

AQA – Homeostasis and response – GCSE Biology Paper 2

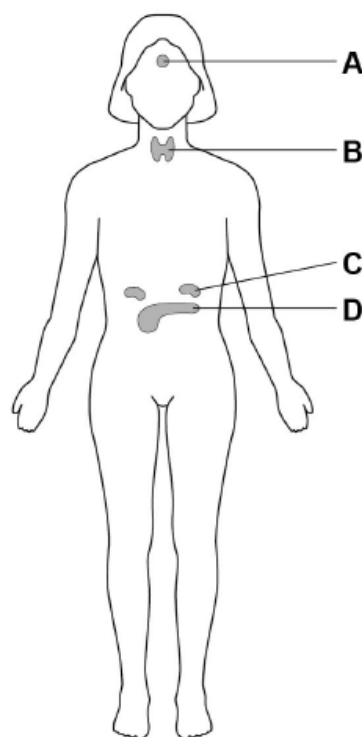
1. June/2021/Paper_2F/No.2

0 2

Many internal processes of the human body are controlled by hormones.

Hormones are produced by glands.

Figure 2 shows glands in a woman's body.

Figure 2

0 2 . 1 Which gland is the pituitary gland?

[1 mark]

Tick (✓) **one** box.

A B C D

0 2 . 2 Which gland is the pancreas?

[1 mark]

Tick (✓) **one** box.

A B C D

The hormone insulin helps to decrease the blood glucose concentration.

Insulin causes its target organs to take in glucose from the blood.

0 2 . 3 Which of the following is a target organ for insulin?

[1 mark]

Tick (✓) **one** box.

Bladder

Heart

Liver

0 2 . 4 The glucose is stored as an insoluble substance.

What is the insoluble storage substance that is formed from glucose?

[1 mark]

Tick (✓) **one** box.

Glycogen

Protein

Urea

Scientists investigated the effect of a glucose drink on the concentration of glucose in a person's blood.

This is the method used.

1. Take a small sample of blood from the person.
2. Measure the concentration of glucose in the person's blood.
3. Give the person a drink containing 50 grams of glucose.
4. Measure the concentration of glucose in the person's blood at intervals.
5. Calculate the **change** in blood glucose concentration from the starting value.

Figure 3 shows the results.

Figure 3

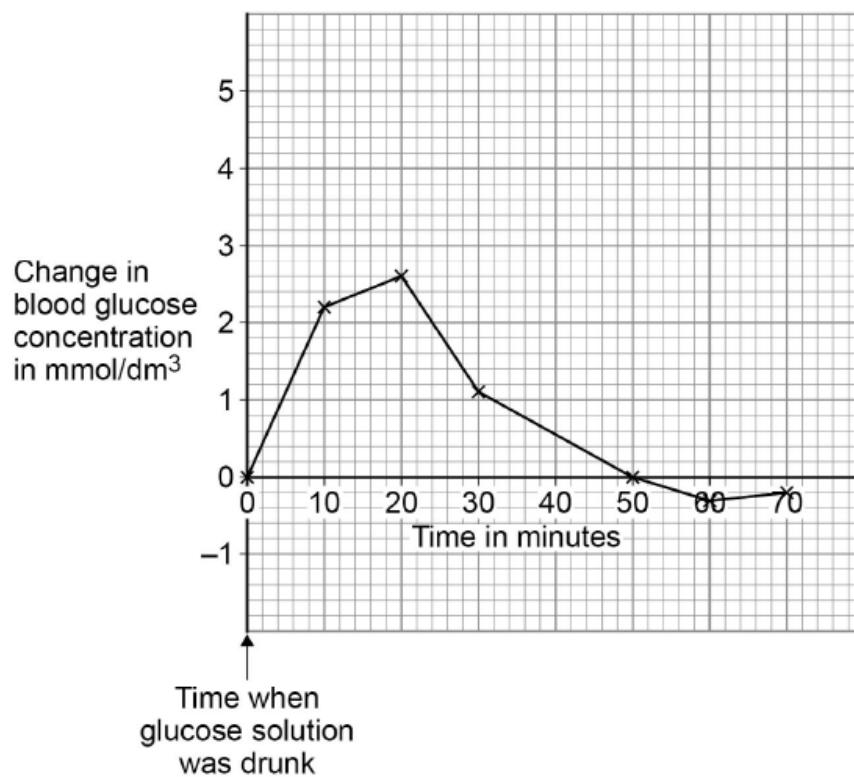


Figure 3 shows the **change** in blood glucose concentration.

