

1 The heart is part of the circulatory system.

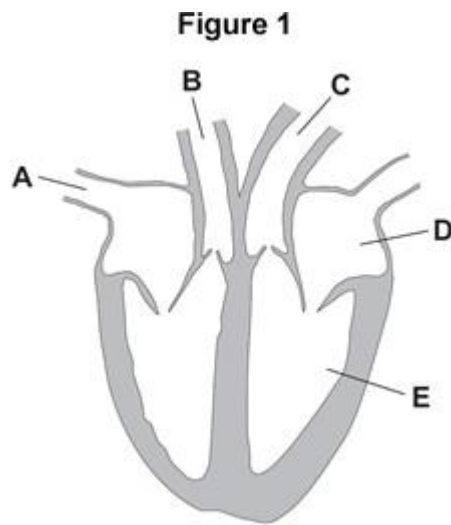
(a) (i) Name **one** substance transported by the blood in the circulatory system.

(1)

(ii) What is the main type of tissue in the heart wall?

(1)

(b) **Figure 1** shows the human heart.



(i) Which blood vessel, **A**, **B** or **C**, takes blood to the lungs?

(1)

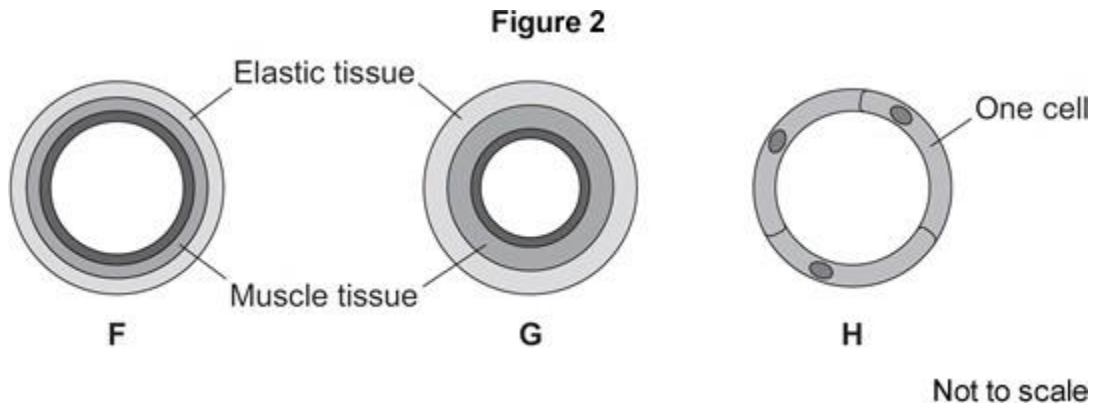
(ii) Name parts **D** and **E** shown in **Figure 1**.

D _____

E _____

(2)

(c) **Figure 2** shows three types of blood vessel, **F**, **G** and **H**.



(i) What type of blood vessel is **F**?

Tick (✓) **one** box.

an artery

a capillary

a vein

(1)

(ii) A man needs to have a stent fitted to prevent a heart attack.

In which type of blood vessel would the stent be placed?

Tick (✓) **one** box.

an artery

a capillary

a vein

(1)

(iii) Explain how a stent helps to prevent a heart attack.

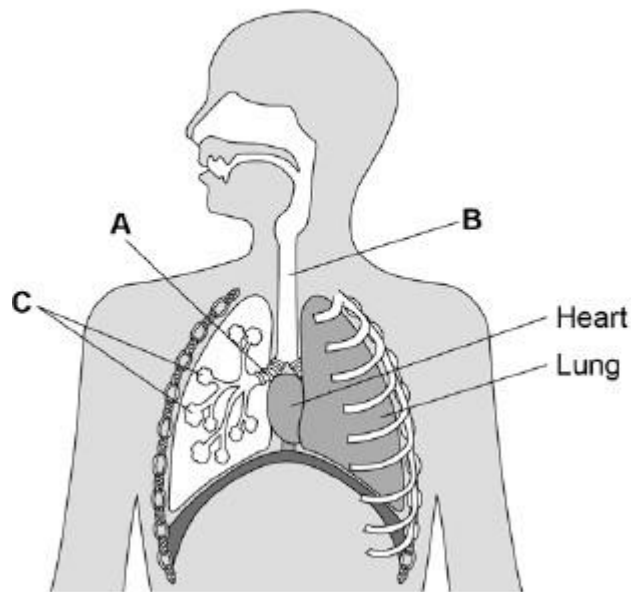
(2)
(Total 9 marks)

