AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.5.3.2

Control of blood glucose concentration

Past-paper questions

Tier	**Foundation**
Question groups	**6**
Available paper years	**2020–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.5.3.2 Control of blood glucose concentration

Question 01

November 2020 | 8464/B/2F | Original Q4

0 4 Homeostasis regulates the internal conditions of the human body.

0 4 . 1 Which **two** processes are regulated by homeostasis?

[2 marks]

Tick (✓) **two** boxes.

- Controlling water output in urine ☐
- Defending the body against pathogens ☐
- How quickly you walk ☐
- Keeping cool on a hot day ☐
- Waking up in the morning ☐

4.5.3.2 Control of blood glucose concentration

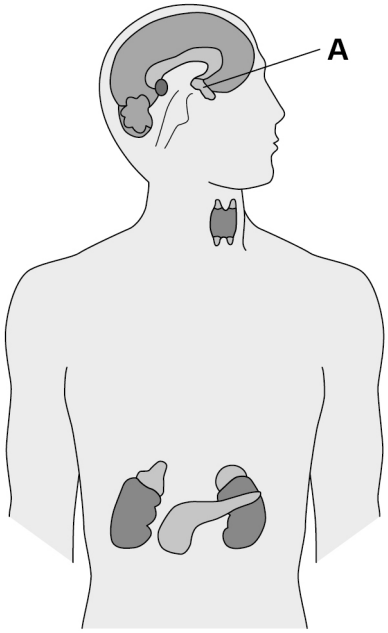
Question 01 · continued

Hormones are produced by glands in the endocrine system.

Each hormone has an effect on a target organ.

Figure 6 shows glands of the endocrine system.

Figure 6



0 4 . 2 What is the name of gland **A**?

[1 mark]

Tick (✓) **one** box.

Pancreas ☐

Pituitary ☐

Thyroid ☐

Question 4 continues on the next page

4.5.3.2 Control of blood glucose concentration

Question 01 · continued

Before eating a sugar-coated cereal a person had a blood glucose concentration of 5.2 mmol/dm^3

Soon after eating the cereal the person had a blood glucose concentration of 8.4 mmol/dm^3

0 4 . 3 Calculate the increase in the blood glucose concentration.

[1 mark]

Increase = _____ mmol/dm^3

0 4 . 4 The person needed medication to decrease their blood glucose concentration.

Suggest what disorder the person has.

[1 mark]

0 4 . 5 There is a problem with the hormone control of the person.

What is the problem?

[1 mark]

Tick (✓) **one** box.

- The blood is not taking hormones to target organs. ☐
- The pancreas is not releasing insulin. ☐
- The pituitary gland is not being stimulated. ☐

4.5.3.2 Control of blood glucose concentration

Question 01 · continued

0 4 . 6 The person:

- works in an office
- drives to work
- is overweight
- watches the television and reads every night
- drinks a hot chocolate every night.

Suggest **two** lifestyle changes the person could make to help treat their disorder.

[2 marks]

1 _____

_____

2 _____

_____

8

Turn over for the next question

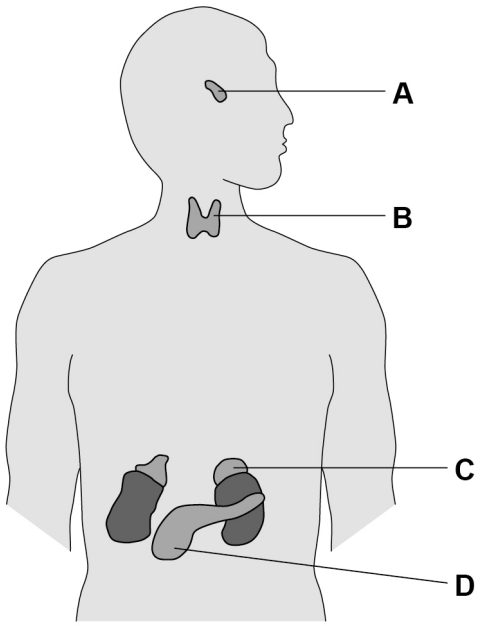
4.5.3.2 Control of blood glucose concentration

Question 02

November 2021 | 8464/B/2F | Original Q6

0 6 **Figure 5** shows glands in the human body.