0 2 . 5 At the start of the investigation, the blood glucose concentration was 5 mmol/dm^3 .

Calculate the highest blood glucose concentration during the investigation.

Use information from **Figure 3** in your answer.

[2 marks]

Highest blood glucose concentration = _____ mmol/dm^3

0 2 . 6 What is the time taken for the blood glucose concentration to decrease from its highest value back to the starting value?

Use data from **Figure 3** in your answer.

[1 mark]

Time taken = _____ minutes

0 2 . 7 Why can you **not** be certain that your answer to Question **02.6** is accurate?

[1 mark]

0 2 . 8 **Figure 3** shows the results for a person who does **not have** Type 2 diabetes.

Sketch a line on **Figure 3** to show the results you would expect for a person who **has** Type 2 diabetes.

[2 marks]

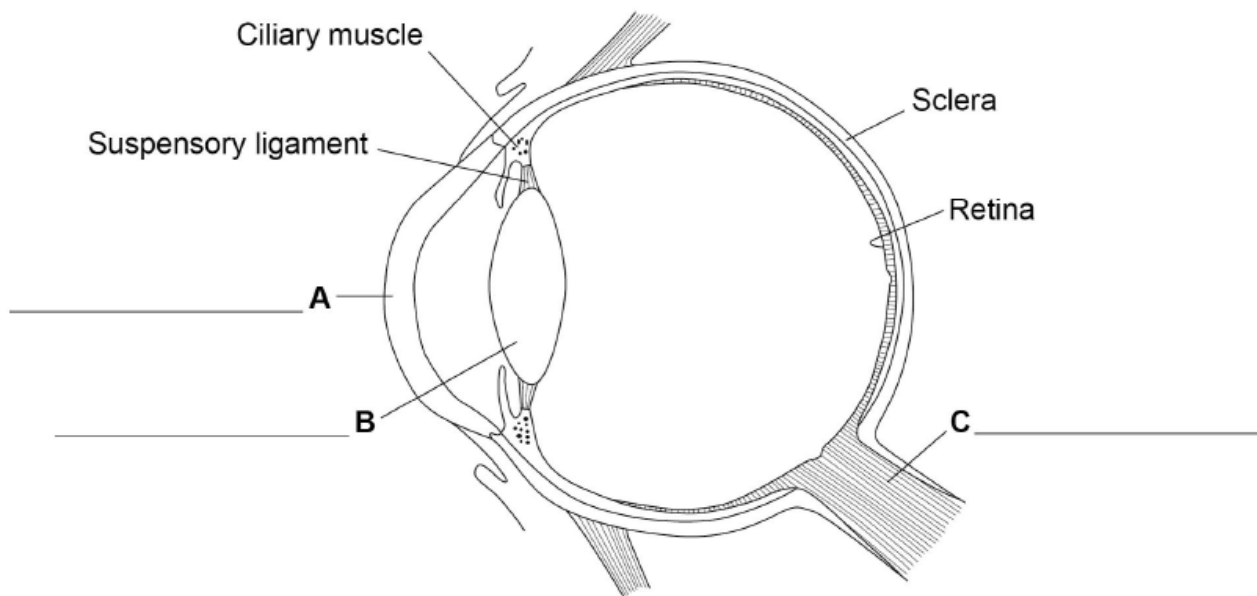
2. June/2021/Paper_2F/No.4

0 4

The human eye can form images of objects that are at different distances away from the eye.

Figure 7 is a diagram of the eye.

Figure 7



0 4 . 1

Label structures **A**, **B** and **C** on Figure 7.

[3 marks]

Choose answers from the box.

cornea	eyelid	iris	lens	optic nerve
--------	--------	------	------	-------------

The eye in **Figure 7** is focused on a distant object.

If the eye then focuses on the words in a book, changes would occur in the eye.

The light rays would be refracted more by the lens.

0 4 . 2 How does the lens refract the light more?

[1 mark]

Tick (✓) **one** box.

By becoming longer

By becoming thicker

By becoming transparent

0 4 . 3 Which **two** structures control the shape of the lens?

[2 marks]

Tick (✓) **two** boxes.

Ciliary muscles

Cornea

Iris

Sclera

Suspensory ligaments

0 4 . 4 To form a clear image, the light rays entering the eye must focus on one structure in the eye.