2

Animals and plants contain organs and tissues.

Figure 1 shows some organs in the human thorax.

Figure 1



(a) Name parts **A**, **B** and **C**.

A _____

B _____

C _____

(3)

(b) Which organ system is the heart part of?

Tick **one** box.

Breathing system

Circulatory system

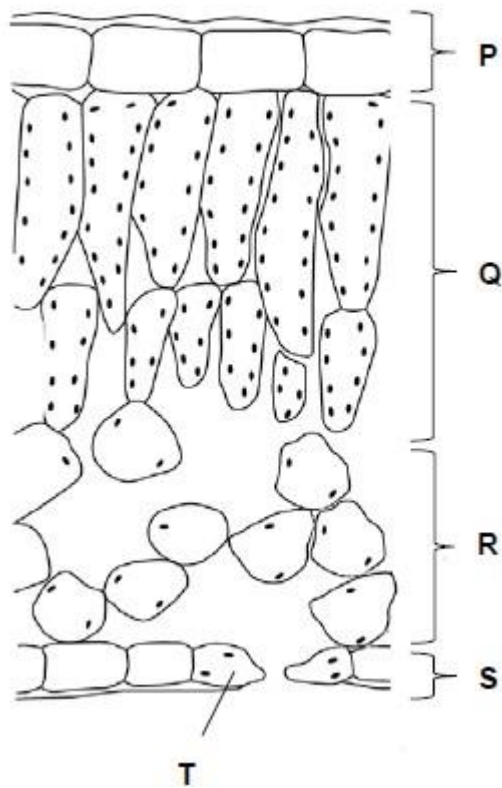
Digestive system

Excretory system

(1)

Figure 2 shows a cross section of a leaf.

Figure 2



(c) In which part of the leaf does most photosynthesis take place?

Tick **one** box.

P	<input type="checkbox"/>	Q	<input type="checkbox"/>	R	<input type="checkbox"/>	S	<input type="checkbox"/>
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(1)

(d) What is part **T**?

Tick **one** box.

- Guard cell
- Phloem
- Stoma
- Xylem

(1)

(e) A leaf is an organ made of tissues.

What is a tissue?

(1)

(f) Draw **one** line from each tissue to its function.

Tissue	Function
<input type="checkbox"/>	Allows diffusion of gases through the leaf
<input type="checkbox"/>	Allows light through to the photosynthesising parts of the leaf
<input type="checkbox"/>	Allows water into the leaf
<input type="checkbox"/>	Transport sugars around the plant
<input type="checkbox"/>	Transports water around the plant

(3)

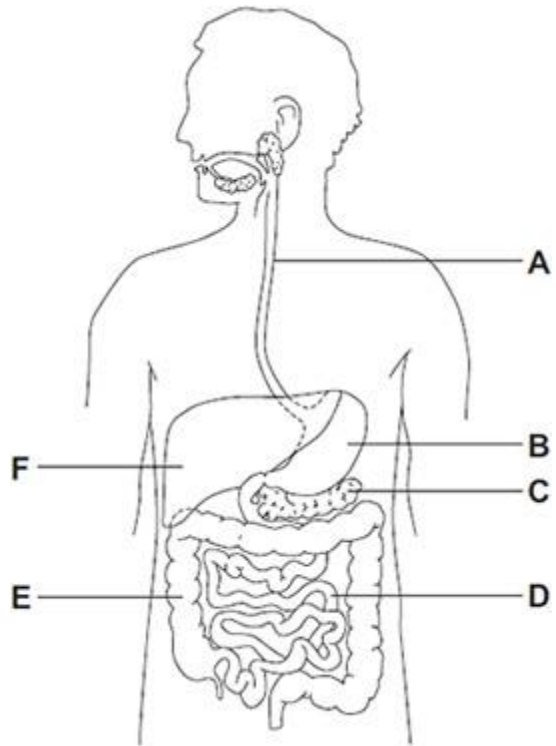
(Total 10 marks)

