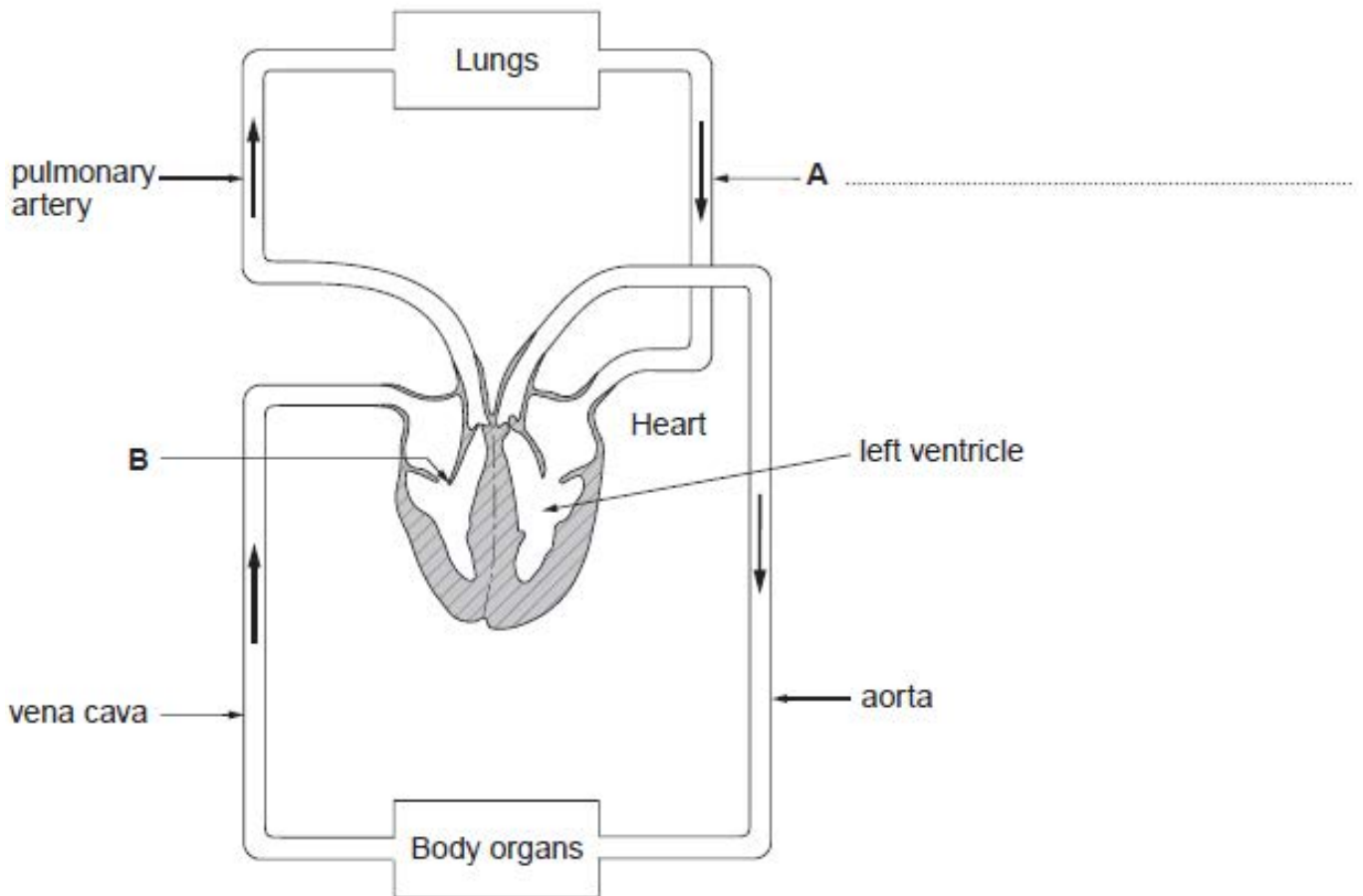


WJEC (Eduqas) Biology GCSE
Topic 2.1 Transport Systems in
Humans
Questions by Topic

1. The diagram shows the human circulatory system.



- (a) (i) Label the blood vessel **A** on the diagram. [1]
- (ii) State the function of structure **B**. [1]
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(b) The table shows blood pressures in different parts of the circulatory system.

Blood vessel	Maximum blood pressure (kPa)
pulmonary artery	3.3
aorta	16.0
capillary in body organ	2.0
left ventricle	17.0
right ventricle	3.5

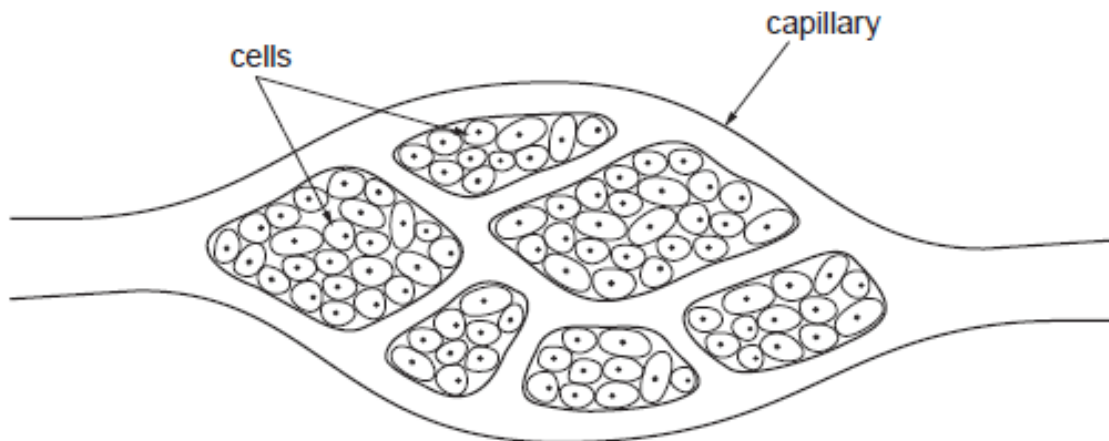
- (i) I. Calculate the difference in the maximum blood pressure between the aorta and the pulmonary artery. [1]

Difference in pressure = kPa

- II. State the reason for the difference in blood pressure in these two blood vessels. [1]

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- (ii) The diagram shows some capillaries in an organ of the body.



