# The Circulatory System

## Total marks:19

**Q1.**

Some blood transfusions contain red blood cells.

Red blood cells are stored in a solution containing 5.0% glucose and 0.9% salt.

Explain why red blood cells cannot be stored in pure water.

**(3)**

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**(Total for question = 3 marks)**

**Q2.**

* Figure 18 shows the structure of the human heart.

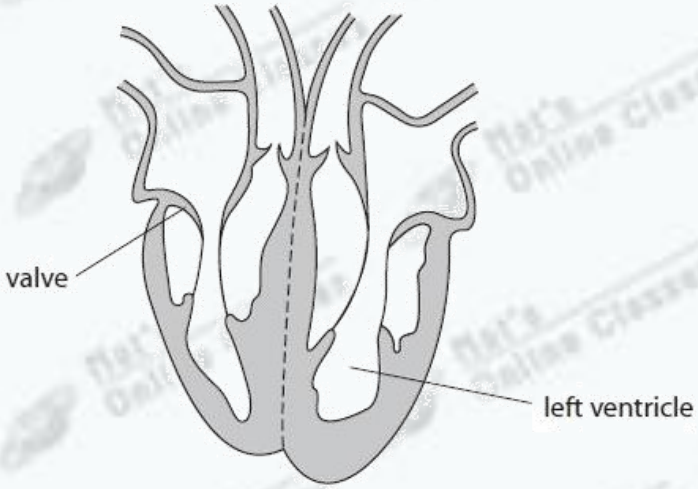


**Figure 18**

Explain how the structure of the heart is related to its function.

(6)

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**(Total for question = 6 marks)**

**Q3.**

Figure 13 shows the heart rate of person A and person B.

Person A does not do any regular exercise.

Person B has been running regularly for one year.

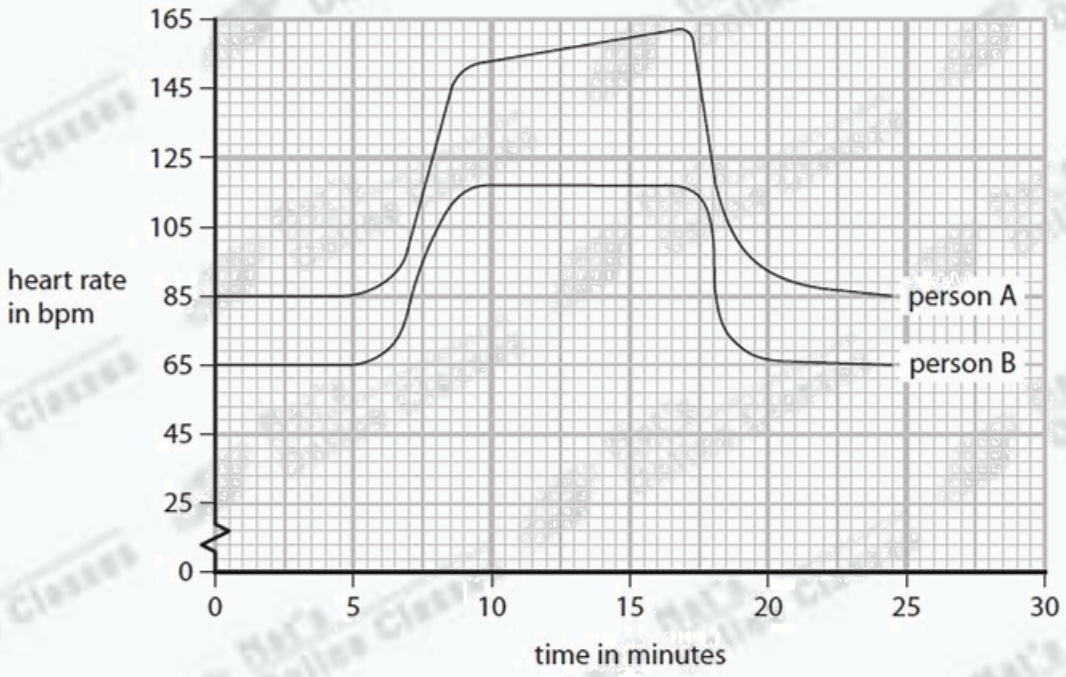


**Figure 13**

Both people rested for the first 6 minutes, then did the same high intensity exercise for the next 12 minutes, then rested.