Figure 5



0 6 . 1 Which organ system includes the glands shown in **Figure 5**?

[1 mark]

0 6 . 2 Which gland produces insulin?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 6 . 3 Which gland produces hormones that stimulate the other glands to produce hormones?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

4.5.3.2 Control of blood glucose concentration

Question 02 · continued

0 6 . 4 How do hormones travel from one gland to another gland?

[1 mark]

0 6 . 5 Name **two** glands involved in human reproduction.

Do **not** refer to glands shown on **Figure 5** in your answer.

[2 marks]

1 _____

2 _____

0 6 . 6 Ovulation test kits can help women know when they are most fertile.

Ovulation test kits detect the increase in the hormone that stimulates ovulation.

Which hormone is detected by ovulation test kits?

[1 mark]

Tick (✓) **one** box.

- Follicle stimulating hormone (FSH) ☐
- Luteinising hormone (LH) ☐
- Oestrogen ☐
- Progesterone ☐

4.5.3.2 Control of blood glucose concentration

Question 02 · continued

0 6 . 7 A new contraceptive drug for men is being tested.

The drug:

- is given in one injection
- stops sperm being able to fertilise eggs
- is effective for up to 13 years.

Evaluate the use of the new drug compared with existing contraceptive methods.

[6 marks]

13

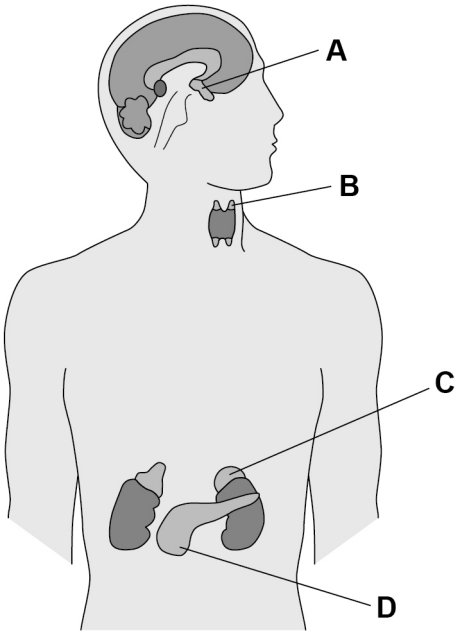
4.5.3.2 Control of blood glucose concentration

Question 03

0 4 The endocrine system is made up of glands which secrete hormones.

Figure 5 shows the position of endocrine glands in the human body.

Figure 5



0 4 . 1 Which letter shows the pancreas?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 4 . 2 Which letter shows the thyroid gland?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

4.5.3.2 Control of blood glucose concentration

Question 03 · continued

0 4 . 3 Hormones travel from the gland where they are made to the target organ where they have an effect.

How do hormones travel from the gland to the target organ?

[1 mark]

When blood glucose concentration becomes too high, hormone **X** from the pancreas causes a decrease in the glucose concentration.

0 4 . 4 Name hormone **X**.

[1 mark]

0 4 . 5 In what **two** ways does hormone **X** cause a decrease in blood glucose concentration?

[2 marks]

Tick (✓) **two** boxes.

