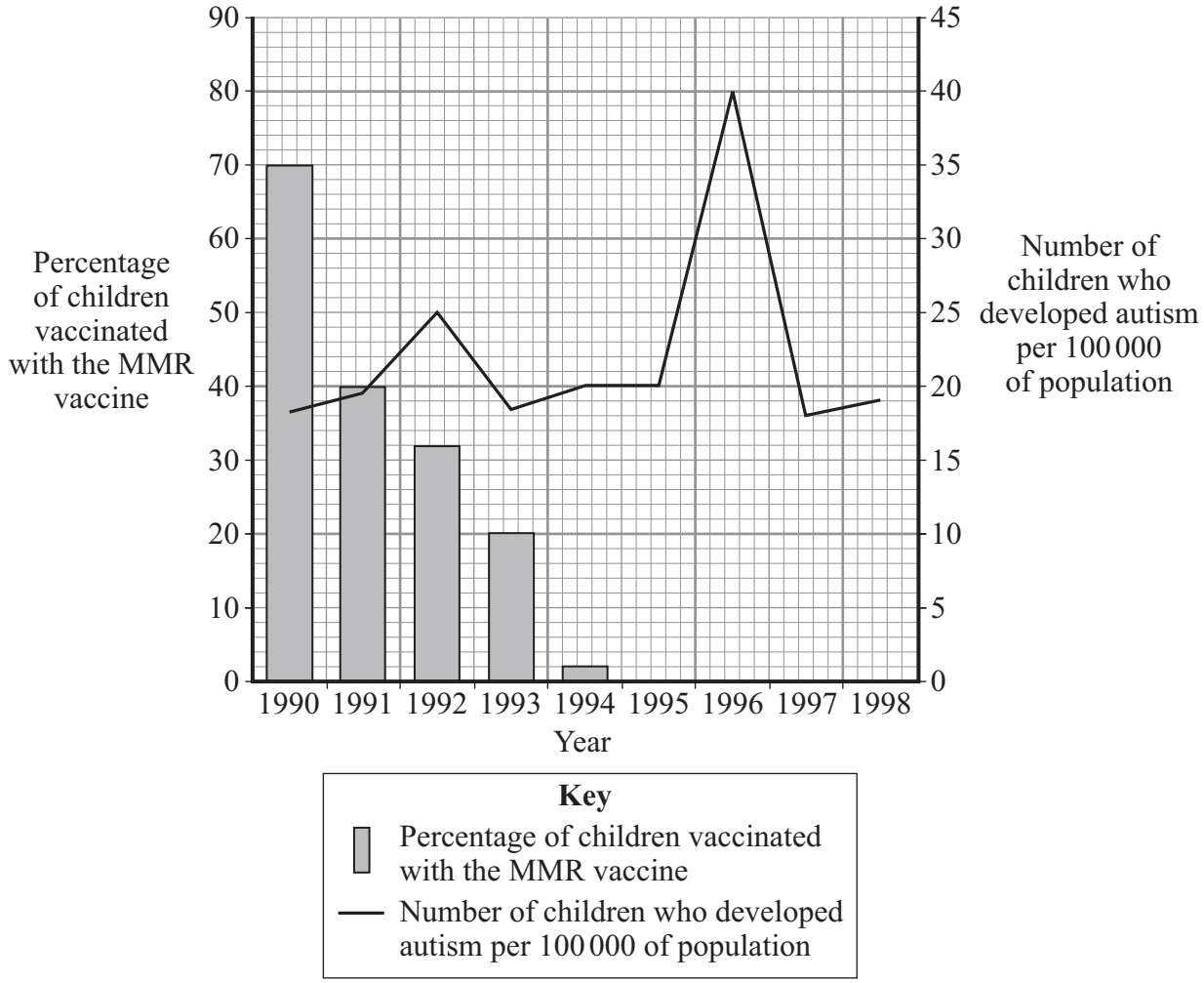
Vaccines stimulate white blood cells to produce ..... .

This makes children ..... to the pathogen.

(2 marks)

7 (b) In the 1990s, many people thought that the MMR vaccine caused autism in some children. As a result, the Japanese government stopped using the MMR vaccine.

The graph gives information about the percentage of children in Japan vaccinated with the MMR vaccine and the number of children who developed autism during the 1990s.



4.2.2.3 Blood

Question 08 · continued

for mark

7 (b) (i) Describe how the percentage of children vaccinated with the MMR vaccine changed between 1990 and 1995.

.....

.....

.....

.....

.....

(2 marks)

7 (b) (ii) Does the data in the graph support a link between MMR vaccination and autism?

Draw a ring around your answer. **Yes** / **No**

Explain the reason for your answer.

.....

.....

.....

.....

.....

(2 marks)

6

4.2.2.3 Blood

Question 09

January 2009 | BLY2F | Original Q7 | Legacy

7 Diabetes is a disease in which a person's blood glucose concentration rises to higher levels than normal.
Diabetes is caused by insufficient insulin being produced.

7 (a) (i) Which organ monitors blood glucose concentration?

.....

(1 mark)

7 (a) (ii) Insulin reduces the concentration of glucose in the blood.

Describe how insulin does this.

.....

.....

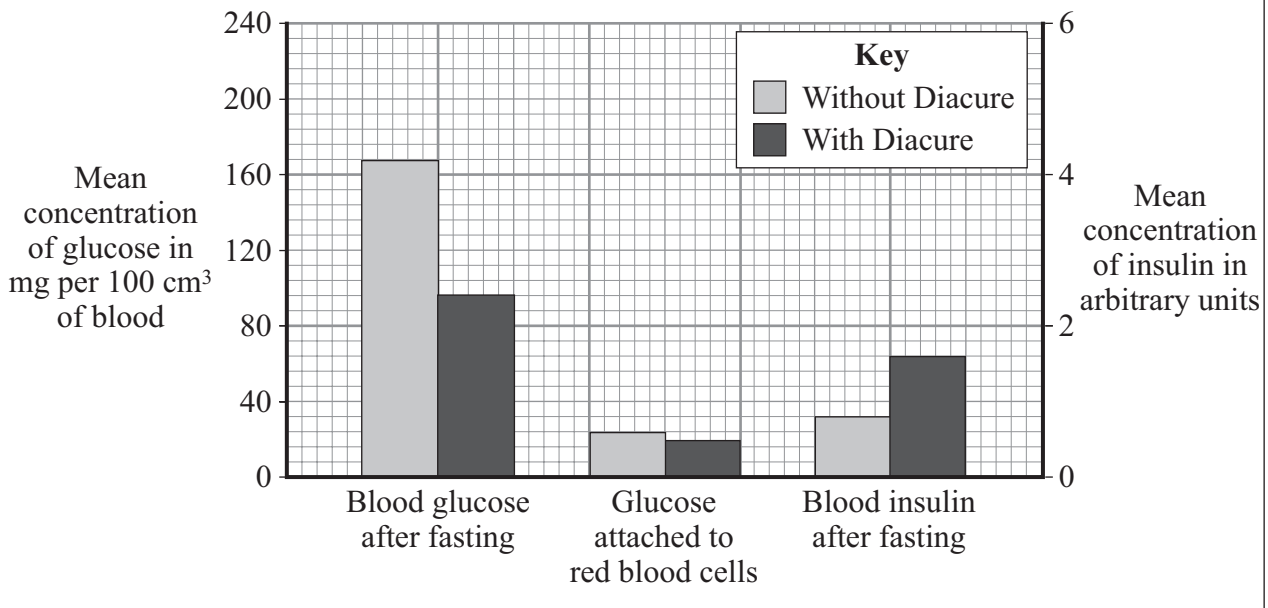
(1 mark)

7 (b) A person with diabetes can be monitored in three ways:

- measuring the blood glucose concentration after fasting (going without food for 12 hours)
- measuring the amount of glucose attached to red blood cells: this is a measure of the average blood glucose concentration over the previous three months
- measuring the concentration of insulin in the blood after fasting

The manufacturer of a new treatment for diabetes, called Diacure, publishes the following two claims.

1. **98.6% of all people who used Diacure reported an improvement in their condition.**
2. **An independent study of 30 diabetic patients showed a significant reduction in blood glucose concentrations and a significant increase in insulin production, as shown by the graph.**



4.2.2.3 Blood

Question 09 · continued

for mark

7 (b) (i) Which of the manufacturer's claims is **not** based on scientific evidence?

.....

.....

(1 mark)

7 (b) (ii) Why might the data in this study be unreliable?

.....

.....

.....

(1 mark)

7 (b) (iii) The manufacturer did **not** draw attention to the data for the amount of glucose attached to red blood cells.

Suggest an explanation for this.

.....

.....

.....

.....

.....

(2 marks)

7 (b) (iv) The study of diabetic patients was carried out by an independent company.

Why is it important that the study should be independent?

.....

.....

.....

(1 mark)

7

4.2.2.3 Blood

Question 10

January 2009 | BLY3F | Original Q1 | Legacy

1 (a) Draw a ring around **one** word to answer each of the following questions.

1 (a) (i) Which type of blood vessel carries blood out of the heart?

artery **capillary** **vein**

(1 mark)

1 (a) (ii) Which type of blood vessel allows substances to enter and leave the blood?

artery **capillary** **vein**

(1 mark)

1 (b) Use words from the box to complete the sentences.

alveoli	**cell membrane**	**nucleus**
plasma	**red blood cells**	**villi**

Oxygen enters the blood through the walls of the ..... .

Most of the oxygen transported by the blood is carried in the

..... .

A red blood cell is different from other body cells because it does not have a

..... .

(3 marks)

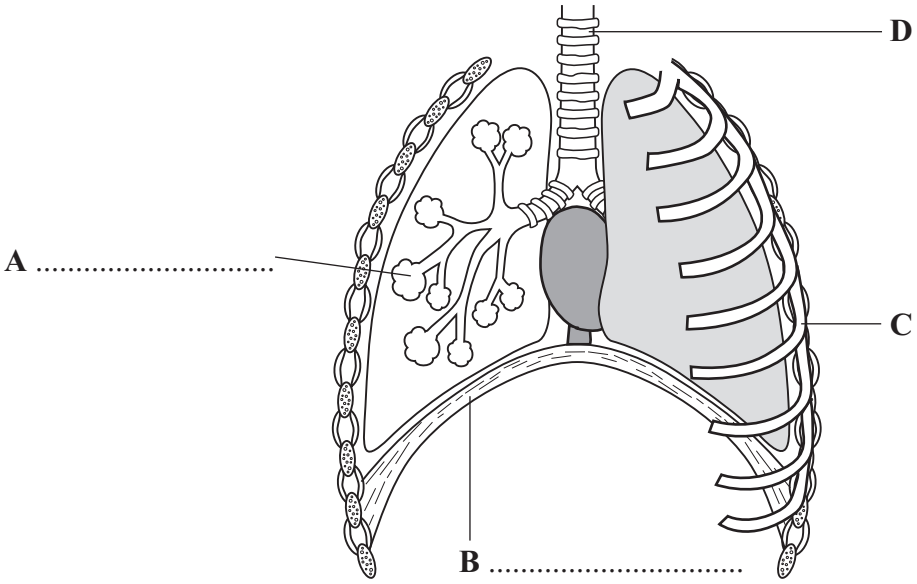
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4.2.2.3 Blood

Question 11

June 2009 | BLY3F | Original Q1 | Legacy

1 The diagram shows the human breathing system.



1 (a) On the diagram, label structures **A** and **B**.