Blood flows very slowly through the capillaries, allowing useful substances in the blood and waste products in cells to be exchanged.

- I. From the table above, what is the evidence that the blood flows slowly through the capillaries? [1]

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- II. State how the capillary walls are well adapted for the exchange of substances. [1]

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2.

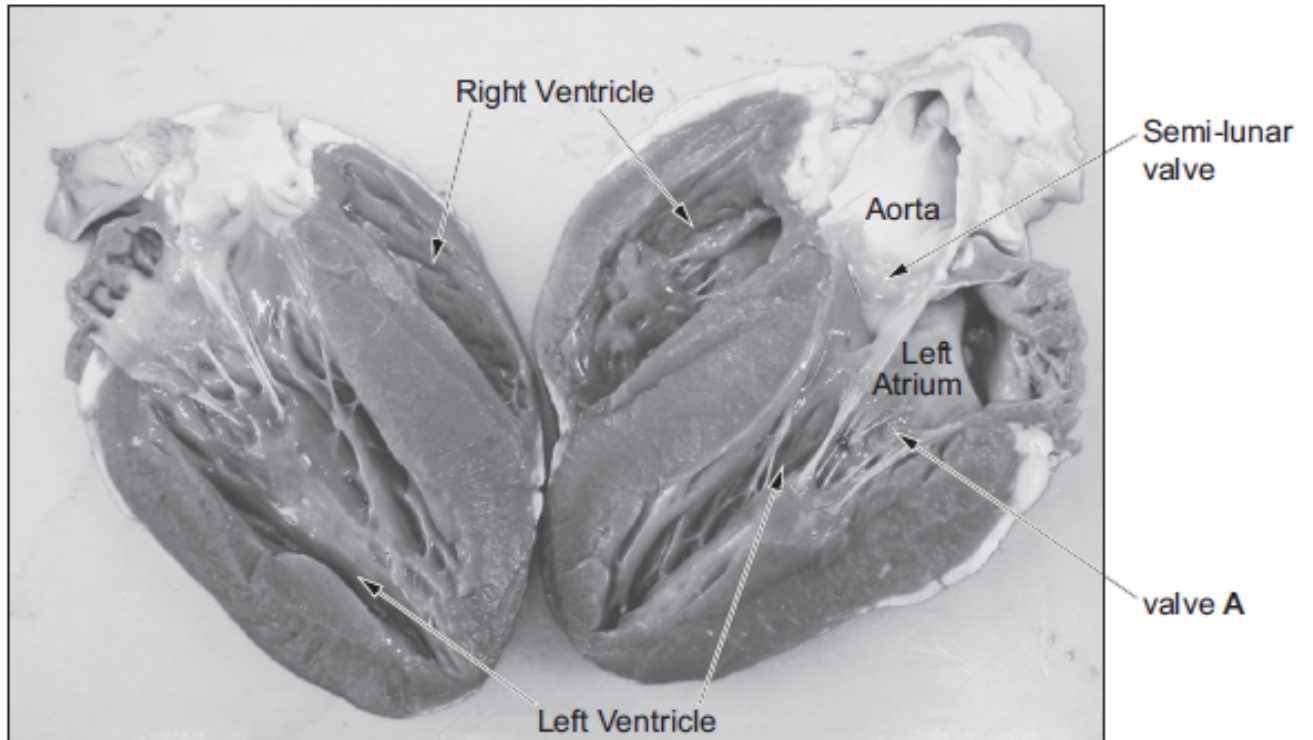
(a) State what is meant by a double circulatory system.

[2]

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The photograph below shows a section through the heart.



(b) Use the picture above and your own knowledge to identify valve A.

[1]

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(c) Explain how the semi-lunar valve, shown in the photograph, helps to ensure a one-way flow of blood through the heart.

[3]

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- (d) The walls of the left ventricle are thicker than the walls of the right ventricle. Explain the significance of this difference. [2]

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In 2016, a research group at Imperial College London reported that weekly exercise seemed to increase the thickness of the walls of the ventricles. This effect could be mistaken for serious heart disease even though the individuals are healthy.

- (e) Suggest an explanation for the effect of exercise on the thickness of the walls of the ventricles. [2]

