1 Fig. 5.1 shows a capillary inside a tissue.

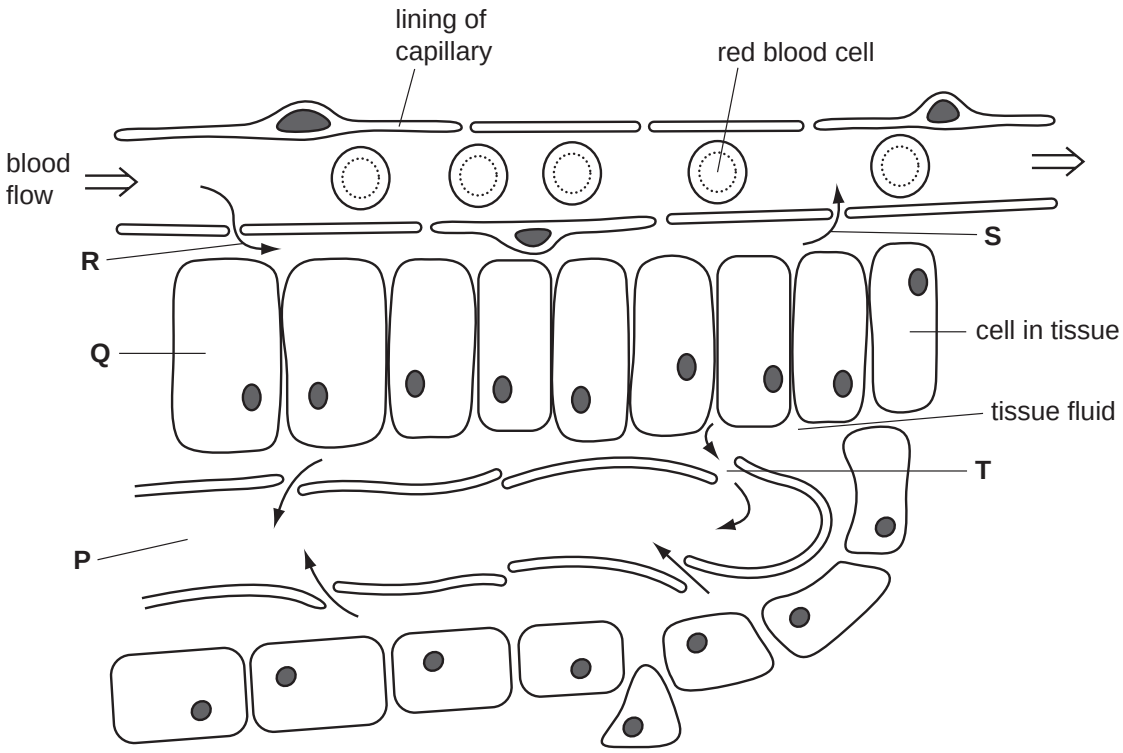

Fig. 5.1

(a) State how oxygen passes from the capillary into cell **Q and** describe the function of this gas in a cell.

.....

..... [2]

(ii) Name two substances required by cells, **other than oxygen**, that pass from the blood to the tissue fluid at **R**.

1. .....

2. ..... [1]

(iii) Name two substances **produced by cells** that pass from the tissue fluid to the blood at **S**.

1. .....

2. ..... [1]

(b) With reference to Fig. 5.1, describe and explain **two** ways in which capillaries are adapted to their function.

1. .....

.....

.....

2. .....

.....

..... [4]

(c) Tissue fluid drains into vessel **P** at **T** and eventually returns to the blood.

(i) Name the type of vessel labelled **P**.

..... [1]

(ii) Explain how fluid passes along these vessels.

.....

..... [1]

[Total: 10]

2 The lymphatic system consists of:

- thin-walled lymph vessels that drain tissue fluid from many organs of the body
- lymph nodes that contain the cells of the immune system

The fluid in the lymph vessels is moved in a way similar to the movement of blood in veins.

Fig. 4.1 shows part of the lymphatic system.

