14. Coordination and response

14.4 Homeostasis

Paper 3 and 4

Question Paper

Paper 3

Questions are applicable for both core and extended candidates unless indicated in the question

1 **(a)** Define the term homeostasis.

.....

.....

.....

.....

..... [2]

(c) Fig. 2.1 shows part of a cross-section of mammalian skin. **(extended only)**

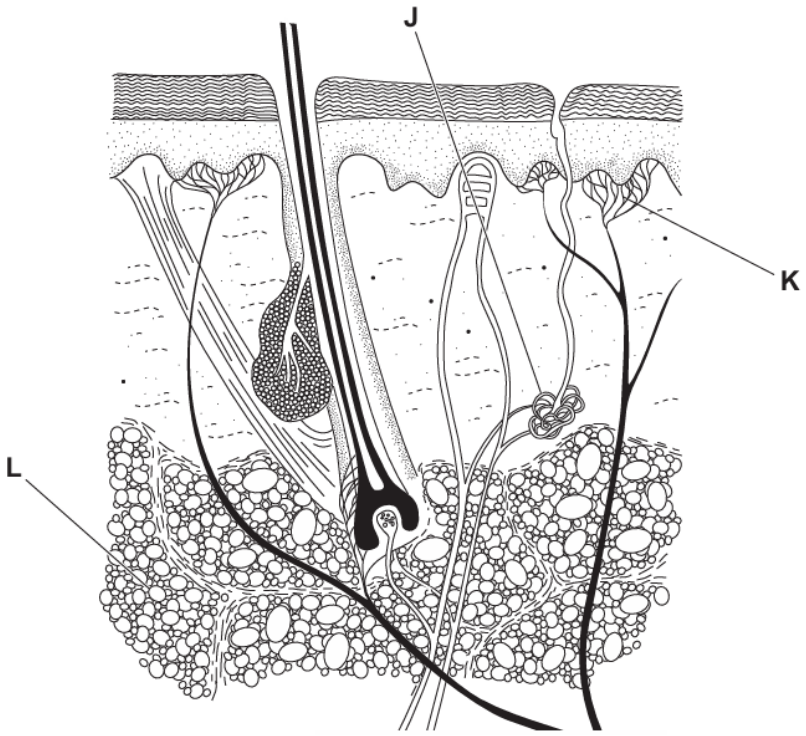

Fig. 2.1

State the names of **J**, **K** and **L** in Fig. 2.1.

J .....

K .....

L .....

[3]

(d) Describe how structures in the body help to keep the body warm in a cool environment. **(extended only)**

.....

.....

.....

.....

.....

.....

..... [3]

2 **(a)** State the term used to describe the maintenance of a constant internal environment.

..... [1]

(b) Mammals can maintain a constant body temperature. **(extended only)**

Complete the sentences by **circling** the correct word in each group of three words that are shown in bold.

Circle **five** words.

When a mammal becomes too cold the **effectors / hormones / receptors** detect a low body temperature and send information to the brain.

The brain coordinates the response. The **effectors / hormones / receptors** respond by raising body hairs to trap a layer of **air / oil / sweat** around the body to insulate it.

During shivering, the **blood / muscle / skin** cells contract and respire more, releasing heat.

Sweat production decreases so that heat transfer to the environment **decreases / increases / stays the same**.

[5]

