

Control of blood glucose (insulin, glucagon, diabetes)

Q1. (2019)

0 6 . 1 Define the term homeostasis.

[2 marks]

Q2. (2019)

0 6 . 2 Name the hormone released if the blood glucose concentration falls too low.

[1 mark]

Q3. (2019)

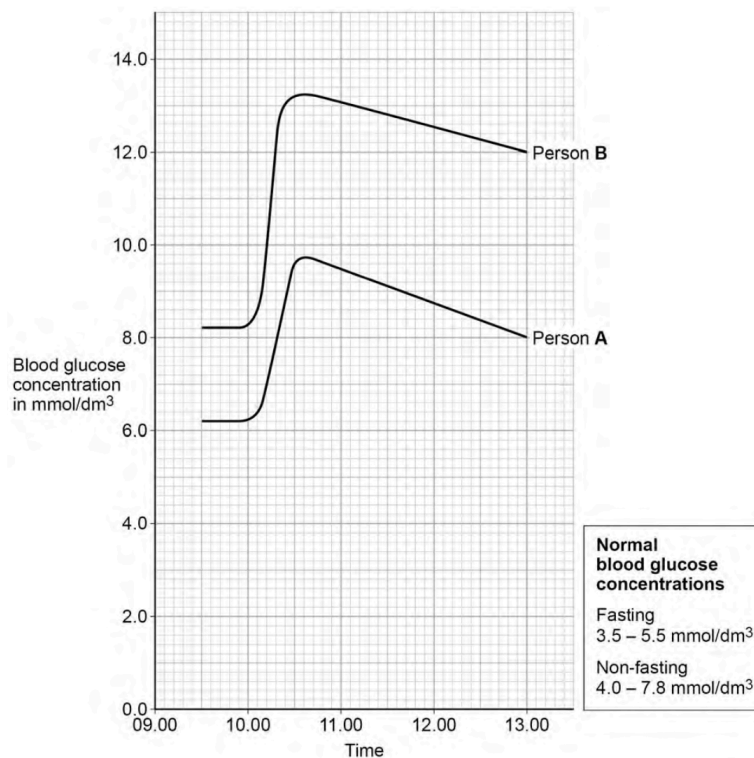
Two people were sent to a hospital to find out if they have diabetes.

This is the method used at the hospital.

- Do not eat or drink after midnight. This is called fasting.
- Measure blood glucose concentration at 9.30 am
- Drink a glucose solution at 10.00 am
- Measure blood glucose concentration for the next 3 hours.

Figure 4 shows the results.

Figure 4



A)

Person A and person B have diabetes.

0 6 . 3 Describe how Figure 4 shows that person B has diabetes.

Use data from Figure 4.

[3 marks]

B)

0 6 . 4

Person **A** and person **B** had a test to measure the concentration of insulin in their blood when they were fasting.

Table 4 shows the results.

Table 4

Person	Fasting blood insulin concentration in arbitrary units
A	280
B	20
Normal range	50–175

Suggest which type of diabetes person **A** and person **B** have.

Give a reason for each answer.

[2 marks]

Person **A**

Type of diabetes _____

Reason _____

Person **B**

Type of diabetes _____

Reason _____

C)

0 6 . 5

Toxic hypoglycaemia syndrome (THS) has caused the deaths of hundreds of starving children in some tropical countries.

- The starving children have had nothing to eat all day.
- The starving children then eat many lychee fruits.
- The lychee fruits contain a molecule which stops an enzyme in the liver working.
- This enzyme normally converts stored fats into glucose.

Children who have eaten during the day are **not** affected by eating many lychee fruits.

Starving children may die from eating many lychee fruits but children who have eaten during the day are not affected.

Explain why.