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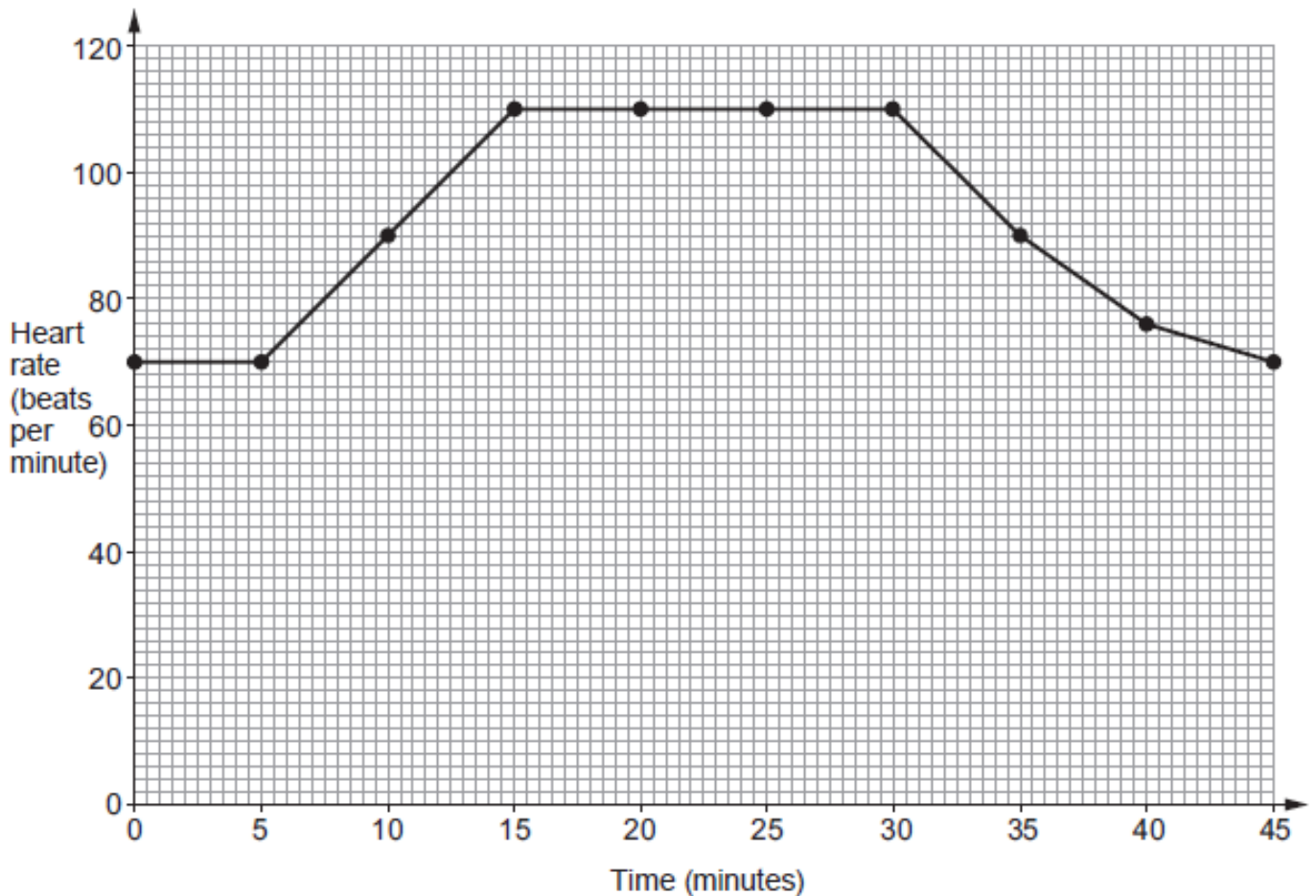
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- (f) Cardiac output is a measurement of the volume of blood pumped by a ventricle in one minute. It can be calculated as follows:

$$\text{Cardiac output} = \text{volume of blood in ventricle} \times \text{heart rate}$$

The volume of blood in a ventricle of an average adult human is 70 cm^3 .

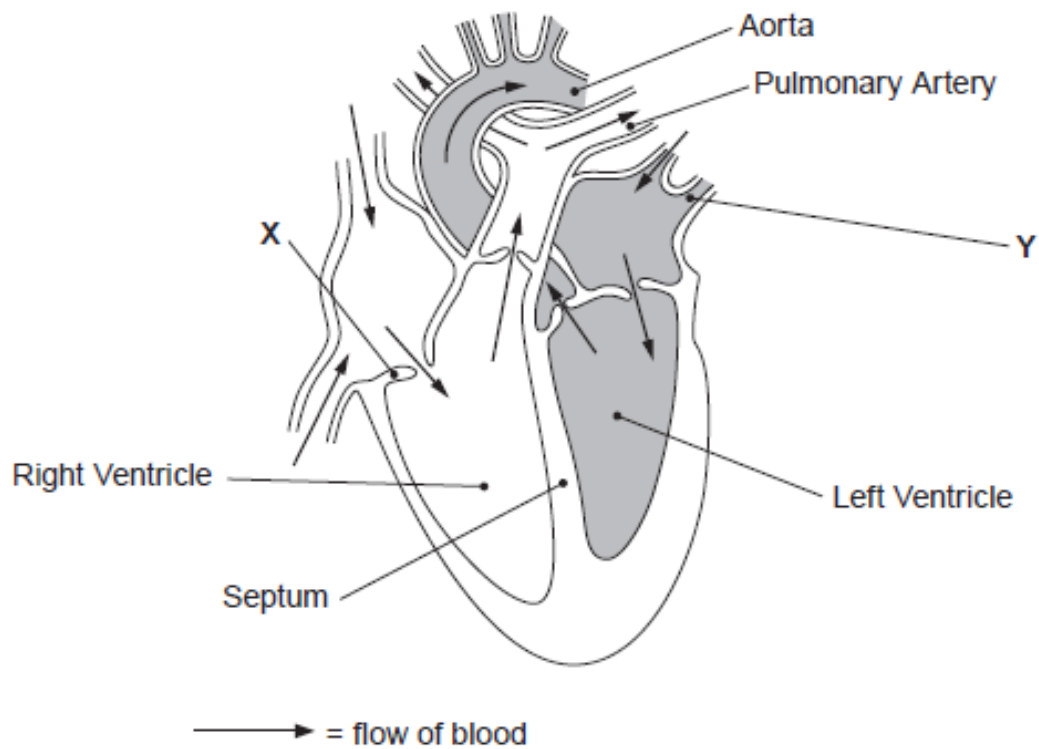
The graph below shows the heart rate of an individual before, during and after a session on an exercise bike.