3 **(a)** Fig. 8.1 is a diagram of a section of human skin. **(extended only)**

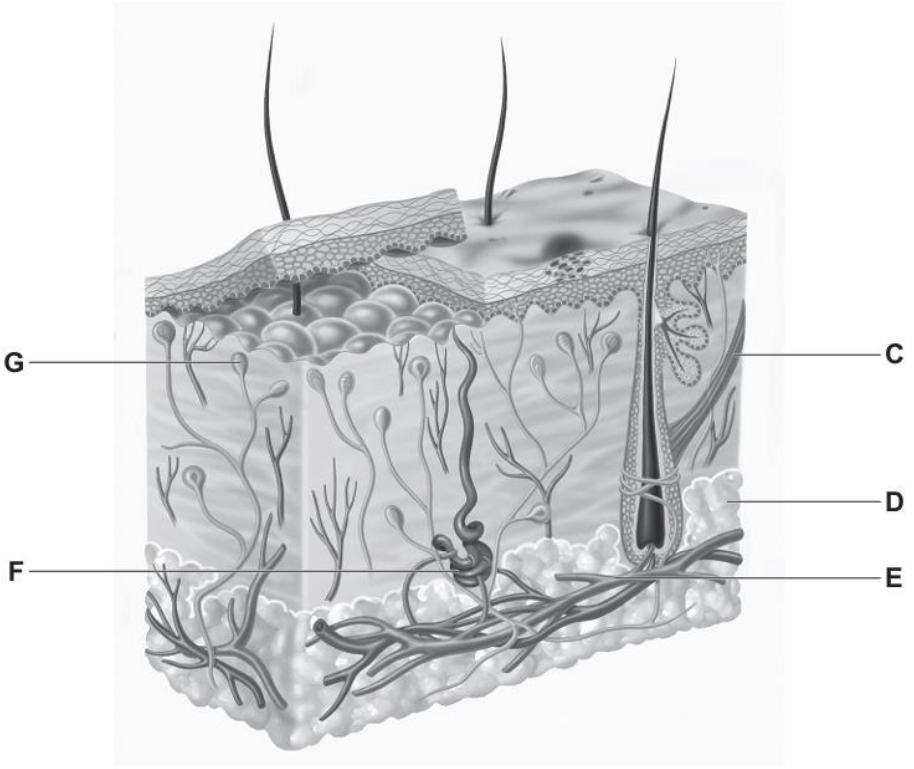

Fig. 8.1

State the names of the structures identified by the labels in Fig. 8.1.

C .....

D .....

E .....

F .....

G .....

[5]

(b) Complete the sentences about temperature control in humans by writing the missing words in the gaps. **(extended only)**

If body temperature increases above normal, ... in the

..... detect the rise in temperature and impulses are sent to the skin.

Glands in the skin produce a liquid called ..... . The main component of this liquid is water.

The water in the liquid ..... from the surface of the skin using heat energy from the body. This lowers the body temperature.

The maintenance of a constant body temperature is an example of

..... .

[5]

[Total: 10]

4 **(b)** The volume and concentration of urine varies with changing conditions.

Table 7.1 shows three changing conditions.

Write **increase** or **decrease** in each of the boxes in Table 7.1 to show how each change affects the volume and the concentration of urine. **(extended only)**

Table 7.1

changing condition	volume of urine	concentration of urine
increase in water intake		
increase in temperature		
increase in exercise		

[3]

Paper 4

Questions are applicable for both core and extended candidates unless indicated in the question

5 **(a)** Fig. 2.1 shows the internal body temperature of a human and the external environmental temperature during six hours in one day.

