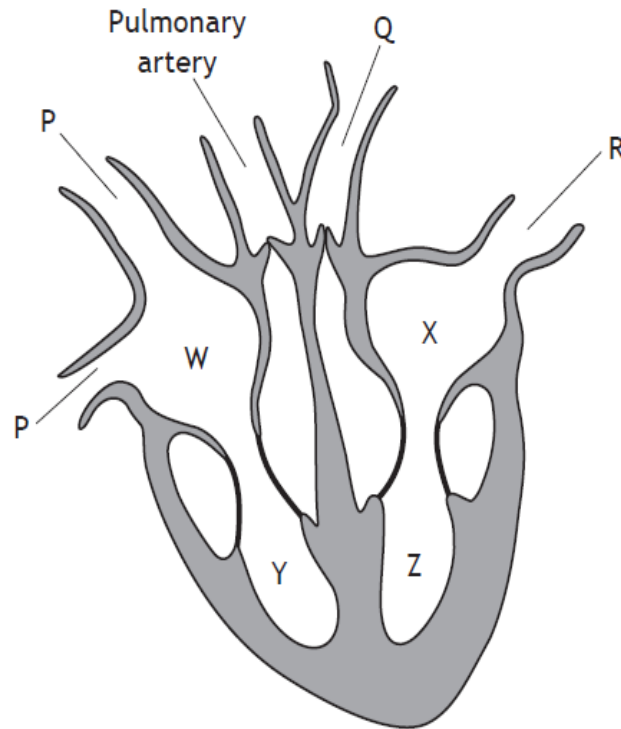


Unit 2 Multicellular Organisms

Key Area 6—Transport Systems Animals and Absorption of Materials



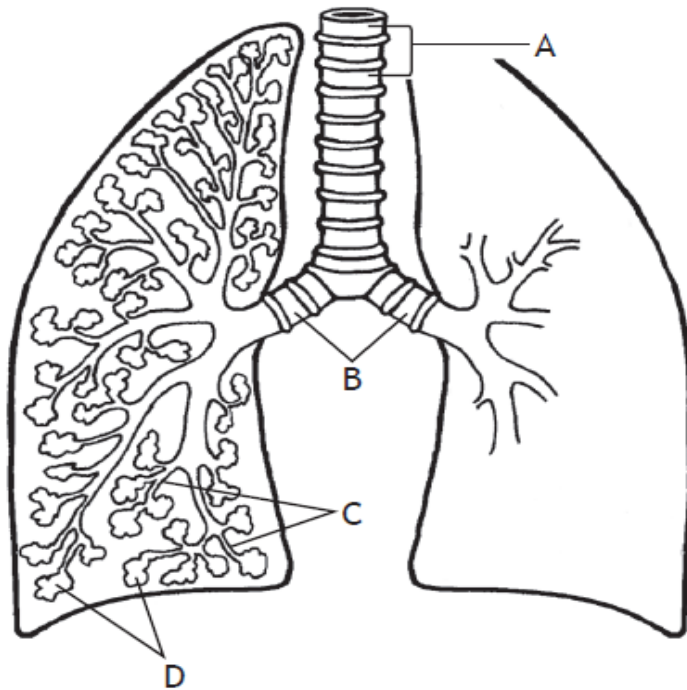
1. Which line in the table below correctly identifies the four chambers of the heart labelled W, X, Y and Z?

	W	X	Y	Z
A	Right ventricle	Left ventricle	Right atrium	Left atrium
B	Right ventricle	Left ventricle	Left atrium	Right atrium
C	Right atrium	Left atrium	Left ventricle	Right ventricle
D	Right atrium	Left atrium	Right ventricle	Left ventricle