- (i) Calculate the cardiac output at 5 minutes and 20 minutes. [1]
- 5 minutes = cm^3/min
- 20 minutes = cm^3/min
- (ii) Calculate the percentage increase in cardiac output between 5 and 20 minutes. [2]

percentage increase in cardiac output = %

3. The diagram shows a section through the human heart.



- (a) State the name of structures labelled X and Y on the diagram.

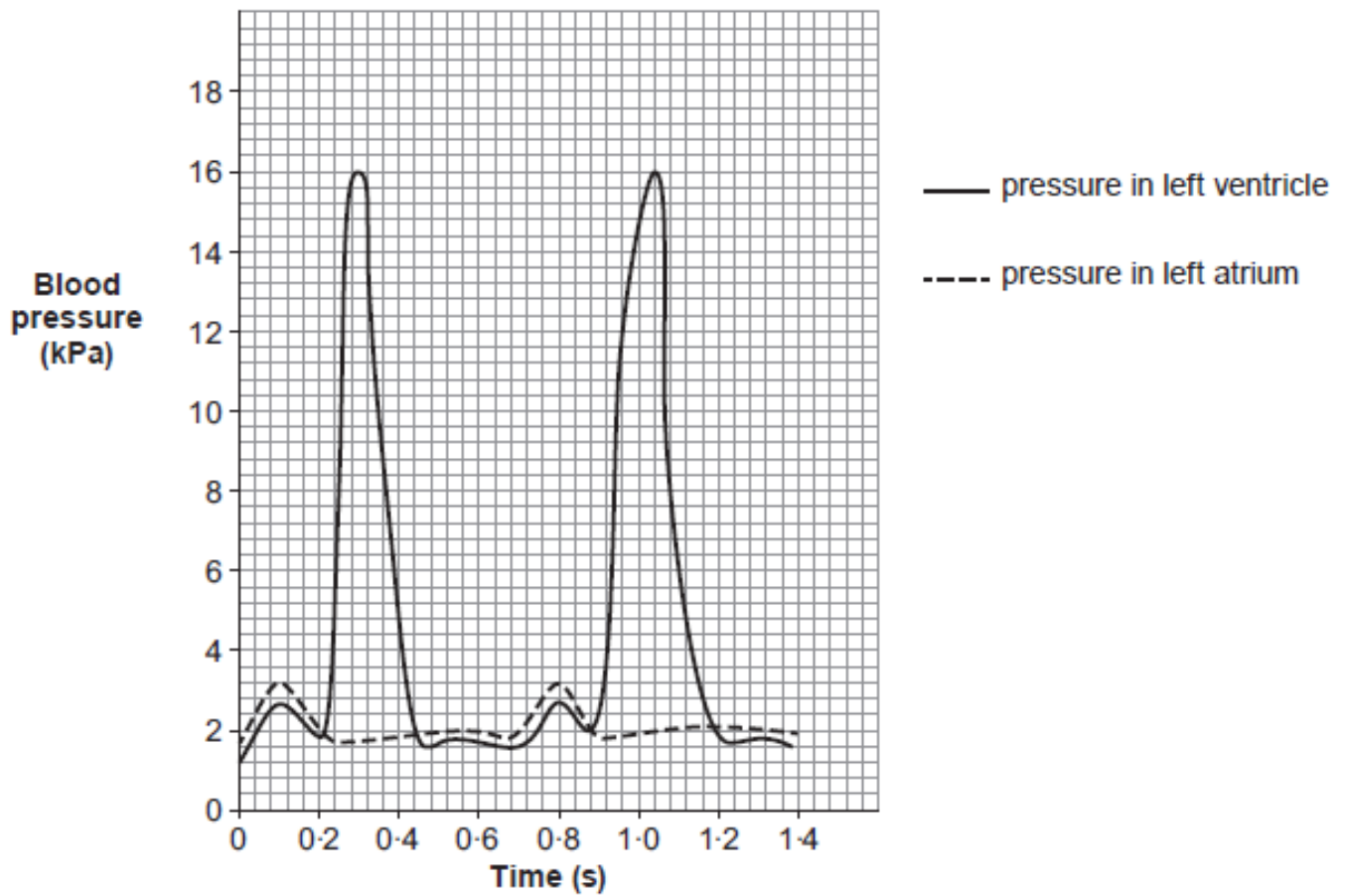
[2]

X

Y

- (b) The walls of the atria and ventricles are of different thicknesses and are made of muscle. When the muscle contracts blood is pumped from one part of the heart to another or is pumped out of the heart.

The chart below shows the change in the blood pressure in the left atrium and left ventricle as they contract.



- (i) State the maximum blood pressure in: [1]
- I. left atrium kPa
 - II. left ventricle kPa
- (ii) State how the blood pressure in the right ventricle would be different to that in the left. Give the reason for this difference and explain its significance. [3]

