

Past-paper walk-through

Homeostasis ■ 14.4

eXercise

Questions in this set

- 0610/23 N25 Q22 ■ 1 mark
- 0610/21 J25 Q24 ■ 1 mark
- 0610/43 J25 Q3 ■ 12 marks
- 0610/22 M25 Q22 ■ 1 mark
- 0610/42 M25 Q2 ■ 11 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 22

0610/23 N25 ■ Q22 ■ 1 mark

22 Which actions can prevent a mammal's internal body temperature falling too low?

- A** shivering and vasoconstriction
- B** shivering and vasodilation
- C** sweating and vasoconstriction
- D** sweating and vasodilation

Solution 22

Answer: **A**

Why

- When too cold the body must generate heat and lose less of it.
- Shivering makes the muscles contract rapidly, releasing heat from respiration.
- Vasoconstriction narrows the skin arterioles, so less blood flows near the surface and less heat escapes.

Question 24

0610/21 J25 ■ Q24 ■ 1 mark

24 What is a response of the human body to overheating?

- A** vasoconstriction of arterioles
- B** vasoconstriction of veins
- C** vasodilation of arterioles
- D** vasodilation of veins

Solution 24

Answer: **C**

Why

- When too hot, the body needs to lose heat through the skin.
- The arterioles supplying the skin capillaries widen – vasodilation.
- More blood flows near the surface, so more heat is radiated away.

Question 3

0610/43 J25 ■ Q3 ■ 12 marks

- 3 (a)** Complete the sentences about the control of blood glucose concentration.

Blood glucose concentration increases after a person eats a meal containing carbohydrates.

Question 3

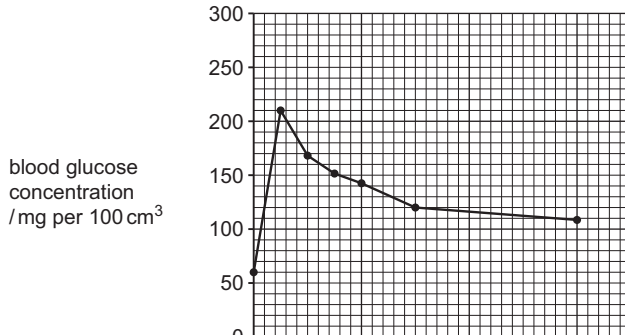
[4]

(b) Outline the treatment of type 1 diabetes.

Question 3

- (c) A scientist investigated the effect of an injection of glucose solution on blood glucose concentration in healthy people. The injection was given at 0 minutes.

Fig. 3.1 shows the results.



Question 3

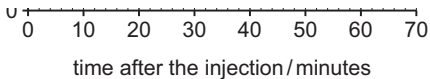


Fig. 3.1

Calculate the percentage change in the blood glucose concentration from 5 minutes after the injection to 30 minutes after the injection.

Give your answer to **two** significant figures.

Space for working.

Question 3

(d) Adrenaline also affects blood glucose concentration.

Suggest how this is an advantage for the “fight or flight” response.

Question 3

[Total: 12] _

Solution 3

(a) Mark scheme

- pancreas ;
- liver ;
- glycogen ;
- negative feedback / homeostasis ;
- 4
- 0610/43
- May/June 2025
- Guidance

Solution 3

(b) Mark scheme

- any two from:
- 1
- monitoring blood glucose ;
- 2
- insulin, injections / pump ;
- 3
- artificial pancreas ;
- 4

Solution 3

- counting carbohydrates (in diet) ;
- 5
- matching, food / carbohydrate, intake to activity ;
- 6
- keeping a healthy weight ;
- 7
- pancreas / islet cell, transplant ;
- 8
- AVP ;
- 2

Solution 3

- e.g. consuming, sugar / glucose, if blood,
- glucose is low / AW

Solution 3

(c) Mark scheme

- $(-)$ 43(%) ;;;
- 3 MP1 correct readings from graph
- 210 and 120 mg per 100 cm³
- MP2 correct calculation to any number of
- significant figures e.g. $(-)$ 42.857(%)
- MP3 correct rounding to two significant
- figures
- ecf from previous step

Solution 3

(d) Mark scheme

- any three from:
- 1
- (adrenaline) causes the, breakdown / conversion, of, glycogen / stored
- carbohydrate ;
- 2
- increasing (blood) glucose concentration ;
- 3
- glucose used in respiration releasing energy ;

Solution 3

- 4
- energy used for muscle contraction ;
- 5
- AVP ;
- 3
- e.g. increased glucose uptake by cells
- Guidance

Question 22

0610/22 M25 ■ Q22 ■ 1 mark

22 The liver and the pancreas work together to control the concentration of glucose in the blood.

Which statement is correct?