Choose your answers from the words in the box.

alveolus	**capillary**	**diaphragm**	**rib**

(2 marks)

In the lungs, oxygen passes from the air into the blood.
Carbon dioxide passes from the blood into the air.

1 (b) Which letter, **A**, **B**, **C** or **D**, shows where oxygen enters the blood? ☐

(1 mark)

4.2.2.3 Blood

Question 11 · continued

for mark

1 (c) When oxygen enters the blood it combines with haemoglobin.

Draw a ring around the correct word or phrase to complete each sentence.

1 (c) (i) Haemoglobin is found in the

plasma
red blood cells
white blood cells

.

(1 mark)

1 (c) (ii) Most of the carbon dioxide is carried by the

plasma
red blood cells
white blood cells

.

(1 mark)

5

4.2.2.3 Blood

Question 12

June 2009 | BLY3F | Original Q2 | Legacy

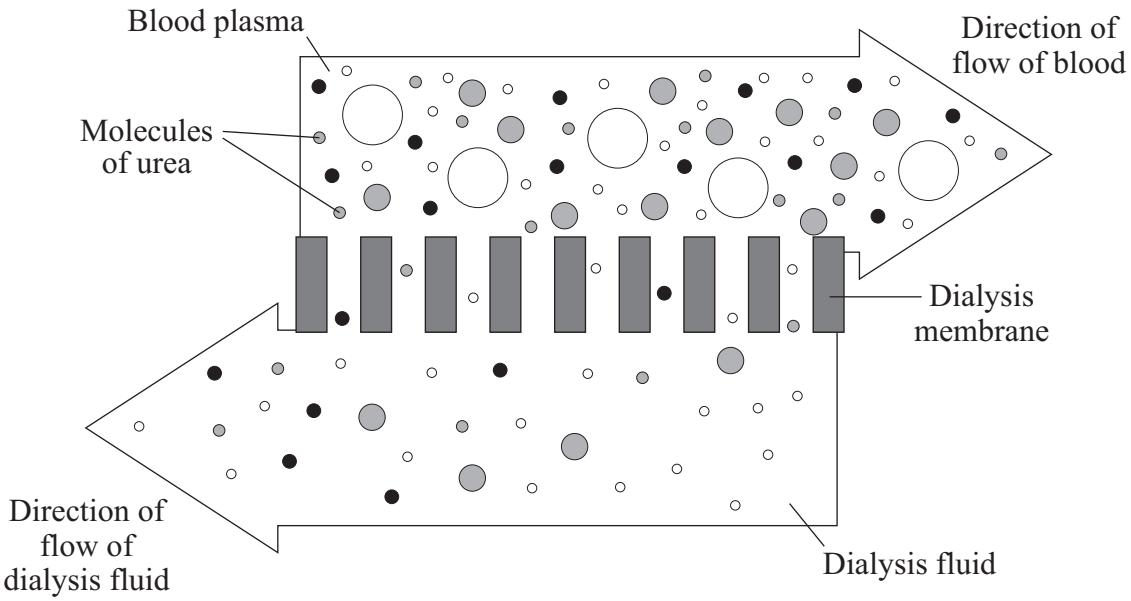
2 (a) Which **two** of the following substances are found in the urine of a healthy person?

Tick (✓) **two** boxes.

Glucose	☐
Mineral ions	☐
Proteins	☐
Water	☐

(2 marks)

2 (b) A person with kidney disease can be treated by dialysis.
The diagram shows how dialysis works.
The circles represent molecules of different substances.



Draw a ring around the correct word or phrase to complete each sentence.

2 (b) (i) During dialysis, urea moves out of the

blood cells
blood plasma
dialysis fluid

.

(1 mark)

4.2.2.3 Blood

Question 12 · continued

for mark

2 (b) (ii) During dialysis, urea moves into the [blood cells / blood plasma / dialysis fluid] .

(1 mark)

2 (b) (iii) Urea moves by the process of [diffusion / digestion / transpiration] .

(1 mark)

2 (b) (iv) To allow the movement of urea, the dialysis membrane is [impermeable / partially permeable / thick] .

(1 mark)

2 (b) (v) The urea can pass through the membrane because

the urea molecules are [large / round / small] .

(1 mark)

2 (c) For most patients a kidney transplant is better than continued dialysis treatment.

Tick (✓) **one** box to complete the sentence.

One major problem with a kidney transplant is that

drug treatment is needed to suppress the immune system. ☐

hospital visits are needed three times a week. ☐

yearly costs are higher than for dialysis. ☐

(1 mark)

8

4.2.2.3 Blood

Question 13

November 2009 | BLY1AP | Original Q3 | Legacy

QUESTION THREE

Infectious diseases make us feel ill.

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A antibody

B medicine

C pathogen

D toxin

	Description
1	drug used to relieve the symptoms of a disease
2	substance produced by white blood cells
3	harmful microorganism
4	poison which makes us feel ill

4.2.2.3 Blood

Question 14

January 2010 | BLY1F | Original Q3 | Legacy

3 Vaccines protect us against diseases.

3 (a) Against which **three** diseases does the MMR vaccine protect us?

Tick (✓) **three** boxes.

- Malaria ☐
- Measles ☐
- Meningitis ☐
- Mumps ☐
- Rabies ☐
- Rubella ☐

(3 marks)

3 (b) Draw a ring around the correct word to complete the sentence.

Vaccines cause white blood cells to produce

antibodies.
cholesterol.
penicillin.

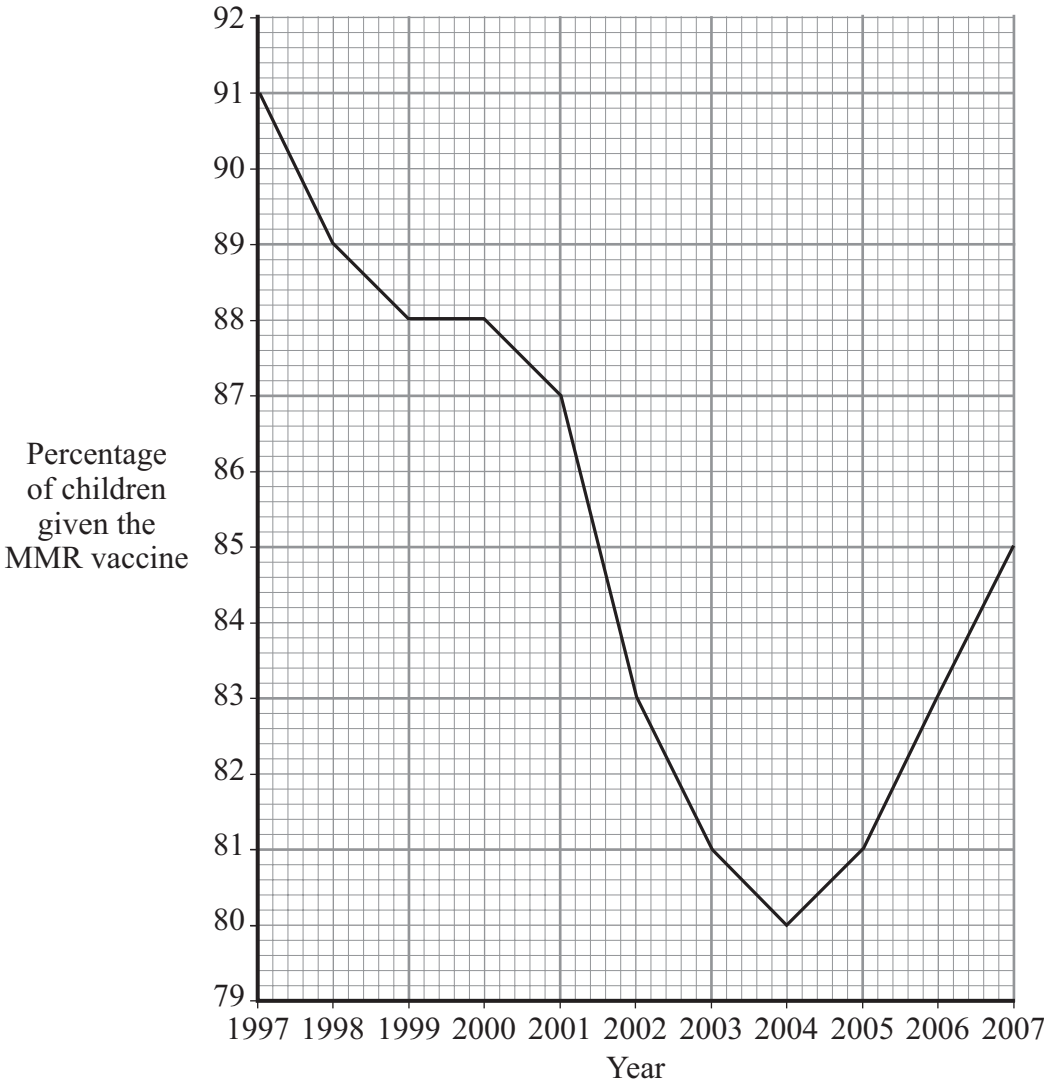
(1 mark)

4.2.2.3 Blood

Question 14 · continued

for mark

The graph shows the percentage of children given the MMR vaccine in the UK between 1997 and 2007.



3 (c) (i) Describe the pattern shown by the data on the graph.

.....

.....

.....

.....

(2 marks)

3 (c) (ii) Suggest **one** explanation for the change in the percentage of children given the MMR vaccine between 1997 and 2004.

.....

.....

(1 mark)

7

4.2.2.3 Blood

Question 15

March 2010 | BLY1AP | Original Q8 | Legacy

QUESTION EIGHT

Measles is a dangerous viral disease which kills about one person in every 1000 people infected. It gives long-term complications for many others. Worldwide, almost 350 000 people, mainly of school age, are killed by measles every year.

After a UK health scare, some parents refused to have their children vaccinated.

In England and Wales:

- in 2006 there were 756 cases of measles
- in 2007 there were 971 cases of measles
- in 2008 there were more than 1300 cases of measles.

8A Approximately how many people are **infected** by measles across the world each year?

1 971

2 350 000

3 350 000 000

4 It is impossible to tell from the data.

8B The rise in the number of people suffering from measles in the UK in recent years . . .

1 can be described as a pandemic.

2 is due to measles viruses mutating.

3 is due to antibiotic resistance.

4 can be described as an epidemic.

4.2.2.3 Blood

Question 15 · continued

March 2010 | BLY1AP | Original Q8 | Legacy

8C White blood cells can protect us from pathogens.

Which row in the table shows the way(s) in which this protection can occur?