3

The digestive system breaks down food into small molecules.

The small molecules can be absorbed into the blood.

The diagram below shows the human digestive system.



(a) (i) Which letter, **A**, **B**, **C**, **D**, **E** or **F**, shows each of the following organs?

Write **one** letter in each box.

large intestine

small intestine

stomach

(3)

(ii) Different organs in the digestive system have different functions.

Draw **one** line from each function to the organ with that function.

Function	Organ
Digestion of fat	Large intestine
Absorption of water into the blood	Liver
Production of hydrochloric acid	Small intestine
	Stomach

(3)

(b) Glucose is absorbed into the blood in the small intestine.

Most of the glucose is absorbed by diffusion.

How does the glucose concentration in the blood compare to the glucose concentration in the small intestine?

Tick (✓) **one** box.

The concentration in the blood is higher.

The concentration in the blood is lower.

The concentration in the blood is the same.

(1)
(Total 7 marks)

4 Catalase is an enzyme.

Catalase controls the following reaction:

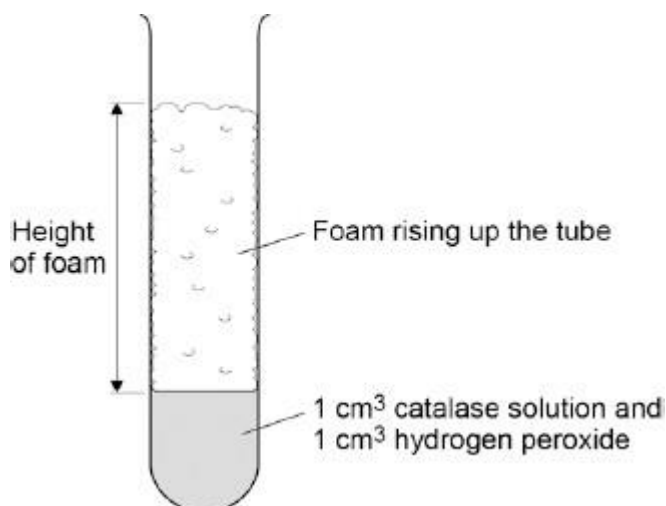


A student did an investigation on catalase activity.

This is the method used.

1. Put 1 cm³ hydrogen peroxide solution in a testtube.
2. Add 1 cm³ of catalase solution.
 - Bubbles of oxygen are produced.
 - Bubbles cause foam to rise up the tube.
3. Measure the maximum height of the foam.

The diagram below shows the experiment.



The experiment is carried out at 20 °C.

The table below shows some results from the investigation.

Temperature in °C	Maximum height of foam in cm			
	Test 1	Test 2	Test 3	Mean
10	1.3	1.1	0.9	1.1
20	0.0	3.3	3.1	3.2
30	5.2	5.0	5.3	5.2
40	4.2	3.5	4.4	4.0

50	2.1	1.9	2.3	2.1
60	0.0	0.0	0.0	0.0

(a) Why did the student carry out the experiment three times at each temperature?

Tick **one** box.

To make the experiment more accurate

To prove the experiment was correct

To show the experiment was more repeatable

(1)

(b) The student thought one result was an anomaly.

Circle the anomaly in the table above.

(1)

(c) What did the student do with the anomalous result?

