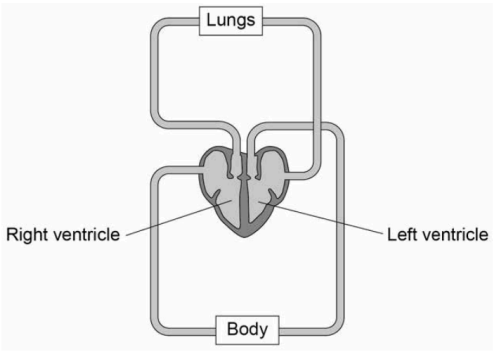
The circulatory system (heart, blood vessels, blood, coronary heart disease)

Q1. (2018)

Figure 9 shows the heart in the circulatory system.

Figure 9



A)

0 4 . 3 The heart is a double pump.

Describe what this means.

Use **Figure 9** to help you.

[2 marks]

B)

0 4 . 4 The wall of the left ventricle is much thicker than the wall of the right ventricle.

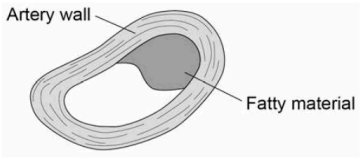
Suggest **one** reason for this.

[1 mark]

Q2. (2018)

Figure 14 shows a coronary artery of someone with CHD.

Figure 14



0 7 . 2 Explain how CHD can cause a heart attack.

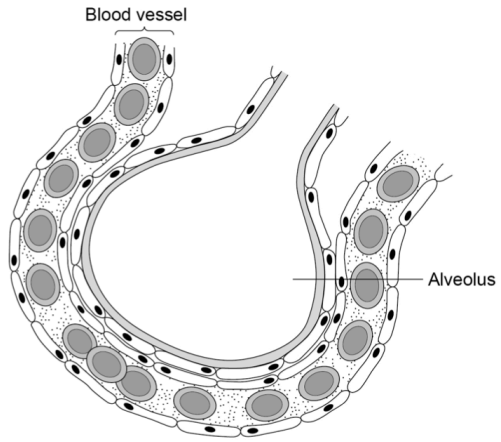
[3 marks]

Q3. (2019)

Multicellular organisms have exchange surfaces to absorb substances.

Figure 4 shows part of the exchange surface in the lungs.

Figure 4



A)

0 2 . 3 Oxygen passes from the alveolus into the blood.

Name the part of the blood that carries the most oxygen.

[1 mark]

B)

0 2 . 4 Name the gas that passes out of the blood into the alveolus.

[1 mark]

C)

0 2 . 5 Alveoli provide a large surface area for gas exchange.

Give **two** other ways the lungs are adapted for efficient gas exchange.

[2 marks]

1 _____

_____

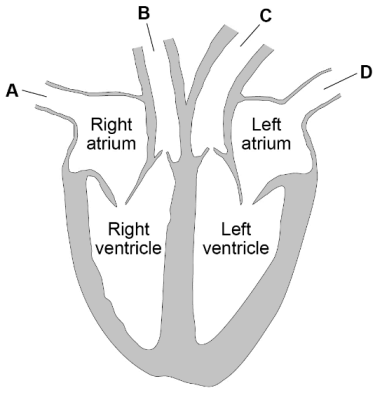
2 _____

_____

Q4. (2019)

0 6 **Figure 10** shows a human heart.

Figure 10



0 6 . 1 Which blood vessel carries deoxygenated blood away from the heart to the lungs?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

Q5. (2019)

0 6 . 2 The natural resting heart rate is controlled by a group of cells that act as a pacemaker.

Where in the heart are 'pacemaker cells' found?

[1 mark]

Tick (✓) **one** box.

Left atrium ☐

Left ventricle ☐

Right atrium ☐

Right ventricle ☐

Q6. (2019)

Beta blockers are another type of drug that slows the heart rate.

Table 2 shows information for people who do not take beta blockers and for people who do take beta blockers.

- Stroke volume is the volume of blood pumped out of the heart each time it beats.
- Cardiac output is the total volume of blood pumped out of the heart each minute.

Table 2

	No beta blockers taken		**Taking beta blockers**	
	At rest	**During exercise**	**At rest**	**During exercise**
Heart rate in beats per minute	68	150	52	88
Stroke volume in cm^3	80	120	**X**	98
Cardiac output in cm^3 per minute	5440	18 000	2800	8624

A)

0 6 . 4 Calculate stroke volume **X** in **Table 2**.

