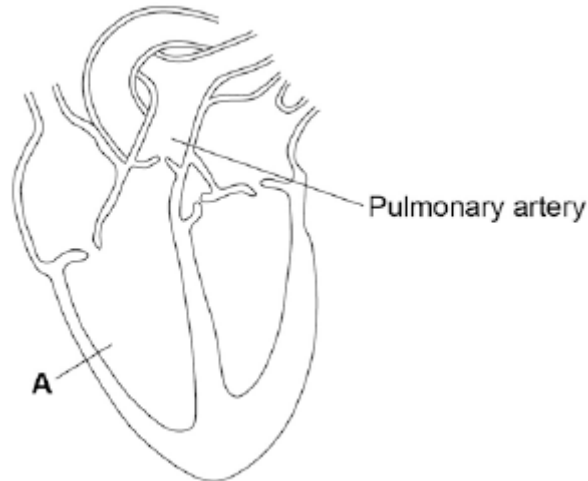


4-2 Organisation – Biology

1.0 Figure 1 shows a diagram of the human heart.

Figure 1



1.1 What part of the heart is labelled **A**?

[1 mark]

Tick **one** box.

- Aorta
- Atrium
- Valve
- Ventricle

1.2 Where does the pulmonary artery take blood to?

[1 mark]

Tick **one** box.

- Brain
- Liver
- Lungs
- Stomach

1.3 Circle a valve on **Figure 1**.

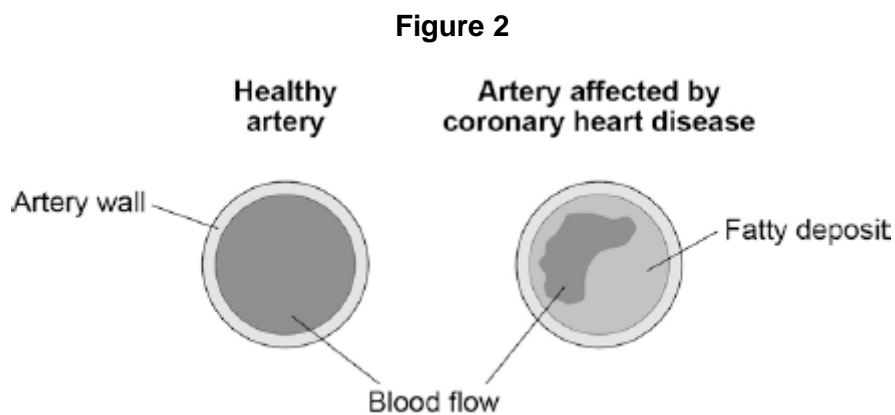
[1 mark]

1.4 State the name of the blood vessel that brings blood from the legs to the right side of the heart.

[1 mark]

1.5 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.

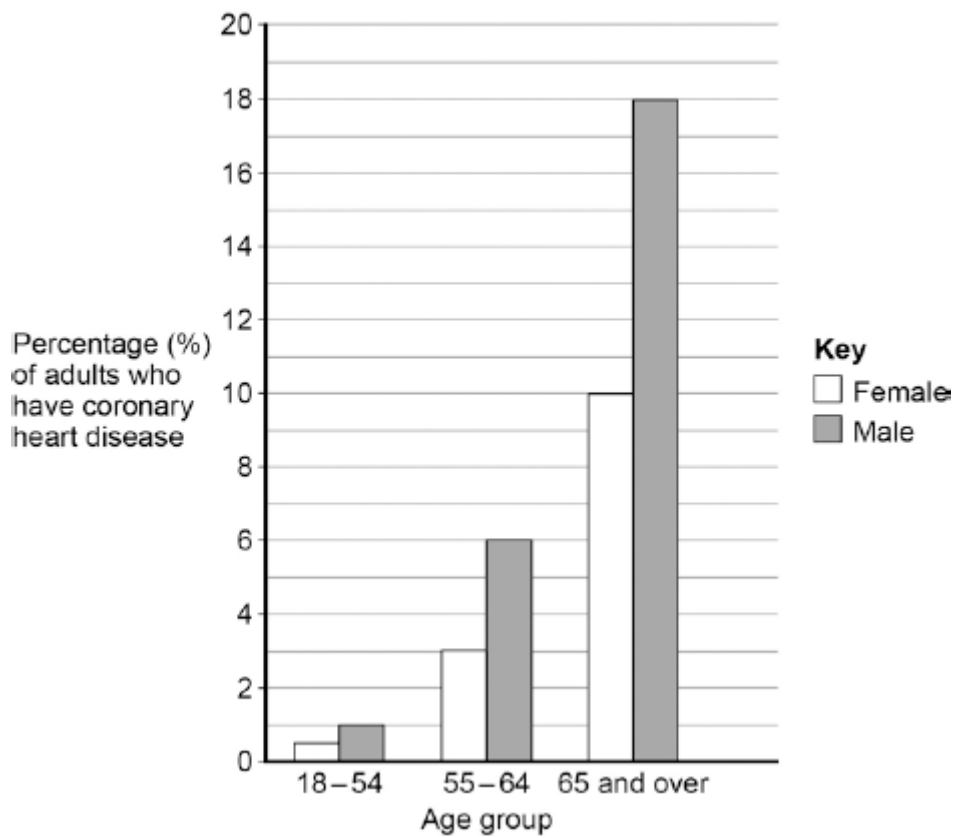
[2 marks]