2. Which line in the table below correctly identifies the type of blood carried in blood vessels P, Q and R?

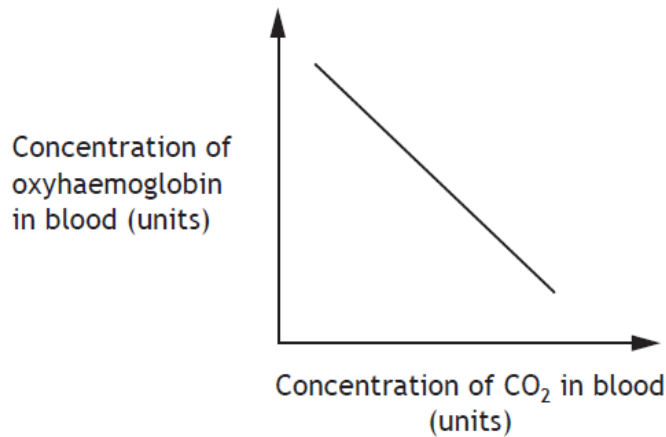
	P	Q	R
A	deoxygenated	oxygenated	oxygenated
B	deoxygenated	oxygenated	deoxygenated
C	oxygenated	deoxygenated	oxygenated
D	oxygenated	deoxygenated	deoxygenated

3. The diagram below shows part of the human respiratory system.



Which letter identifies the alveoli?

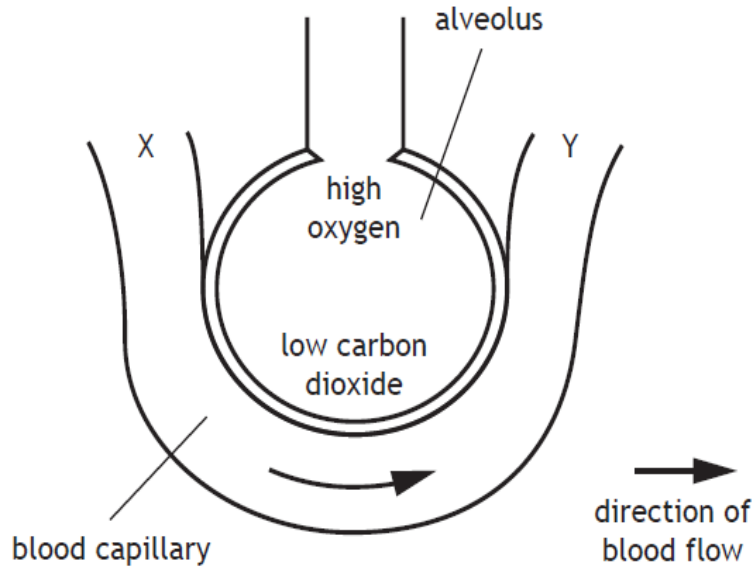
4. The graph below shows the relationship between the concentration of carbon dioxide and oxyhaemoglobin in the blood.



Which of the following statements describes this relationship?

- A As the carbon dioxide concentration increases the concentration of oxyhaemoglobin decreases.
- B As the carbon dioxide concentration decreases the concentration of oxyhaemoglobin decreases.
- C As the carbon dioxide concentration increases the concentration of oxyhaemoglobin increases.
- D Increasing carbon dioxide concentration has no effect upon the concentration of oxyhaemoglobin.

5. The diagram below shows an alveolus and an associated blood capillary.

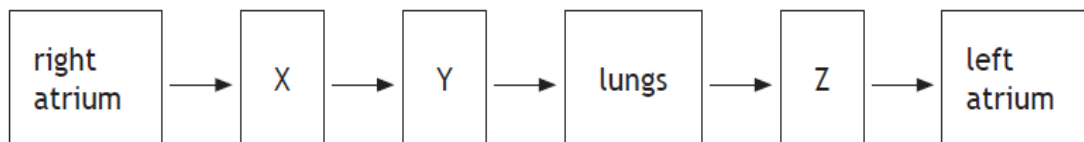


As blood flows from X to Y gases are exchanged with the alveolus.

Which line in the table below identifies the concentrations of gases at X and Y?

