

1 The nervous system coordinates the responses of animals to changes in their environment.

(a) Fig. 2.1 shows the arrangement of the nervous system in a mammal.

Complete Fig. 2.1 by writing the names of the missing parts of the mammalian nervous system in the boxes.

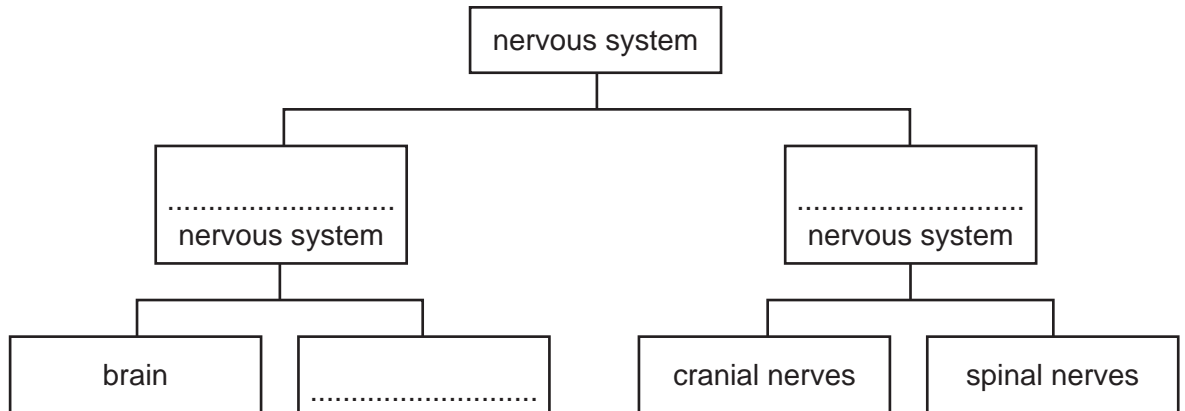


Fig. 2.1

[3]

(b) Fig. 2.2 is a flow chart that shows how an involuntary action is controlled.

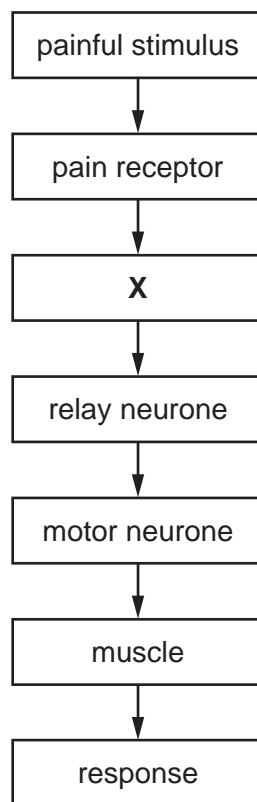


Fig. 2.2

(i) State the structure found at X.

..... [1]

(ii) State the type of involuntary action shown by the flow chart.

..... [1]

(iii) State **two** ways in which a voluntary action differs from an involuntary action.

1 .....

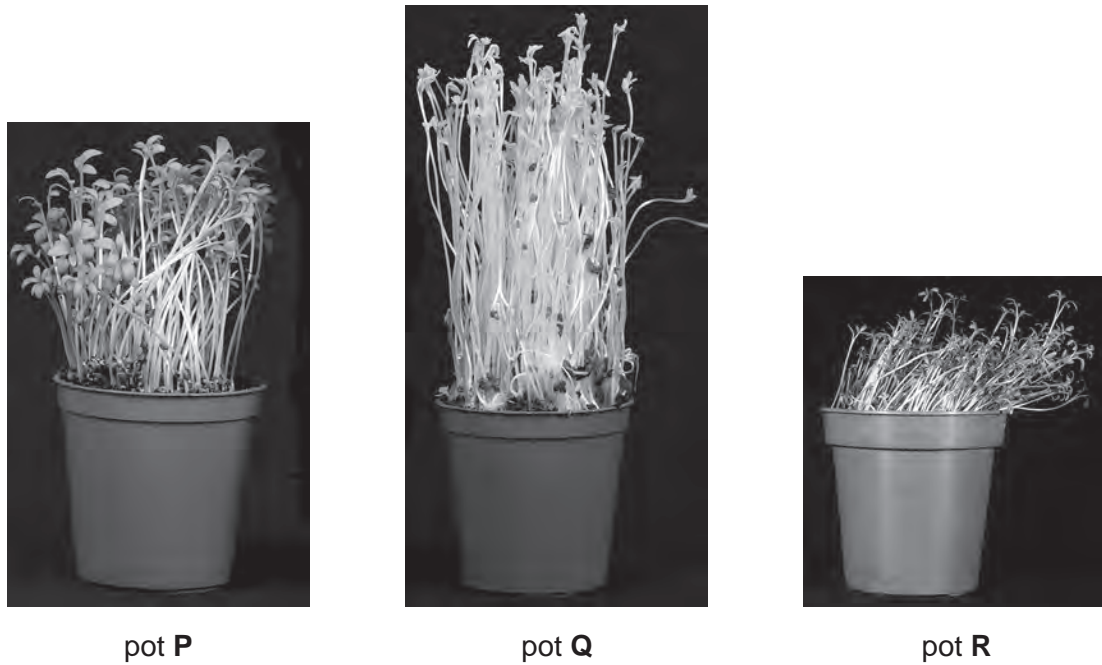
.....