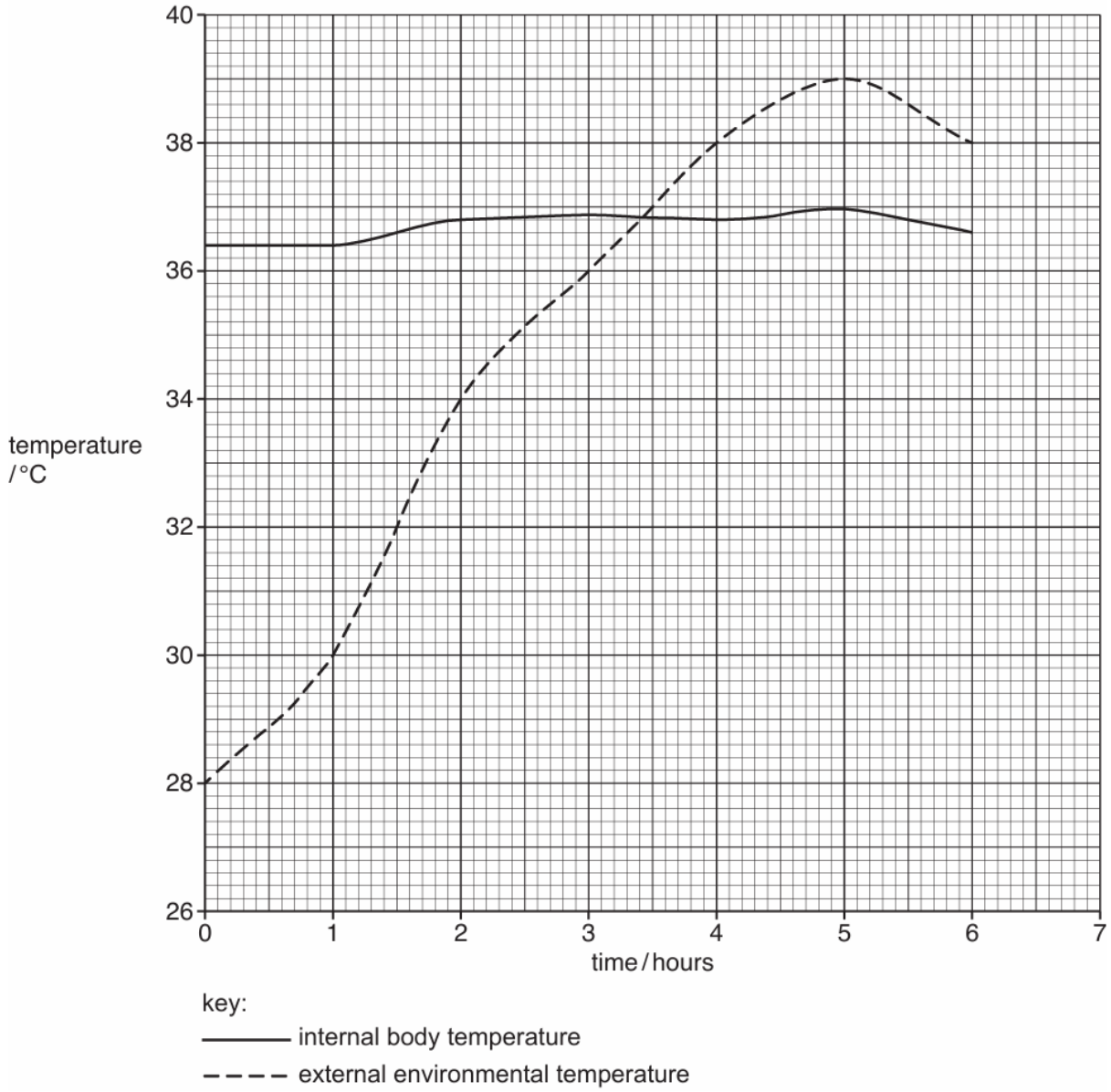

Fig. 2.1

(i) The internal body temperature range is from 36.4 °C to 37.0 °C.

State the range of the external environmental temperature shown in Fig. 2.1. **(extended only)**

..... [1]

(ii) Explain the results for the internal body temperature shown in Fig. 2.1. **(extended only)**

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

(b) Fig. 2.2 shows a cross-section through human skin.

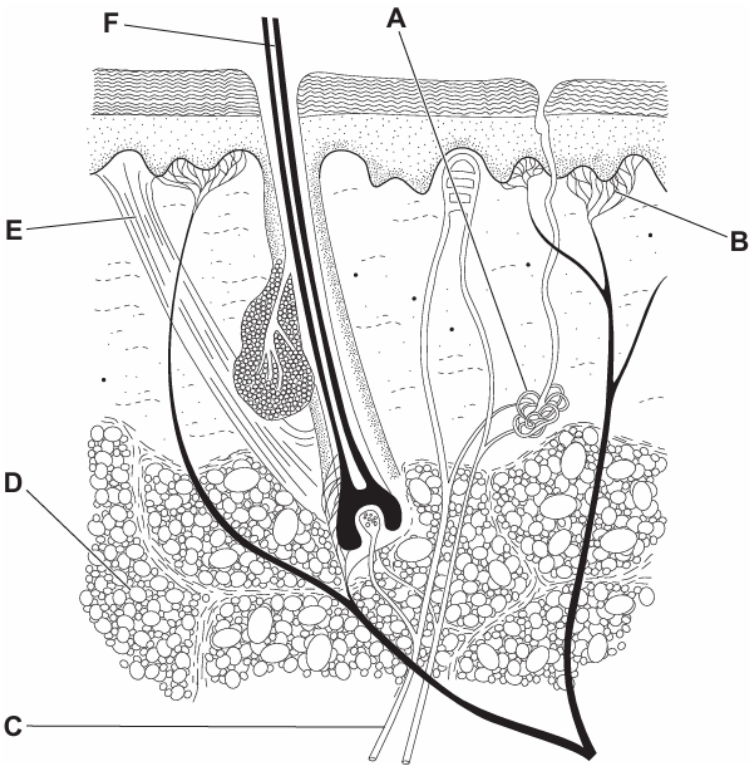

Fig. 2.2

Table 2.1 shows the names of some parts of the skin, the letter identifying the part in Fig. 2.2 and its role in maintaining internal body temperature.