- A** The liver converts the small molecule glucose into the large molecule glucagon.
- B** The liver releases the hormone insulin when blood glucose concentration is too high.
- C** The pancreas does **not** respond to an increase in blood glucose concentration.
- D** The pancreas responds to a fall in the blood glucose concentration by increasing the release of the hormone glucagon.

Solution 22

Answer: **D**

Why

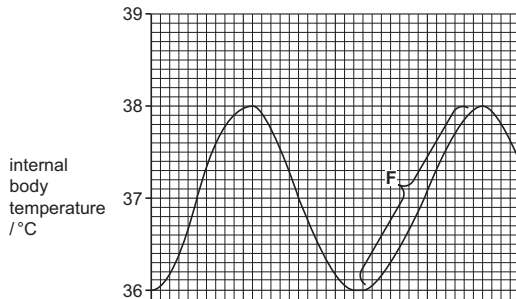
- Insulin from the pancreas makes the liver convert glucose into glycogen for storage.
- Glucagon reverses that, converting glycogen back into glucose.
- So the pancreas makes the hormones and the liver does the storing – both organs are needed.

Question 2

0610/42 M25 ■ Q2 ■ 11 marks

- 2 (a) The internal body temperature of a person was recorded.

Fig. 2.1 shows the results.



Question 2

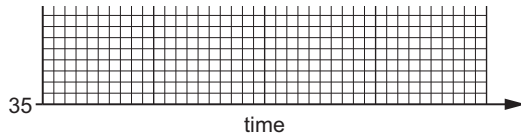


Fig. 2.1

- (i) Using the information in Fig. 2.1, calculate the temperature range for the internal body temperature of the person.

State the units.

Question 2

- (ii) On Fig. 2.1, draw a line to show the set point for the internal body temperature of the person. [1]
- (iii) The maintenance of internal body temperature is an example of homeostatic control.

State the name of the mechanism for homeostatic control.

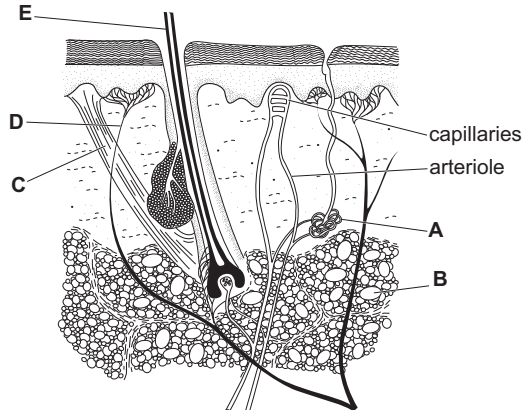
Question 2

(iv) On Fig. 2.1, region **F** shows a change in body temperature.

Explain how the body causes the change in body temperature shown.

Question 2

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



Question 2

Figure 2.2

Fig. 2.2

- (i) State the letter of the structure shown in Fig. 2.2 that produces sweat.

Question 2

(ii) State the names of structures **C** and **D** shown in Fig. 2.2.

Question 2

Question 2

[2]

[Total: 11]

Solution 2

(a)(i)

Mark scheme

- 2 and $^{\circ}\text{C}$;
- 1

(a)(ii)

Mark scheme

- horizontal line drawn at 37°C ;
- 1

Solution 2

(a)(iii)

Mark scheme

- negative feedback ;
- 1

Solution 2

(a)(iv) Mark scheme

- any five from:
- 1
- brain / receptors, detect(s), low temperature / change in temperature ;
- 2
- constriction of arterioles / vasoconstriction ;
- 3
- less blood flow to, skin-surface / capillaries ;
- 4

Solution 2

- ref to shivering / increased or rapid (skeletal) muscle contraction ;
- 5
- increase in rate of respiration ;
- 6
- hair erector muscles contract / hair stands on end ;
- 7
- hair traps (insulating layer of) air ;
- 8
- AVP ;
- 5

Solution 2

(b)(i)

Mark scheme

- A ;
- 1

Solution 2

(b)(ii)

Mark scheme

- C – (hair) erector muscle ;
- D – sensory neurone ;
- 2