1 Fig. 3.1 provides information about the blood pressure in different parts of the mammalian blood circulatory system.

Fig. 3.1 also shows the **total** cross-sectional area of the vessels, relative to one another, in parts of the blood circulatory system.

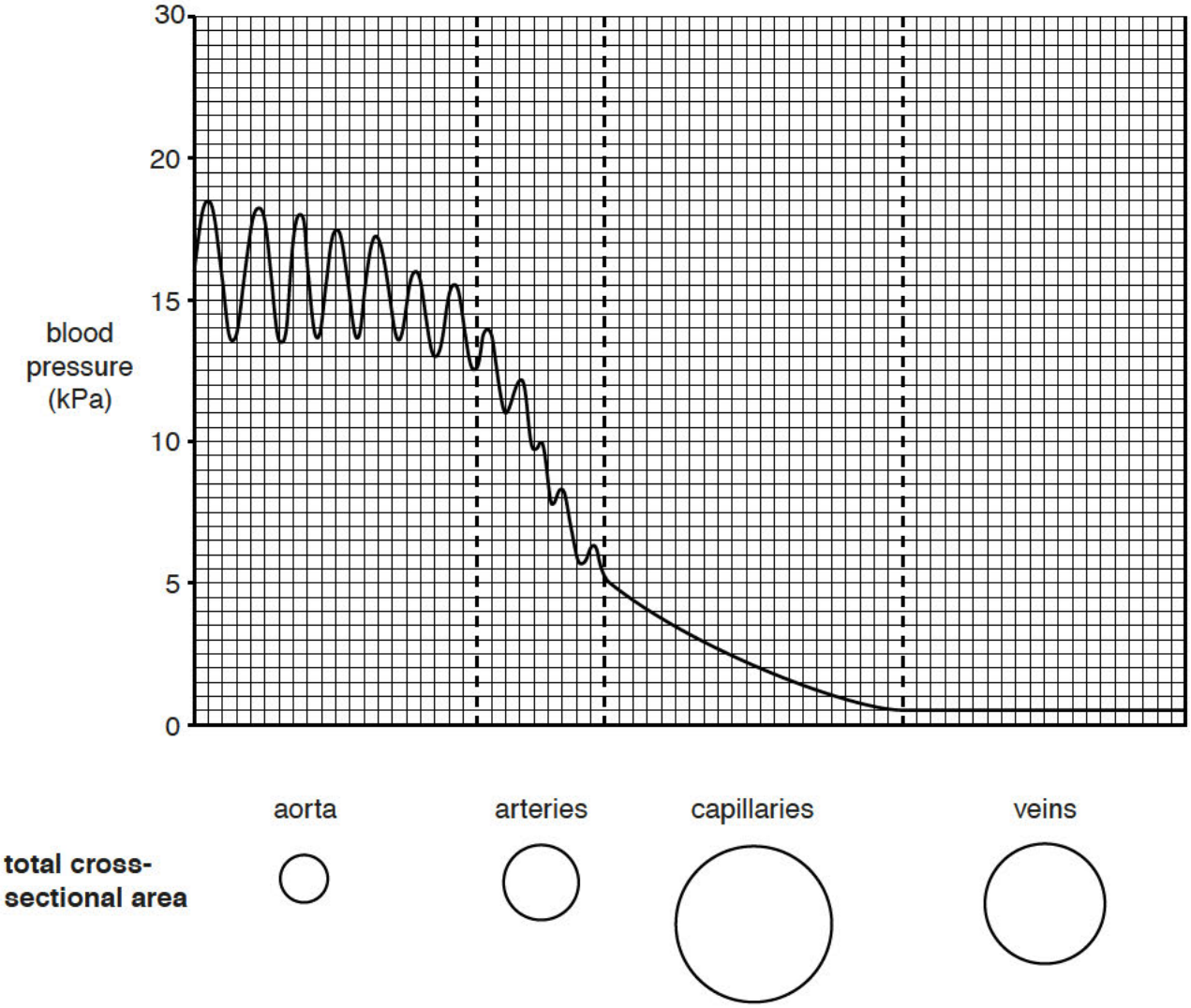


Fig. 3.1

(a) Place a tick (✓) in the box below that most closely describes the mammalian blood circulatory system.

	open circulatory system	closed circulatory system
single circulatory system		
double circulatory system		

[1]

(b) The pressure fluctuates as the blood flows along the aorta, as shown in Fig. 3.1.