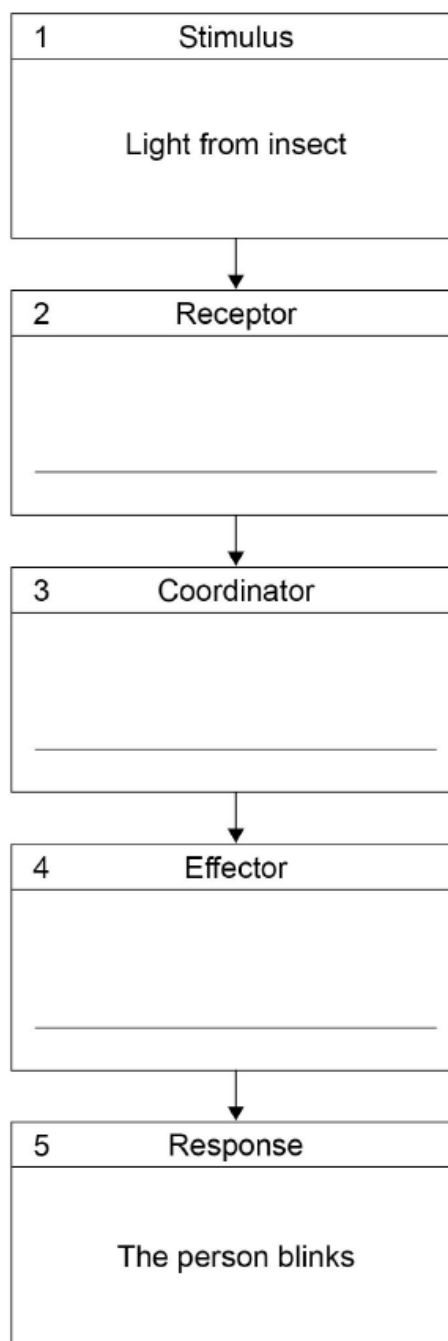
Name the structure.

[1 mark]

- 0 4 . 5 An insect flies near a person's eye. The person blinks.
This is a reflex action.

Figure 8 shows the coordination system for this reflex action.

Figure 8



Complete Figure 8.

[2 marks]

Choose answers from the box below.

Write **one** word in each of boxes 2, 3 and 4 of Figure 8.

brain	cornea	iris	muscles	retina
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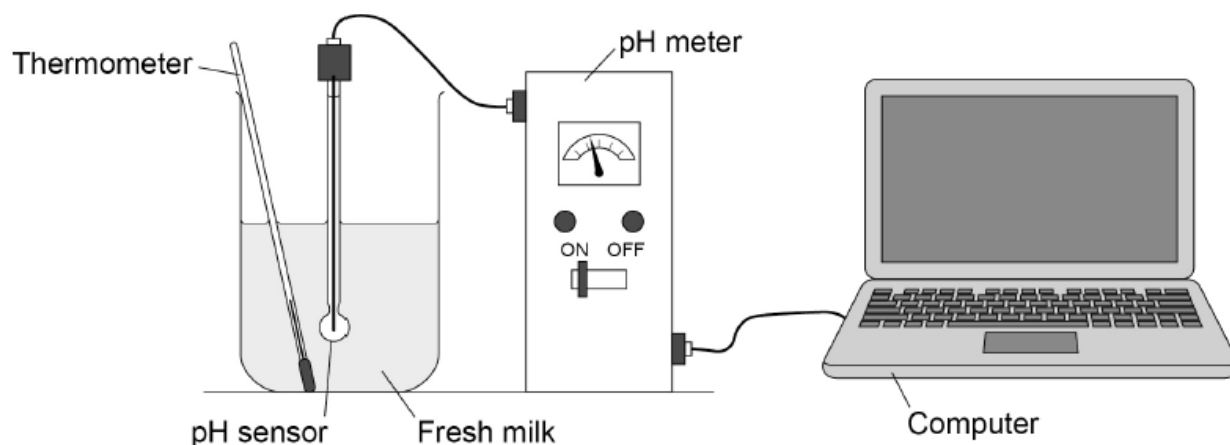
3. June/2021/Paper_2F/No.9

09

A student investigated the effect of temperature on the decay of milk.

Figure 15 shows the apparatus the student used.

Figure 15



This is the method used.

1. Set up the apparatus as shown in **Figure 15** with the milk at 20 °C.
2. Record the pH over 5 days using the computer.
3. Repeat with another batch of fresh milk at 25 °C.

