

1 (a) Mammals have a double circulatory system.

Explain what is meant by a *double circulatory system*.

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

Fig. 4.1 shows sections of three blood vessels: an artery, a capillary and a vein.

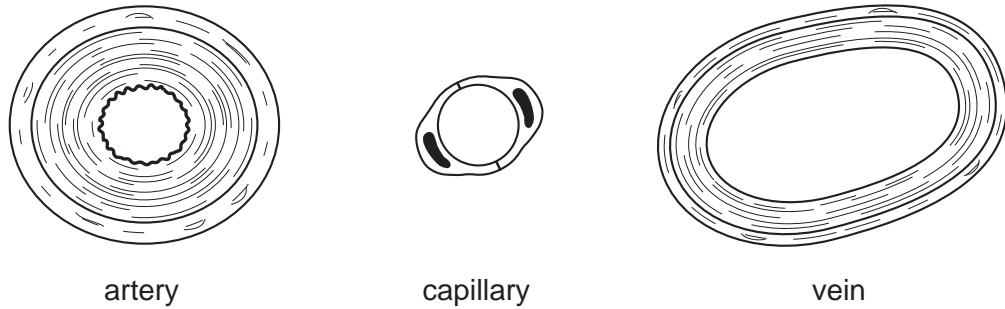


Fig. 4.1

(b) State **one** function for each of the blood vessels shown in Fig. 4.1.

artery

.....

capillary

.....

vein

..... [3]

(c) Explain how the **structure of the artery** shown in Fig. 4.1 is adapted to its function.

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..... [4]

(d) Explain how valves help the transport of blood in veins.

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..... [2]

[Total: 10]

2 Fig. 3.1 shows an external view of the heart and its blood vessels.

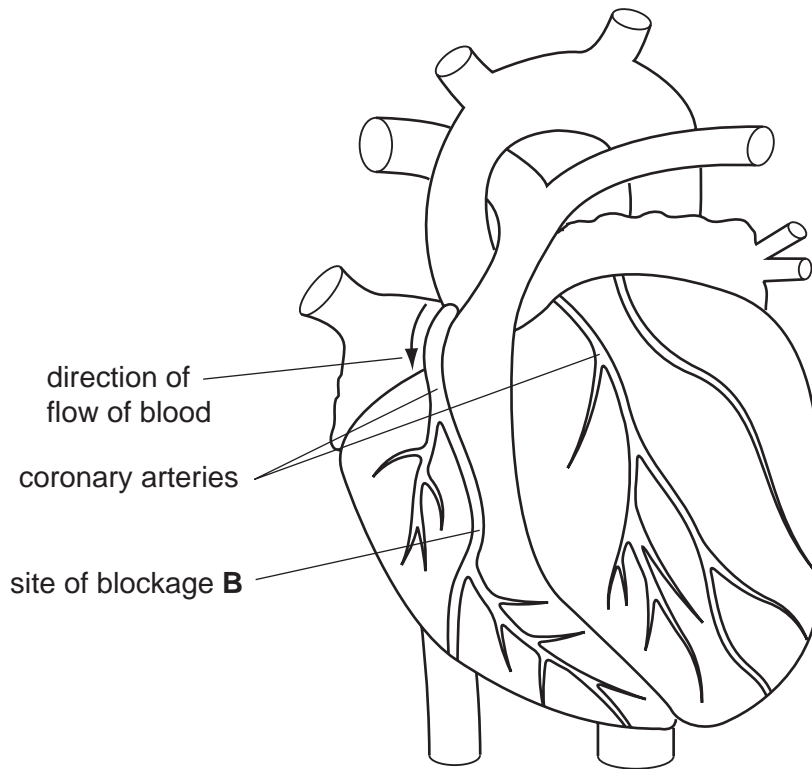


Fig. 3.1

(a) The coronary arteries supply heart tissue with useful substances. Coronary veins remove waste substances.

(i) Name two useful substances the coronary arteries will supply.

1.

2. [2]

(ii) Name **one** waste substance the coronary veins will remove.