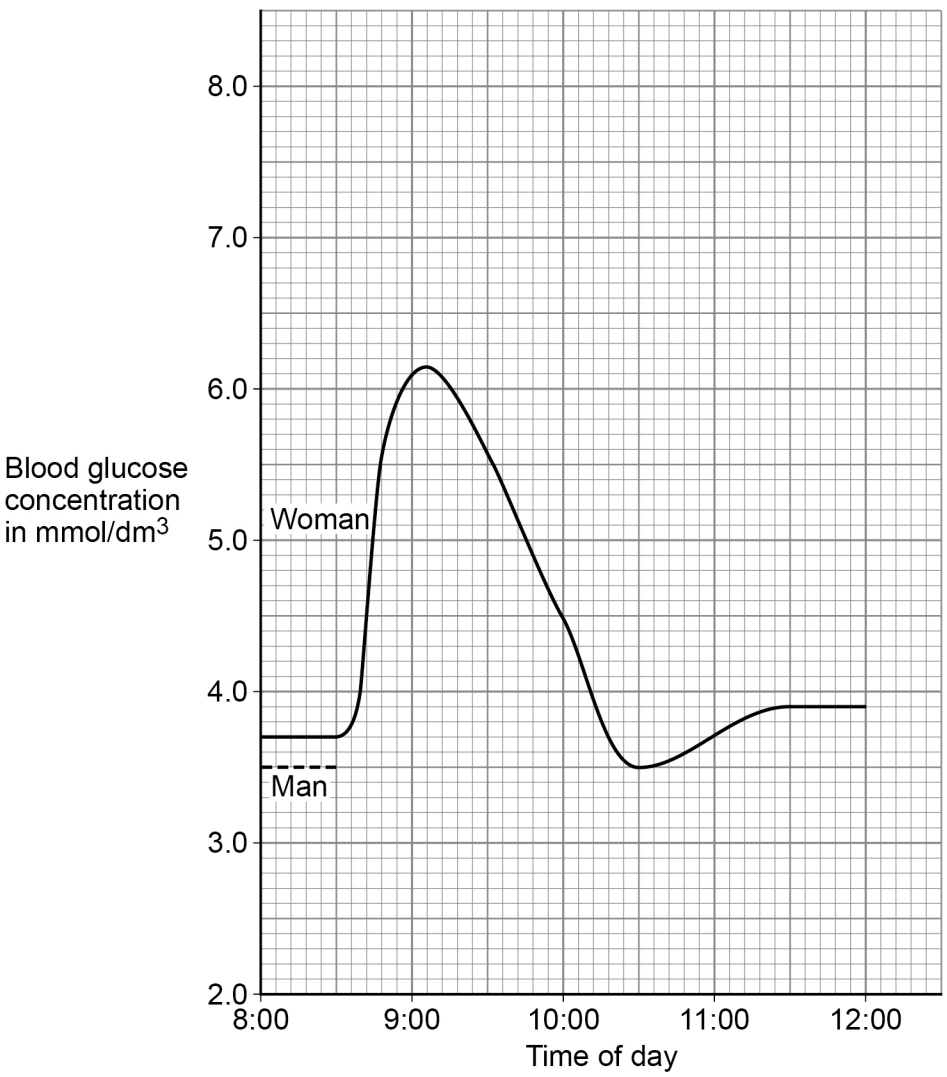
- Glucose is broken down. ☐
- Glucose is converted to glycogen. ☐
- Glucose is excreted by the kidneys. ☐
- Glucose moves from the blood into the cells. ☐
- Glucose moves into the small intestine. ☐

4.5.3.2 Control of blood glucose concentration

Question 03 · continued

Figure 6 shows the blood glucose concentration in a woman.

Figure 6



0 4 . 6 Suggest what time of day the woman ate her breakfast of sugar-coated cereal.

[1 mark]

Time of day = _____

4.5.3.2 Control of blood glucose concentration

Question 03 · continued

The man in **Figure 6** has Type 2 diabetes but he has **not** been treated.

0 4 . 7 The man ate:

- the same type and amount of breakfast cereal as the woman
- at the same time as the woman.

Suggest what his blood glucose concentration would be at 9:00

[1 mark]

Blood glucose concentration = _____ $mmol/dm^3$

0 4 . 8 The man:

- is an obese office worker
- does not exercise
- eats sugary snacks at his desk.

Give **two** lifestyle changes a doctor might recommend to the man to help him control his diabetes.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 9 Describe how a **low** blood glucose concentration would lead to a person feeling weak.

[2 marks]

_____

_____

_____

_____

12

4.5.3.2 Control of blood glucose concentration

Question 04

0 5 Homeostasis is the control of internal body conditions.