09.1

How could the student keep the milk at a constant temperature for 5 days?

[1 mark]

09.2

Give **one** variable the student should keep constant.

Do **not** refer to temperature in your answer.

[1 mark]

Table 2 shows the student's results for the milk at 20 °C.

Table 2

Time in days	0	1	2	3	4	5
pH	6.7	6.7	6.3	5.3	4.6	4.4

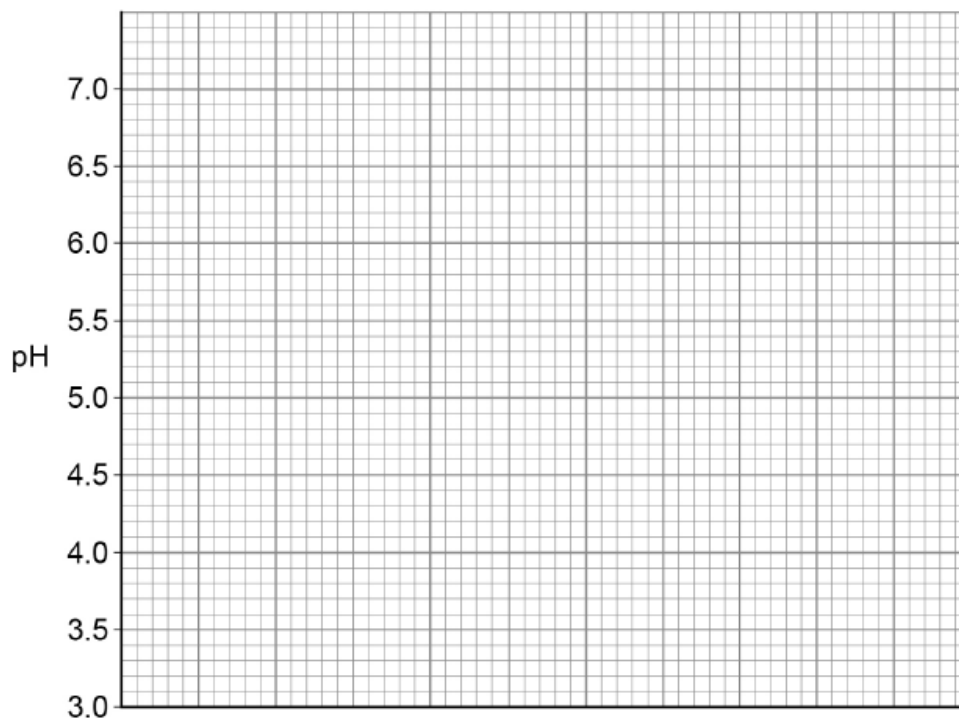
09.3 Complete **Figure 16**.

[4 marks]

You should:

- label the x-axis
- use a suitable scale for the x-axis
- plot the data from **Table 2**
- draw a line of best fit.

Figure 16



09.4 The data you plotted in Question **09.3** were obtained at 20 °C.

Sketch a line on **Figure 16** to show the results you would expect at 25 °C.

Label this line '25 °C'.

[2 marks]

4. June/2021/Paper_2F/No.10

1 0

Human body temperature is controlled within very narrow limits.

Scientists investigated the effect of drinking ice-cold water on:

- internal body temperature
- the rate of sweating.

This is the method used.

1. Sit a person inside a room kept at a constant temperature of 25 °C.
2. Measure the person's internal body temperature near the brain.
3. Measure the person's rate of sweating.
4. After 20 minutes, give the person 500 cm³ of ice-cold water to drink.
5. Continue to measure the person's internal body temperature and sweating rate for a further 50 minutes.

1 0 . 1

Give the reason why the person should not move during the investigation.

[1 mark]

Figure 17 and Figure 18 show the scientists' results.