..... [1]

(b) The tissue forming the wall of the left ventricle responds when it is stimulated by electrical impulses.

(i) Name this type of tissue.

..... [1]

(ii) Describe how this tissue will respond when stimulated.

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

(iii) Describe the effect of this response on the contents of the left ventricle.

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

(c) The coronary arteries can become blocked with a fatty deposit, leading to a heart attack.

(i) State two likely causes of this type of blockage.

1.
2. [2]

(ii) A blockage occurs at point **B** in the coronary artery.

On Fig. 3.1, shade in the parts of the artery affected by this blockage. [1]

(d) Veins have different structures from arteries.

State two features of veins and explain how these features enable them to function efficiently.

1. Featu
.....
Explanation
.....
2. Featu
.....
Explanation
..... [4]

[Total: 14]

3 Fig. 3.1 shows images of red blood cells from a human, **A**, and a bird, **B**.

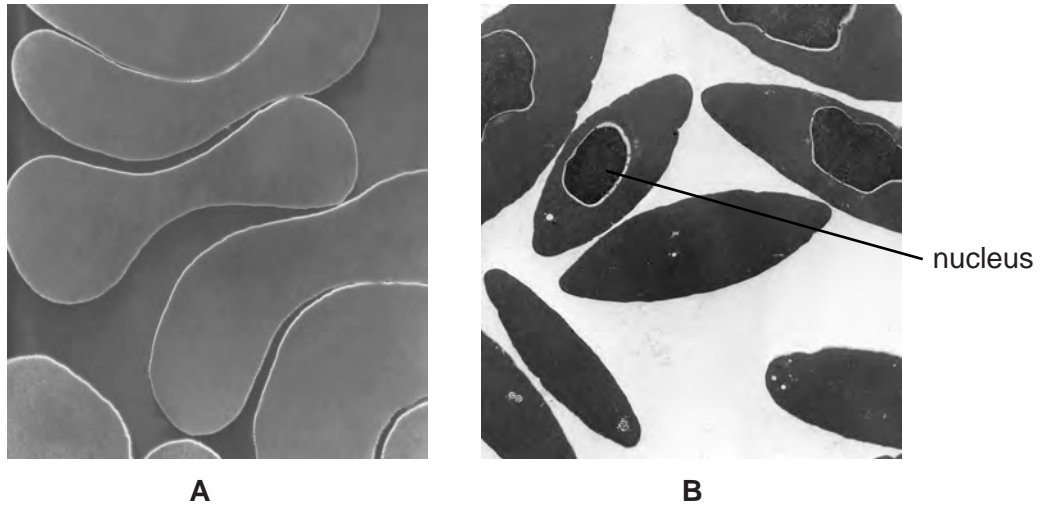


Fig. 3.1

(a) State the function of red blood cells.

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

(b) There is a nucleus present in each of the red blood cells of the bird, as shown in Fig. 3.1.

(i) State the function of a nucleus.

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

(ii) Human red blood cells do not contain a nucleus.

State an advantage of this.

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

Red blood cells from humans were placed into three test-tubes. Each test-tube contained a salt solution of a different concentration. A sample was taken from each test-tube and viewed using a microscope. The results are shown in Fig. 3.2.

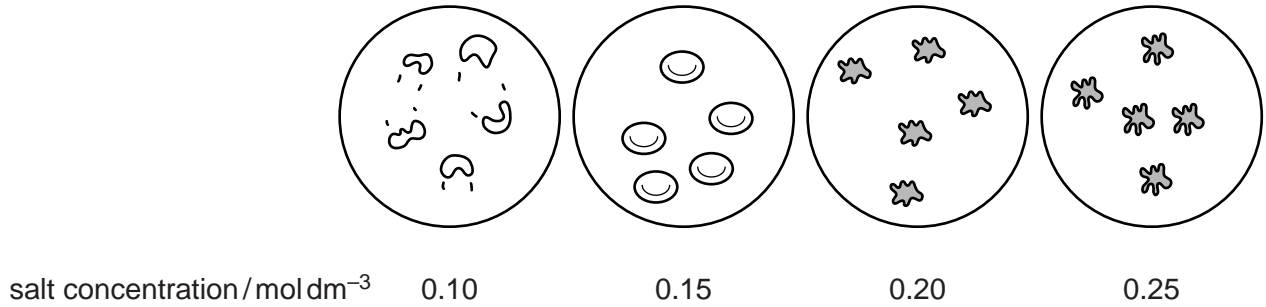


Fig. 3.2

(c) (i) Describe the appearance of the red blood cells in the 0.15 mol dm⁻³ salt solution and the red blood cells in the 0.20 mol dm⁻³ salt solution.

