

Homeostasis – GCSE Combined Science Biology1. **No.4**

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

0	4	.	1
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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

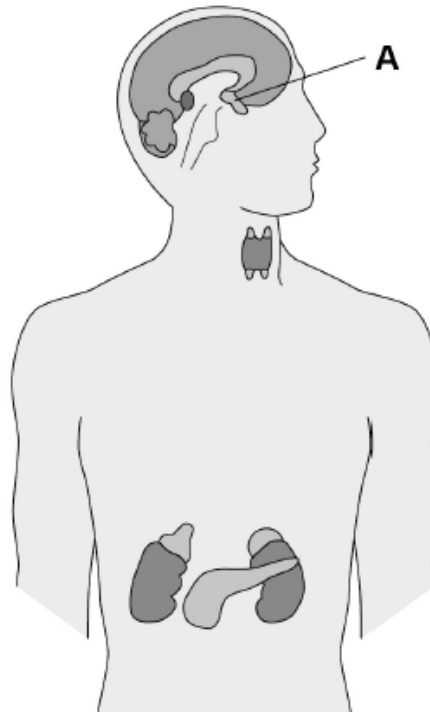
☐

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

☐

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.

☐

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 _____

2. No.2

0 2

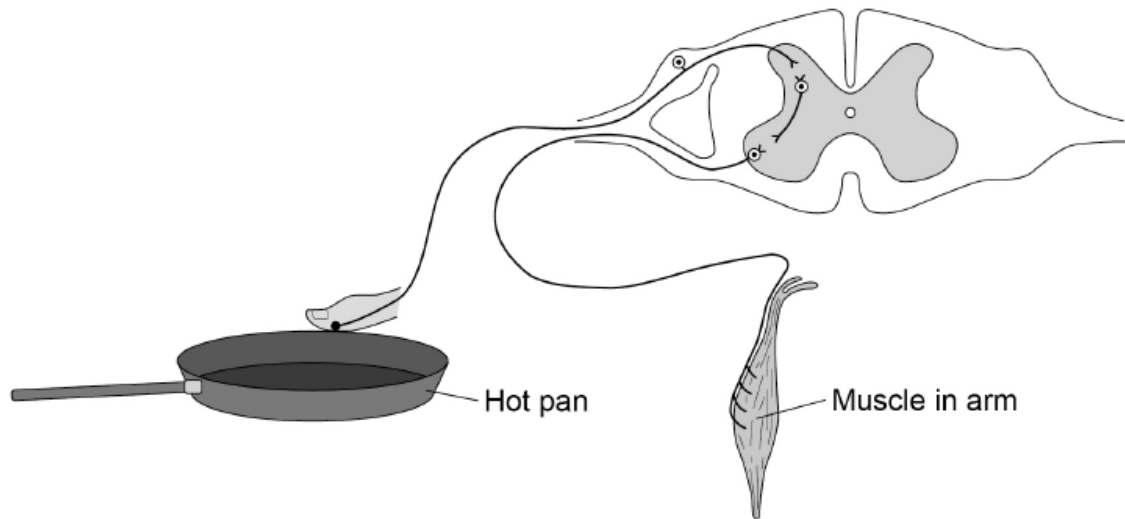
Human reactions are a response to an external change.

0 2 . 1

Reflex actions help to protect the body against damage.

Figure 2 shows the nervous pathway for a reflex action.

Figure 2



A stimulus from the hot pan will cause the muscle in the arm to contract and move the finger away.

Describe how the stimulus from the hot pan reaches the muscle in the arm.

[4 marks]

0 2 . 2

A student investigated whether using the right hand or the left hand had an effect on reaction time.

The student only tested right-handed people.

Describe a method for the student's investigation.

Include details of the test you would use for reaction time.

[4 marks]

A different student carried out an investigation to see if playing tennis improved reaction time.

The student used two groups of six people.

Table 1 shows the results.

Table 1

Person	Reaction time in seconds	
	People who play tennis	People who do not play tennis
1	0.2	0.3
2	0.4	0.4
3	0.3	0.6
4	0.4	0.5
5	0.2	0.3
6	0.3	0.2
Mean	X	0.4

0 2 . 3 Calculate mean value X in Table 1.

[2 marks]

X = _____ seconds

0 2 . 4 What is the dependent variable in the student's investigation?

[1 mark]

The student concluded:

'Playing tennis improves reaction time.'

0 2 . 5

Give **one** piece of evidence which supports the conclusion.

[1 mark]

0 2 . 6

Give **one** piece of evidence which does **not** support the conclusion.

[1 mark]

3. No.1

0 1

Conditions inside the human body are controlled.

0 1 . 1

What is the control of conditions inside the body called?