(1)

(d) Look at the table above.

What conclusion can be made as the temperature increases?

Tick **one** box.

Decreases the rate of reaction up to 30 °C

Decreases the rate of reaction up to 40 °C

Increases the rate of reaction up to 30 °C

Increases the rate of reaction up to 40 °C

(1)

(e) At which temperature was catalase denatured?

Tick **one** box.

10 °C

30 °C

40 °C

60 °C

(1)

(f) The student thought the optimum temperature for catalase activity was between 30 °C and 40 °C.

How could the investigation be improved to find a more precise value for the optimum temperature?

Tick **one** box.

Do the experiment at 70 °C and 80 °C

Do the experiment at 30 °C, 35 °C and 40 °C

Use less hydrogen peroxide solution

Use more catalase solution

(1)

(g) Amylase is the enzyme that controls the breakdown of starch to glucose.

Describe how the student could investigate the effect of pH on the breakdown of starch by amylase.

(4)
(Total 10 marks)

5 After a meal rich in carbohydrates, the concentration of glucose in the small intestine changes. The table below shows the concentration of glucose at different distances along the small intestine.

Distance along the small intestine in cm	Concentration of glucose in mol dm ⁻³
100	50
300	500
500	250
700	0

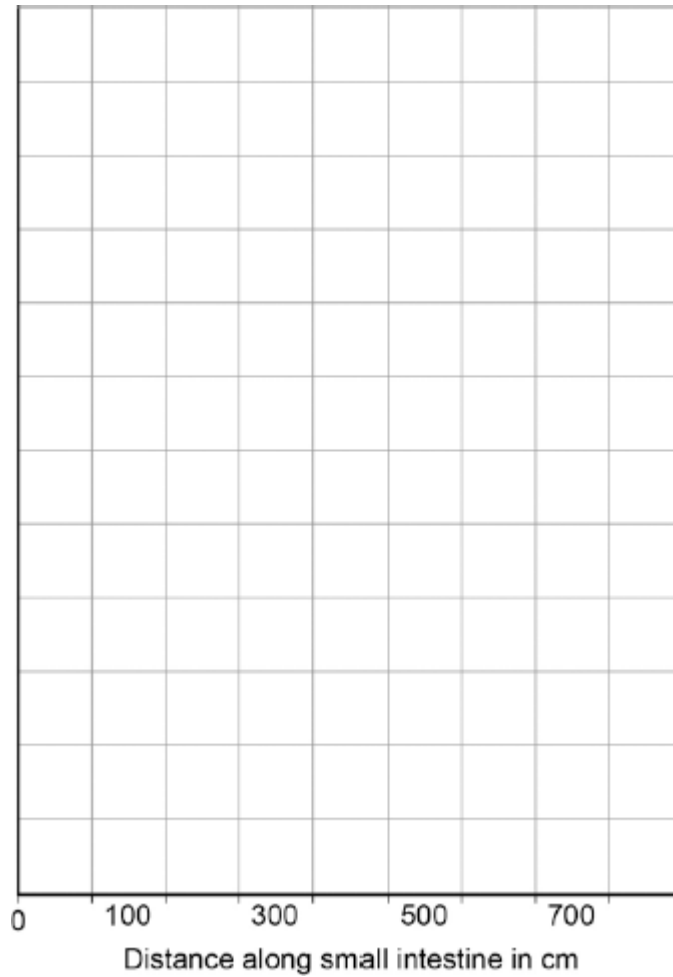
(a) At what distance along the small intestine is the glucose concentration highest?

_____cm

(1)

(b) Use the data in the table to plot a bar chart on the graph below.

- Label the y-axis.
- Choose a suitable scale.



(4)

(c) Look at the graph above.

Describe how the concentration of glucose changes as distance increases along the small intestine.

(2)

(d) Explain why the concentration of glucose in the small intestine changes between 100 cm and 300 cm.