	<i>Concentration at X</i>	<i>Concentration at Y</i>
A	high oxygen	high carbon dioxide
B	low oxygen	high carbon dioxide
C	low oxygen	low carbon dioxide
D	high oxygen	low carbon dioxide

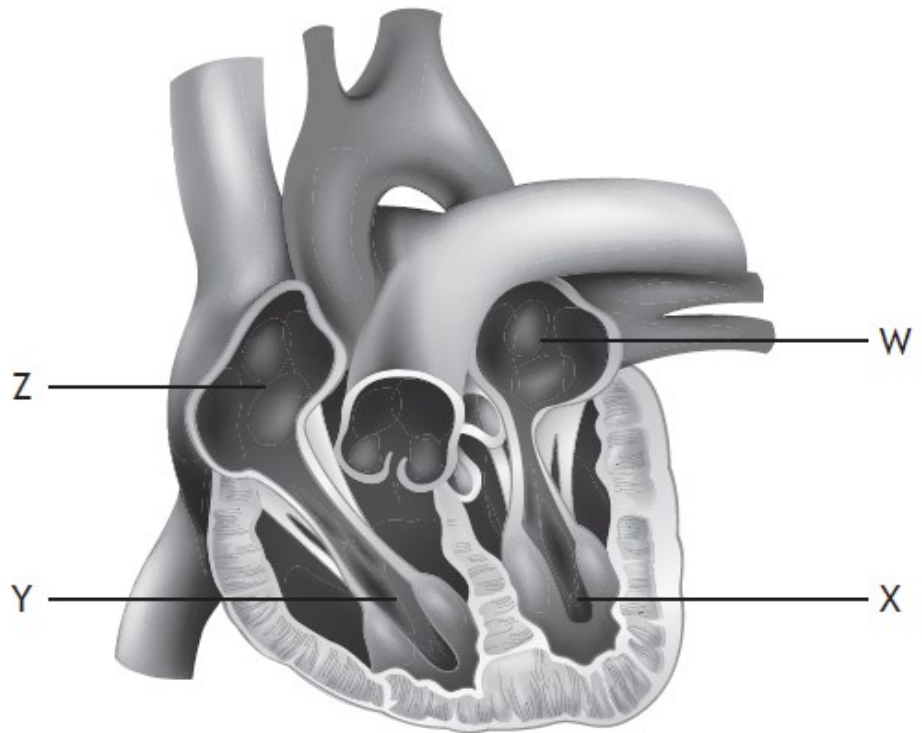
6. The following sequence shows part of the blood flow through the body.



Which line in the table below identifies X, Y and Z?

	X	Y	Z
A	right ventricle	pulmonary vein	pulmonary artery
B	right ventricle	pulmonary artery	pulmonary vein
C	pulmonary vein	pulmonary artery	right ventricle
D	pulmonary artery	right ventricle	pulmonary vein