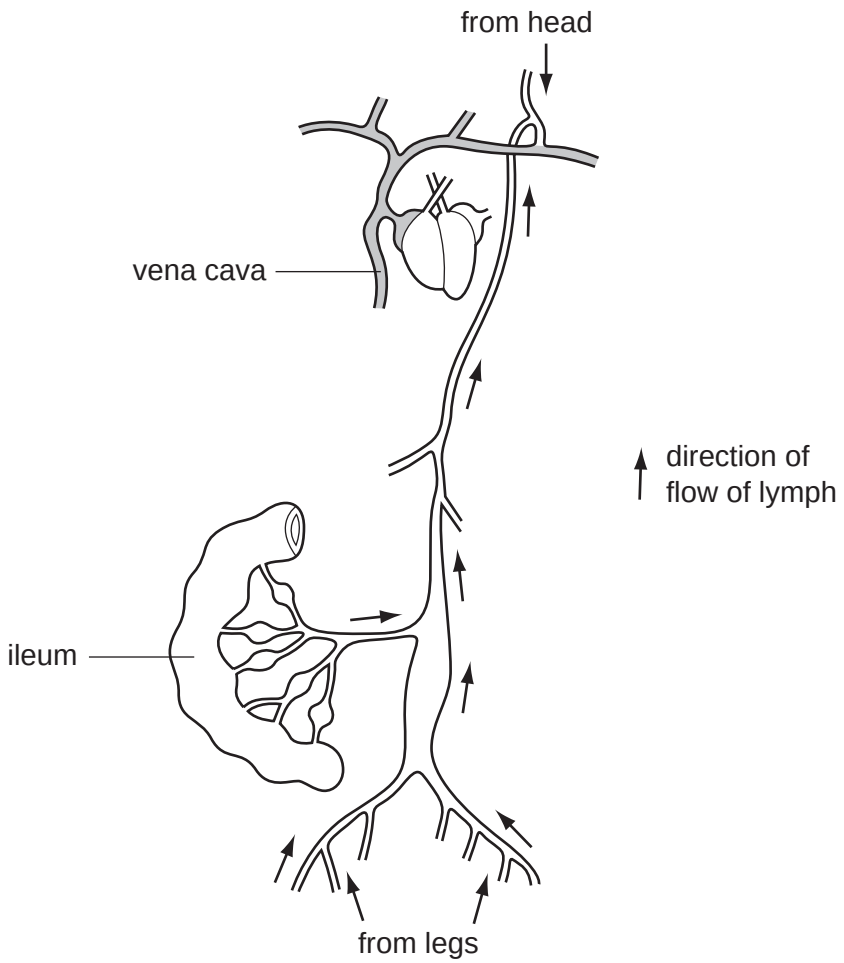

Fig. 4.1

(a) Suggest how lymph is moved in the lymph vessels.

.....

.....

.....

..... [2]

(b) After a meal rich in fatty foods, the lymph leaving the ileum is full of fat droplets.

Explain why there are fat droplets in the lymph leaving the ileum.

.....

.....

.....

.....

..... [2]

Lymph flows through lymph nodes. Fig. 4.2 shows the action of white blood cells in a lymph node when bacteria are present.