Use the equation:

cardiac output = stroke volume × heart rate

Give your answer to 2 significant figures.

[3 marks]

Stroke volume **X** = _____ cm^3

B)

0 6 . 5 Some people who take beta blockers get out of breath when they exercise.

Explain why beta blockers can have this effect during exercise.

You should refer to information given in **Table 2**.

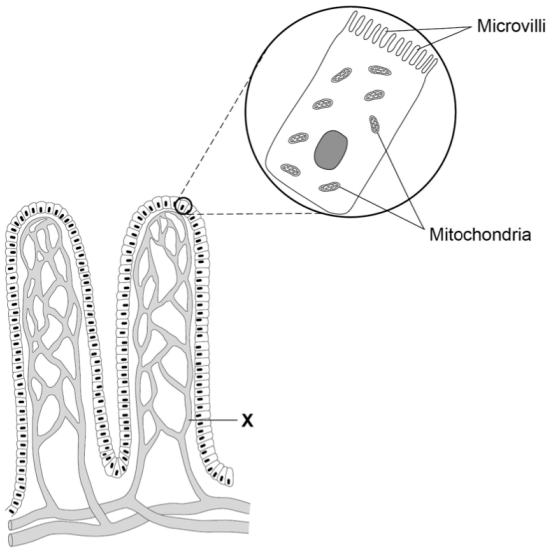
[6 marks]

Q7. (2020)

Figure 6 shows two villi.

Figure 6 also shows one cell on the surface of a villus as seen using an electron microscope.

Figure 6



0 6 . 4 What type of blood vessel is labelled **X**?

[1 mark]

Tick (✓) **one** box.

Artery ☐

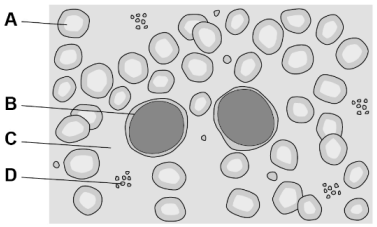
Capillary ☐

Vein ☐

Q8. (2022)

Figure 8 shows blood viewed using a microscope.

Figure 8



A)

0 5 . 7 A vaccine will stimulate the production of antibodies.

Which part of the blood in **Figure 8** produces antibodies?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

B)

0 5 . 8 Which part of the blood in **Figure 8** starts the clotting process?

[1 mark]

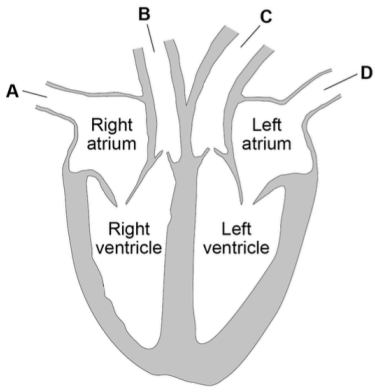
Tick (✓) **one** box.

A ☐ B ☐ C ☐ D ☐

Q9. (2023)

0 4 **Figure 6** shows a human heart.

Figure 6



A)

0 4 . 1 The vena cava carries blood into the heart from the body.

Which blood vessel in **Figure 6** is the vena cava?

[1 mark]

Tick (✓) **one** box.

A ☐ B ☐ C ☐ D ☐

B)

0 4 . 2 Which chamber of the heart pumps blood to the body?

[1 mark]

Tick (✓) **one** box.

Left atrium ☐

Left ventricle ☐

Right atrium ☐

Right ventricle ☐

C)

0 4 . 3 What is the name of the blood vessel that carries blood to the heart muscle?

[1 mark]

Tick (✓) **one** box.

Aorta ☐

Coronary artery ☐

Pulmonary artery ☐

Q10. (2023)

The heart and some blood vessels contain valves.

0 4 . 4 Which type of blood vessel has valves?

[1 mark]

Tick (✓) **one** box.

- Artery ☐
- Capillary ☐
- Vein ☐

Q11. (2023)

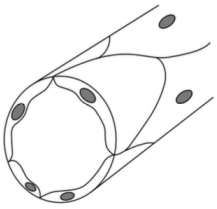
0 4 . 5 What is the function of valves?

