

Organisation – GCSE Biology Paper 1

1. No.1

0	1
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Plants are made of cells, tissues and organs.

0	1	.	1
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Which part of a plant is the largest?

[1 mark]Tick (✓) **one** box.

A guard cell

☐

A leaf

☐

A root hair

☐

Students investigated the effect of concentration of salt solution on the mass of pieces of potato.

This is the method used.

1. Cut two pieces of potato to the same size.
2. Record the mass of each piece of potato.
3. Place one piece of potato into a beaker containing a dilute salt solution.
4. Place the other piece of potato into a beaker containing a concentrated salt solution.
5. After 20 minutes, remove each piece of potato from its solution.
6. Record the change in mass of each piece of potato.
7. Repeat steps 1 to 6 two more times.

Table 1 shows the results.

Table 1

Solution	Change in mass of piece of potato in grams			
	Test 1	Test 2	Test 3	Mean
Dilute salt solution	1.1	1.1	1.4	X
Concentrated salt solution	−7.2	−6.8	−32.4	−7.0

0 1 . 2 Calculate mean value **X** in **Table 1**.

[2 marks]

X = _____ grams

There is an anomalous result for the concentrated salt solution in **Table 1**.

0 1 . 3 Draw a ring around the anomalous result in **Table 1**.

[1 mark]

0 1 . 4 What did the students do with the anomalous result when calculating the mean in **Table 1**?

[1 mark]

0 1 . 5 What name is given to a variable that is kept the same during an investigation?

[1 mark]

Tick (✓) **one** box.

Control variable

☐

Dependent variable

☐

Independent variable

☐

0 1 . 6

One variable the students kept the same during the investigation was the size of the pieces of potato.

Which other variable did the students keep the same?

[1 mark]

Tick (✓) **one** box.

Change in mass of pieces of potato

☐

Concentration of salt solution

☐

Time in the salt solution

☐

0 1 . 7

The pieces of potato in the concentrated salt solution decreased in mass.

Complete the sentence.

Choose the answer from the box.

[1 mark]

excretion

osmosis

respiration

Water moved out of the potato by the process of _____.

0 1 . 8 The potato cells have a partially permeable membrane.

Which particles can pass through a partially permeable membrane?

[1 mark]

Tick (✓) **one** box.

No particles

☐

Some particles

☐

All particles

☐

0 1 . 9 How could the students improve their investigation?

[1 mark]

Tick (✓) **one** box.

Boil the pieces of potato at the start.

☐

Leave the skin on some pieces of potato.

☐

Use more concentrations of salt solution.

☐

2. No.5

0 5

This question is about food and digestion.

0 5

. 1

Proteins are needed to make new body cells by mitosis.

Give **one** reason why a person needs new body cells.

[1 mark]

0 5

. 2

What are proteins made of?

[1 mark]

Tick (✓) **one** box.

Amino acids

☐

Fatty acids

☐

Glucose

☐

Starch

☐

0 5

. 3

Which chemical is used to test for protein in food?

[1 mark]

Tick (✓) **one** box.

Benedict's reagent

☐

Biuret reagent

☐

Ethanol

☐

0 5 . 4

What colour would be seen in a positive test for protein?

[1 mark]

Tick (✓) **one** box.

Black

☐

Purple

☐

Red

☐

White

☐

Enzymes break down food molecules in the human body.

0 5 . 5

Characteristics of enzymes are linked to their function.

Draw **one** line from each characteristic to its effect on enzyme function.

[2 marks]