7. The diagram below shows the heart and associated blood vessels.

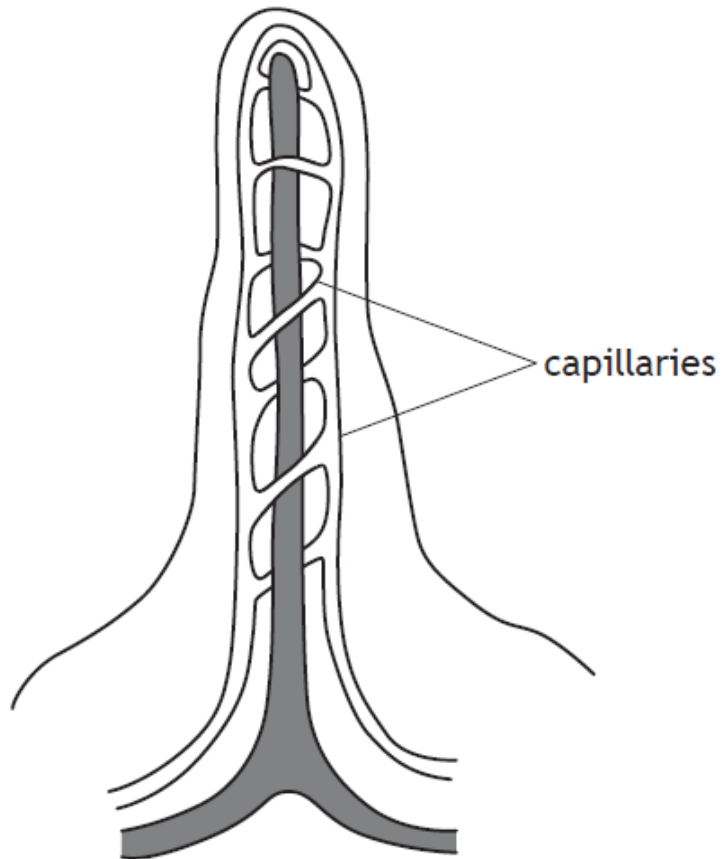


Which of the following statements is correct?

- A W is the left atrium which receives blood from the body.
- B X is the left ventricle which pumps blood to the body.
- C Y is the right atrium which receives blood from the lungs.
- D Z is the right ventricle which pumps blood to the lungs.

8.

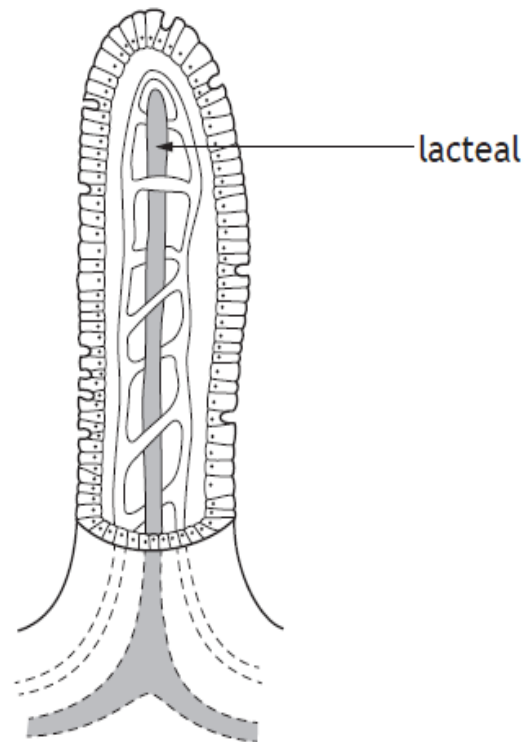
The diagram shows a villus from the small intestine.



Which food molecules are absorbed into the capillaries of the villus?

- A Fatty acids and glycerol
- B Amino acids and glycerol
- C Amino acids and glucose
- D Fatty acids and glucose

9. The diagram shows a villus from the small intestine.



Which of the following products of digestion are both absorbed into the lacteal?

- A Glycerol and fatty acids
- B Glucose and fatty acids
- C Glycerol and amino acids
- D Glucose and amino acids

10. The process which moves food along the digestive system is called

- A diffusion
- B absorption
- C peristalsis
- D osmosis.