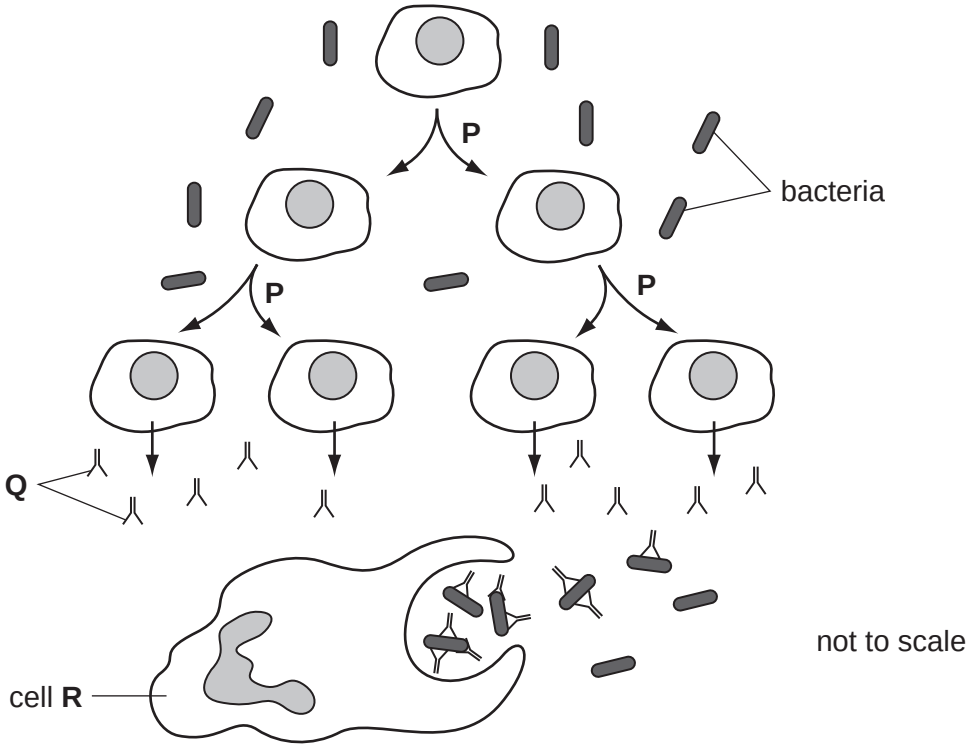

Fig. 4.2

(c) (i) Name the type of nuclear division shown at **P** in Fig. 4.2.

.....

[1]

(ii) Name the molecules labelled **Q** in Fig. 4.2.

.....

[1]

(iii) Describe how bacteria are destroyed by cell **R**.

.....

.....

.....

.....

.....

.....

.....

[3]

Antibiotics are used to treat bacterial infections. An investigation was carried out into the effect of prescribing antibiotics on antibiotic resistance in 20 countries. Fig. 4.3 shows the results of this investigation. Each point represents the result for a country.

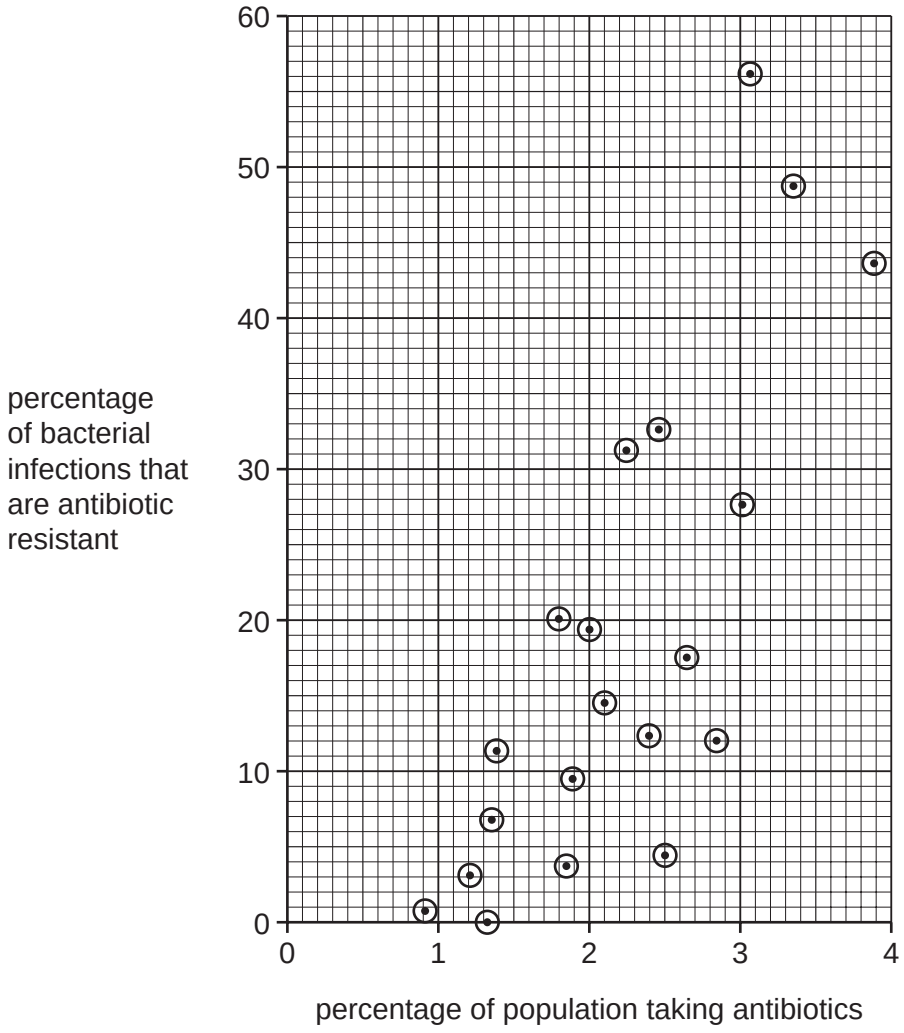

Fig. 4.3

(d) Describe the results shown in Fig. 4.3. Credit will be given for using figures from Fig. 4.3 to support your answer.

