



Percentage	
Grade	

Circulatory System

Total Marks: 29

- Use black or blue ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional paper is used, the question number(s) must be clearly shown
- The number of marks is given in brackets [] at the end of each question or part question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

[illegible]

4 Blood is part of the circulatory system.

4 (a) (i) Give **one** function of white blood cells.

[1 mark]

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4 (a) (ii) Which of the following is a feature of platelets?

Tick (✓) **one** box.

[1 mark]

They have a nucleus.

☐

They contain haemoglobin.

☐

They are small fragments of cells.

☐

4 (b) Urea is transported by the blood plasma from where it is made to where the urea is excreted.

Complete the following sentence.

[2 marks]

Blood plasma carries urea from where it is made in the

to the where the urea is removed from the blood.

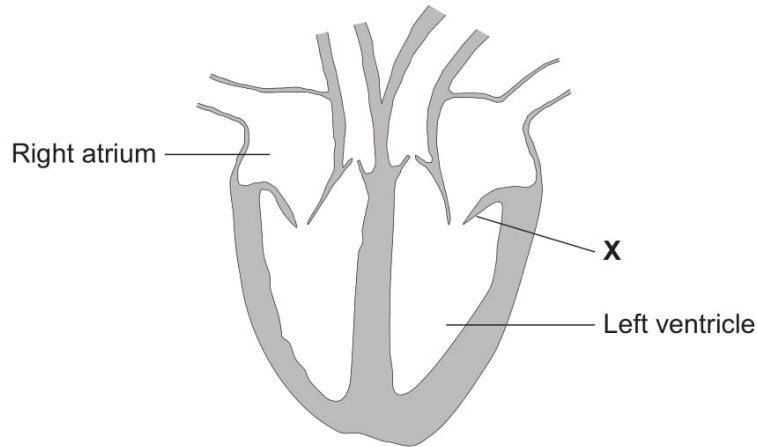
Question 4 continues on the next page

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4 (c) **Figure 4** shows a section through the human heart.

Figure 4



Structure **X** is a valve. If valve **X** stops working, it may need to be replaced.

A scientist is designing a new heart valve. The scientist knows that the valve must be the correct size to fit in the heart.

Suggest **two** other factors the scientist needs to consider so that the newly designed valve works effectively in the heart.

[2 marks]

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2 The circulatory system transports substances such as glucose and oxygen around the body.

2 (a) Name **two** other substances that the circulatory system transports around the body.

[2 marks]

1

2

2 (b) (i) Blood is a tissue. Blood contains red blood cells and white blood cells.

Name **two** other components of blood.

[2 marks]

1

2

2 (b) (ii) The heart is part of the circulatory system.

What type of tissue is the wall of the heart made of?

[1 mark]

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Question 2 continues on the next page

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0 5

- 2 (c) In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Every year, many patients need to have heart valve replacements.

Figure 2 gives information about two types of heart valve.

Figure 2

Living human heart valve	Cow tissue heart valve
<ul style="list-style-type: none">• It has been used for transplants for more than 12 years.• It can take many years to find a suitable human donor.• It is transplanted during an operation after a donor has been found.• During the operation, the patient's chest is opened and the old valve is removed before the new valve is transplanted.	<ul style="list-style-type: none">• It has been used since 2011.• It is made from the artery tissue of a cow.• It is attached to a stent and inserted inside the existing faulty valve.• A doctor inserts the stent into a blood vessel in the leg and pushes it through the blood vessel to the heart.

A patient needs a heart valve replacement. A doctor recommends the use of a cow tissue heart valve.

Give the advantages and disadvantages of using a cow tissue heart valve compared with using a living human heart valve.

Use information from **Figure 2** and your own knowledge in your answer.

[6 marks]

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Extra space

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Turn over for the next question

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6 The circulatory system contains arteries and veins.

6 (a) (i) Describe how the structure of an artery is different from the structure of a vein.

[2 marks]

6 (a) (ii) A comparison is made between blood taken from an artery in the leg and blood taken from a vein in the leg.

Give **two** differences in the composition of the blood.

[2 marks]

1

2



- 6 (b) During operations patients can lose a lot of blood. Patients often need blood transfusions to keep them alive.

Figure 6 shows information about a new artificial blood product.

Figure 6

Sea worms give hope for people in need of blood transfusions

Scientists have carried out a five-year trial using a new artificial blood product. The scientists have used a protein from sea worms to create the new artificial blood and the results from the trial are very positive. Thousands of sea worms can be grown and collected.

During the trial, mice were given blood transfusions of the artificial blood. The bodies of the mice tolerated the artificial blood and the artificial blood did not cause any side effects.

Suggest **two** possible advantages of using the new artificial blood, instead of using human blood for a transfusion in humans.

[2 marks]

- 1 _____

2 _____

Turn over for the next question

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Explain how the human circulatory system is adapted to:

- supply oxygen to the tissues
- remove waste products from tissues.

[6 marks]