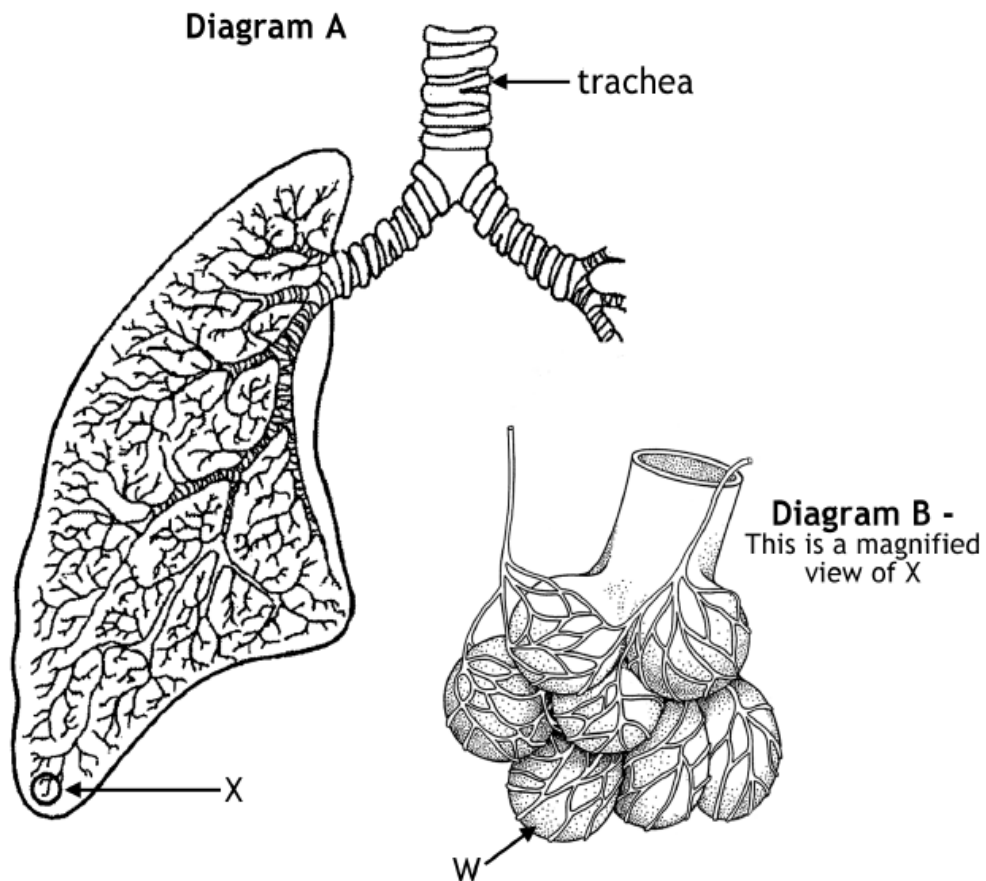
11. Which of the following statements about blood cells is false?

- A White blood cells are part of the immune system.
- B Phagocytes are a type of white blood cell.
- C Red blood cells contain haemoglobin.
- D Phagocytes transport nutrients around the body.

12. Which row in the table identifies how lymphocytes destroy pathogens?

	<i>Antibody production</i>	<i>Phagocytosis</i>
A	Yes	No
B	No	No
C	No	Yes
D	Yes	Yes

12. The diagrams below represent part of the human breathing system.



(a) (i) Name the structure labelled W. 1

(ii) Describe two features of these structures which improve the efficiency of gas exchange. 2