0.15 mol dm⁻³

.....

0.20 mol dm⁻³

.....

[2]

(ii) The red blood cells in the 0.10 mol dm⁻³ salt solution burst.

Explain why the red blood cells burst.

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[3]

(iii) Suggest why a plant cell in 0.10 mol dm⁻³ salt solution would not burst.

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[1]

(d) Some people in accidents lose a lot of blood. Doctors give patients fluid to replace lost blood.

(i) Use the information in Fig. 3.2 to predict and explain the concentration of fluid replacement given to patients who have lost blood.

prediction

explanation

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.....

[2]

(ii) Describe the process of blood clotting.

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..... [3]

[Total: 14]

4 Fig. 2.1 shows a diagram of the liver and the blood vessels that enter and exit from it.

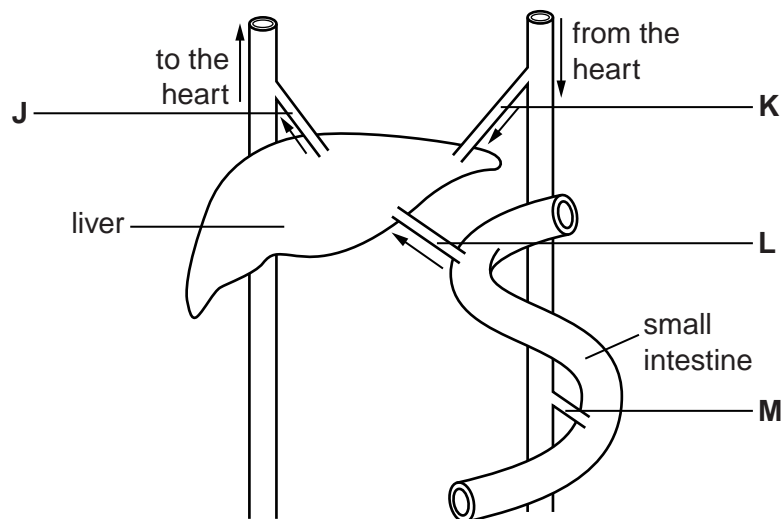


Fig. 2.1

(a) Name blood vessel L.

.....[1]

(b) Blood vessel J is a vein.

State **two** structural features of veins and explain how each feature is related to its function of returning blood to the heart.

feature

explanation

.....

feature

explanation

.....[4]

- (c) Blood samples were taken from each of the blood vessels **J**, **K**, **L** and **M** two hours after a meal of rice. Table 2.1 shows the concentration of glucose in these blood samples.

Table 2.1

blood vessel	blood glucose concentration /mg per 100 cm ³
J	135
K	128
L	181
M	133

Calculate the percentage increase in blood glucose concentration between blood vessel **J** compared with **L**. Express your answer to the nearest whole number.

Show your working.

..... %
[2]

- (d) Control of blood glucose by the liver is an example of homeostasis.

- (i) Explain how the liver lowers blood glucose concentration when it is too high.

.....

 [2]

- (ii) Name **one other** factor in the human body that is also controlled by homeostasis.

.....
 [1]

(e) Amino acids are processed by the liver.

Describe this process.

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.....[3]

(f) State **one other** function of the liver, besides homeostasis and processing amino acids.

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.....[1]

[Total: 14]

5 Proteins in the blood are involved in protection of the body.

Three proteins found in the blood are

- antibodies
- thrombin
- fibrinogen

(a) (i) Name the type of white blood cell that produces antibodies.

..... [1]

(ii) Outline how antibodies protect the body.