(2)

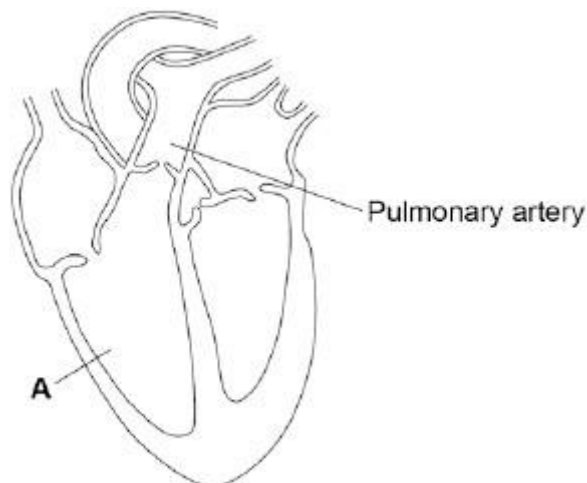
(e) Explain why the concentration of glucose in the small intestine changes between 300 cm and 700 cm.

(3)

(Total 12 marks)

6 **Figure 1** shows a diagram of the human heart.

Figure 1



(a) What part of the heart is labelled **A**?

Tick **one** box.

Aorta

Atrium

Valve

Ventricle

(1)

(b) Where does the pulmonary artery take blood to?

Tick **one** box.

Brain

Liver

Lungs

Stomach

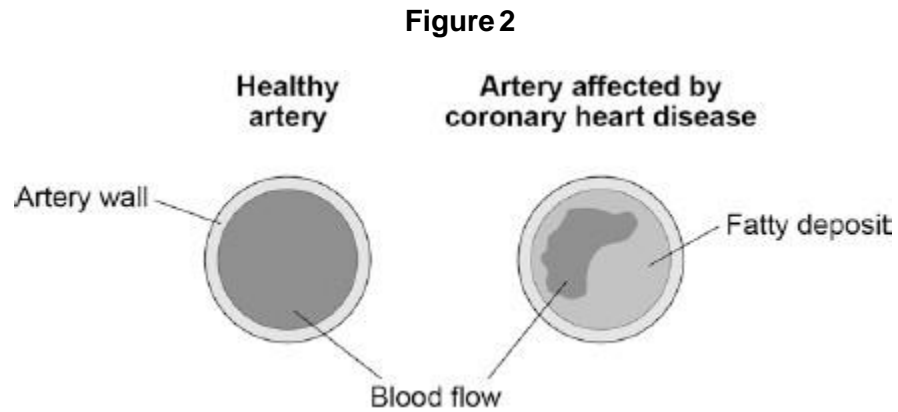
(1)

(c) Circle a valve on **Figure 1**.

(1)

(d) The coronary arteries supply blood to the heart.

Figure 2 shows two coronary arteries.



Describe **two** ways the healthy artery is different from the artery affected by coronary heart disease.

1. _____

2. _____

(2)

(e) What can be used to treat people with coronary heart disease?

Tick **two** boxes.

- | | |
|-------------|--------------------------|
| Antibiotics | <input type="checkbox"/> |
| Hormones | <input type="checkbox"/> |
| Statins | <input type="checkbox"/> |
| Stent | <input type="checkbox"/> |
| Vaccination | <input type="checkbox"/> |

(2)

(f) Suggest **two** risk factors for coronary heart disease.