Control of body temperature is an example of homeostasis.

0 5 . 1 Draw **one** line from each part involved in temperature control to the function of that part.

[3 marks]

Part involved in temperature control	Function
	Changes air temperature outside the body
Brain	
	Contracts to increase body temperature
Muscle	
	Coordinates information about body temperature
Receptor	
	Detects changes in skin temperature

4.5.3.2 Control of blood glucose concentration

Question 04 · continued

0 5 . 2 Why is homeostasis important?

[2 marks]

Tick (✓) **two** boxes.

- To allow cells to function properly ☐
- To change body temperature to match air temperature ☐
- To decrease water levels in the body throughout the day ☐
- To maintain the optimum conditions for enzymes ☐
- To prevent reactions inside cells ☐

Question 5 continues on the next page

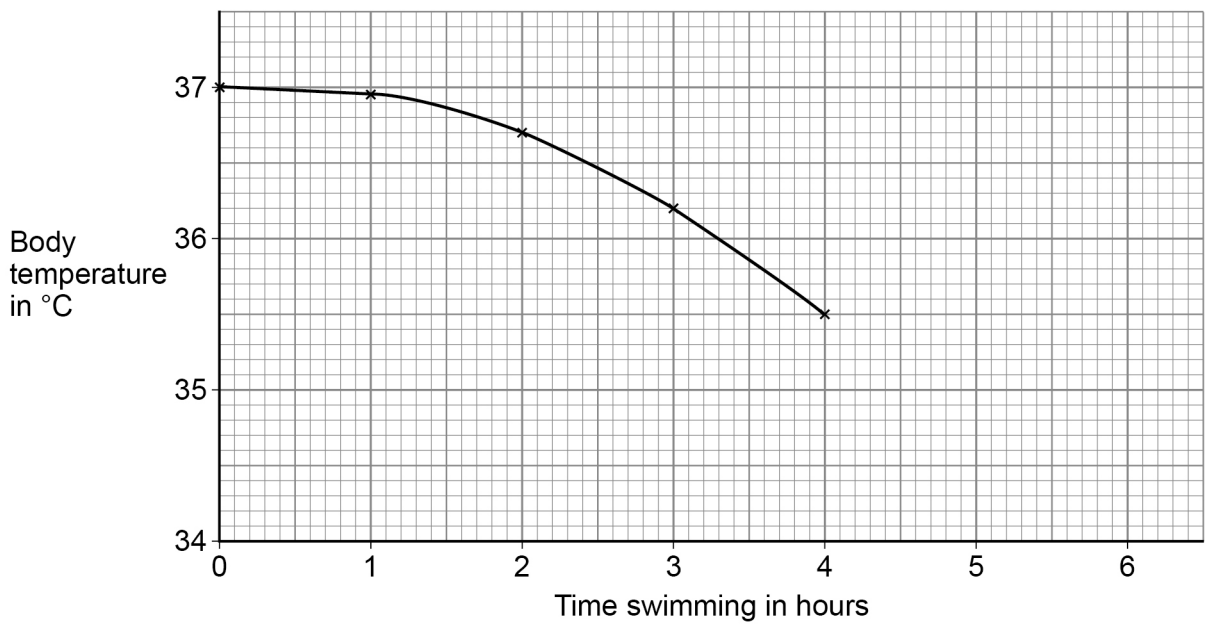
4.5.3.2 Control of blood glucose concentration

Question 04 · continued

The body temperature of a long-distance swimmer can change with the length of time swimming in cold water.

Figure 6 shows how the body temperature of one swimmer changed in the first 4 hours of a 6-hour swim.

Figure 6



0 5 . 3 Describe the trend shown in **Figure 6**.

[1 mark]

4.5.3.2 Control of blood glucose concentration

Question 04 · continued

0 5 . 4 Determine the change in body temperature in the first 4 hours of the swim.

[2 marks]

Change in body temperature = _____ °C

0 5 . 5 Hypothermia is a dangerously low body temperature of 35 °C or colder.