Characteristic**Effect on enzyme function**

Has a special shape

Only fits one molecule

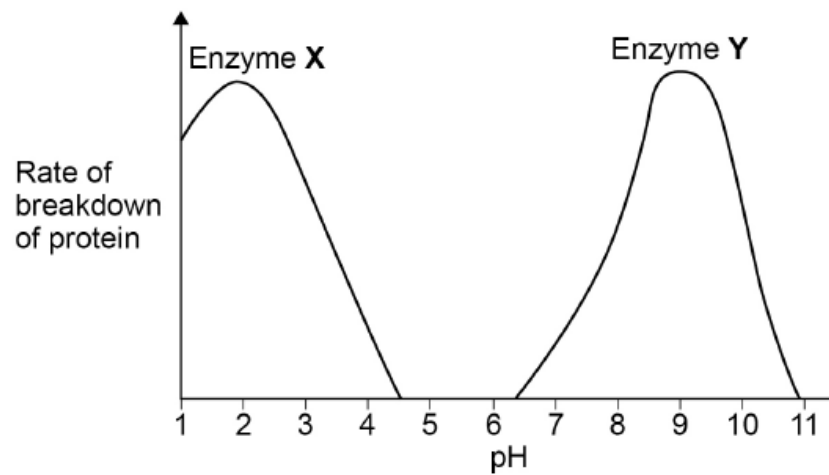
Speeds up reactions

Is a catalyst

Works fast at high pH

Figure 3 shows how pH affects the rate of breakdown of protein.

Figure 3



0 5 . 6 Which pH does enzyme Y work fastest at?

[1 mark]

pH = _____

0 5 . 7 Explain why enzyme X works best in the stomach.

[2 marks]

0 5 . 8

Complete the sentences.

Choose answers from the box.

[2 marks]

active site

antigen

glucose

starch

substrate

Enzyme Y does **not** break down protein at pH 6 because the shape of the enzyme has changed.

The part of the enzyme that changes shape is

the _____.

The change in shape means the enzyme cannot bind to

the _____.

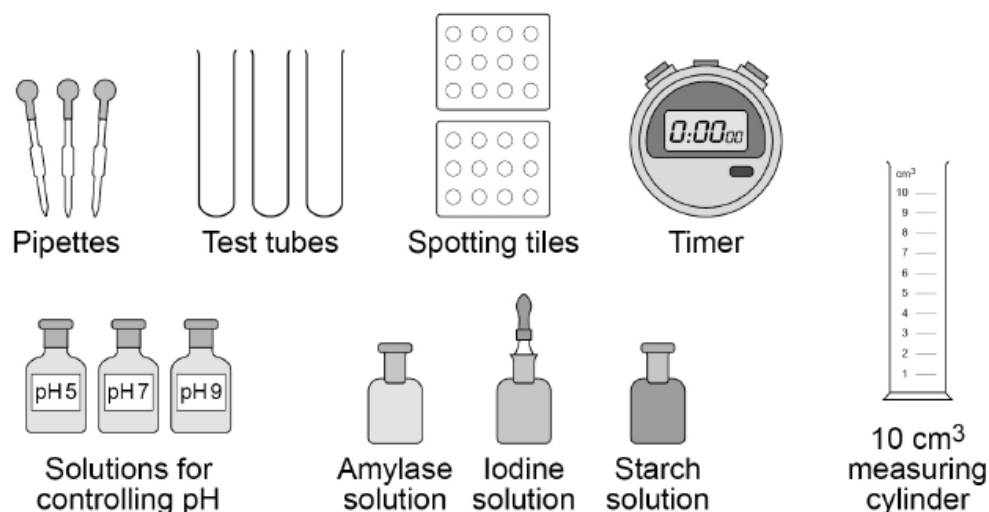
05.9

Amylase is an enzyme which breaks down starch.

A student investigated the effect of pH on the rate of starch breakdown by amylase.

Figure 4 shows some of the apparatus the student used.

Figure 4



Describe a method to investigate the effect of pH on the rate of starch breakdown by amylase.

You should include the apparatus shown in Figure 4.

[6 marks]

3. No.6

0 6

A root is a plant organ.

Plant roots contain many different types of tissue.

0 6 . 1

What is a tissue?

[1 mark]

0 6 . 2

Tissue in the tip of a plant root contains stem cells.

Stem cells can differentiate into any type of cell.

Name the type of tissue in plants that contains stem cells.

[1 mark]

In the past many drugs were extracted from plants.

0 6 . 3

Aspirin is a painkiller.

Which plant does aspirin originate from?

[1 mark]

Scientists have extracted chemical **A** from the deadly nightshade plant.

Chemical **A** can be used as a painkiller.

Table 5 shows information about where chemical **A** is found.

Table 5

Part of deadly nightshade plant	Mass of chemical A in 100 g of plant tissue in grams
Roots	1.3
Leaves	1.2
Berries	0.7

0 6 . 4

The scientists usually extract chemical **A** from the berries of the deadly nightshade plant.