(i) Explain what causes this fluctuation.

.....

.....

.....

.....

.....

..... **[2]**

(ii) State the term used to describe the number of fluctuations per minute.

.....

..... **[1]**

(c) Using the information in Fig. 3.1, describe the pressure changes in the blood as it flows through the circulatory system from the aorta to the veins.

.....

.....

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..... **[3]**

(d) **(i)** Using the information in Fig. 3.1, explain what causes the overall change in pressure as blood flows from the aorta to the arteries and from the arteries to the capillaries.

.....

.....

.....

.....

.....

..... **[2]**

(ii) Explain why it is important that the pressure changes as blood flows from the aorta to the capillaries.

.....

.....

.....

.....

.....

..... **[2]**

[Total: 11]

2 Three examples of fluids in the mammalian body are blood, tissue fluid and lymph.

(a) Complete Table 3.1 below comparing different features of arterial blood, tissue fluid and lymph.

Table 3.1

feature	arterial blood	tissue fluid	lymph
hydrostatic pressure		low	
presence of large proteins	yes		
presence of neutrophils	yes		
presence of erythrocytes			no

[4]

(b) In a closed circulatory system, blood is kept inside blood vessels.

(i) Suggest **two** advantages of keeping the blood inside vessels.

1 .....

.....

2 .....

..... **[2]**

(ii) Describe **and** explain how the wall of an artery is adapted both to withstand and maintain high hydrostatic pressure.



In your answer you should use appropriate technical terms, spelt correctly.

to withstand pressure .....

.....

.....

.....

.....

.....

.....

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.....

.....

to maintain pressure .....

.....

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.....

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..... **[5]**

[Total: 11]

3 Large animals, such as mammals, need efficient transport systems.

(a) Fig. 3.1 shows a section through the mammalian heart.

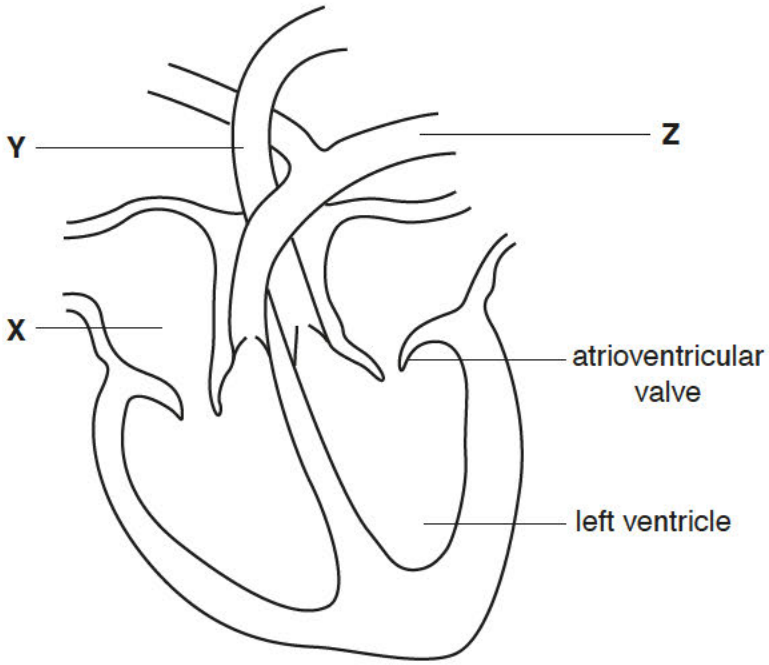


Fig. 3.1

(i) Name the parts labelled **X**, **Y** and **Z**.

X .....

Y .....

Z ..... **[3]**

(ii) Explain why the wall of the left ventricle is thicker than the wall of the left atrium.

.....

.....

.....

.....

.....

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..... **[3]**

(iii) Explain how pressure changes in the heart bring about the closure of the atrioventricular (bicuspid) valve.

.....

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.....

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.....

..... **[2]**

(b) The mammalian transport system is a double circulatory system.