Figure 17

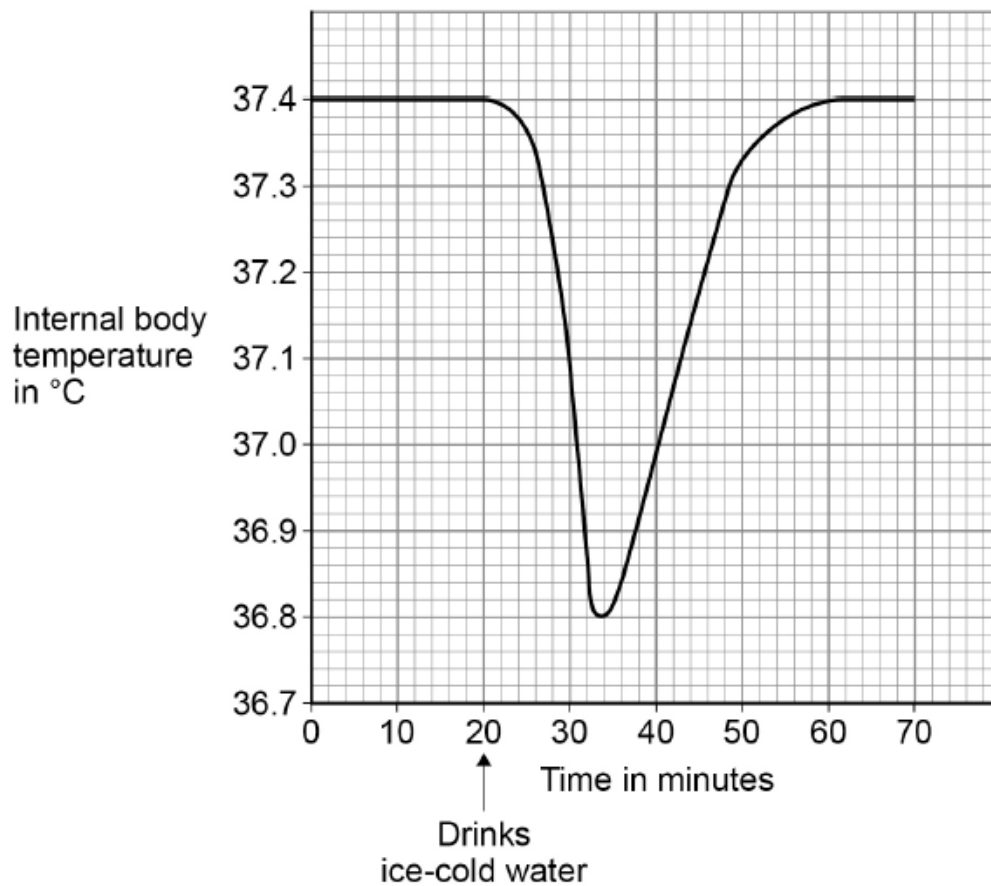
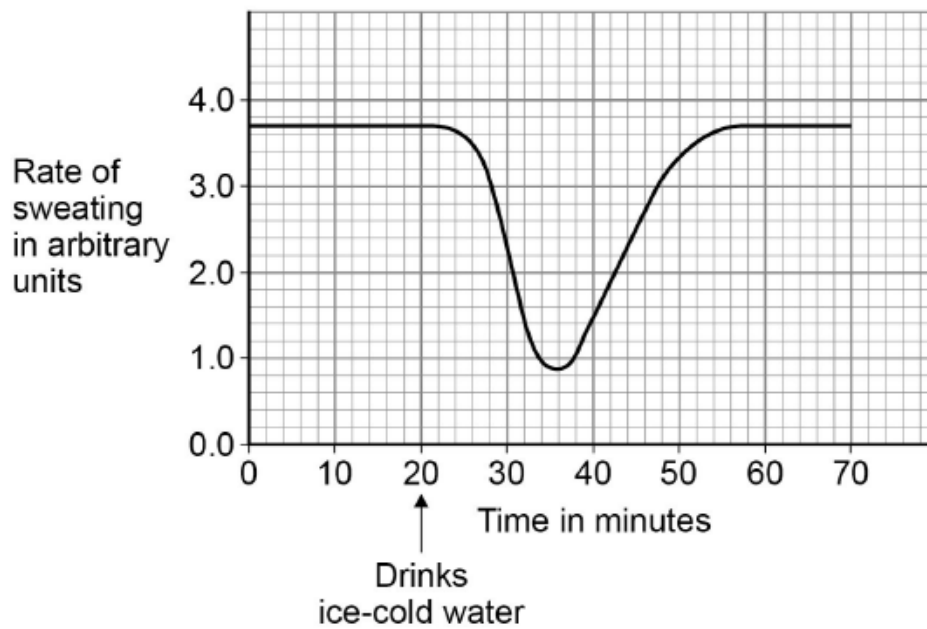


Figure 18



1 0 . 2 What is this person's normal internal body temperature?

[1 mark]

Tick (✓) **one** box.

