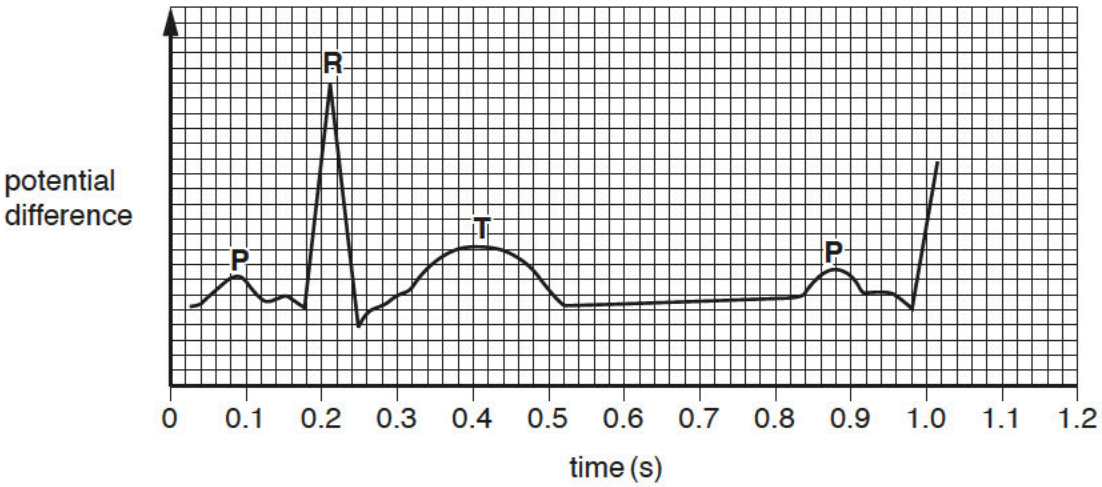
1 Fig. 6.1 shows two electrocardiogram (ECG) traces.

- race **A** is a normal trace.
- race **B** is a trace from a heart after treatment with the drug digitalis.

Trace **A** – an electrocardiogram from a normal heart



Trace **B** – an electrocardiogram from a heart after treatment with digitalis

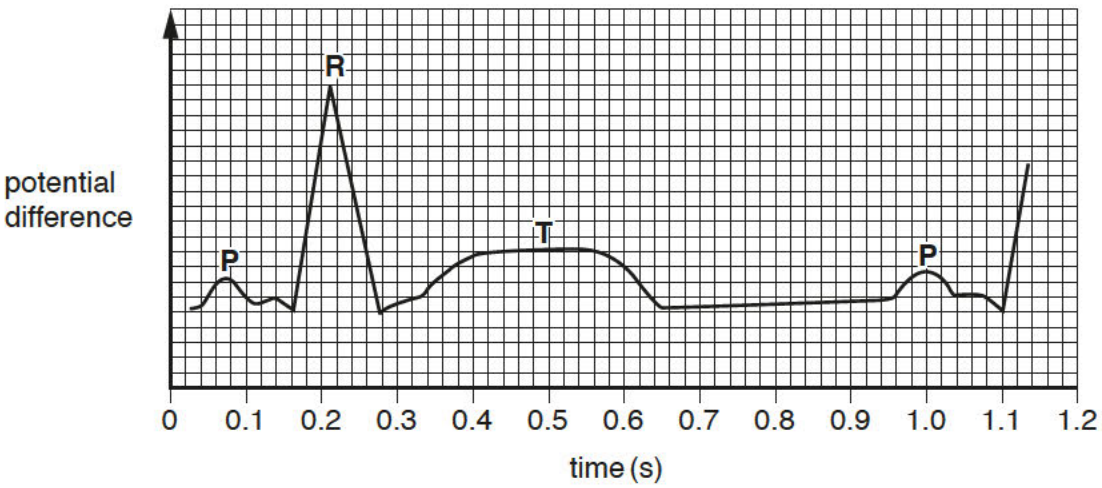


Fig. 6.1

(a) Calculate the heart rate using the information in Trace **A**.

Show your working.

Answer = ... beats per minute **[2]**

(b) Using the information in Fig. 6.1, state **two** effects of digitalis on the activity of the heart.

1 .....

.....

2 .....

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

(c) Describe the roles of the sinoatrial node (SAN) **and** the atrioventricular node (AVN) in coordinating the cardiac cycle.