Predict when the swimmer was **first** at risk of hypothermia.

You should extend the line on **Figure 6**.

[2 marks]

Prediction = _____ hours

Question 5 continues on the next page

4.5.3.2 Control of blood glucose concentration

Question 04 · continued

Swimming in cold water decreases the insulin concentration in the blood.

0 5 . 6 Complete the sentence.

Choose the answer from the box.

[1 mark]

heart	pancreas	stomach

Insulin is produced by the _____ .

0 5 . 7 Insulin is a hormone.

Which organ system produces hormones?

[1 mark]

_____

0 5 . 8 Complete the sentence.

Choose the answer from the box.

[1 mark]

decrease	stay the same	increase

When insulin concentration in the blood increases, blood glucose concentration will _____ .

0 5 . 9 Give **one** risk factor for Type 2 diabetes.

[1 mark]

_____

14

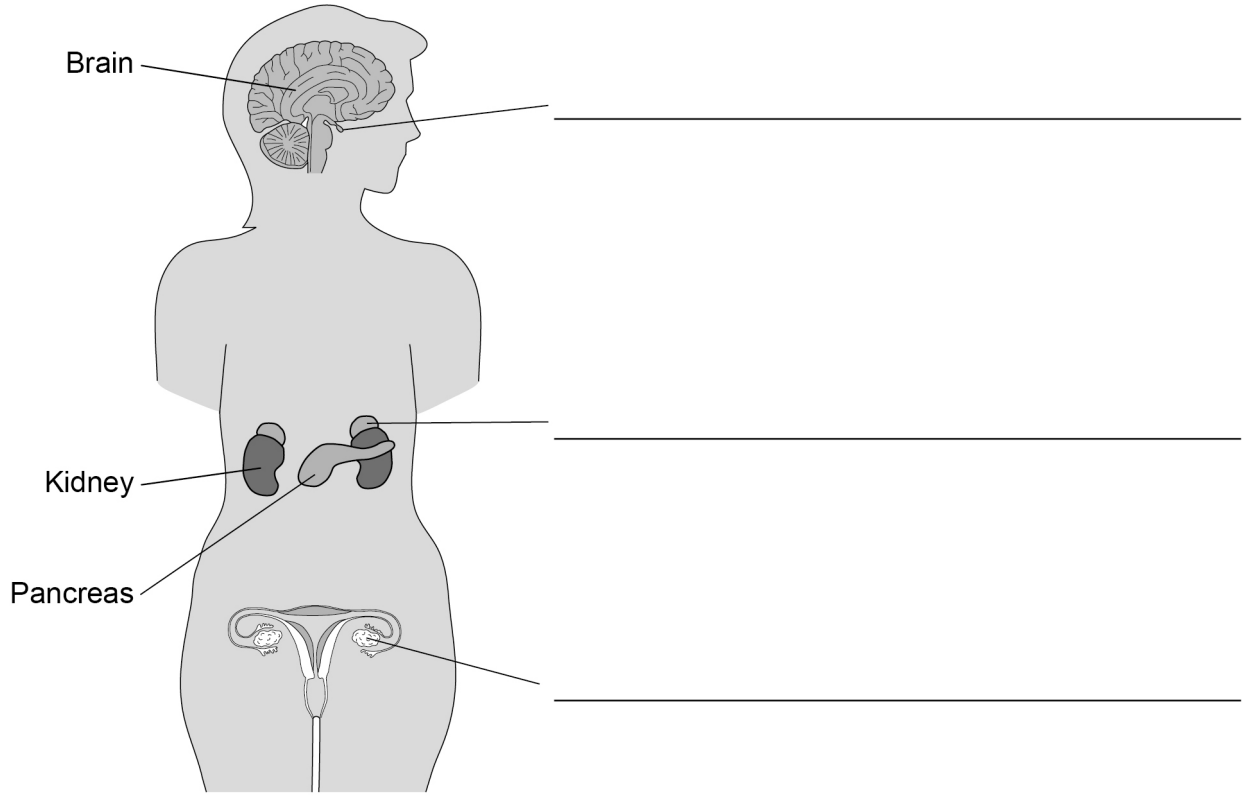
4.5.3.2 Control of blood glucose concentration

Question 05

June 2024 | 8464/B/2F | Original Q2

0 2 **Figure 2** shows organs and glands in a human body.