2 .....

.....

[2]

(c) Fig. 2.3 shows three pots of seedlings that have been kept in different conditions.



**Fig. 2.3**

(i) State the conditions in which pots **P** and **Q** were kept.

**P** .....

**Q** .....

[1]

(ii) State the name of the growth response shown by the seedlings in pot **R**.

.....

[2]

**(iii)** Explain the advantage to the seedlings of this growth response.

.....  
.....  
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.....

[2]

**(iv)** Auxins control the growth responses of seedlings.

Explain how auxins control the growth response of the seedlings in pot **R**.

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[4]

[Total: 16]

2 Fig. 3.1 is a diagram of human skin in cold weather.

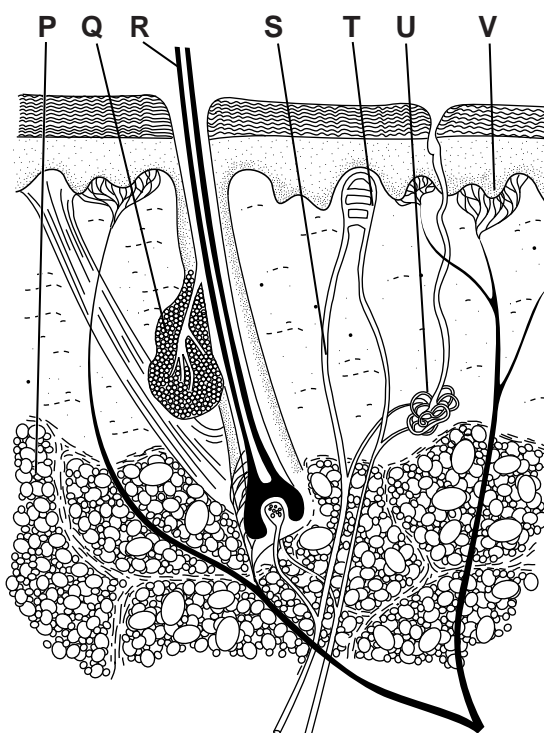


Fig. 3.1

(a) Table 3.1 shows the responses of the skin to cold weather.

Complete the table by:

- naming the parts of the skin that respond to cold weather
- using the letters (**P** to **V**) from Fig. 3.1 to identify these parts of the skin.

Table 3.1

| responses of skin to cold weather       | name of part | letter from Fig. 3.1 |
|---|--------------|----------------------|
| stands upright to trap air              |              |                      |
| constricts to reduce blood flow to skin |              |                      |
| stops producing sweat                   |              |                      |

[3]

(b) The response of the skin to cold weather is an involuntary action.

Explain how an involuntary action differs from a voluntary action.

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

(c) Describe how the nervous system coordinates the response of the skin to cold weather.

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

(d) Explain how negative feedback is involved in the control of body temperature.