Suggest **one** reason why berries are used instead of leaves or roots.

[1 mark]

A deadly nightshade plant has chlorosis (yellow leaves).

The mass of chemical **A** found in the leaves of the plant is 60% of the mass shown in **Table 5**.

0 6 . 5

Calculate the mass of chemical **A** in 200 g of the leaves with chlorosis.

Give your answer in mg.

[4 marks]

Mass of chemical **A** = _____ mg

0 6 . 6

Suggest **one** reason why the leaves of the deadly nightshade plant have chlorosis.

[1 mark]

Chemical **A** has **not** been tested in large-scale clinical trials in the UK.

0 6 . 7

It is important for drugs to be tested in clinical trials before the drugs are approved for use by the public.

Give **two** reasons why.

[2 marks]

1 _____

2 _____

There are many online reports making claims about the effects of chemical **A**.

Some of these reports are biased.

0 6 . 8

Suggest **one** reason why a report making claims about the effects of chemical **A** may be biased.

[1 mark]

0 6 . 9

How can scientists be sure that claims about new drugs are valid?

[1 mark]

Tick (✓) **one** box.

Advertise the claims on social media.

☐

Ask an international company to produce the drug.

☐

Have the claims peer reviewed.

☐

Publish the claims in a newspaper.

☐

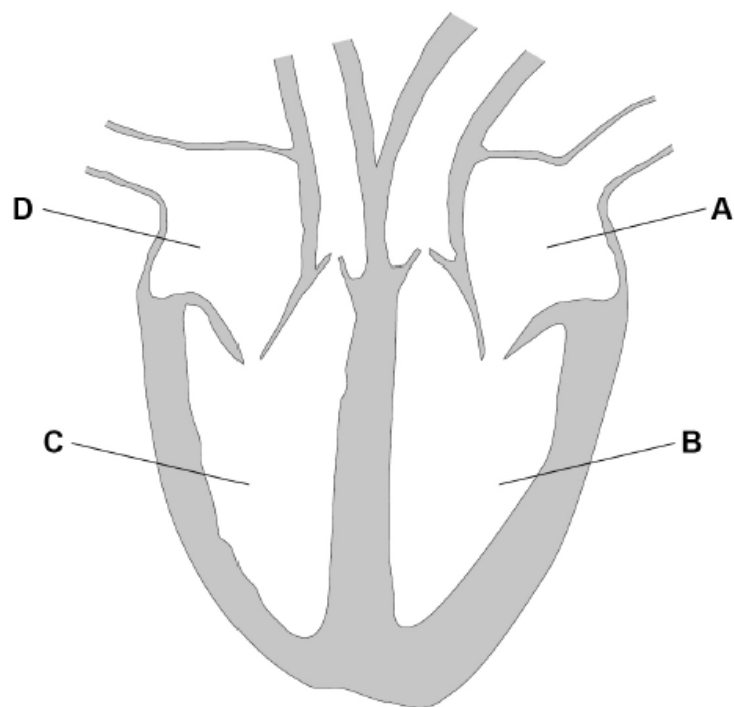
4. No.7

0 7

This question is about the circulatory system.

Figure 5 shows the human heart.

Figure 5



0 7 . 1

Which part of the heart receives oxygenated blood from the lungs?

[1 mark]

Tick (✓) one box.

A

☐

B

☐

C

☐

D

☐

0 7 . 2

Which part of the heart pumps deoxygenated blood to the lungs?

[1 mark]

Tick (✓) one box.

A

☐

B

☐

C

☐

D

☐

07.3

A group of cells called the pacemaker controls the resting heart rate.

Where in the heart is the pacemaker found?

[1 mark]

Tick (✓) **one** box.