1.6 Suggest **two** risk factors for coronary heart disease.

[2 marks]

1.7 **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 mark]

_____ %

1.8 Which is the correct conclusion for the data in **Figure 3**?

Tick **one** box.

[1 mark]

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

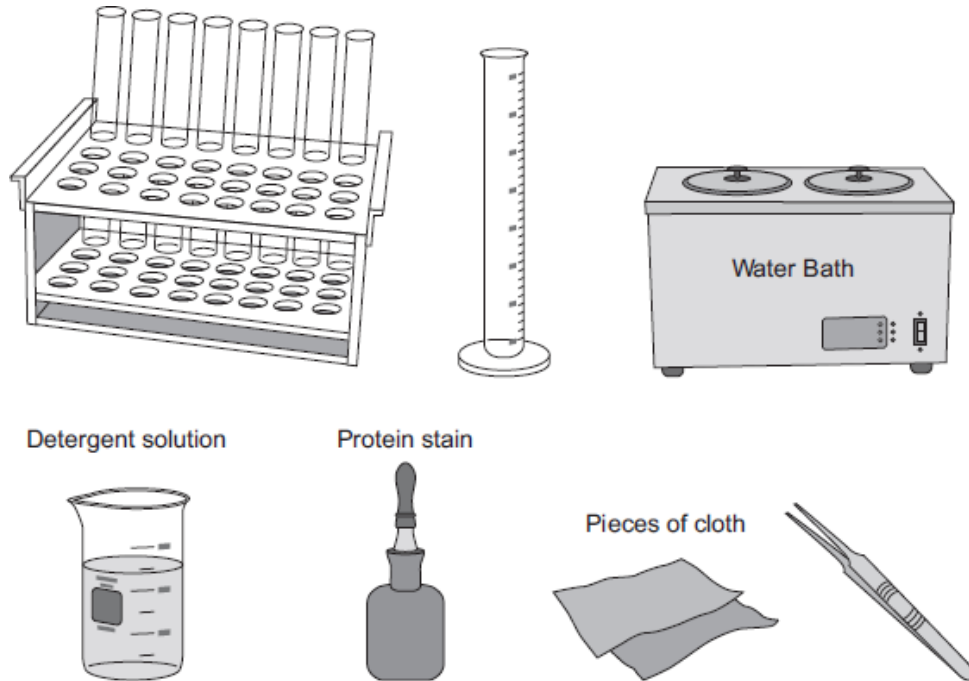
More males suffer from coronary heart disease than females

More younger people suffer from coronary heart disease than older people

2.0 Biological detergents contain protease enzymes.

2.1 **Figure 4** shows some apparatus and materials.

Figure 4



Describe how you would use the apparatus and materials shown in **Figure 4** to find the best temperature for removing stains from clothing.

You should include how you would make the investigation a fair test.

[6 marks]

2.2 In a similar investigation, a student investigated the effect of pH on the time taken to remove a stain from pieces of cloth.

Table 1 shows the student's results.