	Ingesting pathogens	Producing antitoxins	Producing antibodies
1	✓	✓	✗
2	✓	✗	✓
3	✗	✓	✓
4	✓	✓	✓

8D School-age children are more likely to catch measles than adults.

This is because . . .

1 large numbers of children are often close together.

2 children have a poorly developed immune system.

3 the virus multiplies in the soil in playing fields.

4 new vaccines are less effective than older ones in protecting against measles.

4.2.2.3 Blood

Question 16

June 2010 | BLY3F | Original Q6 | Legacy

6 The table shows the concentrations of some substances in the blood plasma, kidney filtrate and urine of one person.

Substance	Concentration in grams per dm^3		
	Plasma	Filtrate	Urine
Protein	78.0	0.0	0.0
Glucose	0.8	0.8	0.0
Urea	0.3	0.3	20.0
Sodium ions	2.8	2.8	3.5

6 (a) Draw a ring around the correct answer to complete each sentence.

6 (a) (i) Protein is **not** found in the filtrate.

This is because protein molecules are

too large to pass through the filter.

used up in respiration.

reabsorbed into the blood.

(1 mark)

6 (a) (ii) Glucose is found in the filtrate but **not** in the urine.

This is because glucose is

too large to pass through the filter.

used up in respiration.

passed through the filter, then reabsorbed into the blood.

(1 mark)

4.2.2.3 Blood

Question 16 · continued

6 (a) (iii) The concentration of urea is much higher in the urine than in the filtrate.

This is because

- urea is made by the kidney.
- water is reabsorbed from the filtrate into the blood.
- glucose and salts are reabsorbed from the filtrate into the blood.

(1 mark)

6 (a) (iv) The fluid entering the bladder

will contain

- water, protein, glucose, urea and sodium ions.
- water, urea and sodium ions.
- water, glucose, urea and sodium ions.

(1 mark)

6 (b) An athlete ran a 10-kilometre race on a cold day. He then ran the same race on a hot day. He ate and drank the same on each day.

Draw a ring round the correct answer to complete each sentence.

6 (b) (i) On the **hot** day this athlete will produce

- more urine.
- less urine.
- the same amount of urine.

(1 mark)

6 (b) (ii) On the **hot** day the athlete's urine will be

- more concentrated.
- less concentrated.
- the same concentration.

(1 mark)

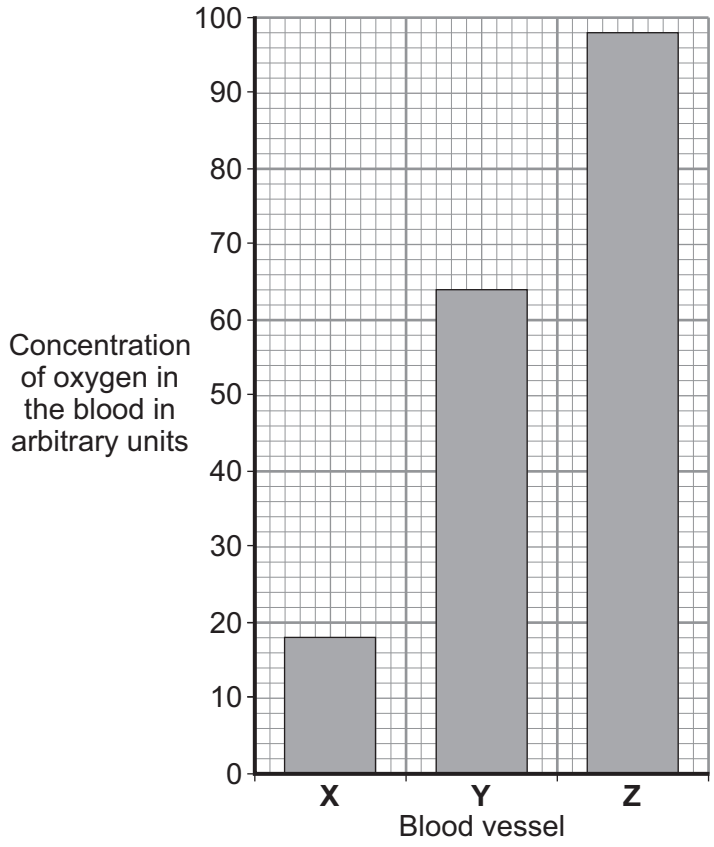
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4.2.2.3 Blood

Question 17

January 2011 | BLY3F | Original Q3 | Legacy

3 The bar chart shows the concentration of oxygen in the blood in three different blood vessels, **X**, **Y** and **Z**.



3 (a) (i) What is the concentration of oxygen in blood vessel **X**?

Answer ..... arbitrary units.

(1 mark)

3 (a) (ii) Which blood vessel, **X**, **Y** or **Z**, carries blood from the lungs to the heart?

(1 mark)

4.2.2.3 Blood

Question 17 · continued

3 (b) Draw a ring around the correct answer to complete each sentence.

3 (b) (i) Most of the oxygen in the blood is carried by the

plasma.

red blood cells.

white blood cells.

(1 mark)

3 (b) (ii) Oxygen combines with a coloured pigment in the blood.

This coloured pigment is called

alveoli.

haemoglobin.

lactic acid.

(1 mark)

4

Turn over for the next question

4.2.2.3 Blood

Question 18

June 2011 | BLY1F | Original Q9 | Legacy

9 The body's immune system protects us from diseases.

Describe the different ways in which white blood cells protect us from infectious diseases.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

4

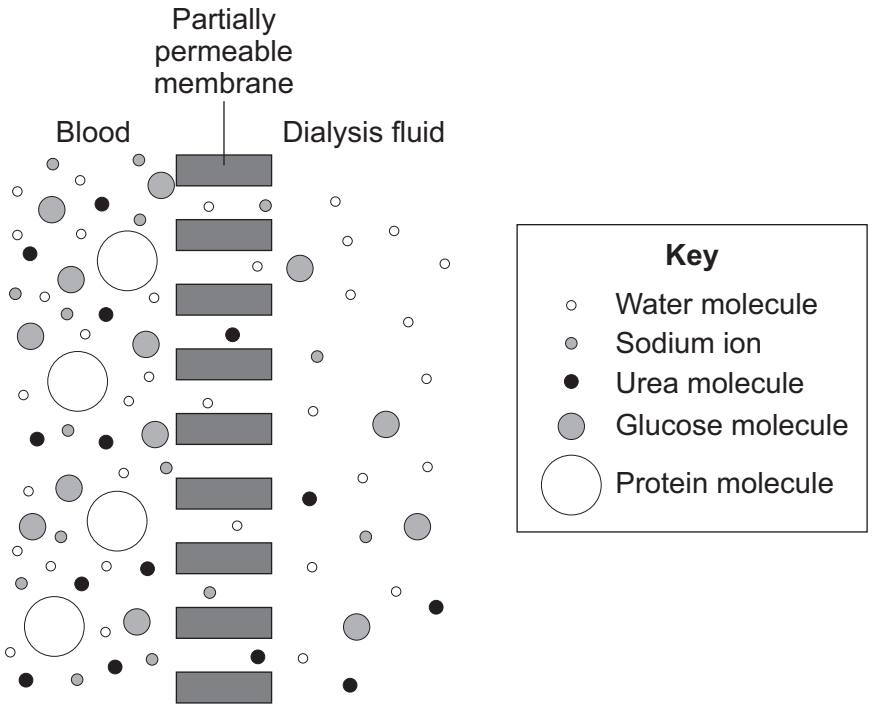
4.2.2.3 Blood

Question 19

June 2011 | BLY3F | Original Q6 | Legacy

6 Dialysis can be used to treat a person with kidney disease.

The diagram shows blood and dialysis fluid separated by a partially permeable membrane.



Blood plasma and dialysis fluid contain several substances dissolved in water.

The table shows the concentrations of some of these substances in dialysis fluid and in the blood plasma of a person with kidney disease immediately before dialysis.

Substance	Concentration of substance in grams per dm^3	
	Blood plasma of person with kidney disease	Dialysis fluid
Sodium ions	3.26	3.15
Urea	0.45	0.00
Glucose	0.90	0.99
Protein	60.00	0.00

6 (a) Protein molecules are **not** able to move from the blood to the dialysis fluid.
Use information from the diagram to explain why.

.....

.....

(1 mark)

4.2.2.3 Blood

Question 19 · continued

June 2011 | BLY3F | Original Q6 | Legacy

6 (b) Urea molecules move from the blood into the dialysis fluid.

6 (b) (i) Give the name of this type of movement. .....
(1 mark)

6 (b) (ii) Why do the urea molecules move in this direction?

Use information from the table to help you to answer this question.

.....

.....
(1 mark)

6 (c) The concentration of sodium ions in the blood plasma will change during dialysis.

Suggest a value for the concentration of sodium ions in the plasma at the end of dialysis.

Use information from the table.

Concentration of sodium ions = ... grams per dm^3
(1 mark)

6 (d) For most patients a kidney transplant is better than continued treatment by dialysis.

6 (d) (i) Give **two** advantages of having a kidney transplant rather than treatment by dialysis.

1 .....

.....

2 .....

.....
(2 marks)

6 (d) (ii) Give **two** possible disadvantages of having a kidney transplant.

1 .....

.....

2 .....

.....
(2 marks)

8

4.2.2.3 Blood

Question 20

November 2011 | BLY1AP | Original Q2 | Legacy

QUESTION TWO

Infectious diseases make us feel ill.

Match words, **A**, **B**, **C** and **D**, with the numbers **1**–**4** in the sentences.

A antibodies

B antibiotics

C toxins

D painkillers

Bacteria make us feel ill because bacteria produce . . . **1** . . . .

To kill bacteria, a doctor might give a patient . . . **2** . . . .

To kill bacteria, our white blood cells produce . . . **3** . . . .

To relieve disease symptoms quickly, a doctor might give a patient . . . **4** . . . .