Left atrium

☐

Left ventricle

☐

Right atrium

☐

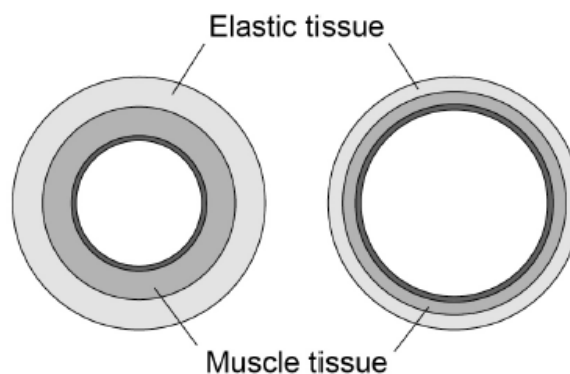
Right ventricle

☐

07.4

Figure 6 shows a cross section of an artery and of a vein.

Figure 6



Describe **two** ways that the structure of an artery is different from the structure of a vein.

[2 marks]

1 _____

2 _____

07.5

In coronary heart disease, the coronary arteries become narrower.

A build-up of fatty material can cause a blockage in a coronary artery.

Table 6 shows how a blockage in a coronary artery affects blood flow.

Table 6

Percentage (%) of coronary artery that is blocked	Blood flow in cm ³ /minute
0	100
10	64
20	42
50	8
80	2

Describe the trend shown in **Table 6**.

[1 mark]

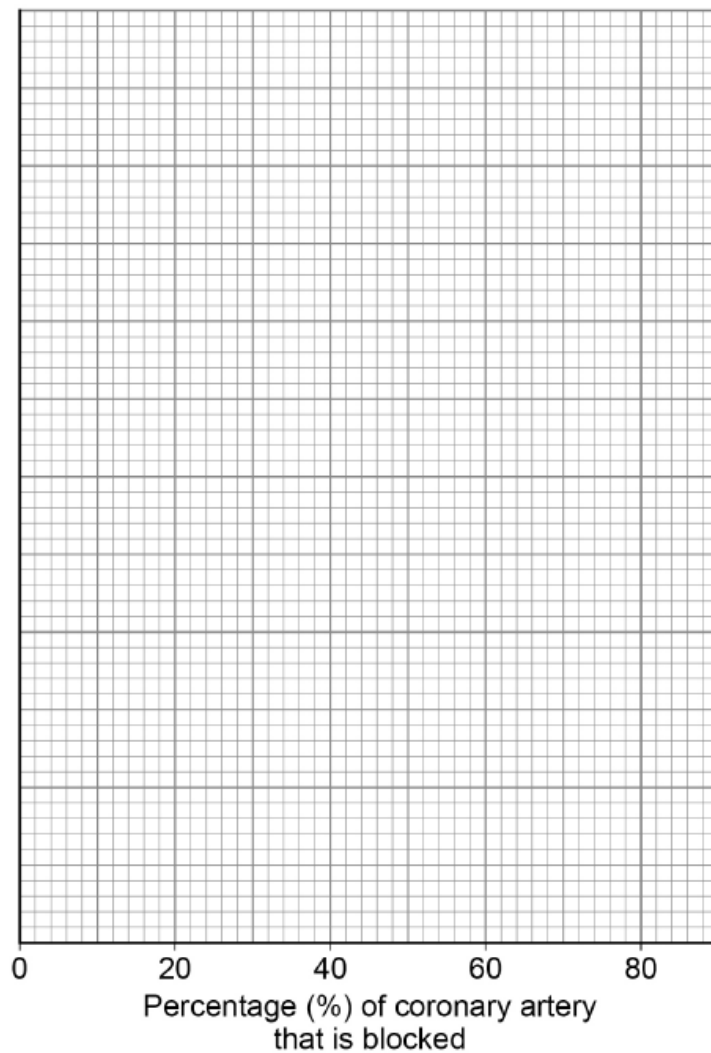
07.6

Complete **Figure 7**.

You should:

- use a suitable scale for the y-axis
- plot the data from **Table 6**
- draw a line of best fit.

[4 marks]

Figure 7Blood flow in
 $\text{cm}^3/\text{minute}$ 

07.7

Predict the blood flow in a coronary artery with a 35% blockage.

Use **Figure 7**.

[1 mark]

Blood flow = _____ $\text{cm}^3/\text{minute}$

07.8

Explain the effect of a partly blocked coronary artery on the human body.

[6 marks]

07.9

There are different treatments for a blockage in a coronary artery.

Explain how **one** treatment for a blockage in a coronary artery works.