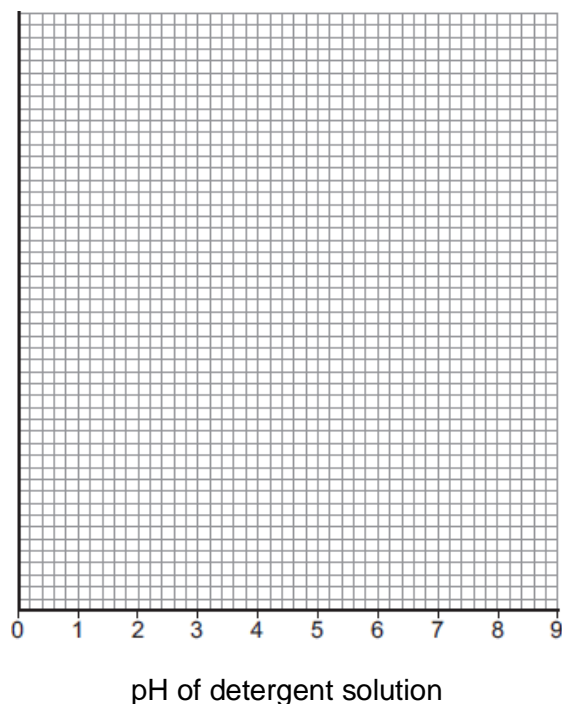
Table 1

	pH of detergent solution								
	1	2	3	4	5	6	7	8	9
Time taken to remove stain in minutes	20	19	17	14	10	4	8	12	16

On the grid below draw a graph to show the student's results.

- Add a suitable scale and label to the y axis.
- Plot the student's results.
- Draw a line of best fit.

[4 marks]



2.3 State the best pH for using the detergent.

[1 mark]

pH = _____

3.0 The leaves of most plants have stomata.

3.1 Name the cells which control the size of the stomata.

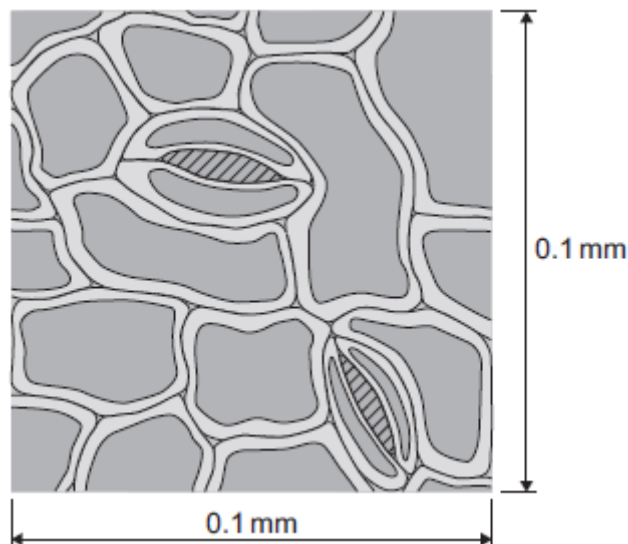
[1 mark]

3.2 Give **one** function of stomata.

[1 mark]

3.3 **Figure 5** shows part of the surface of a leaf.

Figure 5



The length and width of this piece of leaf surface are both 0.1 mm.

Calculate the number of stomata per mm^2 of this leaf surface.

[2 marks]

Number of stomata per mm^2 = _____

3.4 A different plant species has 400 stomata per mm^2 of leaf surface.

Having a large number of stomata per mm^2 of leaf surface can be a disadvantage to a plant.

Give **one** disadvantage.

[1 mark]

3.5 A student investigated the loss of water from plant leaves.

The student did the following:

Step 1: took ten leaves from a plant

Step 2: weighed all ten leaves

Step 3: hung the leaves up in a classroom for 4 days

Step 4: weighed all ten leaves again

Step 5: calculated the mass of water lost by the leaves

Step 6: repeated steps **1** to **5** with grease spread on the upper surfaces of the leaves

Step 7: repeated steps **1** to **5** with grease spread on both the upper and lower surfaces of the leaves.

All the leaves were taken from the same type of plant.

Table 2 shows the student's results.

Table 2

Treatment of leaves	Mass of water the leaves lost in g
No grease was used on the leaves	0.98
Grease on upper surfaces of the leaves	0.86
Grease on upper and lower surfaces of the leaves	0.01

What mass of water was lost in 4 days through the upper surfaces of the leaves?

[1 mark]

3.6 Very little water was lost when the lower surfaces of the leaves were covered in grease.

Explain why.