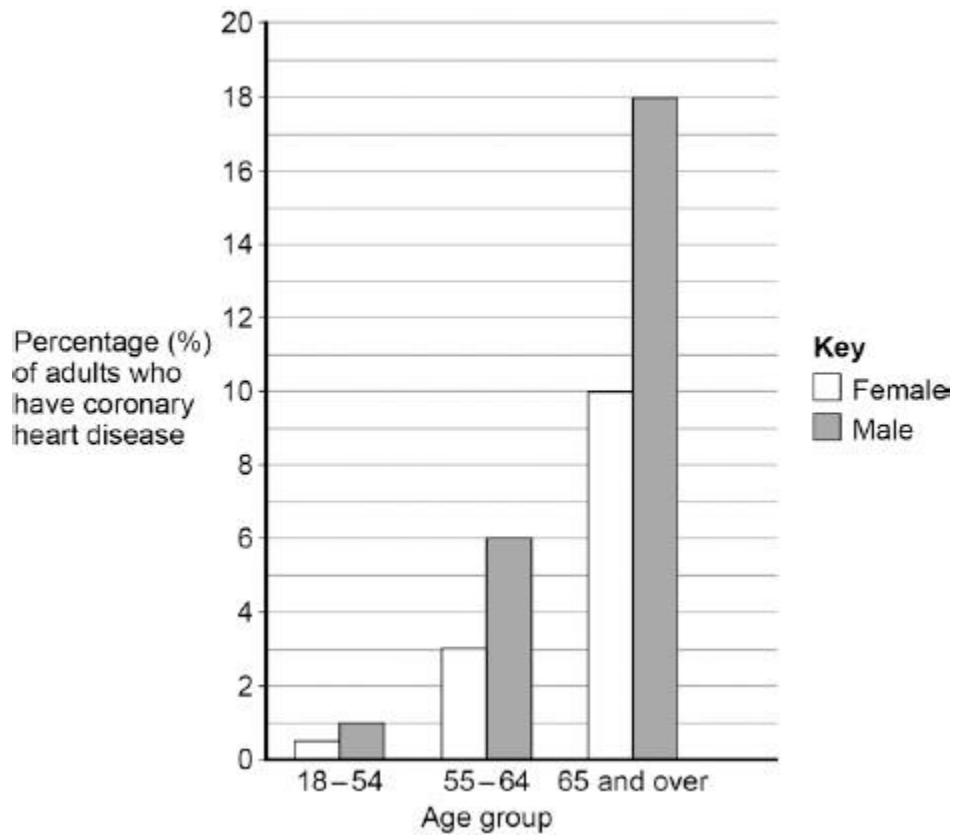
1. _____

2. _____

(2)

(g) **Figure 3** shows the percentages of adults in the UK who have coronary heart disease.

Figure 3



Calculate the difference in the percentage of male and female adults aged 65 and over who have coronary heart disease.

_____ %

(1)

(h) Which is the correct conclusion for the data in **Figure 3**?

Tick **one** box.

Children do **not** suffer from coronary heart disease

More males suffer from coronary heart disease than females

More younger people suffer from coronary heart disease than older people

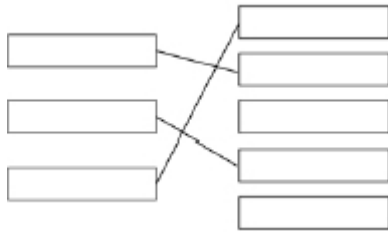
(1)
(Total 11 marks)

Mark schemes

- 1** (a) (i) any **one** from:
- glucose
 - oxygen
 - carbon dioxide
 - urea
 - water
- allow hormones*
- allow named example of a product of digestion*
- 1
- (ii) (cardiac) muscle
- allow muscular*
- 1
- (b) (i) **B**
- 1
- (ii) **D** atrium / atria
- ignore references to left or right*
- 1
- E** ventricle(s)
- ignore references to left or right*
- 1
- (c) (i) a vein
- 1
- (ii) an artery
- 1
- (iii) keeps artery open / wider
- allow ecf from part cii*
- 1
- (so) blood / oxygen can pass through (to the heart muscle)
- 1

[9]

- 2** (a) **(A)** bronchus
allow bronchi
allow bronchiole 1
- (B)** trachea
allow windpipe 1
- (C)** alveolus
allow alveoli
ignore air sac 1
- (b) circulatory system 1
- (c) **Q** 1
- (d) guard cell 1
- (e) a group of cells with a similar structure / function 1