[2 marks]

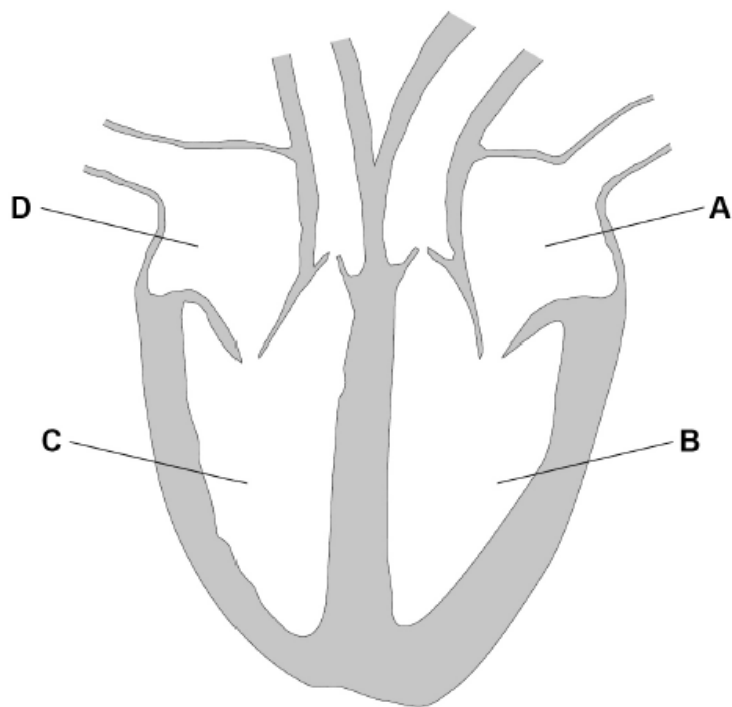
5. No.2

0 2

This question is about the circulatory system.

Figure 1 shows the human heart.

Figure 1



0 2 . 1

Which part of the heart receives oxygenated blood from the lungs?

[1 mark]

Tick (✓) **one** box.

A

☐

B

☐

C

☐

D

☐

0 2 . 2

Which part of the heart pumps deoxygenated blood to the lungs?

[1 mark]

Tick (✓) **one** box.

A

☐

B

☐

C

☐

D

☐

0 2 . 3

A group of cells called the pacemaker controls the resting heart rate.

Where in the heart is the pacemaker found?

[1 mark]

Tick (✓) **one** box.

Left atrium

☐

Left ventricle

☐

Right atrium

☐

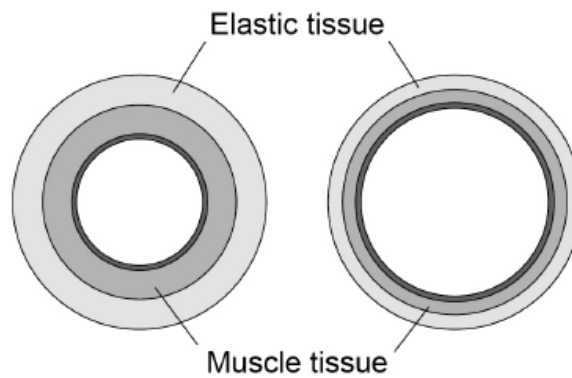
Right ventricle

☐

0 2 . 4

Figure 2 shows a cross section of an artery and of a vein.

Figure 2



Describe **two** ways that the structure of an artery is different from the structure of a vein.

[2 marks]

1 _____

2 _____

0 2 . 5

In coronary heart disease, the coronary arteries become narrower.

A build-up of fatty material can cause a blockage in a coronary artery.

Table 2 shows how a blockage in a coronary artery affects blood flow.

Table 2

Percentage (%) of coronary artery that is blocked	Blood flow in $\text{cm}^3/\text{minute}$
0	100
10	64
20	42
50	8
80	2

Describe the trend shown in **Table 2**.