36.8 °C

37.0 °C

37.4 °C

The results show that when the ice-cold water was drunk, the temperature near the brain decreased.

1 0 . 3 Explain why the temperature near the brain decreased.

[2 marks]

1 0 . 4 The thermoregulatory centre in the brain responds to the decrease in temperature.

How does the thermoregulatory centre send information to sweat glands in the skin?

[1 mark]

1 0 . 5 The rate of sweating changes between 24 minutes and 36 minutes.

Explain how this change helps to maintain the person's normal body temperature.

[2 marks]

1 0 . 6 During exercise, the skin appears red.

What causes the skin to appear red?

[1 mark]

Tick (✓) **one** box.

Blood vessels moving closer to the skin surface

Constriction of blood vessels in the skin

Decrease in heart rate

Dilation of blood vessels in the skin

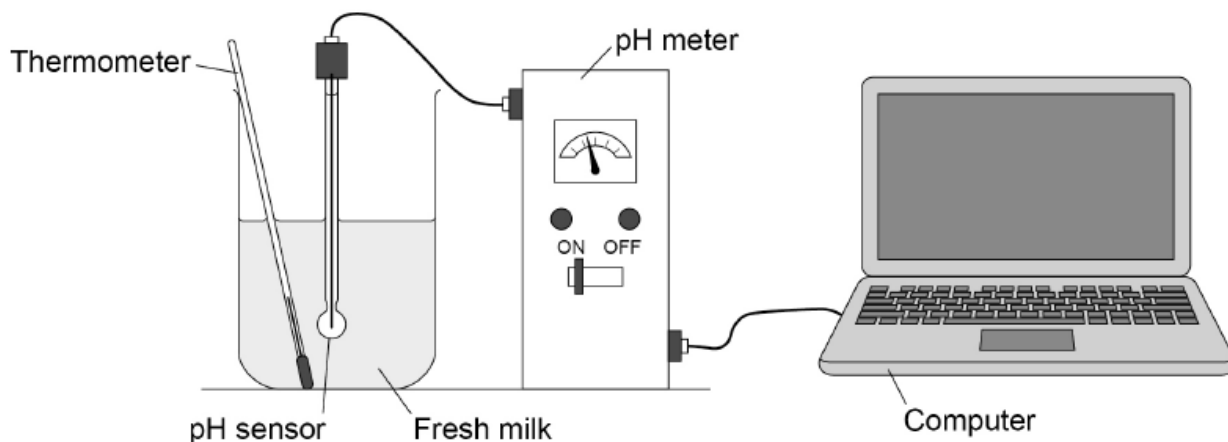
5. June/2021/Paper_2H/No.2

0 2

A student investigated the effect of temperature on the decay of milk.

Figure 3 shows the apparatus the student used.

Figure 3



This is the method used.

1. Set up the apparatus as shown in **Figure 3** with the milk at 20 °C.
2. Record the pH over 5 days using the computer.
3. Repeat with another batch of fresh milk at 25 °C.

0 2 . 1

How could the student keep the milk at a constant temperature for 5 days?

[1 mark]

0 2 . 2

Give **one** variable the student should keep constant.

Do **not** refer to temperature in your answer.

[1 mark]

Table 1 shows the student's results for the milk at 20 °C.