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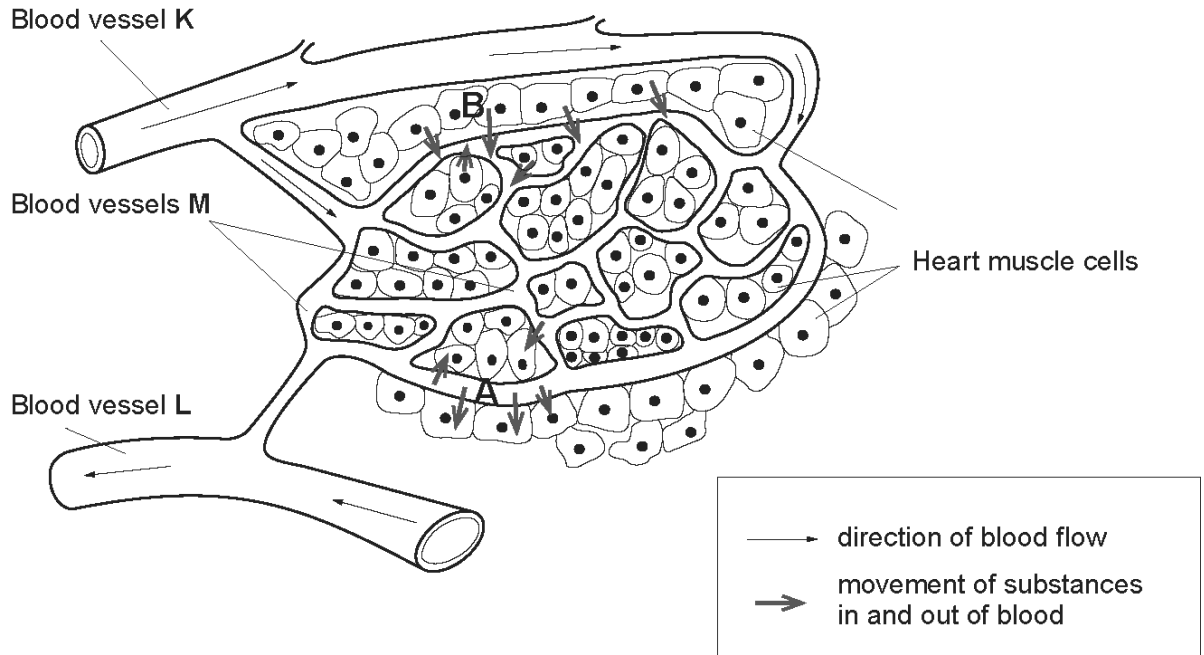
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4.

(a) The diagram below shows a small part of the blood system supplying the muscle cells of the heart. The direction of blood flow is shown by the arrows on the blood vessels.



(ii) Explain why the action of platelets in this blood vessel could be a problem. [2]

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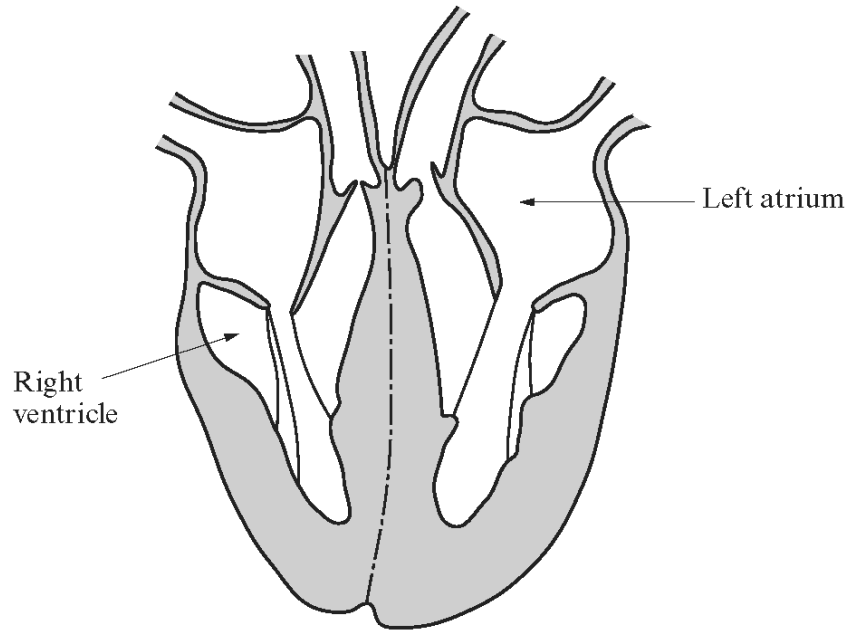
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5.

The diagram shows the human heart in section.



Describe and explain how blood in the right ventricle travels to the left atrium. [6 QWC]

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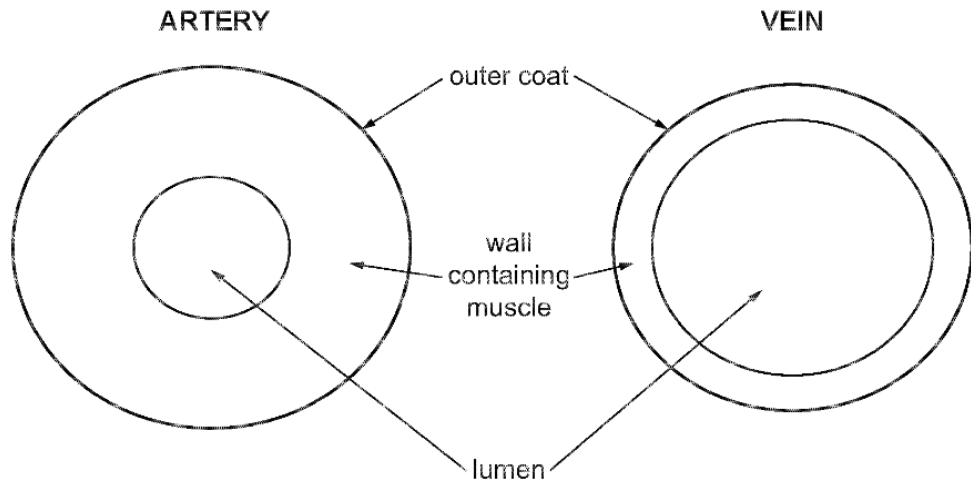
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6.

The diagrams show cross sections of an artery and a vein.