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

**[Total: 13]**

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

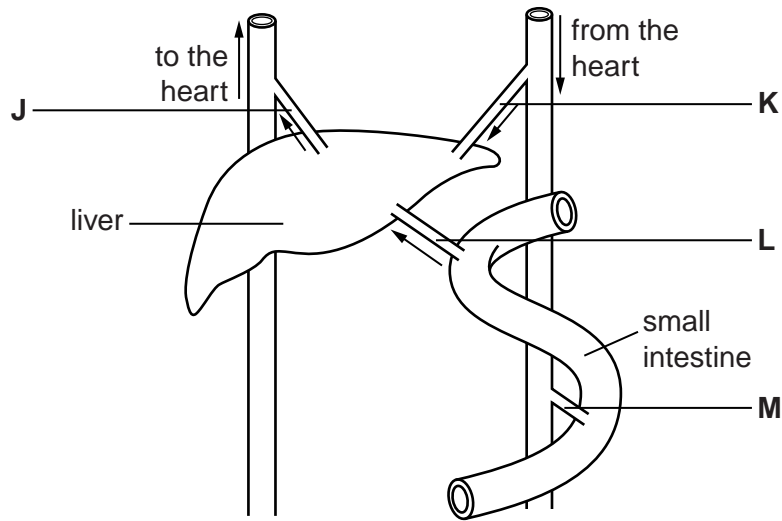


Fig. 2.1

(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 <sup>3</sup> |
|--------------|---|
| <b>J</b>     | 135   |
| <b>K</b>     | 128   |
| <b>L</b>     | 181   |
| <b>M</b>     | 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.

.....

..... [1]

**[Total: 14]**

4 Fig. 3.1 is a diagram that shows the control of blood glucose concentration.

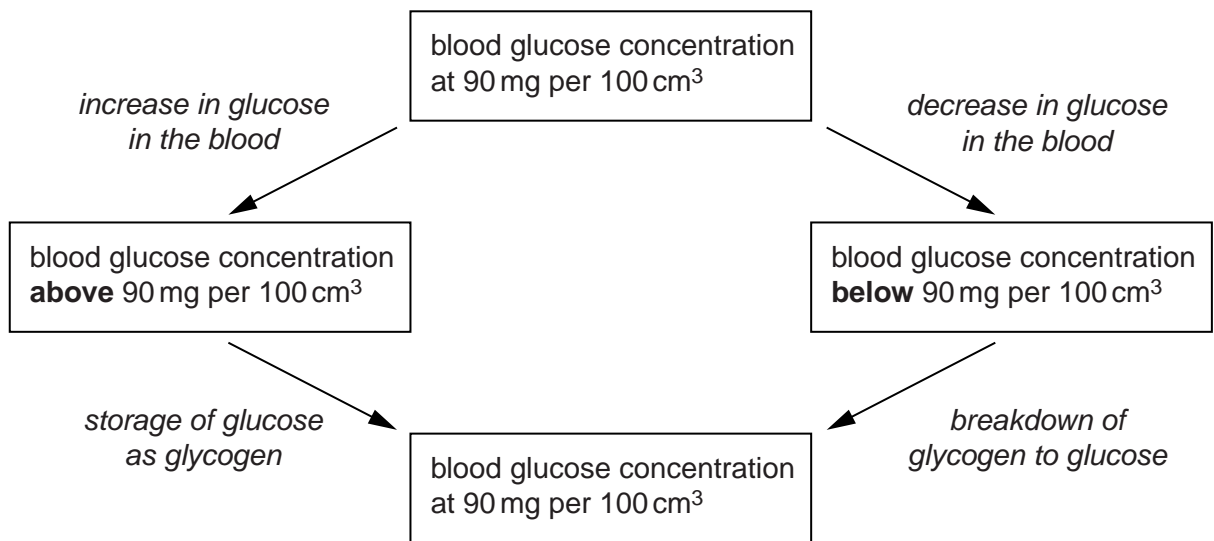


Fig. 3.1

(a) (i) State **one** reason why the concentration of glucose in the blood **increases**.

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

(ii) State **one** reason why the concentration of glucose in the blood **decreases**.

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

(iii) Name **two** places in the body where glycogen is stored.

1 .....  
 2 .....  
 [2]

(b) Explain how an increase in glucose concentration is controlled in the body.

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

- (c) If the blood glucose concentration is very high there is a decrease in the water potential of the blood. This may damage the red blood cells.

Explain how a decrease in water potential of the blood may damage red blood cells.

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[3]

[Total: 10]