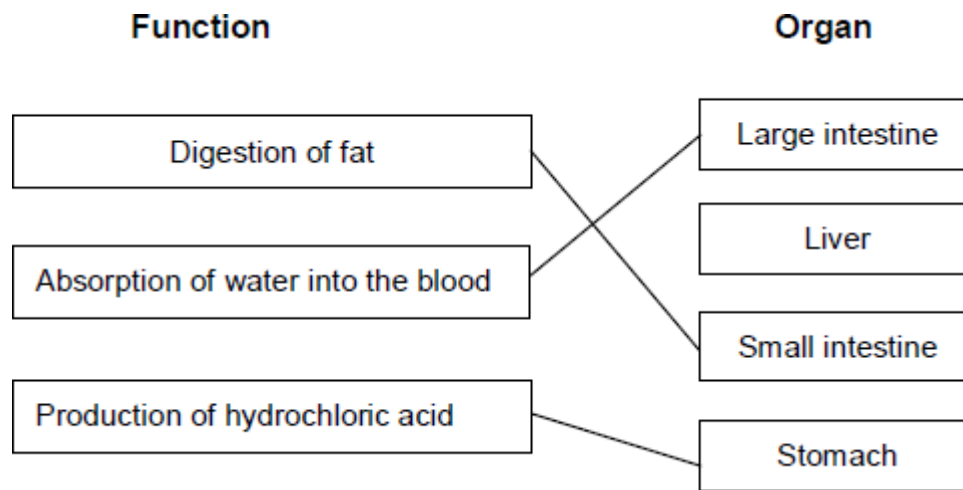


- (f) *1 mark for each correct line*
extra line from a tissue negates the mark for that tissue

3
[10]

- 3** (a) (i) large intestine = **E** 1
- small intestine = **D** 1
- stomach = **B** 1

(ii)



extra lines cancel

3

(b) The concentration in the blood is lower.

1

[7]

4

(a) to show the experiment was more repeatable

1

(b) (circle) 0.0 at 20 °C

1

(c) ignored it / did not use it

ignore repeated it

1

(d) increases the rate of reaction up to 30 °C

1

(e) 60 °C

1

(f) do the experiment at 30 °C, 35 °C and 40 °C

1

(g) **Level 2 (3–4 marks):**

A detailed and coherent plan covering all the major steps is provided. The method is set out logically taking into account control variable and appropriate measurements. The plan could be repeated by another person to determine the effect of pH on breakdown of starch by amylase.

Level 1 (1–2 marks):

Simple statements relating to relevant apparatus or steps are made but they may not be in a logical order. The plan would not allow another person to determine the effect of pH on breakdown of starch by amylase.

0 marks:

No relevant content.

Indicative content

- range of at least 3 pH values / use of buffer solutions
- control variables / keep amount or concentration of starch and amylase the same
- keep temperature the same using water bath / electric heater
- use iodine test to make qualitative observations
- observe colour changes at different temperatures
- do repeats at each pH

4

[10]

5

(a) 300

1

(b) suitable scale on y-axis

1

label y-axis

1

4 bars drawn correctly

allow 1 mark for 3 correct bars

2

(c) increases from 50 to 500

1

then decreases from 500 to 0

1

(d) carbohydrates broken down / digested into sugars

1

broken down by carbohydrase or amylase

1

(e) absorption of glucose

1

into blood

1

by active transport
allow diffusion

1
[12]

- 6**
- (a) ventricle 1
 - (b) lungs 1
 - (c) valve circled on heart 1
 - (d) no fatty deposit 1
 - healthy artery is wider / bigger hole / has more blood flow 1
 - (e) statins 1
 - stent 1
 - (f) any **two** from:
 - smoking
 - high-fat diet
 - lack of exercise

allow:

 - *overweight / obese*
 - *having high blood pressure*
 - *having high cholesterol*2
 - (g) 8 (%) 1
 - (h) more males have coronary heart disease than females 1

[11]