Complete Table 2.1. **(extended only)**

Table 2.1

name of the part	letter in Fig. 2.2	role in maintaining internal body temperature
		insulation
	E	
		detect temperature changes

[3]

6 **(b)** Outline how blood glucose concentration is controlled. **(extended only)**

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

7 **(c)** The kidneys are examples of organs that help the body to maintain a constant internal environment.

(i) State the term for maintaining a constant internal environment by negative feedback.

..... [1]

(ii) Explain how negative feedback controls the blood glucose concentration of a person who has **not** eaten for a day. **(extended only)**

.....

.....

.....

.....

.....

.....

..... [3]

8 **(b)** Insulin is one of many human proteins that are made by genetically engineered bacteria.

Some people cannot produce insulin because their immune system has destroyed the cells that make insulin.

(i) State the organ that contains the cells that have been destroyed. **(extended only)**

..... [1]

(ii) State the name of the disease caused by the destruction of these cells. **(extended only)**

..... [1]

(iii) State the function of insulin in the body.

..... [1]

9 Homeostasis is the maintenance of a constant internal environment.

(a) Human skin is involved in the maintenance of a constant internal body temperature.

(i) Skin is an organ.

State why the skin is an organ.

.....

.....

..... [1]

(ii) State the name of the organ that coordinates the control of body temperature. **(extended only)**

..... [1]

Fig. 1.1 shows a diagram of a section through human skin. **(extended only)**

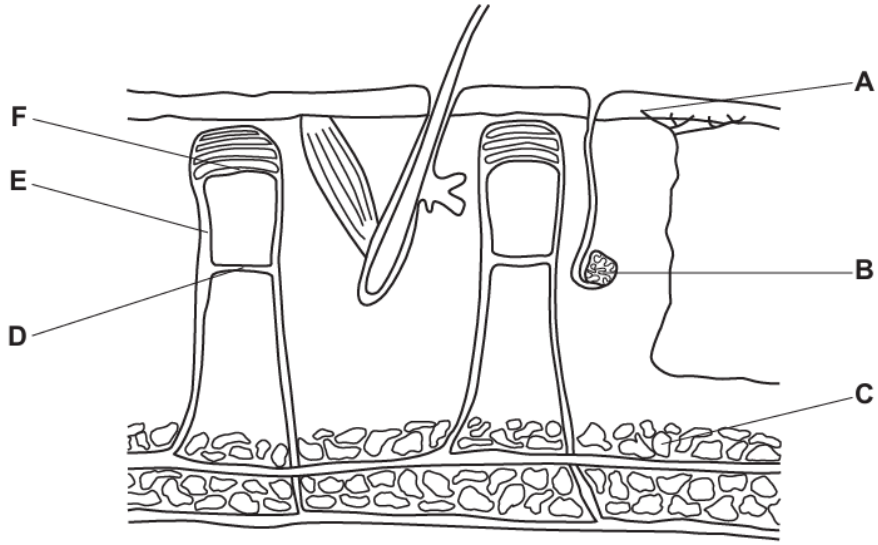

Fig. 1.1

(iii) State the names of structures **A**, **B** and **C** in Fig. 1.1. **(extended only)**

A .....

B .....

C .....

[3]

(iv) Structure **D** is a shunt vessel and **E** is an arteriole.

Describe how these blood vessels are involved in maintaining a constant internal body temperature in a cold environment. **(extended only)**

.....

.....

.....

.....

.....

.....

..... [3]

10 **(c)** Explain the importance of regulating body temperature in humans. **(extended only)**

.....

.....

.....

.....

.....

.....

.....

.....

.....[4]