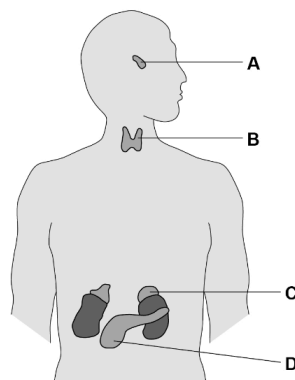
[6 marks]

Q4. (2021)

0 1

Figure 1 shows glands in the human body.

Figure 1



0 1 . 2 Which gland produces insulin?

[1 mark]

Tick (✓) **one** box.

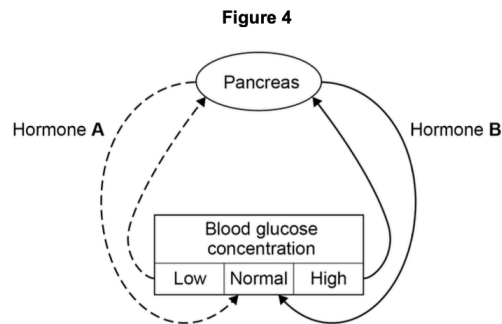
A ☐ B ☐ C ☐ D ☐

Q5. (2022)

0 5

Blood glucose concentration in the human body needs to be kept within the normal range.

Figure 4 shows that two hormones control blood glucose concentration.



A)

0 5 . 2

Name hormones **A** and **B** in **Figure 4**.

[1 mark]

A _____
B _____

B)

0 5 . 3

Explain how the two hormones in **Figure 4** keep the blood glucose concentration within the normal range for 3 hours after a meal.

[6 marks]

Q6. (2024)

0 6 . 3

Cells in the pancreas detect changes in blood glucose concentration.

What type of cell in the body detects changes?

[1 mark]

Q7. (2024)

Scientists investigated whether blood glucose concentration affects reaction time.

The reaction times of ten people with Type 1 diabetes were measured.

This is the method used.

1. Tell one person to drink a glucose solution.
2. Monitor the person's blood glucose concentration.
3. Record the person's reaction time when the person's blood glucose concentration is:
 - 16 mmol/dm³
 - 6 mmol/dm³
 - 3 mmol/dm³
4. Repeat steps 1 to 3 for the nine other people.

A)

0 6 . 4 People with Type 1 diabetes were selected for the investigation instead of people who did **not** have diabetes.

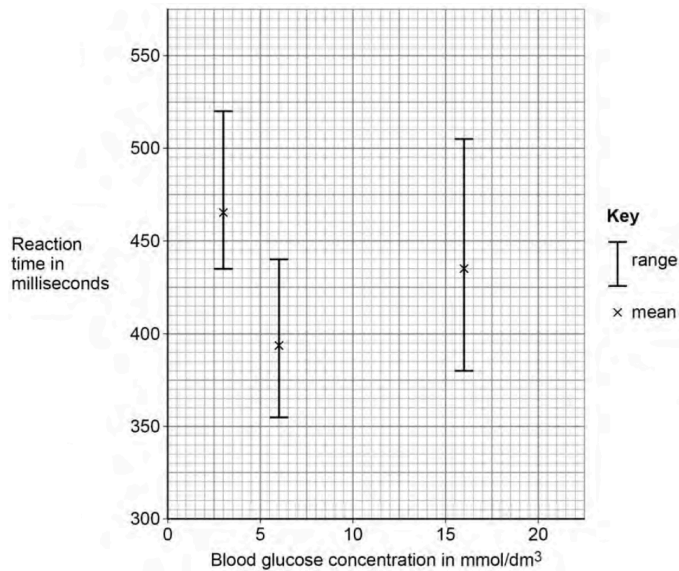
Explain why.

[2 marks]

B)

Figure 6 shows the results.

Figure 6



0 6 . 8 Describe how blood glucose concentration is maintained within narrow limits in people who do **not** have diabetes.

[5 marks]

C)

0 6 . 9 The scientists gave the hypothesis:

'Optimum blood glucose concentration increases the production of chemicals that diffuse across synapses.'

Describe how an increase in the chemicals could decrease reaction time.

[2 marks]