Table 1

Time in days	0	1	2	3	4	5
pH	6.7	6.7	6.3	5.3	4.6	4.4

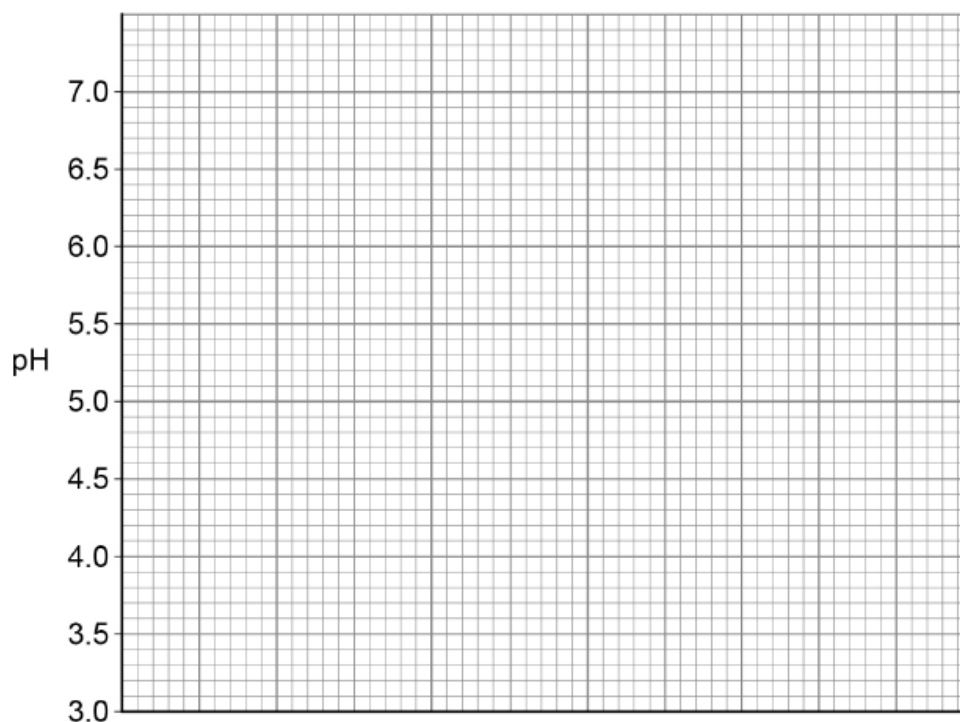
0 2 . 3 Complete **Figure 4**.

[4 marks]

You should:

- label the x-axis
- use a suitable scale for the x-axis
- plot the data from **Table 1**
- draw a line of best fit.

Figure 4



0 2 . 4 The data you plotted in Question 02.3 were obtained at 20 °C.

Sketch a line on **Figure 4** to show the results you would expect at 25 °C.

Label this line '25 °C'.

[2 marks]

6. June/2021/Paper_2H/No.3

0 3

Human body temperature is controlled within very narrow limits.

Scientists investigated the effect of drinking ice-cold water on:

- internal body temperature
- the rate of sweating.

This is the method used.

1. Sit a person inside a room kept at a constant temperature of 25 °C.
2. Measure the person's internal body temperature near the brain.
3. Measure the person's rate of sweating.
4. After 20 minutes, give the person 500 cm³ of ice-cold water to drink.
5. Continue to measure the person's internal body temperature and sweating rate for a further 50 minutes.

0 3 . 1

Give the reason why the person should **not** move during the investigation.

[1 mark]

Figure 5 and Figure 6 show the scientists' results.