Figure 2



0 2 . 1 Label the glands on **Figure 2**.

Choose answers from the box.

[3 marks]

adrenal gland	**ovary**	**pituitary gland**
testis	**thyroid gland**	

Question 2 continues on the next page

4.5.3.2 Control of blood glucose concentration

Question 05 · continued

0 2 . 2 Cells in the pancreas detect blood glucose concentration.

What type of cells **detect** blood glucose concentration?

[1 mark]

Tick (✓) **one** box.

- Coordinator cells ☐
- Muscle cells ☐
- Receptor cells ☐

0 2 . 3 The pancreas produces insulin.

How is insulin transported from the pancreas to the rest of the body?

[1 mark]

4.5.3.2 Control of blood glucose concentration

Question 05 · continued

0 2 . 4 Which organ is a target organ of insulin?

[1 mark]

Tick (✓) **one** box.

Liver ☐

Small intestine ☐

Stomach ☐

0 2 . 5 Which chemical is a store of glucose in human cells?

[1 mark]

Tick (✓) **one** box.

Cellulose ☐

Glycogen ☐

Protein ☐

Question 2 continues on the next page

4.5.3.2 Control of blood glucose concentration

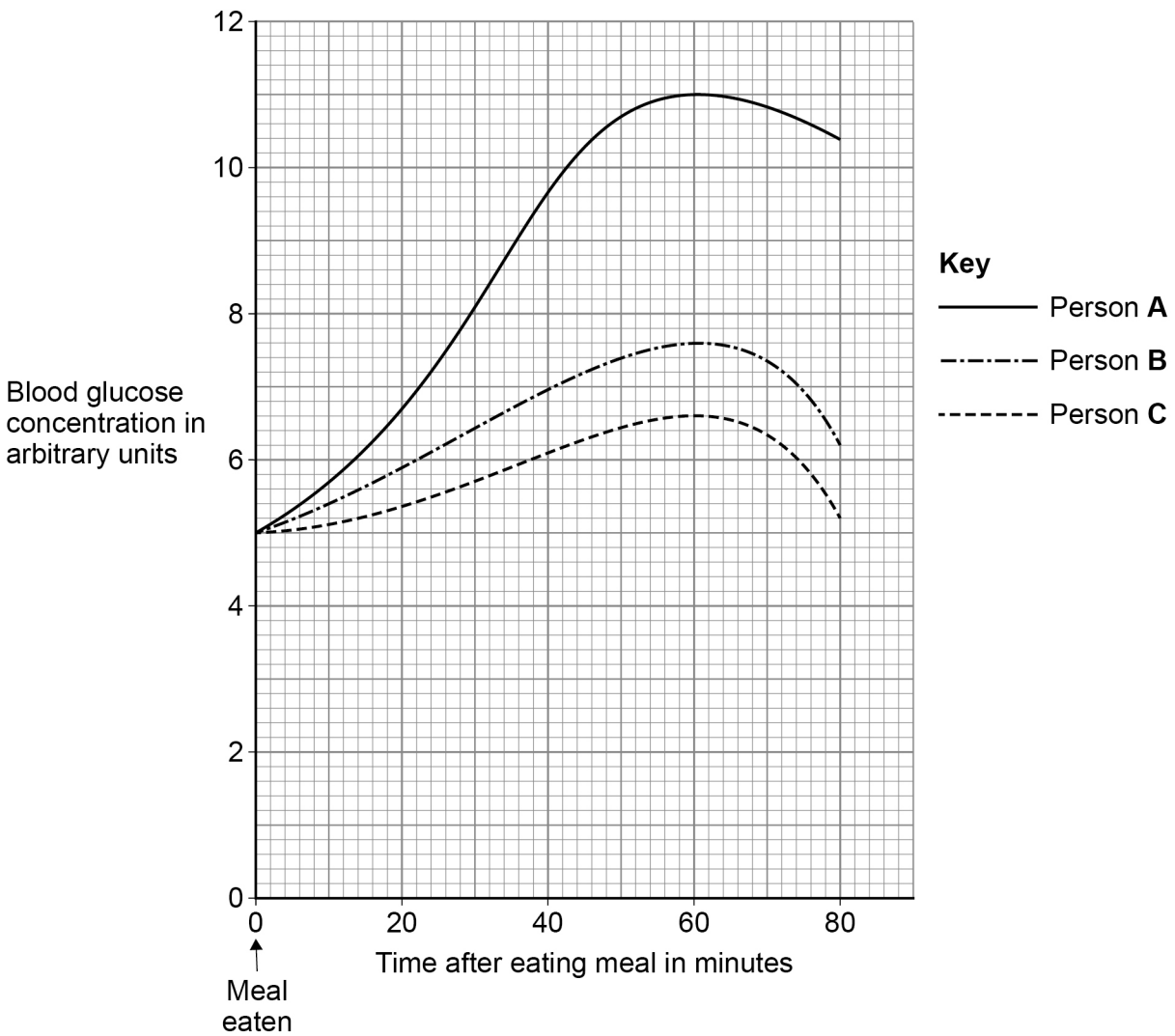
Question 05 · continued

Three people each ate similar meals.

The blood glucose concentration of each person was recorded for 80 minutes after the meal.

Figure 3 shows the results.

Figure 3



0 2 . 6 What was the **change** in blood glucose concentration in person **A** from 0 minutes to 60 minutes?

[1 mark]

Change = _____ arbitrary units

4.5.3.2 Control of blood glucose concentration

Question 05 · continued

0 2 . 7 Describe the **trend** in the relationship between blood glucose concentration and time after the meal.

[2 marks]

0 2 . 8 A student concluded:

'Person **A** has diabetes'.

Explain how **Figure 3** supports the student's conclusion.

You should refer to insulin in your answer.

[2 marks]