Compare the structure of arteries and veins and explain how they are related to their functions in the circulation of blood in the human body. [6 QER]



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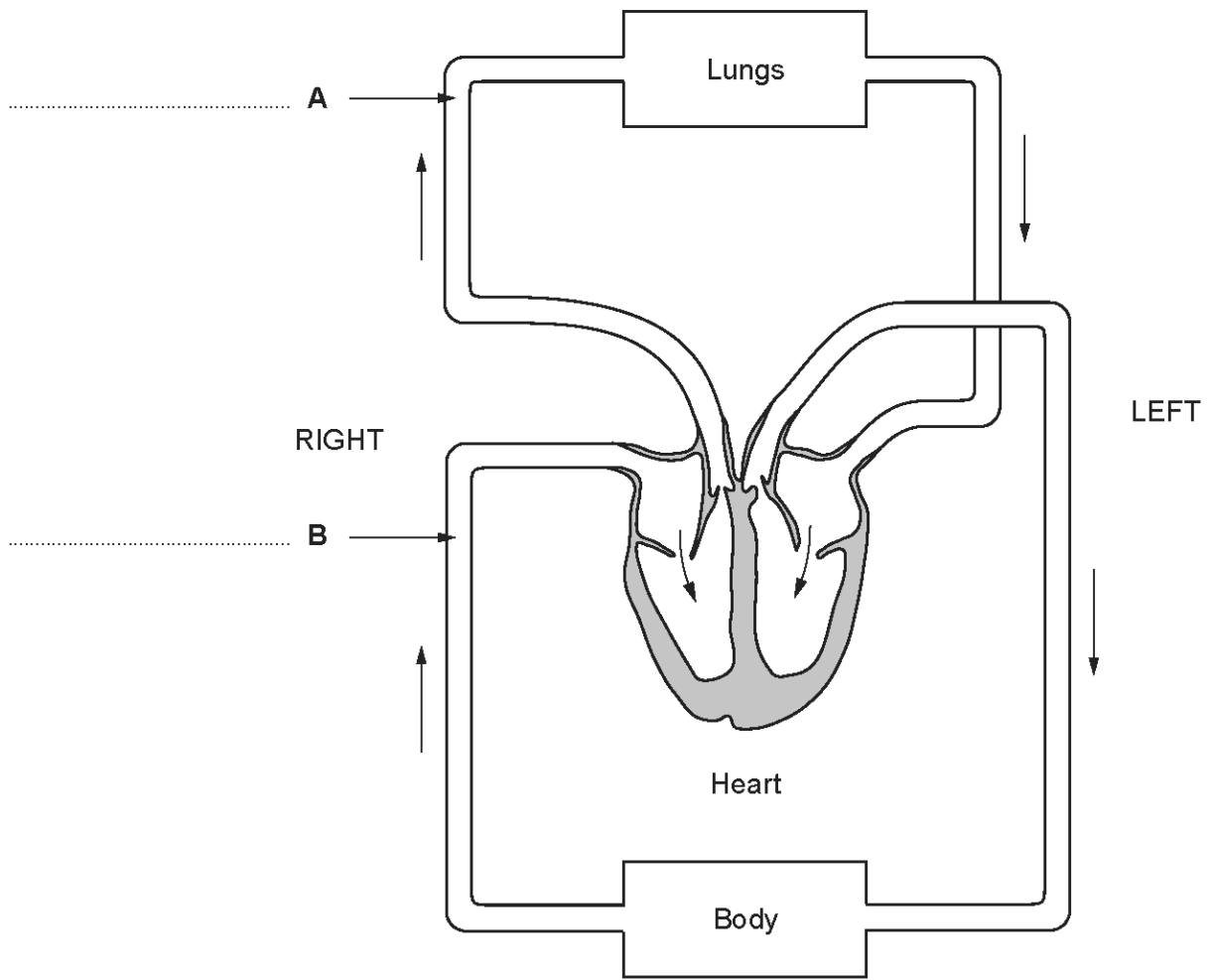
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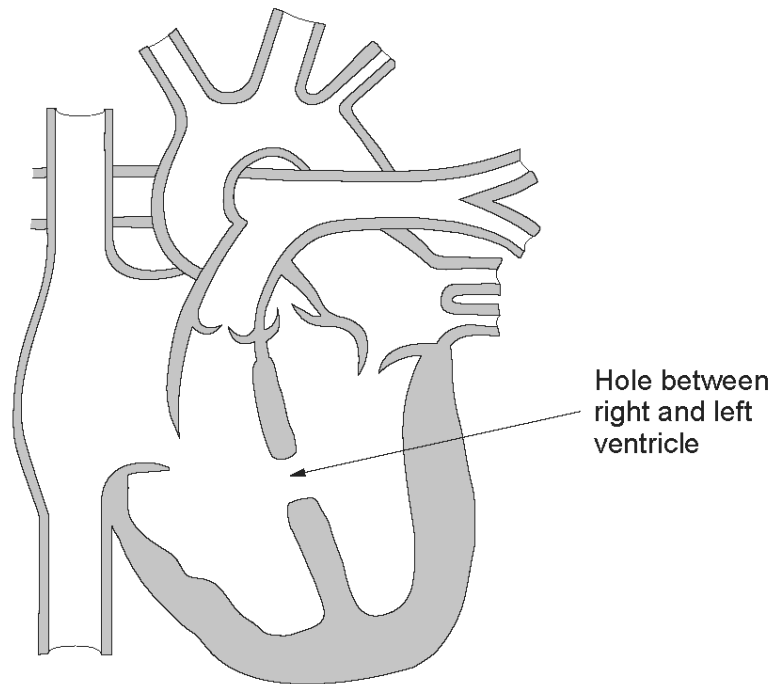
The diagram below shows the double circulation of blood found in humans.



(a) Label blood vessels **A** and **B** on the diagram above.

[2]

- (b) Occasionally a baby is born with a hole in the wall that separates the left and right sides of the heart. In the diagram below this hole is shown in the wall separating the right and left ventricles.