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

(b) Thrombin is an enzyme that catalyses the reaction:



(i) State when this reaction occurs.

..... [1]

(ii) Explain how fibrin protects the body.

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

An investigation was carried out to determine the effect of different temperatures on the activity of thrombin. The results are shown in Fig. 4.1.

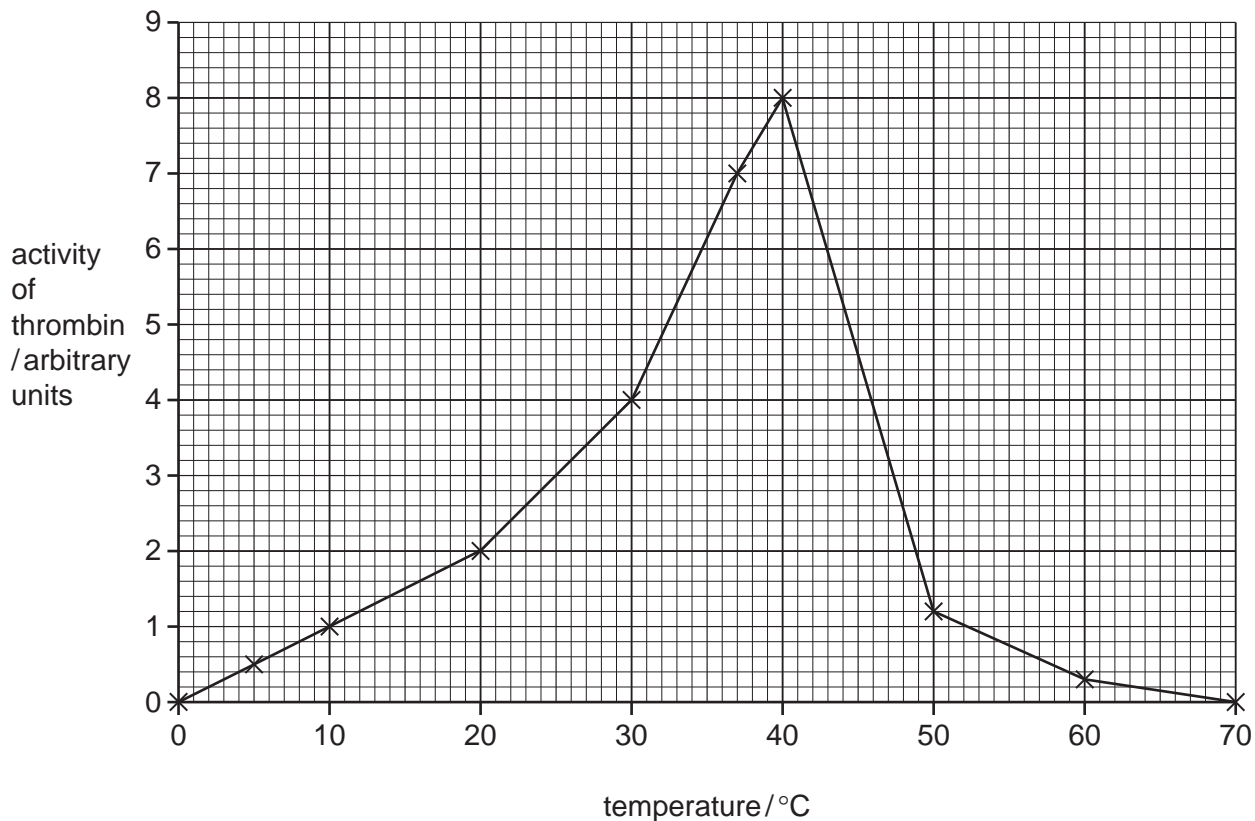


Fig. 4.1

(c) (i) Explain why thrombin functions slowly at 5 °C and does not function at all at 70 °C.

5 °C

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.....

70 °C

.....

..... [3]

(ii) Suggest how the activity of thrombin was determined.

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..... [1]

(iii) State **two** conditions that would have been kept constant during the investigation.

1
2 [2]

[Total: 13]