0 2 . 9 Describe **two** ways a person with Type 2 diabetes could change their lifestyle to control their diabetes.

[2 marks]

1

2

14

4.5.3.2 Control of blood glucose concentration

Question 06

June 2025 | 8464/B/2F | Original Q1

0 1 The concentration of glucose in the blood can be controlled.

0 1 . 1 A person drinks a glucose solution.

What happens to the person's blood glucose concentration soon after drinking the glucose solution?

[1 mark]

Tick (✓) **one** box.

- Blood glucose concentration decreases. ☐
- Blood glucose concentration stays the same. ☐
- Blood glucose concentration increases. ☐

0 1 . 2 Insulin controls blood glucose concentration.

Which organ produces insulin?

[1 mark]

Tick (✓) **one** box.

- Pancreas ☐
- Pituitary ☐
- Stomach ☐

4.5.3.2 Control of blood glucose concentration

Question 06 · continued

0 1 . 3 Organs affected by insulin are called target organs.

Which **two** organs are target organs for insulin?

[2 marks]

Tick (✓) **two** boxes.

- Liver ☐
- Lung ☐
- Muscle ☐
- Ovary ☐
- Spinal cord ☐

0 1 . 4 Complete the sentences.

Choose answers from the box.

[2 marks]

DNA	**glucose**	**glycogen**	**urea**

Insulin causes cells to take in _____.

The storage molecule made inside the cells is _____.

Question 1 continues on the next page

4.5.3.2 Control of blood glucose concentration

Question 06 · continued

0 1 . 5 Complete the sentence.

Choose the answer from the box.

[1 mark]

increase	**stay the same**	**decrease**

Insulin causes blood glucose concentration to _____.

0 1 . 6 Type 2 diabetes is caused when the body cells no longer respond to insulin.

Give **two** ways to reduce the risk of developing Type 2 diabetes.

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

[2 marks]

1 _____

_____

2 _____

_____

9