Using the diagram of the double circulation of blood shown opposite and your knowledge of blood circulation, explain the consequences to a person suffering from a hole between the right and left ventricles of the heart. [4]

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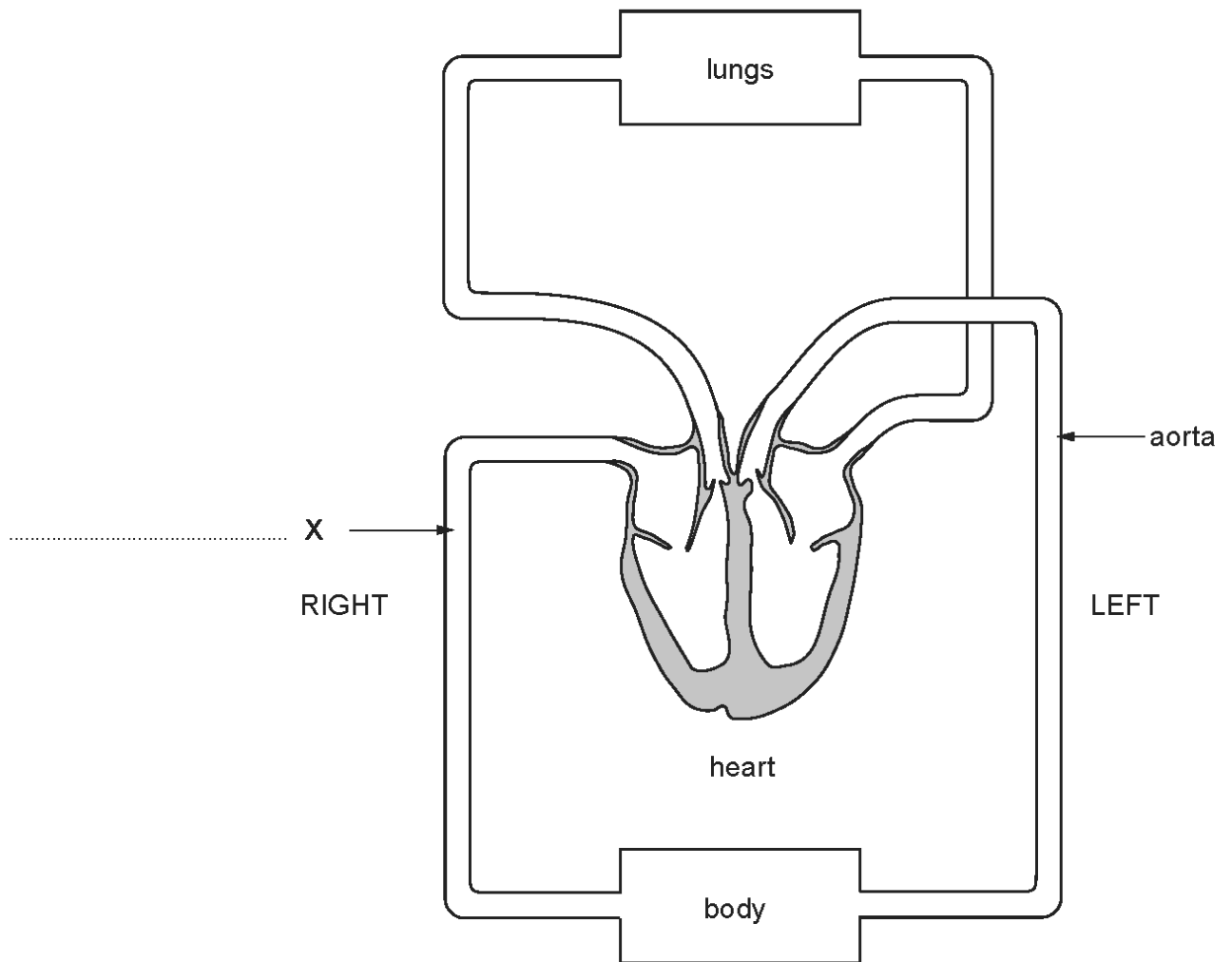
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8.

- (a) The diagram below shows the circulatory system of the human body. This is called a *double circulation*. Some structures have been labelled.



On the diagram above:

- (i) label blood vessel X; [1]
- (ii) draw arrows on the aorta and blood vessel X to show the direction of blood flow. [1]

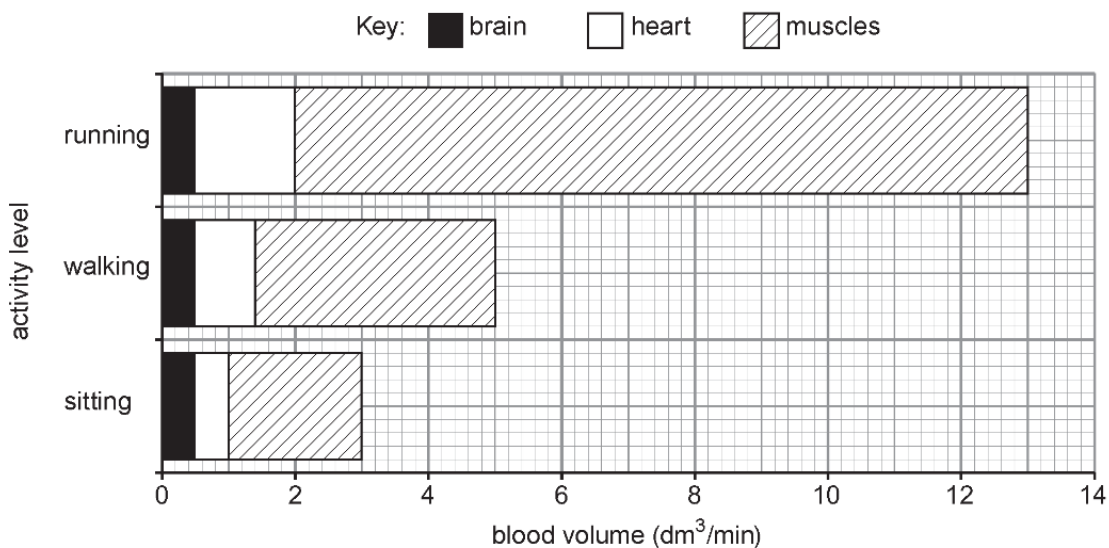
9.