Turn over for the next question

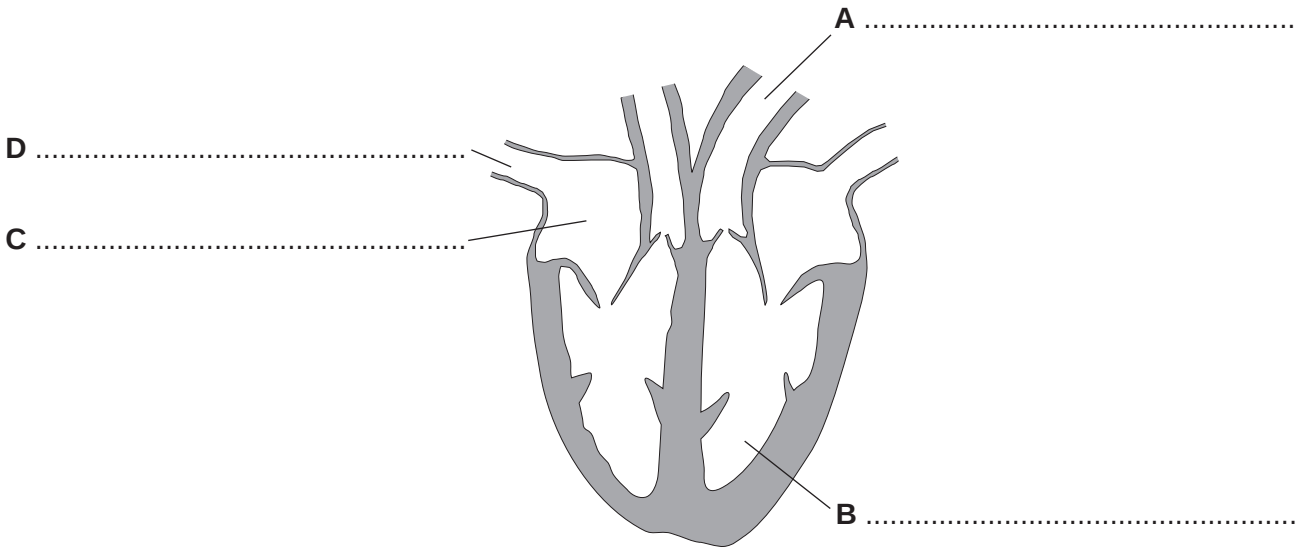
4.2.2.3 Blood

Question 21

June 2013 | BL3FP | Original Q5 | Legacy

5 **Diagram 1** shows a section through the heart.

Diagram 1



5 (a) Use words from the box to label parts **A**, **B**, **C** and **D**.

artery	**atrium**	**capillary**	**platelet**	**vein**	**ventricle**

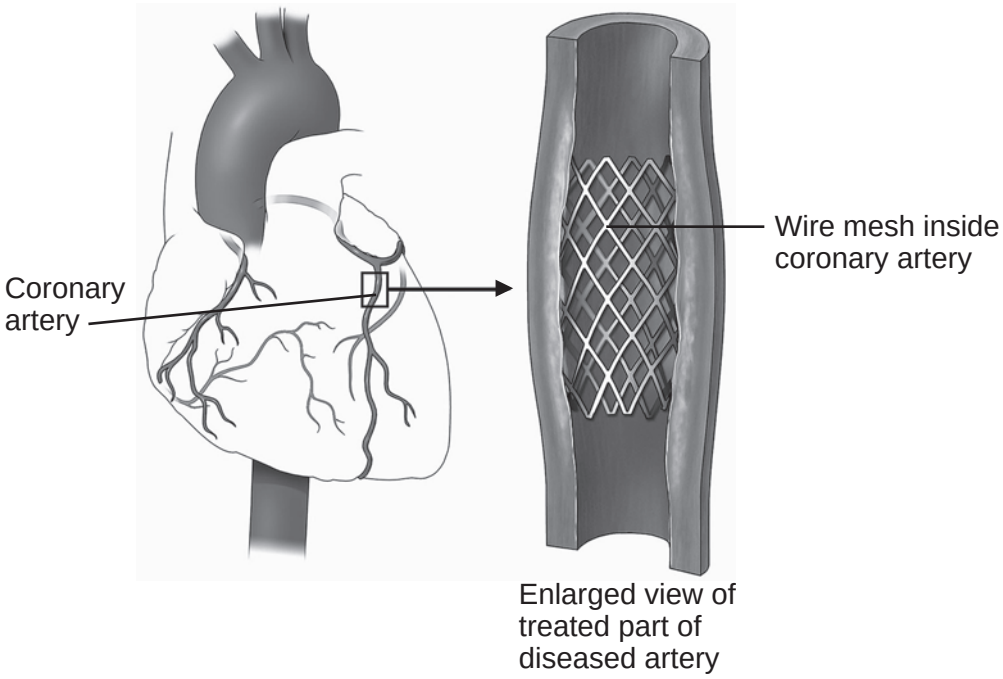
(4 marks)

4.2.2.3 Blood

Question 21 · continued

5 (b) **Diagram 2** shows one treatment for a diseased coronary artery.

Diagram 2



5 (b) (i) Name the treatment shown in **Diagram 2**.

.....

(1 mark)

5 (b) (ii) Explain how the treatment works.

.....

.....

.....

.....

(2 marks)

7

4.2.2.3 Blood

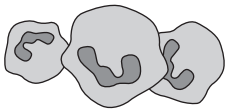
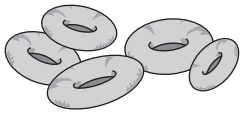
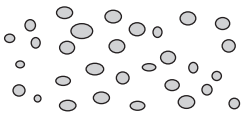
Question 22

June 2014 | BL3FP | Original Q1 | Legacy

1 (a) (i) Blood is part of the circulatory system.

Draw **one** line from each part of the blood to its correct function.

[3 marks]

Part of the blood	Function
 White blood cells	carry glucose around the body
 Red blood cells	carry oxygen around the body
 Platelets	help the blood to clot
	destroy microorganisms

1 (a) (ii) Name **one** waste product that is transported by the blood plasma.

[1 mark]

.....

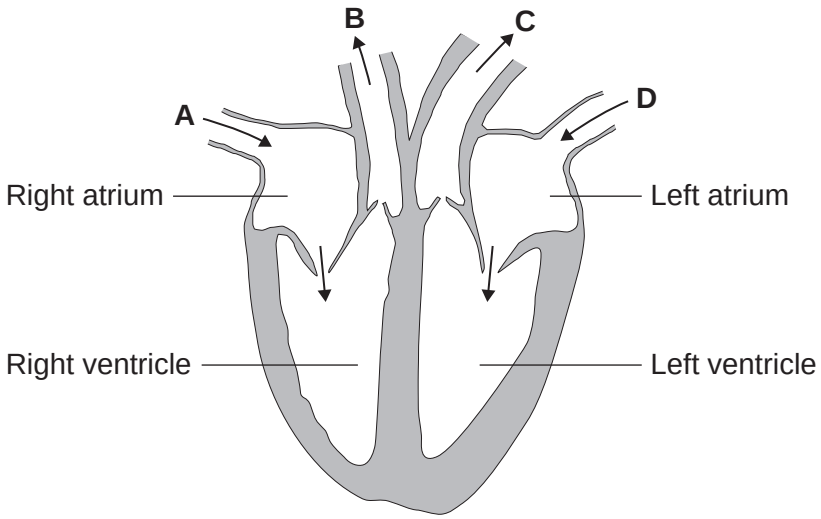
4.2.2.3 Blood

Question 22 · continued

1 (b) The heart is also part of the circulatory system.

Figure 1 shows a section through the human heart.

Figure 1



1 (b) (i) Which arrow, **A**, **B**, **C** or **D**, shows blood leaving the heart in the pulmonary artery to go to the lungs? ☐

[1 mark]

1 (b) (ii) Which arrow, **A**, **B**, **C** or **D**, shows blood from the lungs entering the heart in the pulmonary vein? ☐

[1 mark]

1 (b) (iii) Valves in the circulatory system make sure blood only travels in one direction.

Name the type of blood vessel that has valves.

[1 mark]

.....

Question 1 continues on the next page

4.2.2.3 Blood

Question 22 · continued

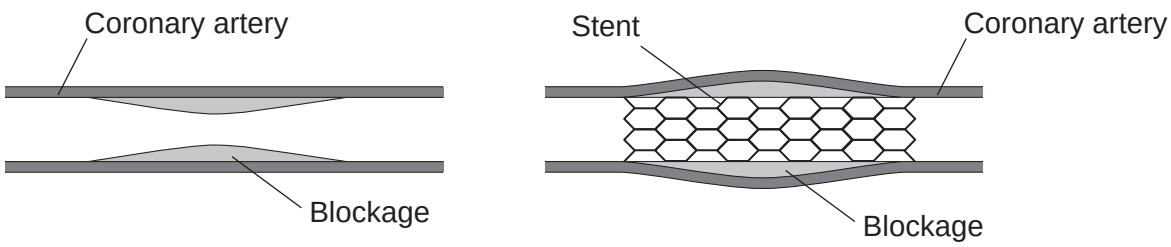
1 (c) A person's coronary artery has become narrower.

The person has a heart attack.

A doctor puts a stent into the person's coronary artery.

Figure 2 shows a stent inside a coronary artery.

Figure 2



1 (c) (i) How does the stent help to prevent another heart attack?

Give **one** way.

[1 mark]

.....

.....

4.2.2.3 Blood

Question 22 · continued

1 (c) (ii) **Figure 3** shows a surgeon putting a stent into a patient.

Figure 3



The surgeon puts the stent into an artery in the leg. He moves the stent through the artery to the coronary artery.

Suggest **two** possible risks of this operation.

[2 marks]

1 .....

.....

2 .....

.....

10

4.2.2.3 Blood

Question 23

June 2014 | BL3FP | Original Q3 | Legacy

3 Substances can move into cells and out of cells.

3 (a) Draw a ring around the correct answer to complete each sentence.

[2 marks]

Water moves into cells and out of cells by

- active transport.
- osmosis.
- reabsorption.

The water moves through a

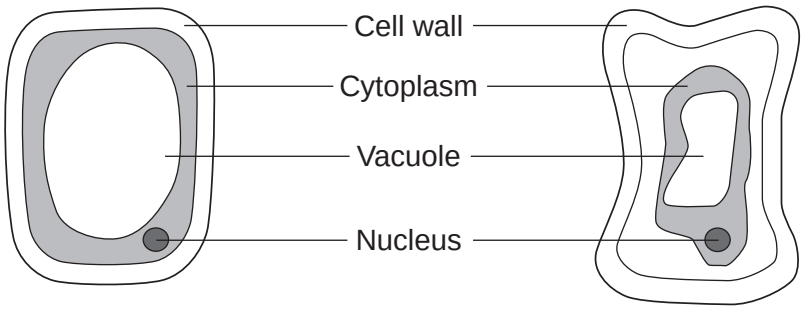
- freely permeable
- non-permeable
- partially permeable

membrane.

3 (b) Students put plant cells into two different strengths of sugar solutions, **A** and **B**.

Figure 5 shows what the cells looked like after 1 hour.

Figure 5



Cell in sugar solution **A** (after 1 hour)

Cell in sugar solution **B** (after 1 hour)

3 (b) (i) Describe **two** ways in which the cell in sugar solution **B** is different from the cell in sugar solution **A**.

[2 marks]

1 .....

.....

2 .....

.....

4.2.2.3 Blood

Question 23 · continued

3 (b) (ii) A student put red blood cells into water.

Suggest what would happen to the cells.

[1 mark]

.....

.....

.....

3 (c) In the human body, glucose is absorbed into the blood from the small intestine.

The small intestine contains many villi.

Which **two** of the following help the absorption of glucose in the small intestine?

Tick (✓) **two** boxes.