[1 mark]

Tick (✓) **one** box.

Excretion

☐

Fertilisation

☐

Homeostasis

☐

Osmosis

☐

0 1 . 2

What are the **two** ways information is sent to control body conditions?

[2 marks]

Tick (✓) **two** boxes.

By antigens

☐

By hormones

☐

By muscles

☐

By nerve impulses

☐

By red blood cells

☐

0 1 . 3

One condition in the body that needs to be controlled is the level of water.

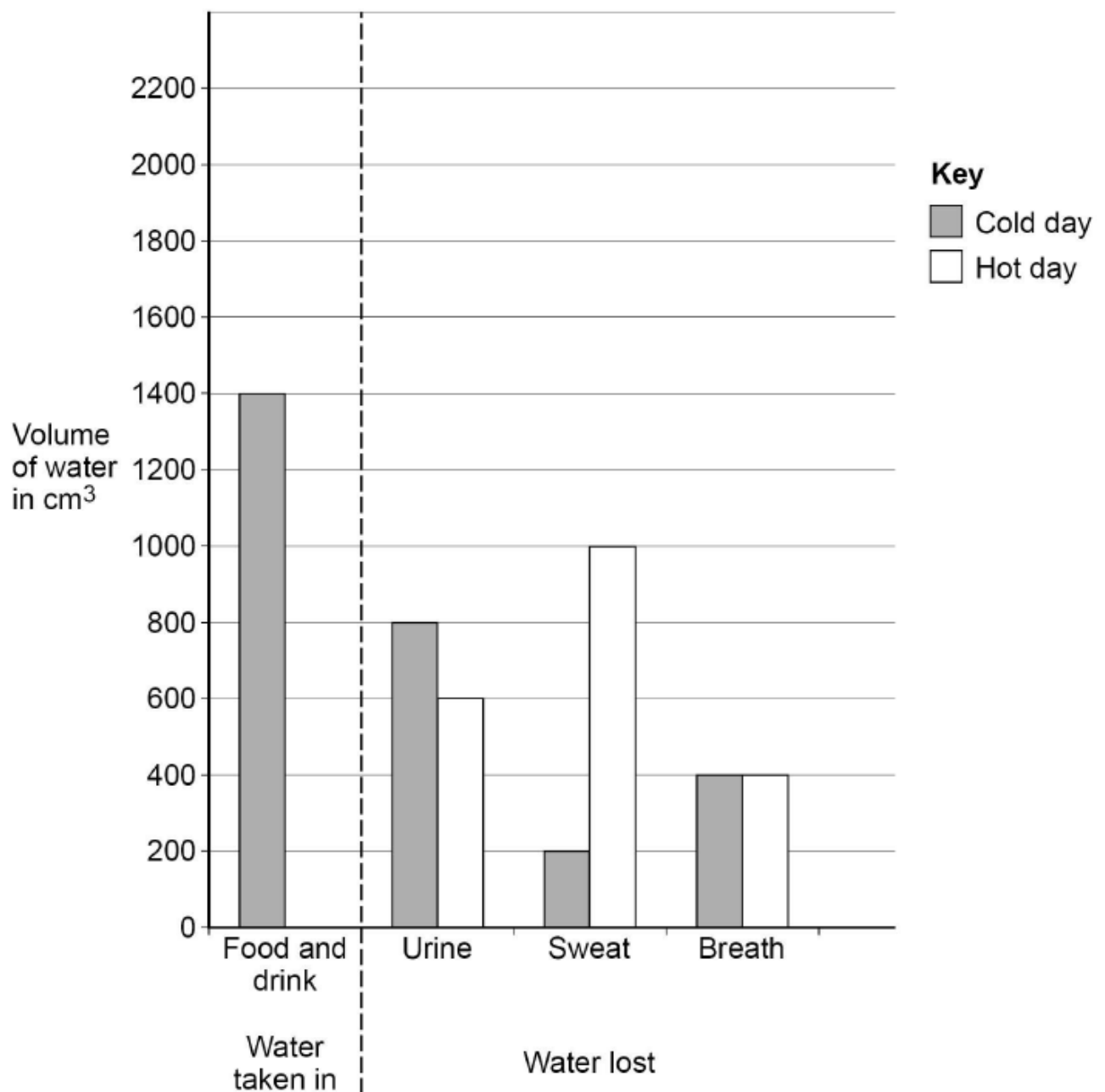
Give **one** other condition in the human body that needs to be controlled.

[1 mark]

Figure 1 shows the volumes of water taken in and lost by one person.

The volume for water taken in on a hot day has not been plotted on the bar graph.

Figure 1



0 1 . 4 The person lost 1400 cm^3 of water on the cold day.