.....

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.....

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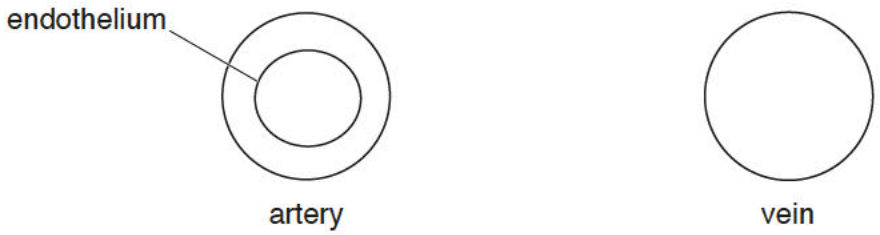
.....

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

[Total: 7]

2 **(a)** **(i)** Fig. 5.1 represents a transverse section of an artery and a vein.

Draw a line to show the relative position of the endothelium of the **vein**.



[1]

Fig. 5.1

(ii) State **two other** ways in which the wall of an artery is different from the wall of a vein.

1 .....

.....

2 .....

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

(b) **(i)** Blood in the arteries has a high hydrostatic pressure.

State how this hydrostatic pressure is generated in the heart.

.....

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

(ii) Explain why the hydrostatic pressure of the blood drops as blood moves away from the heart.

.....

.....

.....

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

(iii) Capillaries have walls that are one cell thick.

Fig. 5.2 shows how the hydrostatic pressure of the blood changes as it moves through a capillary.

Fig. 5.2 also shows the water potential of the blood, due largely to the plasma proteins, which tends to move water into the blood.

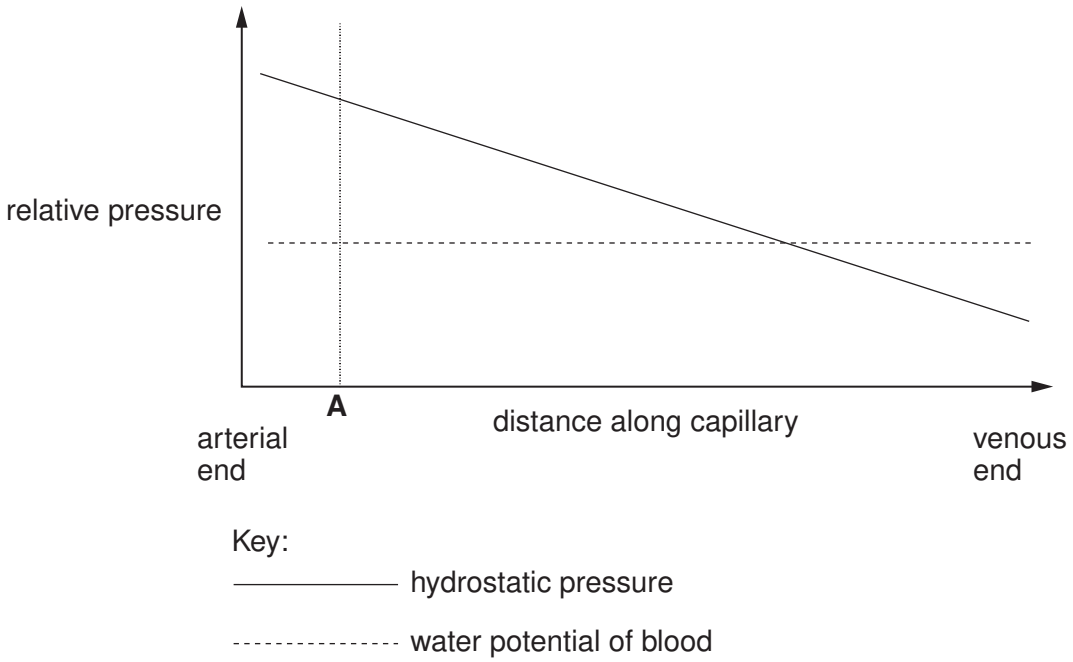


Fig. 5.2

Describe **and** explain what happens to the blood plasma at point **A** along the capillary in Fig. 5.2.

.....

.....

.....

.....

.....

.....

.....

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

(c) Carbon dioxide is produced in tissues as a waste product of respiration.

The majority of carbon dioxide is carried as hydrogencarbonate ions (HCO_3^-) in the plasma.