[1 mark]

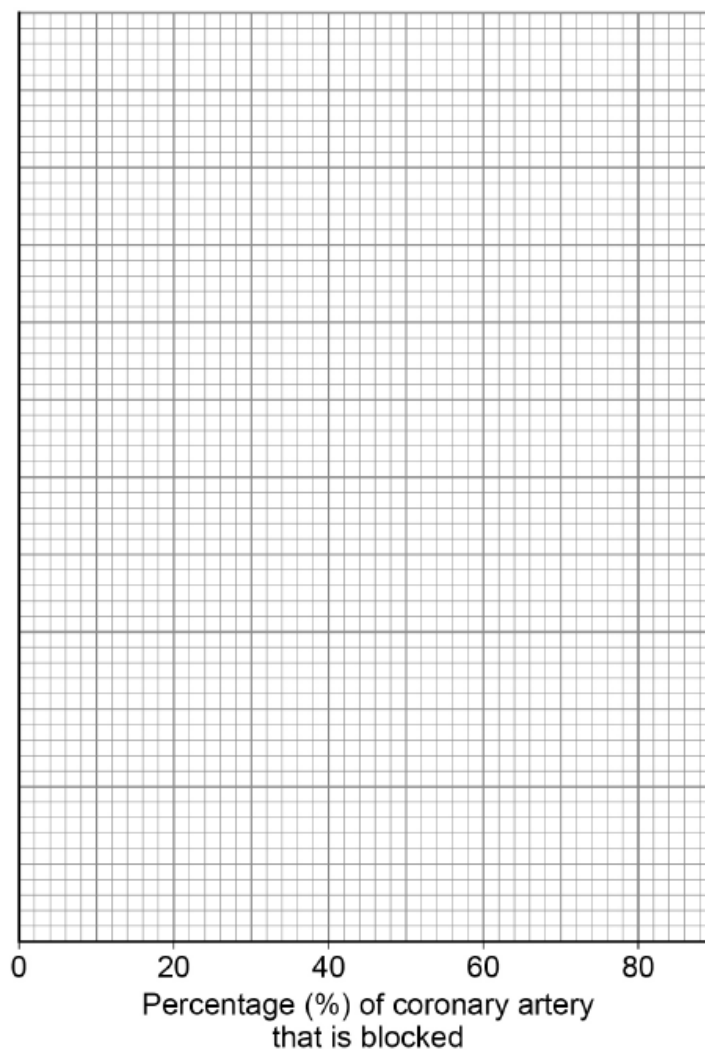
0 2 . 6

Complete **Figure 3**.

You should:

- use a suitable scale for the y-axis
- plot the data from **Table 2**
- draw a line of best fit.

[4 marks]

Figure 3Blood flow in
 $\text{cm}^3/\text{minute}$ 

0 2 . 7

Predict the blood flow in a coronary artery with a 35% blockage.

Use **Figure 3**.

[1 mark]

Blood flow = _____ $\text{cm}^3/\text{minute}$

0 2 . 8

Explain the effect of a partly blocked coronary artery on the human body.

[6 marks]

0 2 . 9

There are different treatments for a blockage in a coronary artery.

Explain how **one** treatment for a blockage in a coronary artery works.

[2 marks]

6. No.4

0	4
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This question is about exercise.

0	4
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1

During vigorous exercise, anaerobic respiration occurs in a person's body.

Explain **two** effects of anaerobic respiration on the person's body.**[4 marks]**

1

2

Design an investigation to show the effect of different types of exercise on the heart rate of athletes.

[6 marks]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Anabolic steroids are drugs.

Anabolic steroids:

- increase muscle mass in humans
- are banned in most competitive sports.

Some athletes take anabolic steroids to improve their performance in sport.

0 4 . 3

Explain how taking anabolic steroids could improve an athlete's performance.

[2 marks]

Scientists use monoclonal antibodies to test for the presence of anabolic steroids in an athlete's urine.

To produce monoclonal antibodies, a mouse lymphocyte is combined with a tumour cell.

0 4 . 4

What type of cell is created when a mouse lymphocyte and a tumour cell combine?

[1 mark]

Tick (✓) **one** box.

Embryo

☐

Hybridoma

☐

Phagocyte

☐

Stem cell

☐

0 4 . 5

Describe how scientists make monoclonal antibodies using the cell created when a mouse lymphocyte and a tumour cell combine.

[3 marks]

0 4 . 6

What property makes a monoclonal antibody useful in detecting the presence of an anabolic steroid in urine?