[2 marks]

Villi have a cell wall. ☐

Villi are covered in thick mucus. ☐

Villi give the small intestine a large surface area. ☐

Villi have many blood capillaries. ☐

7

4.2.2.3 Blood

Question 24

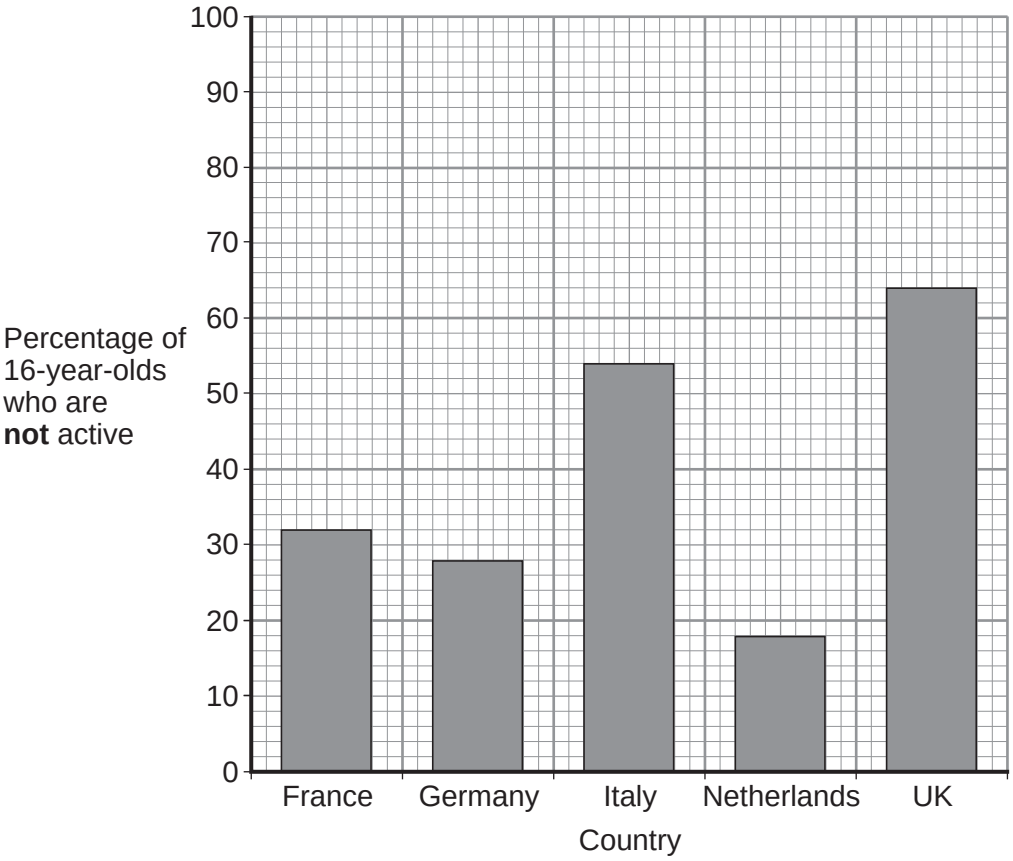
June 2015 | BL1FP | Original Q2 | Legacy

2 Scientists investigated the effect of different factors on health.

2 (a) People who are **not** active may have health problems.

Figure 3 shows the percentage of 16-year-olds in some countries who are **not** active.

Figure 3



2 (a) (i) What percentage of 16-year-olds in the UK are **not** active?

[1 mark]

..... %

2 (a) (ii) What percentage of 16-year-olds in the UK are **active**?

[1 mark]

..... %

4.2.2.3 Blood

Question 24 · continued

2 (a) (iii) A newspaper headline states:

People in the UK are the laziest in the world.

Information in **Figure 3** does **not** support the newspaper headline.

Suggest **one** reason why the newspaper headline may be wrong.

[1 mark]

.....

.....

2 (b) Doctors gave a percentage rating to the health of 16-year-olds.
100% is perfect health.

Table 2 shows the amount of exercise 16-year-olds do and their health rating.

Table 2

Amount of exercise done in minutes every week	Health rating as %
Less than 30	72
90	76
180	82
300	92

What conclusion can be made about the effect of exercise on health?

Use information from **Table 2**.

[1 mark]

.....

.....

Question 2 continues on the next page

4.2.2.3 Blood

Question 24 · continued

2 (c) Inherited factors can also affect health.

Give **one** health problem that may be affected by the genes someone inherits.

Draw a ring around the correct answer.

[1 mark]

being malnourished	**having a high cholesterol level**	**having a deficiency disease**

2 (d) White blood cells are part of the immune system.

Use the correct answer from the box to complete each sentence.

antibiotics	**antibodies**	**pathogens**	**vaccines**

2 (d) (i) When we are ill, white blood cells produce ..... to kill microorganisms.

[1 mark]

2 (d) (ii) Many strains of bacteria, including MRSA, have developed resistance to drugs called ..... .

[1 mark]

7

4.2.2.3 Blood

Question 25

June 2015 | BL3FP | Original Q8 | Legacy

8 The circulatory system transports substances such as glucose and oxygen around the body.

8 (a) Name **two** other substances that the circulatory system transports around the body.

[2 marks]

1 .....

2 .....

8 (b) (i) Blood is a tissue. Blood contains red blood cells and white blood cells.

Name **two** other components of blood.

[2 marks]

1 .....

2 .....

8 (b) (ii) The heart is part of the circulatory system.

What type of tissue is the wall of the heart made of?

[1 mark]

.....

Question 8 continues on the next page

4.2.2.3 Blood

Question 25 · continued

8 (c) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Every year, many patients need to have heart valve replacements.

Figure 9 gives information about two types of heart valve.

Figure 9

Living human heart valve	Cow tissue heart valve
• It has been used for transplants for more than 12 years. • It can take many years to find a suitable human donor. • It is transplanted during an operation after a donor has been found. • During the operation, the patient's chest is opened and the old valve is removed before the new valve is transplanted.	• It has been used since 2011. • It is made from the artery tissue of a cow. • It is attached to a stent and inserted inside the existing faulty valve. • A doctor inserts the stent into a blood vessel in the leg and pushes it through the blood vessel to the heart.

A patient needs a heart valve replacement. A doctor recommends the use of a cow tissue heart valve.

Give the advantages and disadvantages of using a cow tissue heart valve compared with using a living human heart valve.

Use information from **Figure 9** and your own knowledge in your answer.

[6 marks]

.....

.....

.....

.....

.....

.....

.....

.....

4.2.2.3 Blood

Question 26

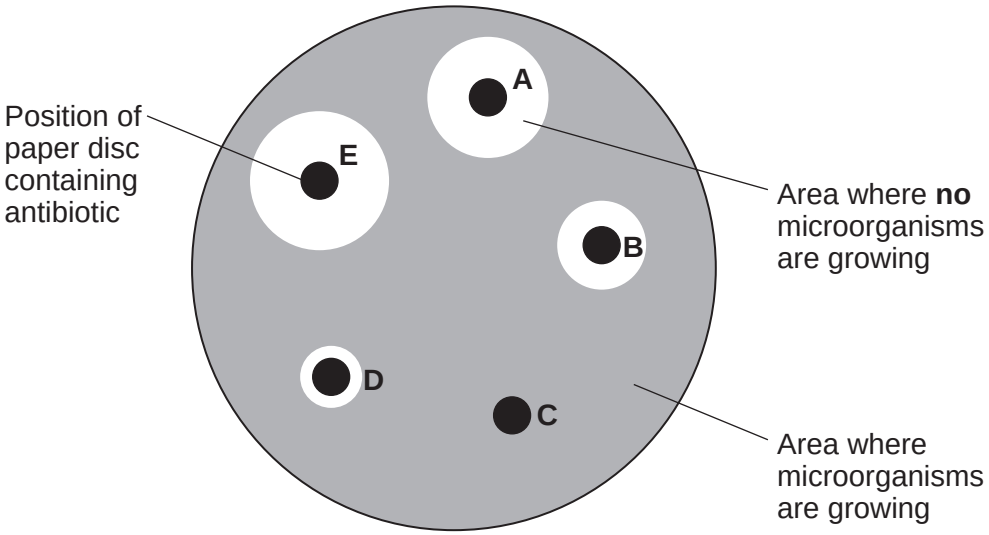
5 Some students investigated antibiotics.

The students:

- spread one type of microorganism on a sterile Petri dish containing an agar culture medium
- added five paper discs, each with one drop of a different antibiotic, **A**, **B**, **C**, **D** and **E**
- secured the lid on the dish with adhesive tape
- incubated the dish for 3 days at 25° C.

Figure 6 shows the Petri dish after the 3 days.

Figure 6



5 (a) Give **one** safety precaution that the students used in their investigation.

State why this safety precaution is needed.

[2 marks]

Safety precaution used _____

_____

Why the safety precaution is needed _____

_____

Question 26 · continued

5 (b) One student made a conclusion:

'Doctors should always give antibiotic **E** to get rid of any disease.'

5 (b) (i) Describe the evidence from **Figure 6** which supports the student's conclusion.

[1 mark]

_____

_____

5 (b) (ii) Suggest **one** reason why the student's conclusion may **not** be correct.

[1 mark]

_____

_____

5 (c) Antibiotics can be given to farm animals as well as to humans.

Table 2 shows the mass of different antibiotics that have been given to farm animals and to humans.

Table 2

Antibiotic	Mass of antibiotic in kilograms	
	Given to farm animals	Given to humans
A	121 600	314 500
B	323 000	47 500
C	37 000	5 400
D	71 200	47 700
E	42 000	49 000

5 (c) (i) Write down **all** of the antibiotics, **A**, **B**, **C**, **D** or **E**, which have been used **more** for farm animals than for humans.

[1 mark]

_____

Question 5 continues on the next page

4.2.2.3 Blood

Question 26 · continued

5 (c) (ii) Farmers in some countries use antibiotics to prevent disease in farm animals. This prevents the animals becoming ill or dying.

Suggest **one** other advantage to the farmer of giving antibiotics to farm animals.

[1 mark]

Tick (✓) **one** box.

The antibiotics will be passed to people who consume the animals. ☐

Healthy animals will produce a higher yield. ☐

The antibiotics will build up in the animals. ☐

5 (c) (iii) What is the possible effect of using too much antibiotic?

[1 mark]

Tick (✓) **one** box.

Animals become resistant to the antibiotic. ☐

Microorganisms become resistant to the antibiotic. ☐

People become immune to the antibiotic. ☐

People become resistant to the antibiotic. ☐

5 (d) The human body defends itself against pathogens using one type of blood cell.

5 (d) (i) Complete the sentence.

[1 mark]

Pathogens in the body can be killed by _____ blood cells.

4.2.2.3 Blood

Question 26 · continued

5 (d) (ii) Give **two** ways in which the blood cells you have named in part **(d)(i)** protect the body from disease.

[2 marks]

Tick (✓) **two** boxes.