[3 marks]

4.1 Complete **Table 3** to show which part of the blood carries out each function.
Choose your answers from the list.

plasma **platelet** **red blood cell** **white blood cell**

The first answer has been done for you.

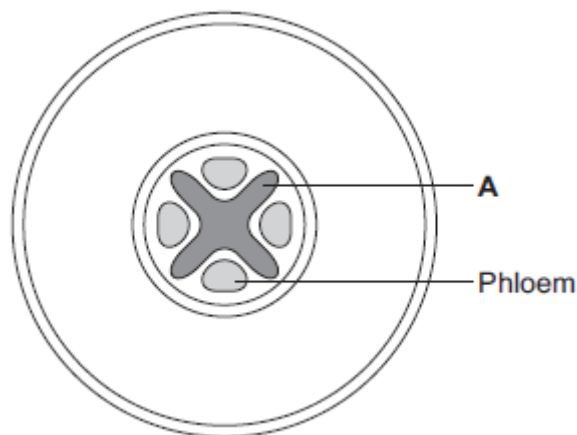
[4 marks]

Table 3

Function	Part of the blood
Transports most of the carbon dioxide	<i>plasma</i>
Transports most of the oxygen	
Helps blood to clot at a wound	
Defends the body against microorganisms	
Transports the products of digestion	

5.0 **Figure 6** shows a cross-section of a plant root.
The transport tissues are labelled.

Figure 6



5.1 What is tissue **A**?
Choose the correct answer.

[1 mark]

cuticle **epidermis** **xylem**

5.2 Name **two** substances transported by tissue **A**.

[2 marks]

5.3 Phloem is involved in a process called translocation

What is translocation?

[1 mark]

5.4 Explain why translocation is important to plants.

[2 marks]

5.5 Plants must use active transport to move some substances from the soil into root hair cells.

Active transport needs energy.

Explain why active transport is necessary in root hair cells.

[2 marks]

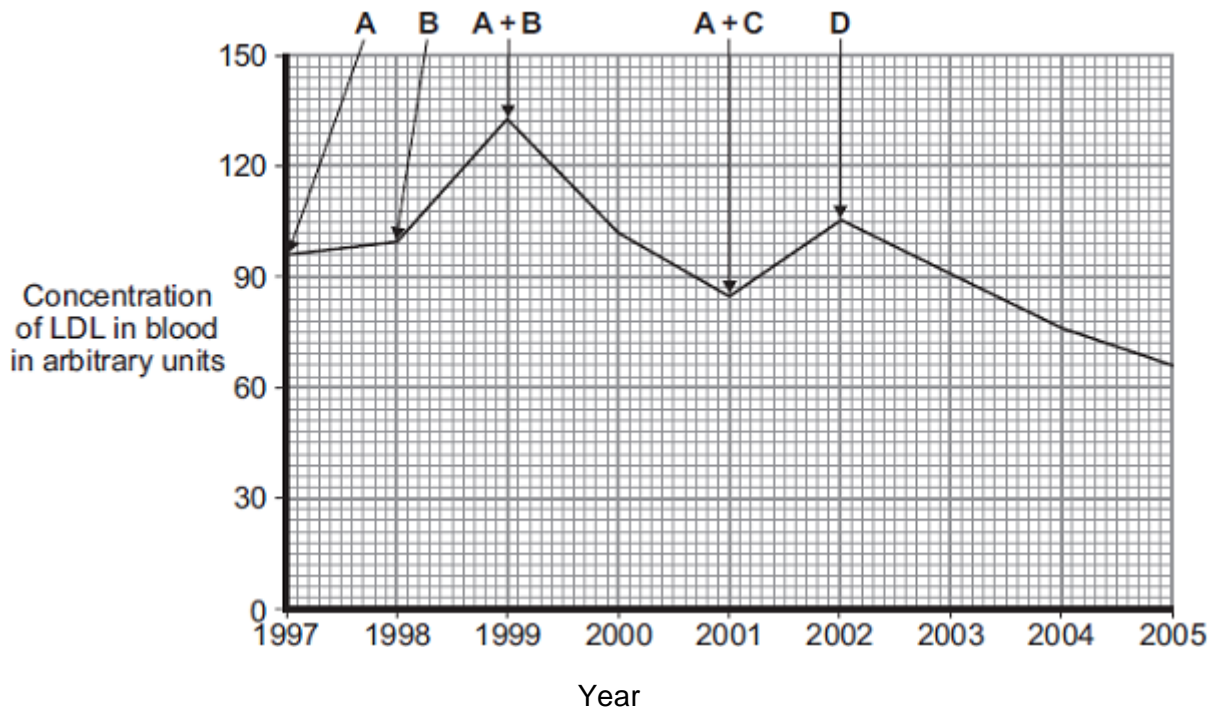
6.0 LDL is one form of cholesterol found in the blood. People with a high concentration of LDL in their blood may be treated with drugs called statins.