[1 mark]

Q12. (2023)

Figure 7 shows a blood capillary.

Figure 7



0 4 . 6 Explain **one** way the capillary is adapted for its function.

[2 marks]

Q13. (2023)

Table 2 shows information about the blood of four people.

Table 2

Person	Concentration of blood component in number/mm^3		
	Red blood cells	White blood cells	Platelets
W	5 000 000	15 000	200 000
X	4 700 000	5 500	20 000
Y	8 000 000	7 200	250 000
Z	4 900 000	6 400	225 000

A)

0 4 . 7 Person **W** has 5 000 000 red blood cells in 1 mm^3 of blood.

What is 5 000 000 written in standard form?

[1 mark]

Tick (✓) **one** box.

- 5 × 1 000 000 ☐
- 5×10^6 ☐
- 5×10^7 ☐
- 50×10^5 ☐

B)

0 4 . 8 Draw **one** line from each description to the person in **Table 2** it describes.

[2 marks]

Description	Person in Table 2
	Person **W**
Person most likely to have an infection	Person **X**
Person whose blood will **not** clot properly	Person **Y**
	Person **Z**

Q14. (2023)

0 4 . 9 The greater the height above sea level, the less oxygen there is in the air.

People who live high above sea level have more red blood cells than people who live at sea level.

Some athletes train in mountains high above sea level.

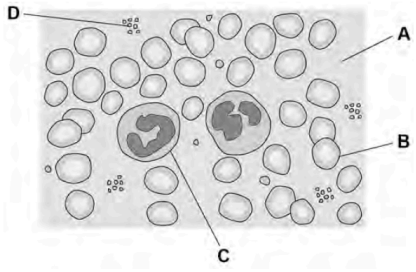
Explain why having more red blood cells will improve an athlete's performance.

[3 marks]

Q15. (2024)

0 3 **Figure 5** shows different parts of blood.

Figure 5



0 3 . 1 Which letter shows a white blood cell?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

Q16. (2024)

0 3 . 2 Which part of the blood causes the blood to clot?

[1 mark]

Tick (✓) **one** box.

Plasma ☐

Platelets ☐

Red blood cells ☐

Q17. (2024)

0 3 . 3 Name **two** substances transported in the blood.

[2 marks]

1 _____

2 _____

Q18. (2024)

Healthy people can volunteer to donate blood.

The donated blood is then given to patients who need the blood.

When a volunteer donates blood:

- the volunteer's health is checked
- a needle is used to remove blood from a vein in the arm
- the volunteer rests for 15 minutes after the donation.

0 3 . 4 Suggest **one** reason why blood is removed from a vein and **not** from an artery.

[1 mark]

Q19. (2024)

Patients may receive blood during a medical emergency.

Donating blood and receiving blood has risks.

A)

0 3 . 5 Suggest **one** advantage and **one** disadvantage to a patient who **receives** blood.

[2 marks]

Advantage _____

_____

Disadvantage _____

_____

B)

0 3 . 6 Suggest **one** advantage and **one** disadvantage to the volunteer who **donates** blood.

[2 marks]

Advantage _____

_____

Disadvantage _____

_____

Q20. (2024)

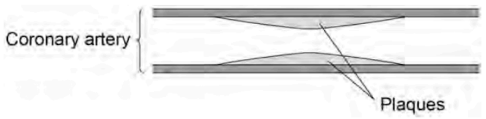
Deposits can form in coronary arteries.

The deposits are called plaques.

Plaques cause damage to the arteries.

Figure 6 shows plaques in a coronary artery.

Figure 6



A)

0 4 . 5 Which **two** factors **increase** the risk of plaques forming in the coronary artery?

[2 marks]

Tick (✓) **two** boxes.

- High fat diet ☐
- Low blood glucose ☐
- Regular exercise ☐
- Smoking ☐
- Taking statins ☐

B)

0 4 . 6 Which treatment can be used for the plaques in **Figure 6**?

[1 mark]

Tick (✓) **one** box.

- A placebo ☐
- A stent ☐
- An antibiotic ☐

Q21. (2024)

0 4 . 7 A heart attack can happen when plaques block a coronary artery.

During a heart attack muscle cells in the heart die.

Explain how the blockage can lead to the death of muscle cells in the heart.

[3 marks]