.....

.....

.....

.....

.....

.....

..... [3]

(e) Many different antibiotics are used.

Suggest why some antibiotics are used less frequently than others.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 15]

3 Fig. 2.1 shows a diagram of human skin in hot weather.

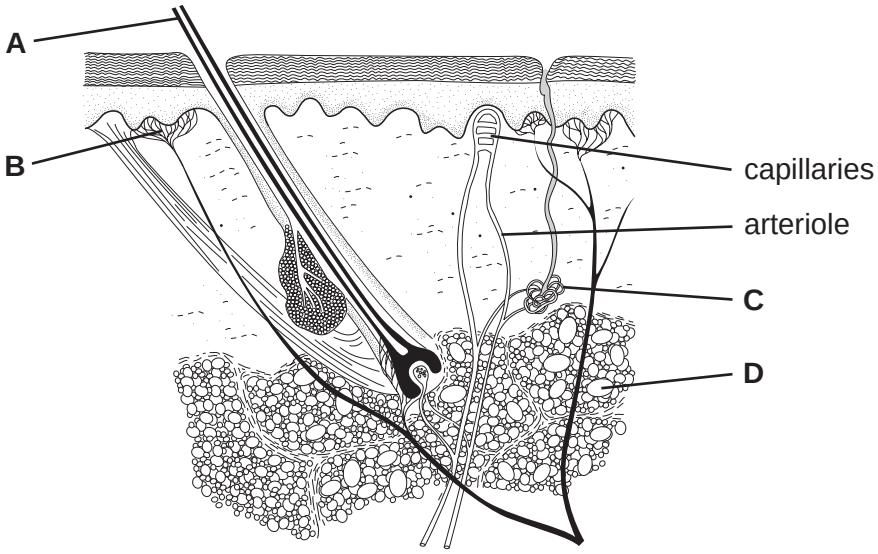

Fig. 2.1

(a) Name structures **A** to **D**.

A .....

B .....

C .....

D ..... [4]

(b) Describe how the structures (**A** to **D**) in the skin help to maintain a constant body temperature. You may refer to the structures by their letters.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(c) (Blood flow through the skin changes in response to changes in the air temperature.

State **and** explain what happens to blood flow through the skin when the temperature of the surrounding air becomes very cold.

.....

.....

.....

.....

.....

.....

(ii) Explain how the changes you have described in **(c)(i)** reduce heat loss.

.....

.....

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.....

.....

..... [5]

(d) The control of body temperature is an example of negative feedback.

Describe how negative feedback is involved in the control of body temperature.

.....

.....

.....

.....

..... [3]

[Total: 16]

4 Fig. 2.1 shows the blood supply for the liver of a mammal.

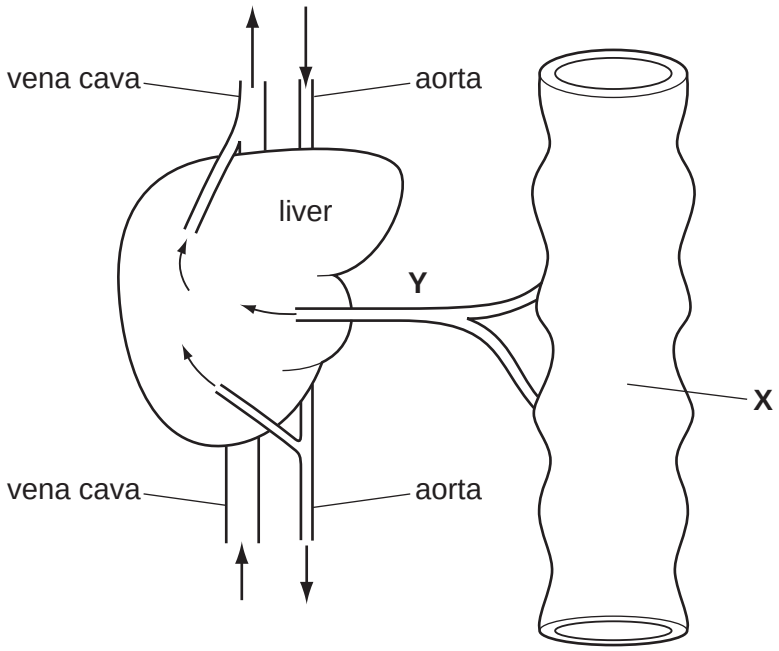

Fig. 2.1

(a) Blood from organ **X** is carried to the liver by blood vessel **Y**.

