

Control of blood glucose (insulin, glucagon, diabetes)

Q1. (2020)

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

A)

0 4 . 3

Calculate the increase in the blood glucose concentration.

[1 mark]

Increase = _____ mmol/dm^3

B)

0 4 . 4

The person needed medication to decrease their blood glucose concentration.

Suggest what disorder the person has.

[1 mark]

C)

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.

☐

D)

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 _____

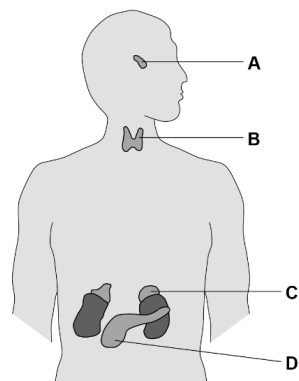
2 _____

Q2. (2021)

0 6 . 2

Figure 5 shows glands in the human body.

Figure 5



0 6 . 2

Which gland produces insulin?

[1 mark]

Tick (✓) **one** box.

A ☐ B ☐ C ☐ D ☐

Q3. (2022)

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

A)

0 4 . 4

Name hormone **X**.

[1 mark]

B)

0 4 . 5

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

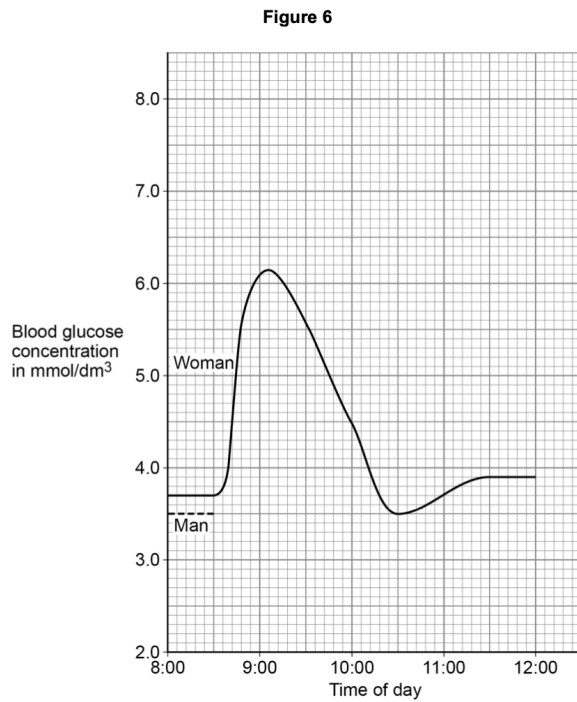
[2 marks]

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.	☐

C)

Figure 6 shows the blood glucose concentration in a woman.



0 4 . 6 Suggest what time of day the woman ate her breakfast of sugar-coated cereal. [1 mark]

Time of day = _____

D)

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/dm³

E)

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 _____

F)

0 4 . 9 Describe how a **low** blood glucose concentration would lead to a person feeling weak. [2 marks]

Q4. (2023)

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 _____.

Q5. (2023)

0 5 . 7 Insulin is a hormone.

Which organ system produces hormones?

[1 mark]

Q6. (2023)

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 _____.

Q7. (2023)

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

[1 mark]

Q8. (2024)

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 ☐

Q9. (2024)

0 2 . 3 The pancreas produces insulin.

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

[1 mark]

Q10. (2024)

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

[1 mark]

Tick (✓) **one** box.

Liver

☐

Small intestine

☐

Stomach

☐

Q11. (2024)

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

[1 mark]

Tick (✓) **one** box.

Cellulose

☐

Glycogen

☐

Protein

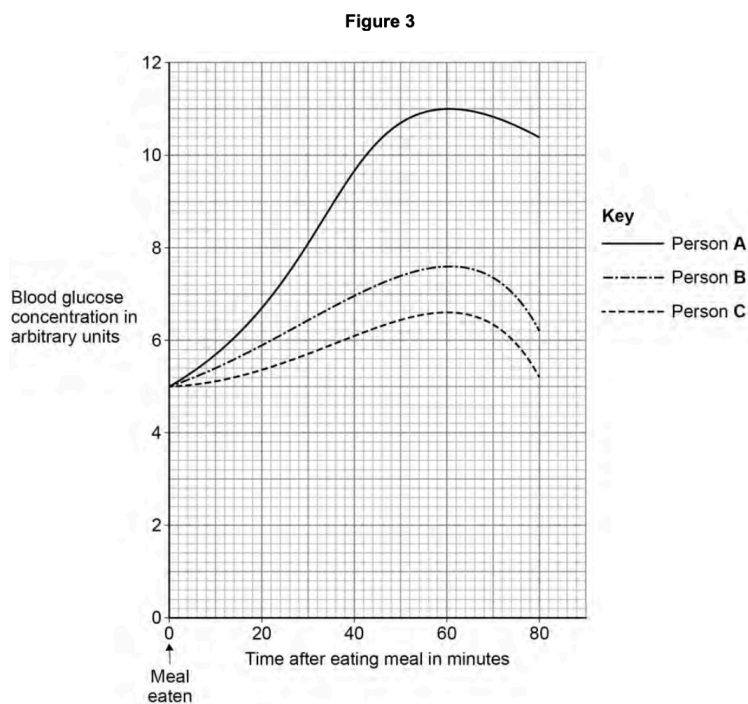
☐

Q12. (2024)

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.



A)

- 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

B)

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

[2 marks]

C)

- 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]

Q13. (2024)

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

[2 marks]

1 _____

 2 _____