Figure 5

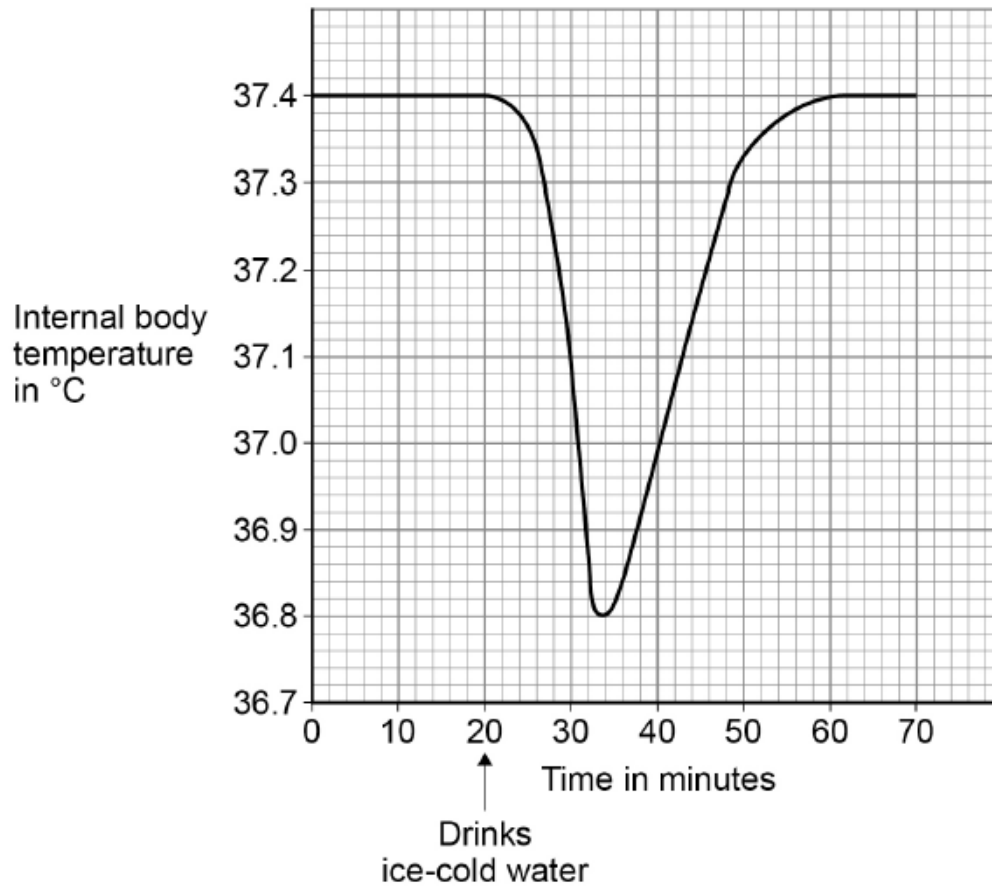
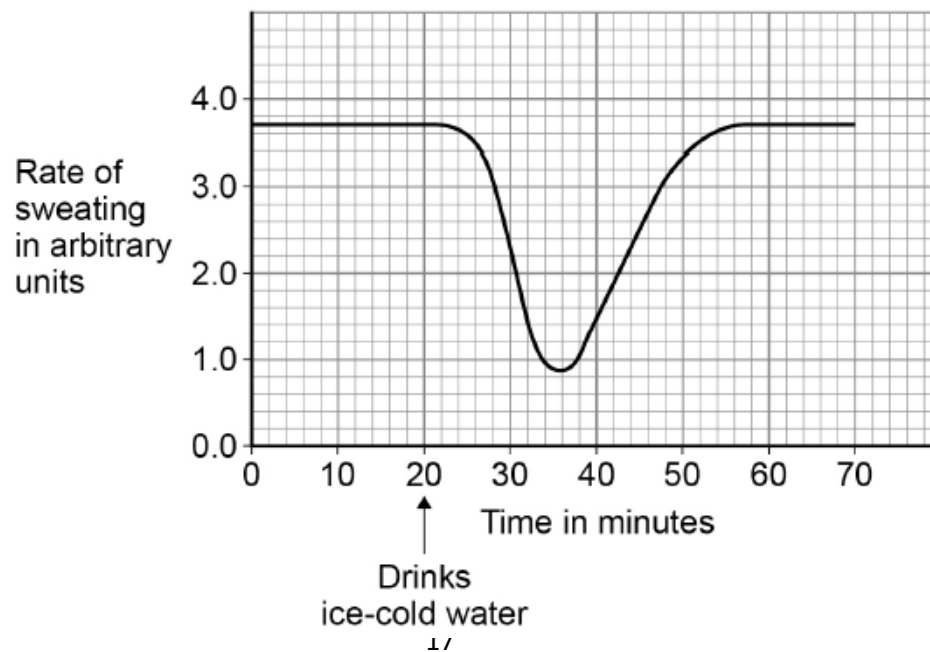


Figure 6



0 3 . 2

What is this person's normal internal body temperature?

[1 mark]

Tick (✓) **one** box.36.8 °C 37.0 °C 37.4 °C

The results show that when the ice-cold water was drunk, the temperature near the brain decreased.

0 3 . 3

Explain why the temperature near the brain decreased.

[2 marks]

0 3 . 4

The thermoregulatory centre in the brain responds to the decrease in temperature.

How does the thermoregulatory centre send information to sweat glands in the skin?

[1 mark]

0 3 . 5

The rate of sweating changes between 24 minutes and 36 minutes.

Explain how this change helps to maintain the person's normal body temperature.

[2 marks]

0 3 . 6 During exercise, the skin appears red.

What causes the skin to appear red?

[1 mark]

Tick (✓) **one** box.

Blood vessels moving closer to the skin surface

Constriction of blood vessels in the skin

Decrease in heart rate

Dilation of blood vessels in the skin

7. June/2021/Paper_2H/No.6

0 6

Reflex actions are coordinated by the nervous system.

0 6 . 1

What is meant by the term 'reflex action'?

[2 marks]

0 6 . 2

A woman's hand accidentally touches a hot object.

The woman moves her hand away rapidly.

Describe how the woman's nervous system coordinates the reflex action.

[6 marks]

0 6 . 3 The endocrine system coordinates many internal functions of the body.

Give **three** ways coordination by the endocrine system is different from coordination by the nervous system.

[3 marks]

1 _____

2 _____

3 _____

0 6 . 4 Describe how hormones control the menstrual cycle.

[5 marks]