1 _____

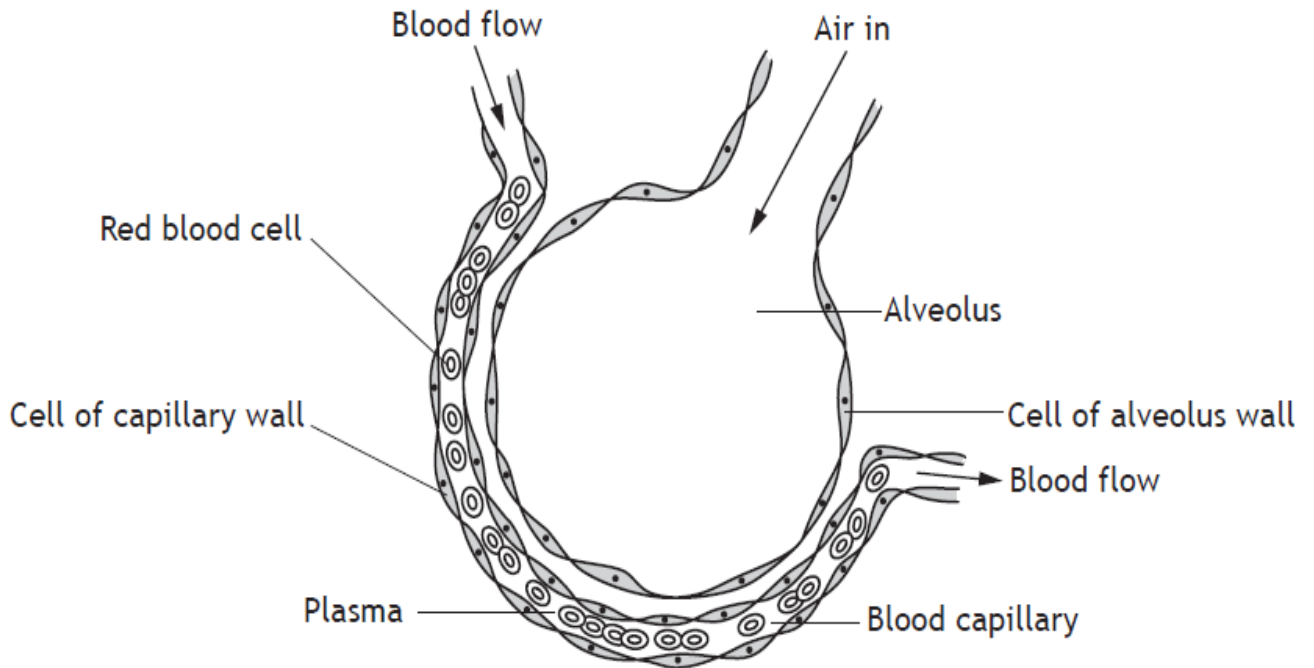
2 _____

(b) Mucus and cilia are found in the trachea.

Describe how the mucus and cilia work together to help prevent bacteria getting into the lungs. 2

13.

The diagram below shows a site of gas exchange in the lungs.



The table below shows the relative concentration of oxygen, carbon dioxide and water in these cells and plasma, the liquid part of the blood.

	<i>Relative concentration of substances</i>		
	<i>oxygen</i>	<i>carbon dioxide</i>	<i>water</i>
Plasma	low	high	medium
Red blood cell	low	high	medium
Cell of capillary wall	medium	medium	medium
Cell of alveolus wall	high	low	medium

- (a) (i) Describe the pathway that oxygen would take when moving between these cells. 1

- (ii) Explain why the oxygen moves along this pathway. 1

(continued)

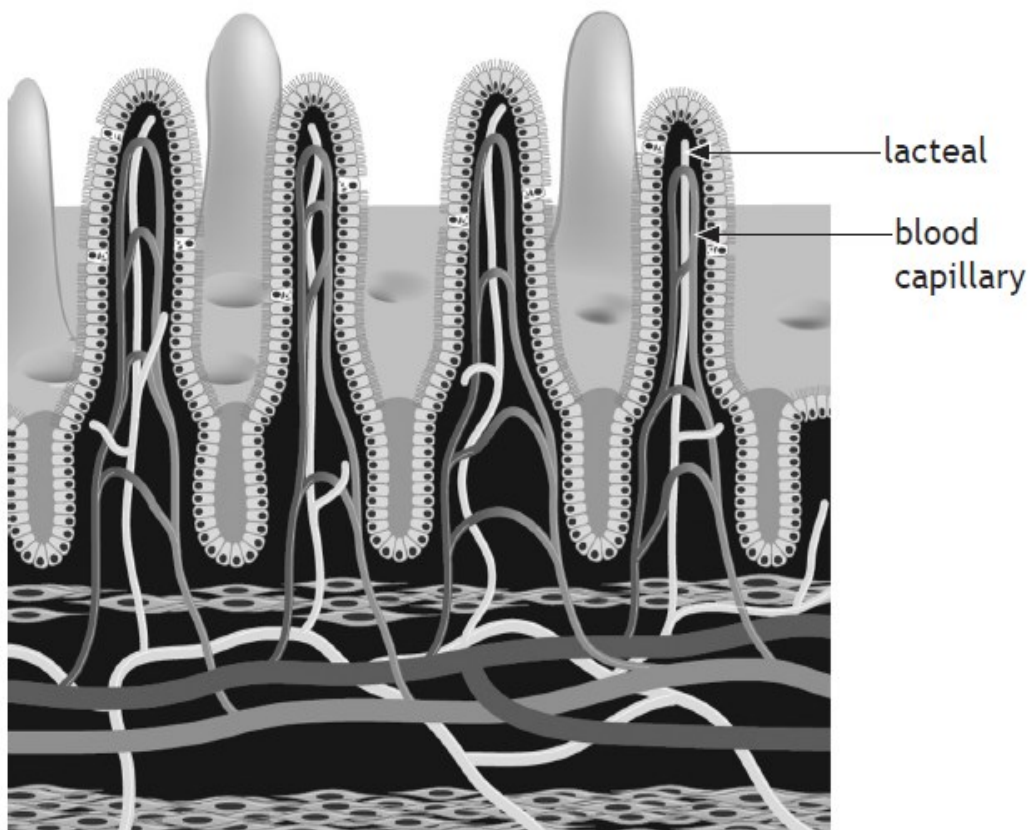
- (b) State whether osmosis would occur between the cells of the capillary wall and the cells of the alveolus wall. Insert a tick (✓) in the correct box. 1