These blood cells produce antibiotics. ☐

These blood cells produce antibodies. ☐

These blood cells ingest pathogens. ☐

These blood cells reproduce pathogens. ☐

These blood cells produce toxins. ☐

10

4.2.2.3 Blood

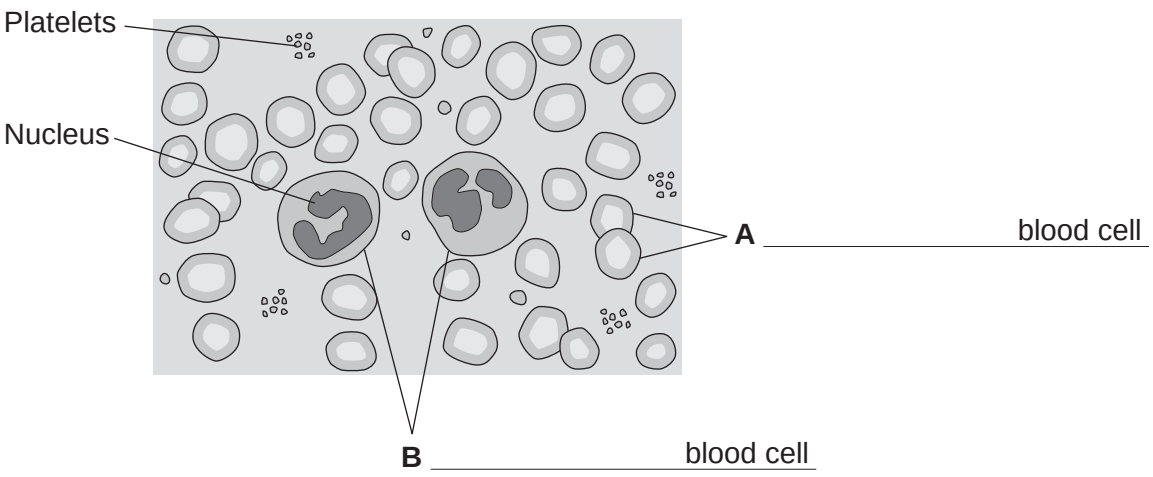
Question 27

June 2017 | BL3FP | Original Q3 | Legacy

3 Blood is a tissue.

Figure 4 is a diagram of the parts of the blood.

Figure 4



3 (a) **A** and **B** are different types of blood cell.

Label cells **A** and **B** in **Figure 4**.

[2 marks]

3 (b) A man has a bad cut on his arm that continues to bleed.

The man goes to hospital and has a blood test.

Table 1 shows the results of the man's blood test.

Table 1

Blood test results

Test	Normal range	Result	Healthy	Abnormal
Platelets	140 – 400	98		✓
Cholesterol	112 – 328	297	✓	
Iron	12 – 300	120	✓	

4.2.2.3 Blood

Question 27 · continued

3 (b) (i) Use information from **Table 1** and your own knowledge to explain why the man's cut does not stop bleeding.

[2 marks]

_____

_____

_____

_____

_____

3 (b) (ii) The doctor gives the man a blood transfusion.

Suggest why the blood needs to be the same blood group as the man.

[1 mark]

Tick (✓) **one** box.

So the donor is not harmed ☐

To prevent rejection of the new blood cells ☐

To reduce the number of blood cells ☐

To suppress the immune system ☐

3 (c) Blood plasma carries substances around the body.

Use the correct answers from the box to complete the sentences.

[3 marks]

bladder	**carbon dioxide**	**kidneys**	**lungs**
oxygen	**small intestine**	**starch**	

Blood plasma carries _____ from the organs to the lungs.

Blood plasma carries the soluble products of digestion from the _____ to other organs.

Blood plasma carries urea from the liver to the _____ to be removed.

8

4.2.2.3 Blood

Question 28

June 2018 | 8461/1F | Original Q4

0 4 This question is about the circulatory system.

0 4 . 1 Draw **one** line from each blood component to its function.

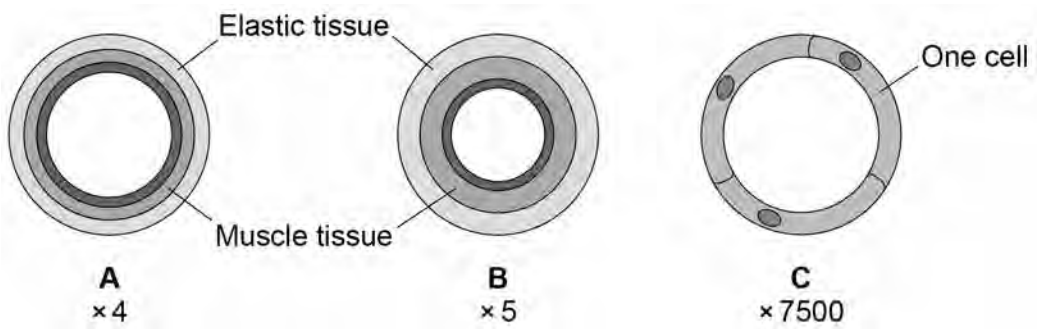
[3 marks]

Blood component	Function
Platelet	Destroys microorganisms
Red blood cell	Helps the blood to clot
White blood cell	Transports glucose around the body
	Transports oxygen around the body
	Transports urea

Question 4 continues on the next page

0 4 . 2 **Figure 6** shows cross sections of the three main types of blood vessel found in the human body. Each blood vessel is drawn to the scale shown.

Figure 6



Which blood vessel has the smallest diameter?

[1 mark]

Tick **one** box.

A		B		C	

0 4 . 3 Which blood vessel in **Figure 6** is an artery?

Give **one** reason for your answer.

[2 marks]

Blood vessel: _____

Reason: _____

_____

Question 28 · continued

Table 1 gives information about the blood flow in two people.

Table 1

Person	Blood flow through the coronary arteries in cm^3/minute
A - does **not** have coronary heart disease	250
B - has coronary heart disease	155

0 4 . 4 Calculate the difference in blood flow between person **A** and person **B**.

[1 mark]

Difference = _____ cm^3/minute

0 4 . 5 Suggest why blood flow through the coronary arteries is lower in people with coronary heart disease.

[1 mark]

0 4 . 6 Calculate the volume of blood flowing through the coronary arteries of person **A** in 1 hour.

Give your answer in dm^3.

[2 marks]

Volume of blood in 1 hour = _____ dm^3

Question 28 · continued

Coronary heart disease can be treated by:

- inserting a stent
- using a Coronary Artery Bypass Graft (CABG).

Table 2 gives information about each method.

Table 2

	Stent	CABG
Procedure	The patient is awake during the procedure. A small cut is made in the skin. A wire mesh is inserted into the coronary artery via a blood vessel in the arm or leg.	The patient is not awake during the procedure. The chest is cut open. A section of blood vessel from the arm or leg is removed. It is used to create a new channel for blood to bypass the blockage in the coronary artery.
When procedure is recommended	When only one blockage is present	When multiple blockages are present
Time spent in hospital after procedure	2-3 hours	at least 7 days
Recovery time after procedure	7 days	12 weeks
Risk of heart attack during procedure	1%	2%
Chance of failure within one year	40%	5%

0 4 . 7 Give **two** advantages of using a stent instead of CABG.

[2 marks]

1 _____

_____

2 _____

_____

4.2.2.3 Blood

Question 28 · continued

0 4 . 8 Give **two** advantages of using CABG instead of a stent.

[2 marks]

1 _____

_____

2 _____

_____

14

Turn over for the next question

4.2.2.3 Blood

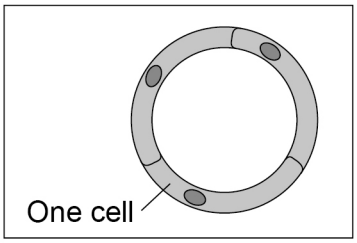
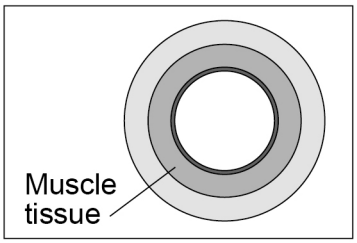
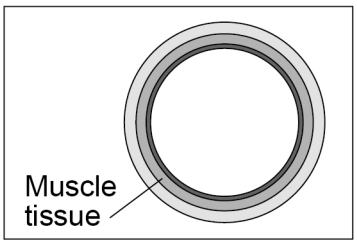
Question 29

November 2020 | 8461/1F | Original Q6

0 6 Blood is transported around the body in blood vessels.

0 6 . 1 Draw **one** line from each type of blood vessel to the structure of the blood vessel.

[2 marks]

Type of blood vessel	Structure of blood vessel
Artery	
Capillary	
Vein	

0 6 . 2 Explain how the structure of an artery is related to its function.

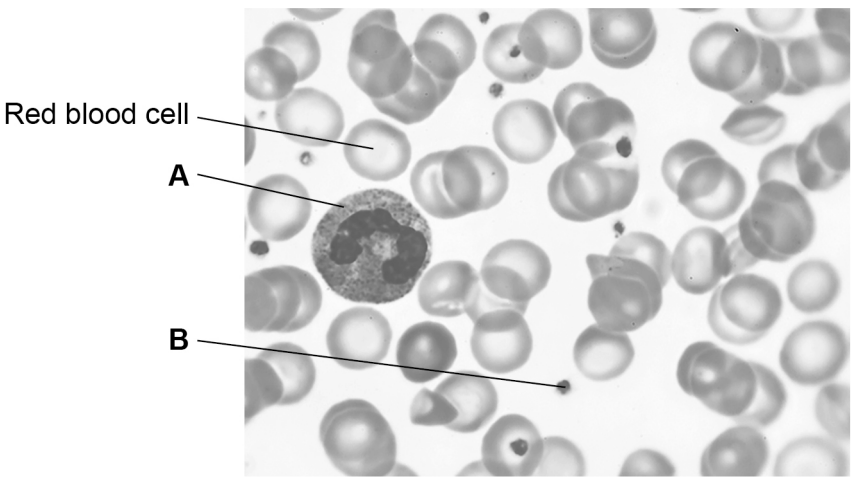
[2 marks]

4.2.2.3 Blood

Question 29 · continued

Figure 9 shows blood viewed through a microscope.

Figure 9



0 6 . 3 Name **A** and **B** in **Figure 9**.

[2 marks]

A _____

B _____

0 6 . 4 A red blood cell:

- has no nucleus
- contains a red pigment called haemoglobin.

Suggest how these adaptations help the red blood cell carry out its function.

[2 marks]

No nucleus _____

_____

Haemoglobin _____

_____

4.2.2.3 Blood

Question 29 · continued

0 6 . 5 The blood components are carried around the body in the liquid part of the blood.

What is the liquid part of the blood called?

[1 mark]

Tick (✓) **one** box.

Cell sap ☐

Plasma ☐

Saliva ☐

Urine ☐

Table 2 shows the results of a man's blood test.

Table 2

Blood component	Patient results	Normal range
Red blood cells	4.8	4.5 to 6.5
Lymphocytes	2.6	1.0 to 4.0
Neutrophils	5.1	1.8 to 7.5
Platelets	50	140 to 400

0 6 . 6 Which component of the man's blood is **not** within the normal range?