In a study of physical fitness levels, experts analysed a survey of adults in which they were asked how much they had exercised in the previous four weeks.

The report of the survey, which involved 1615 people, claimed that 30% of the British population did no exercise.

Reported in DailyTelegraph 05/06/15

(c) The bar chart shows the blood volume (dm^3/min) supplied to some parts of the body at rest and during exercise.



(iii) Complete the following sentence. [1]

As blood flows through muscles, substances pass out of narrow blood vessels.

These blood vessels are called

(iv) Three of the following statements correctly describe the result of an **increase in blood volume** supplied to muscles. [3]

Underline the **three** correct statements.

More oxygen is supplied

More lactic acid is produced

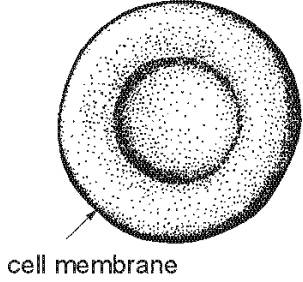
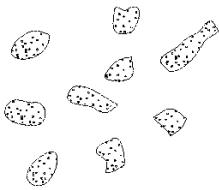
More glucose is supplied

More anaerobic respiration takes place

More aerobic respiration takes place

10.

(a) The table below has information on some of the parts of blood.

part of blood	structure	function
red blood cell		
white blood cell		defence against disease
platelets		

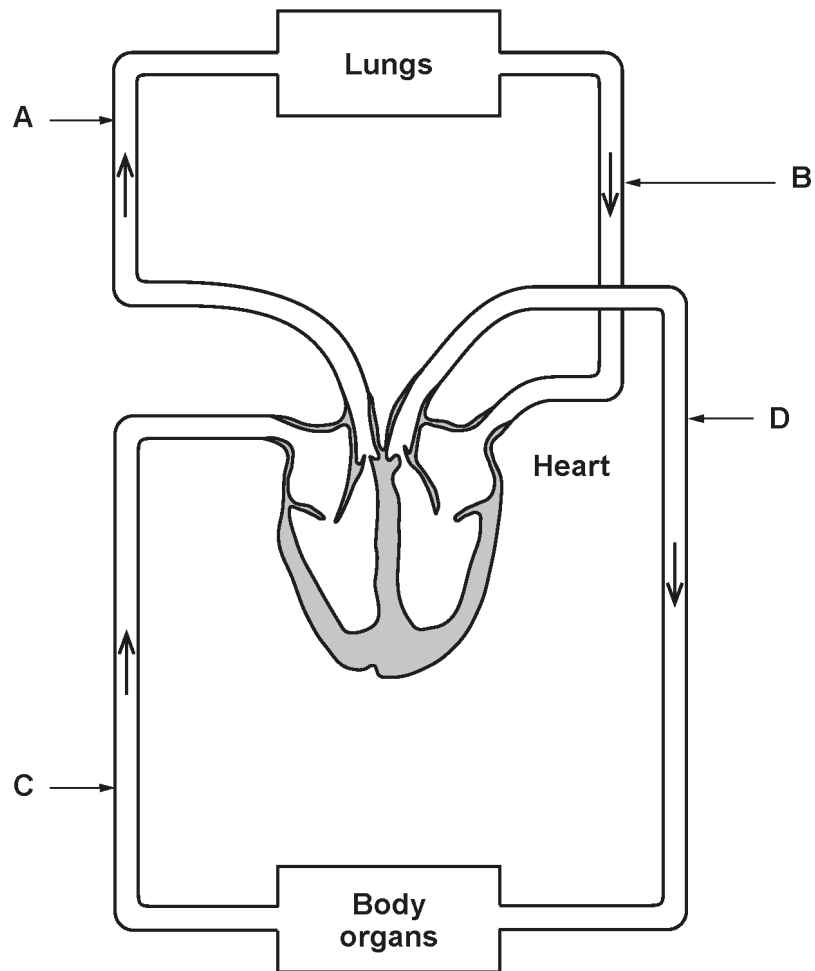
Complete the table above by

(ii) giving the functions of a red blood cell and platelets. [2]

(b) The liquid part of the blood is called plasma. State two substances which are transported in blood plasma. [2]

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The diagram below shows the human circulatory system.

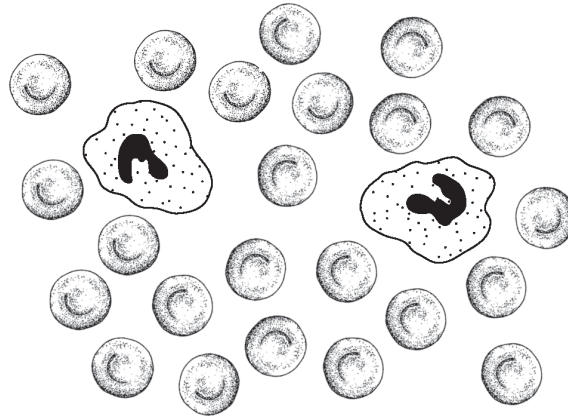


- (i) From the diagram above, state the letter which shows
- I. the pulmonary artery
 - II. the aorta

[2]

11.

The diagram shows a blood smear as seen through a light microscope.



(a) Complete the table below about the different parts of the blood.

[4]

name of part	function
red cell
.....	produce antibodies
platelets