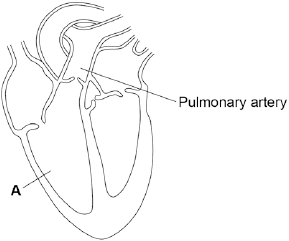
**4-2 Organisation – Trilogy**

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

**Figure 1**



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

Tick **one** box.

[1 mark]

Aorta 

Atrium 

Valve 

Ventricle 

**1.2** Where does the pulmonary artery take blood to?

Tick **one** box.

[1 mark]

Brain 

Liver 

Lungs 

Stomach 

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

[1 mark]

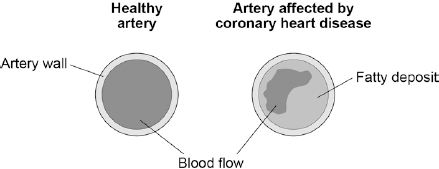
**1.4** State the name of the blood vessel that brings blood from the legs to the right side of the heart.

[1 mark]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1.5** The coronary arteries supply blood to the heart.  
**Figure 2** shows two coronary arteries.

Figure 2

****

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

[2 marks]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

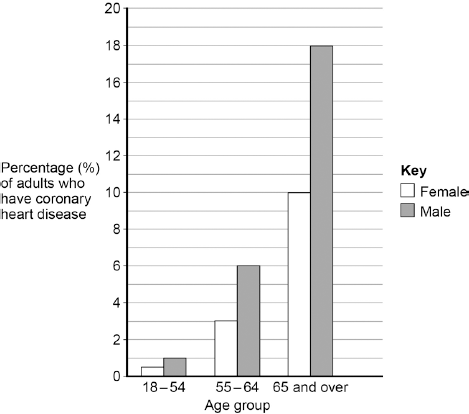
[2 marks]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**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 

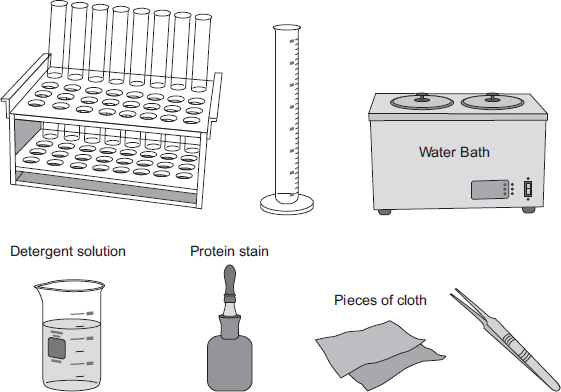
More males suffer from coronary heart disease than females 

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]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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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**

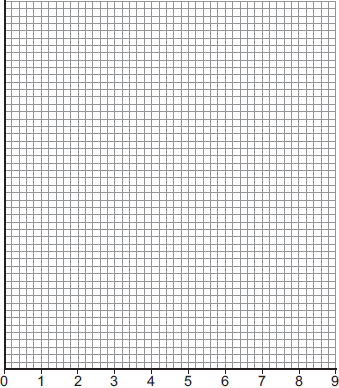
|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **pH of detergent solution** | | | | | | | | |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **Time taken to remove stain in minutes** | 20 | 19 | 17 | 14 | 10 | 4 | 8 | 12 | 16 |

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.

  
pH of detergent solution

[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]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

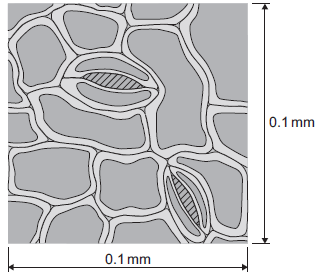
**3.2** Give **one** function of stomata.

[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 mm2 of this leaf surface.

[2 marks]

Number of stomata per mm = \_\_\_\_\_\_\_\_\_\_\_\_\_

**3.4** A different plant species has 400 stomata per mm2 of leaf surface.  
Having a large number of stomata per mm2 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]

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**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 |  | 2 |
| 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** | | |  |
| • (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  • se 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  points or bars plotted correctly to within ± 1 mm  one suitable line of best fit drawn on graph | data spread greater than half of grid to gain the mark  deduct 1 mark for each incorrect plot up to a maximum of 2  do not allow extrapolation to (0.0) | 1  2  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 × 0.1 = 0.01 (mm2) | 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 |  | 1 |
| 3.6 | the lower surface has most stomata  stomata are now covered / blocked (by grease)  so water cannot escape / evaporate from the stomata | ignore waterproof  to gain credit, stomata must be mentioned at least once | 1  1  1 |