A high concentration of LDL cholesterol in the blood may result in an increased risk of heart and circulatory diseases.

Figure 7 shows the effects of the treatment of one person with four different statins, **A, B, C** and **D**, over a period of 8 years. The arrows show when each new treatment was started.

Each treatment was continued until the next treatment was started.

Figure 7



6.1 Compare the effectiveness of the five treatments in reducing the risk of heart and circulatory diseases for this person.

[3 marks]

MARK SCHEME

Qu No.		Extra Information	Marks
1.1	Ventricle		1
1.2	Lungs		1
1.3	Valve circled on heart		1
1.4	Vena cava		1
1.5	No fatty deposit Healthy artery is wider or has bigger hole or has more blood flow		1 1
1.6	any two from: smoking high-fat diet lack of exercise having high blood pressure having high cholesterol	allow overweight / obese	2
1.7	8 (%)		1
1.8	More males suffer from coronary heart disease than females		1

Qu No.		Extra Information	Marks
2.1			
Level 3	There is a clear and logical method described. It could be easily followed and would enable valid results to be collected		5-6
Level 2	The method described could be followed and would enable some results to be collected. The detail required to ensure valid results may be missing.		3-4
Level 1	Some steps of a method are given, but these are not always given clearly and logically. Following the method would not give valid results.		1-2
Level 0	No relevant content.		0
Indicative content			
	<ul style="list-style-type: none"> (use of measuring cylinder to) measure equal volumes of detergent solution (use of dropping bottle to) apply same number of drops / amount of stain to each piece of cloth include stainless cloth as control use of forceps to transfer cloths use of test tubes as containers for detergent solution + stained cloth use water bath to provide a range of temperatures cloths left in detergent solution at each temperature for same length of time or measure time taken to remove stain repetition method of assessing the stain removal is given, i.e. percentage cover 		
2.2	y axis: labelled 'Time (taken to remove stain in) minutes' plus suitable scale	data spread greater than half of grid to gain the mark	1
	points or bars plotted correctly to within ± 1 mm	deduct 1 mark for each incorrect plot up to a maximum of 2	2
	one suitable line of best fit drawn on graph	do not allow extrapolation to (0.0)	1
2.3	6 ± 0.1	allow ecf from student graph	1

Qu No.		Extra Information	Marks
3.1	guard (cells)	allow phonetic spelling	1
3.2	any one from, allow carbon dioxide to enter allow oxygen to leave control gas exchange	ignore reference to cells	1
3.3	200	correct answer gains 2 marks with or without working allow 1 mark for $0.1 \times 0.1 = 0.01$ (mm ²)	2
3.4	more / a lot of / increased water loss	allow plant more likely to wilt (in hot / dry conditions)	1
3.5	0.12 (g)		1
3.6	the lower surface has most stomata		1
	stomata are now covered / blocked (by grease)	ignore waterproof	1
	so water cannot escape / evaporate from the stomata	to gain credit, stomata must be mentioned at least once	1

Qu No.		Extra Information	Marks
4.1	red (blood cell) platelet white (blood cell) plasma	in this order only	1 1 1 1

Qu No.		Extra Information	Marks
5.1	xylem		1
5.2	water minerals / ions / named example(s)	ignore nutrients	1 1
5.3	movement of (dissolved) sugar	allow additional substances, e.g. amino acids / correct named sugar (allow sucrose / glucose)	1
5.4	sugars are made in the leaves (therefore) they need to be moved to other parts of the plant for respiration / growth / storage		1 1
5.5	for movement of minerals / ions against their concentration gradient	do not allow 'water'	1 1

Qu No.		Extra Information	Marks
6.1	A + B most effective (treatment)	ignore descriptions of LDL levels	1
	D is (the most) effective (treatment)	allow D is the best single treatment	1
	neither A nor B (alone) are effective	allow increase risk of heart disease instead of not effective	1