Fig. 5.3 shows the chemical pathway in which carbon dioxide is converted into HCO_3^- in a red blood cell.

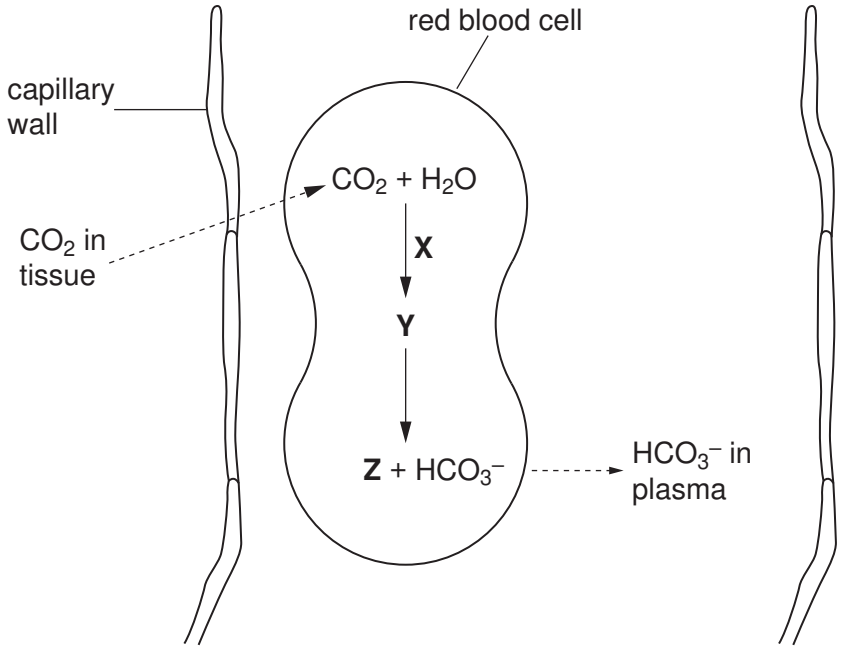


Fig. 5.3

Identify the following:

enzyme **X** .....

substance **Y** .....

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

[Total: 12]

3 **(a)** **(i)** Name the type of muscle found in the walls of the heart chambers.

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

(ii) Name the process that creates pressure inside the heart chambers.

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

(b) Fig. 6.1 shows the changes in pressure inside the heart chambers during one heart beat.