[1 mark]

Tick (✓) **one** box.

A monoclonal antibody is quick and easy to produce.

☐

A monoclonal antibody is specific to only one person's urine.

☐

A monoclonal antibody only binds to the anabolic steroid.

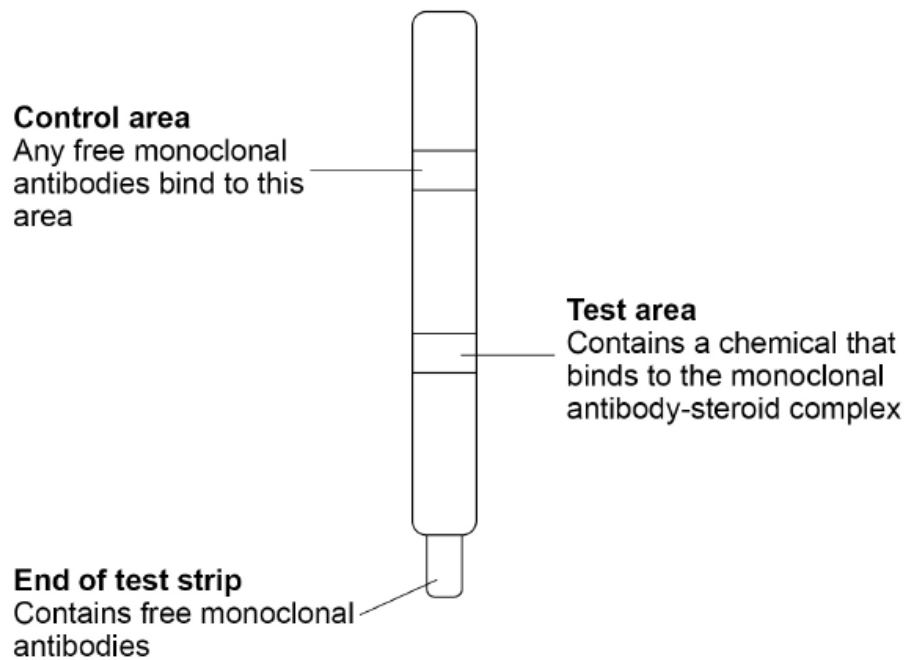
☐

A monoclonal antibody can identify many different drugs at the same time.

☐

Figure 5 shows a test strip that can detect the presence of an anabolic steroid in an athlete's urine.

Figure 5



The end of the test strip is dipped in urine.

The urine moves up through the test strip.

The test area and the control area contain a dye.

The dye turns blue when monoclonal antibodies bind to it.

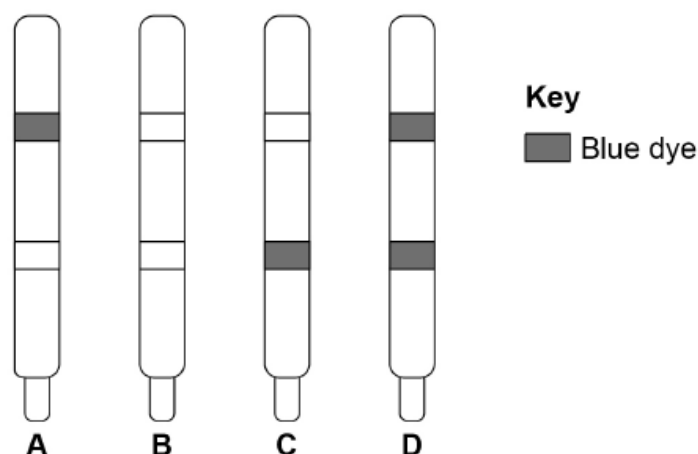
0 4 . 7

Suggest the purpose of the control area in the test strip.

[1 mark]

Figure 6 shows the urine test results of four athletes.

Figure 6



0 4 . 8 Describe the evidence in **Figure 6** that shows the test for athlete **B** has **not** worked.

Suggest **one** reason why the test did **not** work.

[2 marks]

Evidence _____

Reason _____

0 4 . 9 Which athlete has tested positive for anabolic steroids in their urine?

[1 mark]

Tick (✓) **one** box.

A

☐

B

☐

C

☐

D

☐