Name

(i) organ **X**,

..... [1]

(ii) blood vessel **Y**.

..... [1]

Fig. 2.2 shows some liver cells as seen with a light microscope.

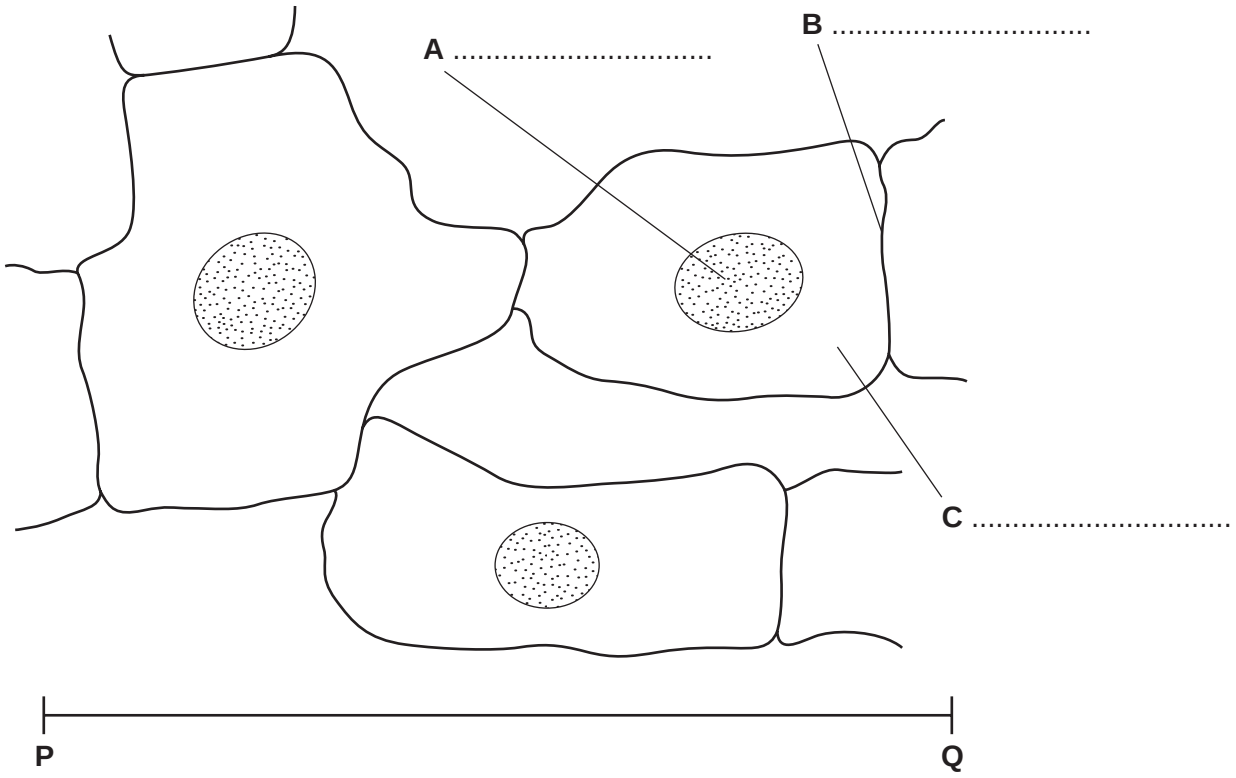

Fig. 2.2

(b) (i) Label, on Fig. 2.2, the structures **A**, **B** and **C**.

[3]

(ii) The distance **P-Q** is 0.06 mm.

Calculate the magnification of Fig. 2.2.

Show your working.

Magnification = x ..... [2]

Liver cells absorb glucose and amino acids from the blood and help to regulate the concentrations of these substances in the blood.

(c) Explain how liver cells help to regulate the concentration of glucose in the blood in response to hormones from the pancreas in each of the following situations.

Blood glucose concentration is higher than normal.

.....

.....

.....

.....

.....

.....

Blood glucose concentration is lower than normal.

.....

.....

.....

.....

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..... [5]

(d) Describe what happens to amino acids inside liver cells.

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.....

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.....

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.....

.....

..... [3]

[Total: 15]