Osmosis would occur Osmosis would not occur

Justify your answer.

Total marks 3

14. The following diagram shows a cross-section of some villi in the small intestine.



Explain why the structure and number of villi make absorption an efficient process in the small intestine. 3

15. The table below gives information about features of three different types of blood vessel.

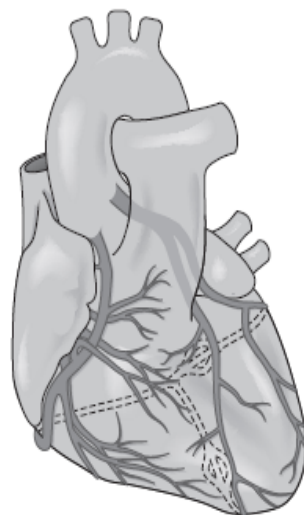
- (a) (i) Complete the table by writing the name of the missing types of blood vessels in the empty boxes. 2

<i>Type of blood vessel</i>	<i>Diameter of central channel (mm)</i>	<i>Thickness of vessel wall (mm)</i>
	30.0	1.5
Capillary	0.006	0.001
	25.0	2.0

- (ii) Of all the blood vessels, capillaries are best adapted for gas exchange.

Using the information in the table, give a reason for this. 1

- (b) The heart is a muscle which pumps blood around the body and requires its own blood supply.



Name the blood vessel which supplies the heart muscle with blood. 1

16. (a) The table shows some information about causes of adult deaths in Scotland.

<i>Cause of adult deaths</i>	<i>Number of adult deaths (per 100 000 population)</i>	
	<i>Males</i>	<i>Females</i>
Cancer	385	274
Coronary heart disease	165	105
Chronic obstructive pulmonary disease	71	58

Calculate the simple whole number ratio of male deaths to female deaths due to coronary heart disease.

1

Space for calculation

_____ : _____
Males *Females*

- (b) (i) Coronary heart disease can gradually cause the coronary arteries to get narrower or become blocked completely.

Name one essential substance that will no longer be able to reach the cells in the heart if these arteries become blocked.

1

- (ii) A person has been told that they have a high risk of developing coronary heart disease.

Suggest a lifestyle choice that they could make, other than exercising more, to help reduce this risk.

1

(continued)

- (c) Chronic obstructive pulmonary disease is a condition which affects the lungs. It can destroy the alveolar walls, leading to fewer alveoli.

The diagrams represent lung tissues which have undamaged and damaged alveoli.

undamaged



damaged



Identify a feature of the alveoli which will be affected by this reduction in their number.

The following statements are about blood vessels.

1. Contain valves.
2. Have a narrow central channel.
3. Carry blood under low pressure.
4. Form networks at organs and tissues.
5. Carry blood from the heart to organs.