[1 mark]

0 6 . 7 Suggest a symptom the man might show.

[1 mark]

11

4.2.2.3 Blood

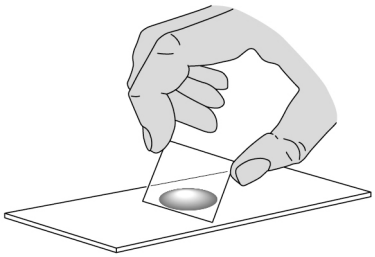
Question 30

November 2021 | 8461/1F | Original Q7

0 7 A student prepared some animal cells to view using a microscope.

Figure 14 shows the student preparing the cells.

Figure 14



0 7 . 1 Name **two** pieces of laboratory equipment the student could have used to **prepare** cells to view using a microscope.

[2 marks]

1 _____

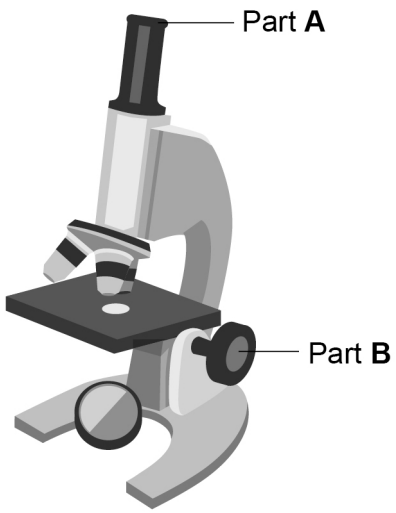
2 _____

4.2.2.3 Blood

Question 30 · continued

Figure 15 shows the student's light microscope.

Figure 15



0 7 . 2 Name part **A**.

[1 mark]

0 7 . 3 What is the function of part **B**?

[1 mark]

0 7 . 4 The student tried to look at the cells using the microscope.

Suggest **one** reason why the student could **not** see any cells when looking through part **A**.

[1 mark]

Question 7 continues on the next page

4.2.2.3 Blood

Question 30 · continued

0 7 . 5 Red blood cells are specialised animal cells.

Compare the structure of a red blood cell with the structure of a plant cell.

[6 marks]

0 7 . 6 When placed into a beaker of water:

- a red blood cell bursts
- a plant cell does **not** burst.

Explain why the red blood cell bursts but the plant cell does **not** burst.

[2 marks]

13

4.2.2.3 Blood

Question 31

June 2022 | 8461/1F | Original Q1

0 1 HIV (Human Immunodeficiency Virus) is a pathogen.

0 1 . 1 How is HIV spread from one person to another person?

[1 mark]

Tick (✓) **one** box.

Coughing ☐

Sexual intercourse ☐

Touching door handles ☐

Table 1 shows information about new cases of HIV diagnosed in the UK.

Table 1

Year	Number of new HIV cases
2010	2642
2014	2767
2018	1530

0 1 . 2 Describe what happened to the number of new cases of HIV from 2010 to 2018.

[2 marks]

4.2.2.3 Blood

Question 31 · continued

0 1 . 3 What could cause a **decrease** in the number of new HIV cases in the future?

[1 mark]

Tick (✓) **one** box.

A higher population of people in the UK ☐

A lower number of trained HIV nurses ☐

Better education on how to prevent the spread of HIV ☐

0 1 . 4 Scientists have been working to produce a vaccine for HIV for many years.

How could a vaccine work to prevent a person being infected with HIV?

Write the stages **A**, **B**, **C**, **D** and **E** in the correct order.

[3 marks]

The first stage has been completed for you.

A Antibodies attach to the inactive virus.

B Antibodies destroy the inactive virus.

C An inactive form of the virus is injected into the body.

D If the active virus enters the body, antibodies are produced quickly.

E White blood cells produce antibodies to the inactive virus.

C → _____ → _____ → _____ → _____

Question 1 continues on the next page

4.2.2.3 Blood

Question 31 · continued

0 1 . 5 When scientists produce a vaccine for a disease the vaccine is tested on live animals.

What is the next stage in testing the vaccine?

[1 mark]

Tick (✓) **one** box.

- Testing on cells in a laboratory ☐
- Testing on healthy volunteers ☐
- Testing on the whole human population ☐

0 1 . 6 A vaccine for HIV is important because it is difficult to develop safe drugs to destroy viruses.

Why is it difficult to develop safe drugs to destroy viruses?

[1 mark]

Tick (✓) **one** box.

- Drugs that destroy viruses also damage body tissues. ☐
- There are too many viruses for the drugs to destroy. ☐
- Viruses are too big for the drugs to destroy. ☐

4.2.2.3 Blood

Question 31 · continued

0 1 . 7 Some drugs originated from plants.

Draw **one** line from each drug to the plant the drug originated from.

[2 marks]

Drug	Plant the drug originated from
Aspirin	Foxglove
	Rose
Digitalis	Tobacco
	Willow

11

4.2.2.3 Blood

Question 32

June 2023 | 8461/1F | Original Q4

0 4 Malaria is caused by a protist.

The protist is passed from one person to another person by mosquitos.

0 4 . 1 Which term describes the mosquito?

[1 mark]

Tick (✓) **one** box.

Bacterium ☐

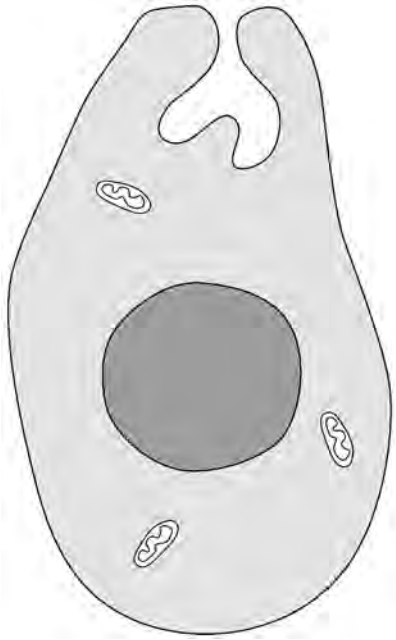
Gene ☐

Vector ☐

0 4 . 2 The malarial protist is a eukaryotic cell.

Figure 2 shows a malarial protist.

Figure 2



4.2.2.3 Blood

Question 32 · continued

Give **two** features of the malarial protist that show the cell is eukaryotic and **not** prokaryotic.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 3 Which organism is prokaryotic?

[1 mark]

Tick (✓) **one** box.

Cow ☐

Grass ☐

Salmonella ☐

0 4 . 4 The malarial protist reproduces asexually.

What is a feature of asexual reproduction?

[1 mark]

Tick (✓) **one** box.

Only one parent is involved. ☐

The offspring show genetic variation. ☐

Two gametes fuse. ☐

Question 4 continues on the next page

4.2.2.3 Blood

Question 32 · continued

0 4 . 5 Mitosis occurs in the malarial protist during asexual reproduction.

The protist has 14 chromosomes.

How many chromosomes will each new protist cell have after mitosis?

[1 mark]

Tick (✓) **one** box.

7 ☐ 14 ☐ 21 ☐ 28 ☐

0 4 . 6 When a person has malaria, the protists destroy red blood cells.

What change would happen in the blood of a person with malaria?

[1 mark]

Tick (✓) **one** box.

Decreased antibodies ☐

Decreased haemoglobin ☐

Increased plasma ☐

Increased platelets ☐

0 4 . 7 It is estimated that 210 million people are infected with malaria every year. Half of these infected people survive the disease.

Calculate how many people would survive the disease in 3 years if the estimate is correct.

Give your answer in standard form.

[4 marks]

Number of people (in standard form) = _____

0 4 . 8 The spread of malaria can be controlled by using mosquito nets to avoid being bitten.

Describe **two** other ways that people can reduce the chance of being bitten by mosquitos.

Do **not** refer to mosquito nets in your answer.

[2 marks]

1 _____

2 _____

Question 4 continues on the next page

4.2.2.3 Blood

Question 32 · continued

0 4 . 9 Different types of disease may interact.

Scientists studied how having disorder **S** interacts with malaria.

The scientists calculated the chance of children with disorder **S** getting malaria.

Table 4 shows the results.

Table 4

Age in years	Percentage (%) chance of children with disorder S getting malaria
2	70
4	65
6	50
8	45

Describe the trend shown in **Table 4**.

Use data from **Table 4**.

[2 marks]

15

4.2.2.3 Blood

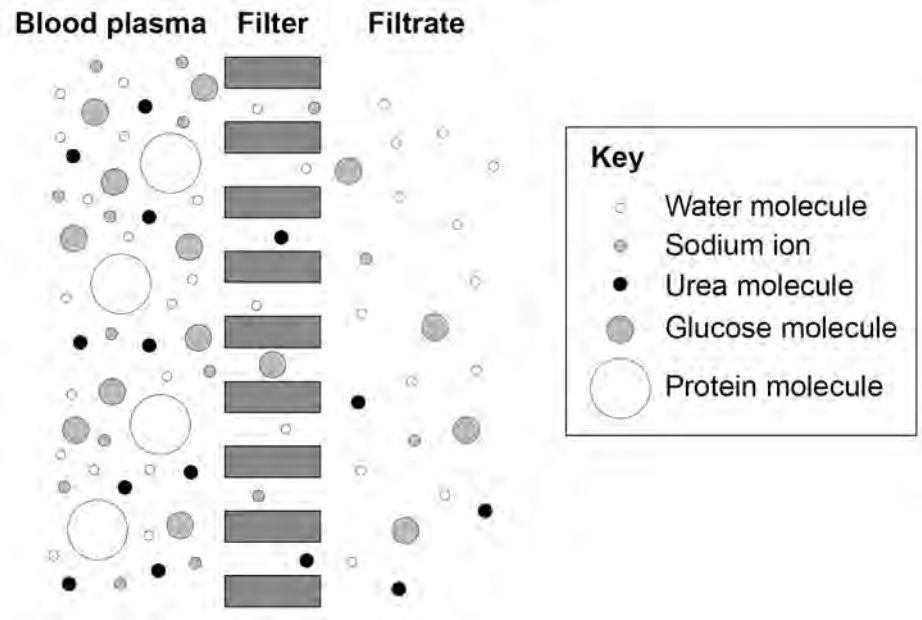
Question 33

June 2023 | 8461/2F | Original Q6

0 6 The kidneys filter the blood.

Figure 10 shows filtration in the kidney.

Figure 10



0 6 . 1 Glucose molecules are found in the blood plasma **and** in the filtrate.

Protein molecules are **only** found in the blood plasma.

Draw **one** line from each substance to the reason for where the substance is found.

[2 marks]

Substance	Reason
Glucose	The molecules are too large to pass through the filter
	The molecules are small enough to pass through the filter
Protein	
	The molecules are too small to pass through the filter

4.2.2.3 Blood

Question 33 · continued

0 6 . 2 The kidneys control the volume of water in the body.

Table 4 shows information about a person on one day.

Table 4

	Volume in dm^3
Water filtered from blood	160.0
Water lost in urine	1.9

Calculate the volume of water reabsorbed into the blood.