An efficient circulatory system consists of a pump, a means of maintaining pressure, a transport medium and exchange surfaces.

State the component of the **mammalian circulatory system** that fulfils each of these roles.

The first one has been done for you.

pump ..... heart .....

means of maintaining pressure .....

transport medium .....

exchange surface .....

[3]

[Total: 11]

4 Read the following passage and complete each sentence by writing the most appropriate **term or phrase** in the spaces provided.

Large, active organisms need a circulatory system because they have a small

..... .

Haemoglobin is a pigment found in red blood cells. These cells are also known as

..... . Haemoglobin has a high ..... for oxygen. In the

lungs, the haemoglobin associates with oxygen to form ..... .

In respiring tissues, the oxygen is released by dissociation. In very active tissues, the amount of

oxygen released can be increased by the presence of more ..... .

This is called the ..... effect. **[6]**

[Total: 6]

5 Fig. 2.1, **on the insert**, is a photomicrograph of a blood smear. The smear has been stained.

(a) State **two** reasons why the blood smear has been stained.

.....

.....

.....

.....

.....

..... **[2]**

(b) Suggest **one** detail that would be made visible if the micrograph were taken using:

(i) a scanning electron microscope

.....

(ii) a transmission electron microscope.

..... **[2]**

(c) The red colouration of the red blood cells is caused by the pigment haemoglobin. The main function of haemoglobin is to transport oxygen in the form of oxyhaemoglobin.

Fig. 2.2 shows the dissociation curves of adult oxyhaemoglobin (curve **A**) and fetal oxyhaemoglobin (curve **F**).

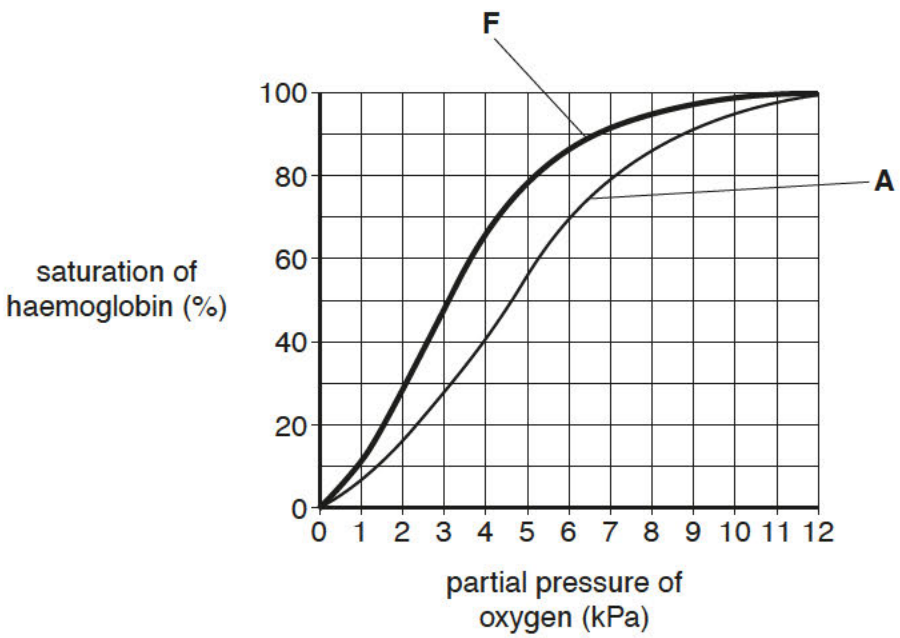


Fig. 2.2

Explain why the curve for fetal oxyhaemoglobin is to the left of the curve for adult oxyhaemoglobin.



In your answer you should use appropriate technical terms, spelt correctly.

.....

.....

.....

.....

.....

.....

.....

.....

..... **[4]**

(d) In high partial pressures of carbon dioxide, the oxyhaemoglobin dissociation curve undergoes a change known as the Bohr shift.

(i) **Draw a curve on Fig. 2.2** to show the effect of the Bohr shift. **[2]**

(ii) Outline the benefits of the Bohr shift to actively respiring tissue.

.....

.....

.....

.....

..... **[2]**

[Total: 12]