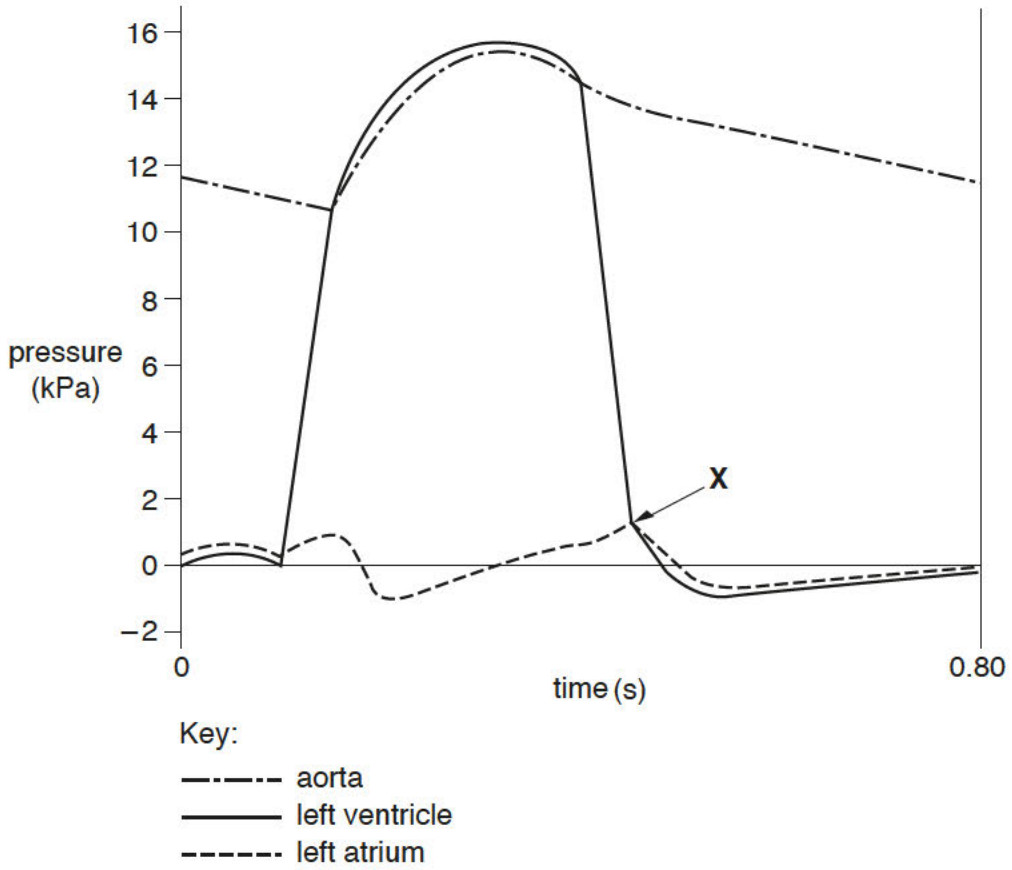


Fig. 6.1

(i) Calculate the heart rate from the information in Fig. 6.1.

Show your working and give your answer **to the nearest whole number**.

(ii) Describe and explain what happens **immediately after X** on Fig. 6.1.



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

.....

.....

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.....

.....

.....

.....

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

[Total: 8]

4 Fish have a single, closed circulatory system.

(a) State the meaning of the terms *single circulatory system* and *closed circulatory system.*

single circulatory system .....

.....

.....

closed circulatory system .....

.....

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

(b) The heart of a mammal contains four main chambers. The action of these chambers is coordinated by electrical activity in specialised tissues.

Fig. 5.1 shows where these tissues are found in the heart.

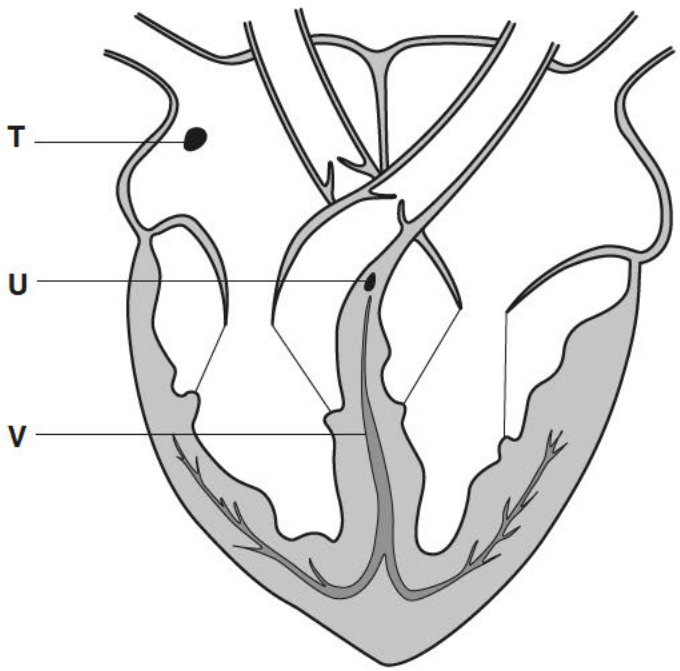


Fig. 5.1

(i) Name the tissues labelled **T**, **U** and **V**.

T .....

U .....

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

(ii) Describe how the action of the heart is initiated **and** coordinated.



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

.....

.....

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.....

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

[Total: 10]

5 **(a)** List **three** reasons why a large, multicellular animal, such as a mammal, needs a transport system.

.....

.....

.....

.....

.....

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

Fig. 1.1, **on the insert**, shows the nervous pathways that coordinate heart action.

Above the diagram is a trace showing the electrical activity associated with one heart beat.

(b) **(i)** State the full name given to a trace showing the electrical activity of the heart.

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

(ii) Identify the components of the heart labelled **A** and **B** on Fig. 1.1.

A .....

B .....

[2]

(c) **(i)** During the electrical stimulation of the heart, there is a short delay between the excitation of the atria and excitation of the ventricles.

Explain why this delay is essential.

.....

.....

.....

.....

.....

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

(ii) The Purkyne tissue carries the excitation wave down the septum to the apex of the heart.

Explain why the excitation wave is carried to the apex.

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.....

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.....

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

[Total: 10]