[1 mark]

Volume = _____ dm^3

Question 6 continues on the next page

4.2.2.3 Blood

Question 33 · continued

0 6 . 3 A person with kidney disease may be treated by dialysis or by having a kidney transplant.

Figure 11 gives information about dialysis and kidney transplants.

Figure 11

Dialysis

- A person needs 3 dialysis sessions a week, with each session lasting about 8 hours.
- Most patients have dialysis in hospital.
- Protein and salt levels in food must be kept low.
- Dialysis costs £35 000 per year for each patient.

Kidney transplant

- In a surgical operation the use of a general anaesthetic can occasionally cause damage to other organs.
- After a transplant the patient must take drugs for the rest of their life to suppress the immune system.
- A transplant costs £17 000 in the first year and then £5 000 in each of the following years for drugs.
- The transplanted kidney will work well for about 10 years.

4.2.2.3 Blood

Question 33 · continued

A doctor states:

‘It is better to treat a person with kidney disease by using a kidney transplant rather than by dialysis.’

Evaluate the doctor’s statement.

Use information from **Figure 11**.

[6 marks]

Question 6 continues on the next page

4.2.2.3 Blood

Question 33 · continued

0 6 . 4 A kidney transplant costs £17 000 in the first year and then £5 000 in each of the following years for drugs.

Calculate the total cost of treatment by kidney transplant over the first 5 years.

[3 marks]

Total cost = £ _____

12

4.2.2.3 Blood

Question 34

0 3 Measles is caused by a virus.

0 3 . 1 The measles vaccine is given to children to prevent them becoming ill with measles.

Draw **one** line from each blood component to its function when someone is vaccinated against measles.

[2 marks]

Blood component	Function
	Help clot the blood where the vaccine was injected
Platelets	Produce antibodies to the measles virus
White blood cells	Produce the measles skin rash
	Transport oxygen to the measles virus

Question 3 continues on the next page

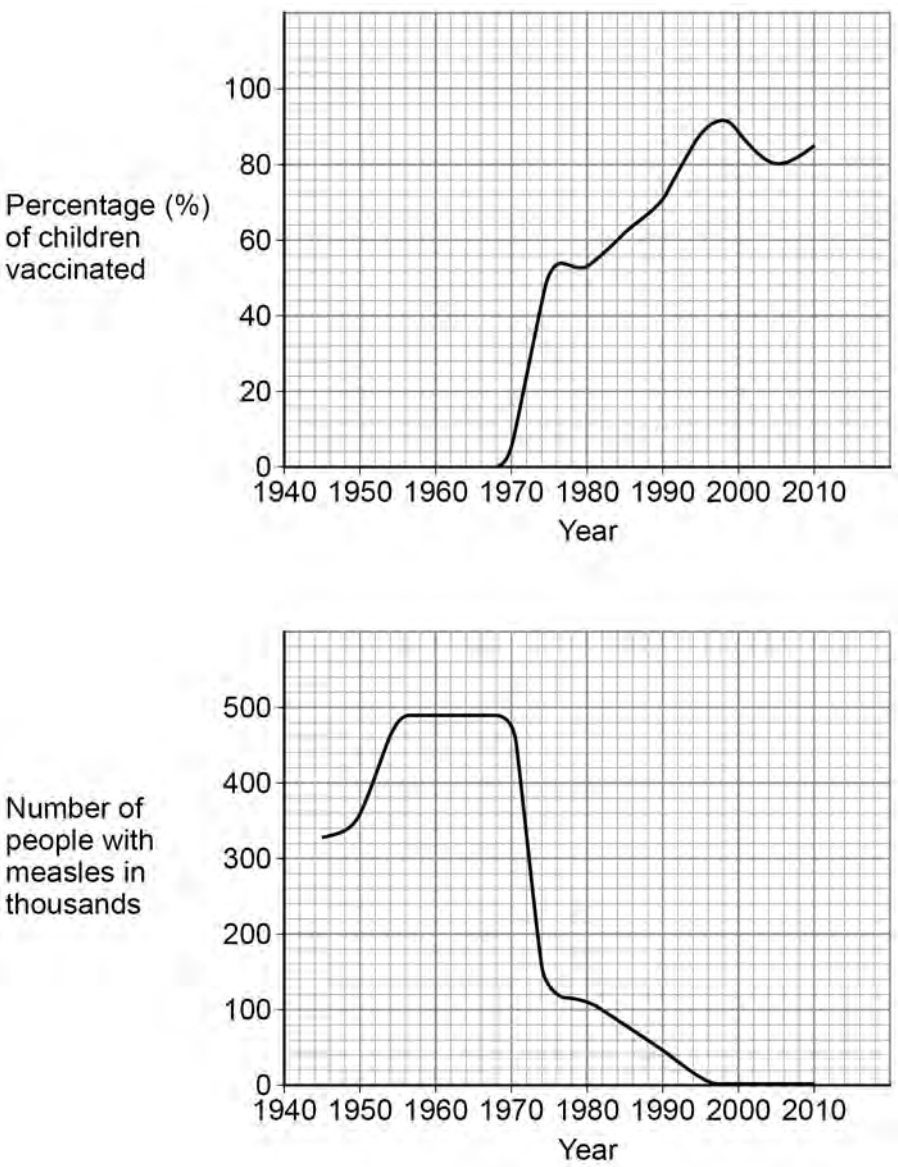
4.2.2.3 Blood

Question 34 · continued

Figure 3 shows information about trends in the UK for:

- percentage of children vaccinated
- the number of people with measles.

Figure 3



4.2.2.3 Blood

Question 34 · continued

0 3 . 2 What year was the measles vaccine first used?

Use **Figure 3**.

[1 mark]

0 3 . 3 Describe the trend in the **number of people with measles** from 1945 to 1975.

Use **Figure 3**.

[3 marks]

In **1998**, a scientific paper was published suggesting a link between condition **X** and one type of measles vaccine.

0 3 . 4 What happened to the **percentage of children vaccinated** against measles after the scientific paper was published in 1998?

Use **Figure 3**.

[1 mark]

Question 3 continues on the next page

4.2.2.3 Blood

Question 34 · continued

0 3 . 5 Why might the claims made in the scientific paper have affected the percentage of children vaccinated?

[1 mark]

Tick (✓) **one** box.

- The measles pathogen did not exist in the UK anymore. ☐
- Parents were worried their children would get condition **X**. ☐
- The health service in the UK did not have any vaccines. ☐

0 3 . 6 In 2010, the scientific paper linking condition **X** and the measles vaccine was shown to be based on false claims.

What should scientists do with scientific research to help detect false claims?

[1 mark]

Tick (✓) **one** box.

- Have the research peer reviewed. ☐
- Publish the research on the internet. ☐
- Send a research questionnaire to the public. ☐

0 3 . 7 The person who wrote the scientific paper was paid to research the link between condition **X** and the measles vaccine.

Why are the claims in the scientific paper likely to be considered **not** valid?

[1 mark]

10

4.2.2.3 Blood

Question 35

0 3 Blood contains different types of cell.

0 3 . 1 Complete the sentences.

Choose answers from the box.

[2 marks]

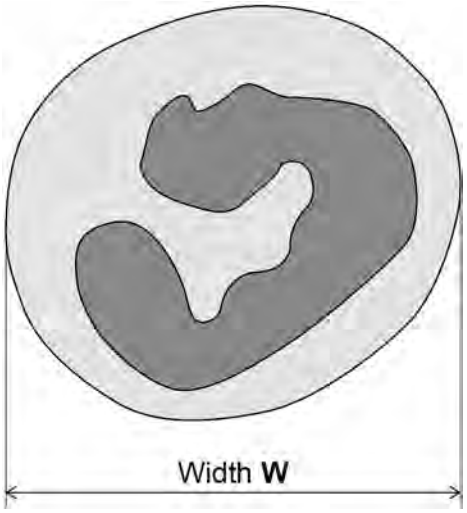
antibiotics	**antitoxins**	**painkillers**	**pathogens**

White blood cells defend the body against _____.

Some white blood cells release chemicals that neutralise toxins. These chemicals are called _____.

0 3 . 2 **Figure 3** shows a white blood cell.

Figure 3



The image of the white blood cell in **Figure 3** is magnified 4000 times.

4.2.2.3 Blood

Question 35 · continued

Calculate the real width of the white blood cell.

[4 marks]

Complete the following steps.

Measure width **W** in millimetres (mm).

Width **W** = _____ mm

Convert your measurement to micrometres (µm).

1 millimetre (mm) = 1000 micrometres (µm).

_____

_____

Width **W** in micrometres = _____ µm

Calculate the real width of the white blood cell.

Use the equation:

$$\text{real width} = \frac{\text{width } \mathbf{W} \text{ (µm)}}{\text{magnification}}$$

_____

_____

_____

_____

Real width = _____ µm

Question 35 · continued

Table 3 shows information about different types of blood vessel.

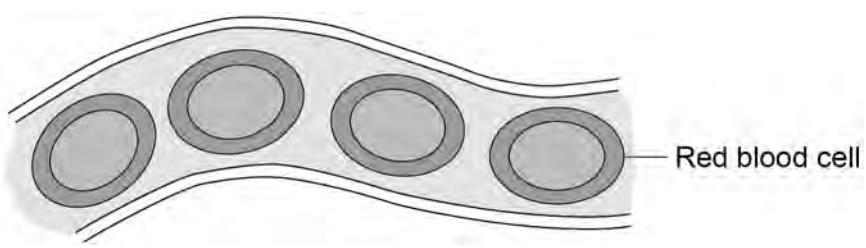
Table 3

Blood vessel	Width of blood vessel in micrometres (µm)	Pressure of blood travelling through the blood vessel
Artery	10 000	High
Capillary	10	Low
Vein	20 000	Very low

0 3 . 3 The width of a red blood cell is 8 µm.

Figure 4 shows red blood cells in one type of blood vessel.

Figure 4



Which type of blood vessel is shown in **Figure 4**?

Use **Table 3**.

[1 mark]

Tick (✓) **one** box.

Artery ☐

Capillary ☐

Vein ☐

4.2.2.3 Blood

Question 35 · continued

0 3 . 4 Explain why arteries need to have thick walls.

Use **Table 3**.

[2 marks]

Coronary arteries in the heart can become narrowed.

0 3 . 5 What happens inside coronary arteries to cause them to become narrowed?

[1 mark]

0 3 . 6 Explain why narrowed coronary arteries can be dangerous.

[2 marks]

Question 3 continues on the next page

4.2.2.3 Blood

Question 35 · continued

0 3 . 7 Treatments are available for some cardiovascular diseases.

Draw **one** line from each cardiovascular disease to a treatment for the disease.

[3 marks]

Cardiovascular disease	Treatment
A blocked coronary artery	Antibiotics
Heart failure	Heart transplant
High blood cholesterol	Statins
	Stent

0 3 . 8 Why is coronary heart disease described as a 'non-communicable disease'?

[1 mark]

_____

_____

16