Compare the heart rates of person A with the heart rates of person B.

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**(Total for question = 4 marks)**

**Q4.**

Figure 10 shows the estimated blood flow through some parts of the body when a person is at rest and during exercise.

| part of the body | estimated rate of blood flow in $cm^3$ per minute | |
|---|---|---|
| | at rest | during exercise |
| brain | 750 | 748 |
| heart muscle | 350 | 1 150 |
| digestive system | 2 500 | 1 200 |
| other muscles | 1 200 | 14 500 |
| all other organs (except lungs) | 1 423 | 1 420 |

**Figure 10**

A person has a cardiac output of 4.9 litres per minute. The stroke volume of each heart beat is 70 ml.

Calculate the heart rate.

**(2)**

..... beats per minute

**(Total for question = 2 marks)**

**Q5.**

**Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.**

Figure 1 shows a diagram of the heart.

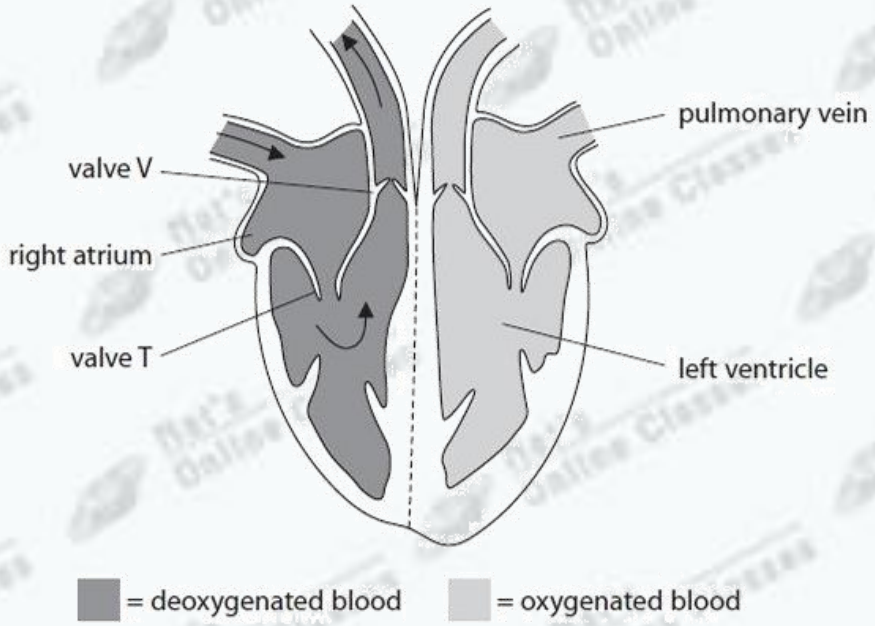


**Figure 1**

(i) Draw arrows on Figure 1 to show how oxygenated blood moves through the heart.

(1)

(ii) What happens when the right ventricle contracts?

(1)

☒ **A** valve T opens

☒ **B** valve T closes

☒ **C** blood is forced into the left atrium

☒ **D** blood is forced into the pulmonary vein

(iii) Draw **one** straight line from each structure to its function.

(2)

| structure | function |
| --- | --- |
| pulmonary vein | carries deoxygenated blood |
| | forces blood towards body organs |
| | carries blood from the lungs to the heart |
| left ventricle | takes blood to the right side of the heart |
| | forces blood towards the lungs |

**(Total for question = 4 marks)**