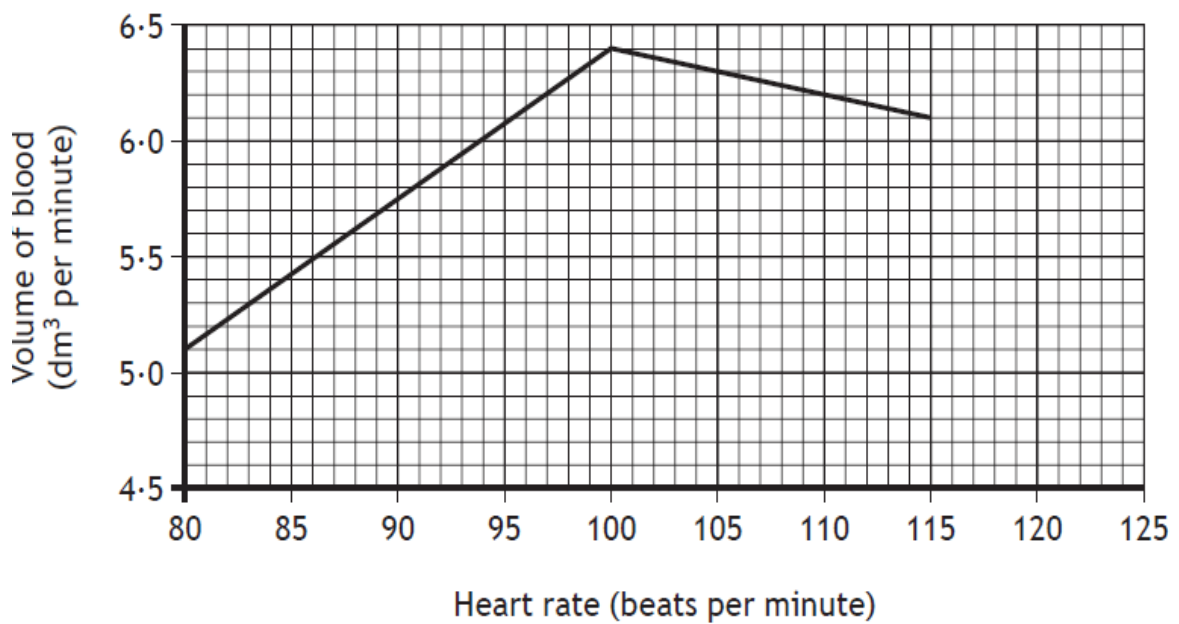
(a) Choose either arteries or veins and select two statements from the list above which describe that type of blood vessel.

2

Blood vessel _____

Statements _____ and _____

(b) The graph shows the effect of changes in heart rate on the volume of blood pumped by the left ventricle.



(i) Describe the relationship between heart rate and volume of blood pumped by the left ventricle.

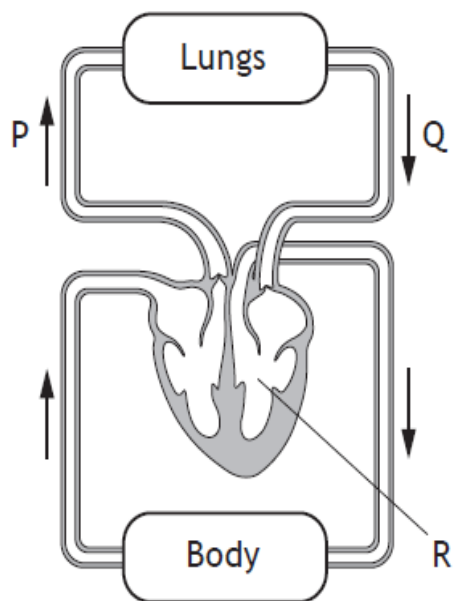
2

(ii) Predict the volume of blood pumped by the left ventricle at 120 beats per minute.

1

_____ dm³ per minute

(c) The diagram represents part of the circulatory system in humans.



(i) Describe the difference in oxygen concentration in the blood travelling through blood vessels P and Q. 1

(ii) Name the heart chamber labelled R. 1