How much extra water did they lose on the hot day?

[2 marks]

Extra volume of water lost = _____ cm^3

0 1 . 5 Explain why the volume of water lost on a hot day is higher than on a cold day.

[2 marks]

0 1 . 6 A boy drank 750 cm^3 of water.

His total intake of water for that day was 3000 cm^3

Calculate the percentage of the boy's total intake that the 750 cm^3 represents.

[2 marks]

Percentage = _____ %

4. No.6

0 6

This question is about homeostasis.

0 6

. 1

Define the term homeostasis.

[2 marks]

0 6

. 2

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

[1 mark]

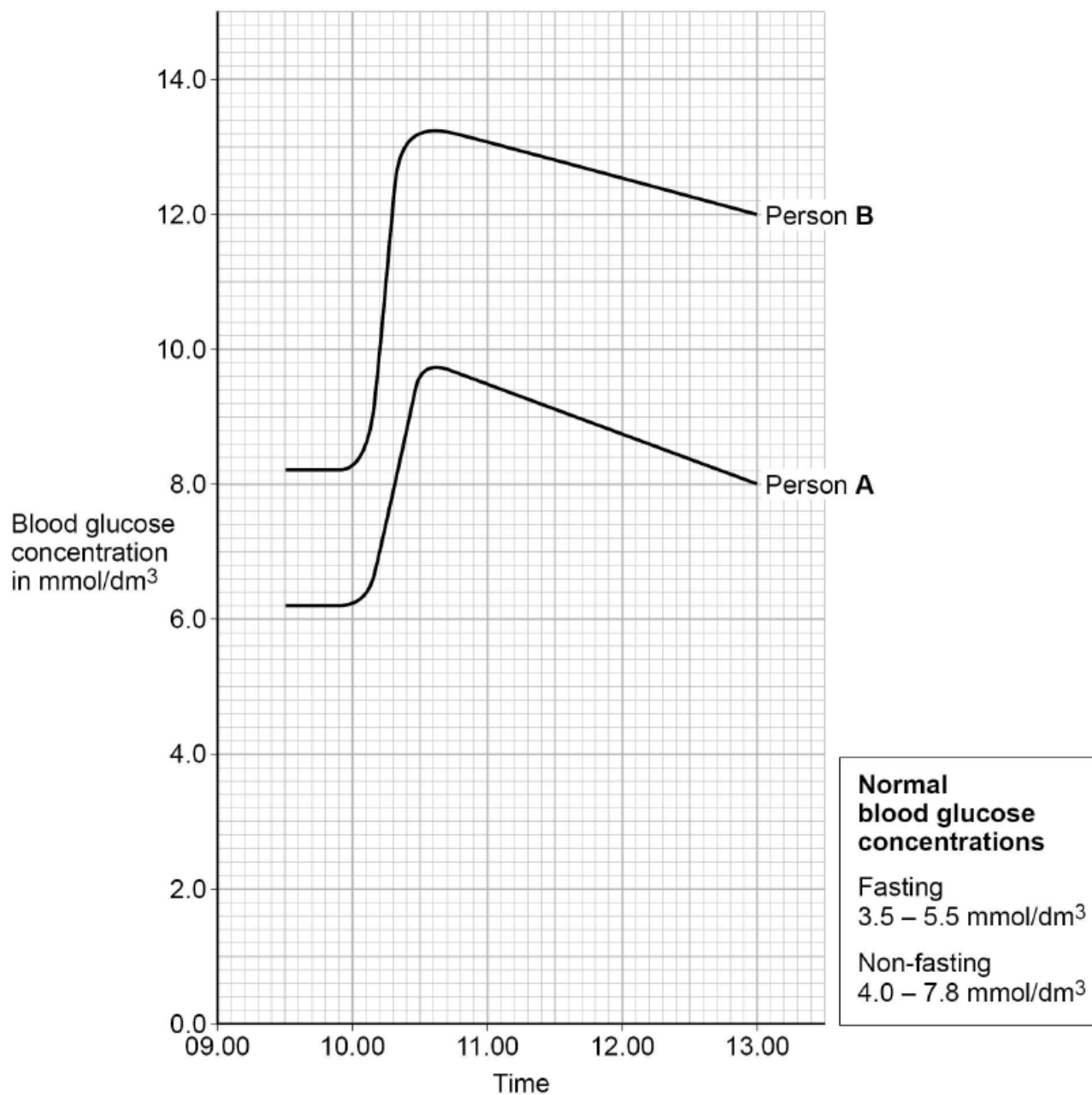
Two people were sent to a hospital to find out if they have diabetes.

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



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]

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 _____

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]
