



**There are no questions printed on this page**

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0 1

Studying fossils helps scientists understand how living things have evolved.

**Figure 1** shows a fossilised snake.

**Figure 1**



0 1 . 1

Describe how the fossil in **Figure 1** may have formed.

[3 marks]

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\_\_\_\_\_

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\_\_\_\_\_

0 1 . 2

Many species of snake have become extinct.

Give **one** reason why a species might become extinct.

[1 mark]

\_\_\_\_\_



\_\_\_\_\_

**Question 1 continues on the next page**

There are many types of rat snake in the world.

**Table 1** shows two types of rat snake

**Table 1**

		
<b>Type of snake</b>	Japanese rat snake	Texas rat snake
<b>Colour of snake</b>	Green	Pale brown
<b>Type of environment</b>	Grass	Dry and dusty

**0 1 . 3** The different types of rat snake have evolved to suit their environments.

Explain how the Japanese rat snake might have evolved.

**[4 marks]**

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**0 1 . 4** Charles Darwin proposed the theory of natural selection.

Many people at the time did not accept his theory.

Give **two** reasons why his theory was **not** accepted until much later.

**[2 marks]**

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

**0 1 . 5** A different theory said that changes in an organism during its life could be inherited.

Who proposed this theory?

**[1 mark]**

\_\_\_\_\_

**Turn over for the next question**

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**0 2**

A gardener wants to add compost to the soil to increase his yield of strawberries.

**0 2** . **1**

The compost will add nitrates to the soil.

Describe how plants use nitrates.

**[2 marks]**

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**0 2 . 2** The gardener is going to make his own compost.

The gardener finds this research on the internet:

**'A carbon to nitrogen ratio of 30:1 will produce fertile compost.'**

Look at **Table 2**.

**Table 2**

Type of material to compost	Carbon:nitrogen ratio	Cost per bag in £
Chicken manure	7:1	10.00
Horse manure	20:1	0.50
Peat moss	58:1	2.00

Which type of material in **Table 2** would be **best** for the gardener to use to make his compost?

Give **two** reasons for your answer.

**[2 marks]**

Type of material \_\_\_\_\_

Reason 1 \_\_\_\_\_

\_\_\_\_\_

Reason 2 \_\_\_\_\_

\_\_\_\_\_

**Question 2 continues on the next page**





**0 2 . 4** Figure 2 shows two strawberries.

Both strawberries were picked from the same strawberry plant.

Both strawberries were picked 3 days ago.

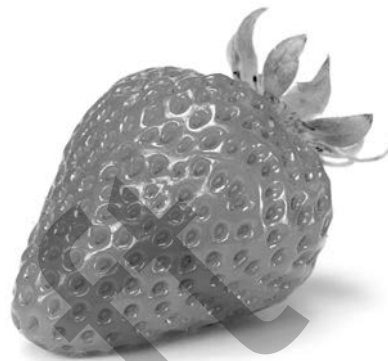
The strawberries were stored in different conditions.

**Figure 2**

**Strawberry A**



**Strawberry B**



Give **three** possible reasons that may have caused strawberry **A** to decay.

**[3 marks]**

1

2

3

**Turn over for the next question**

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**0 3**

Many people have breathing problems because they are allergic to cats.

The allergy is caused by a chemical called Fel D1.

Different cats produce different amounts of Fel D1.

A cat has been bred so that it does not produce Fel D1.

This means the cat does **not** cause an allergic reaction.

**0 3****. 1**

Describe how the cat has been produced using selective breeding.

**[4 marks]**

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**0 3****. 2**

Selective breeding could cause problems of inbreeding in the cats.

Give **one** problem inbreeding causes.

**[1 mark]**

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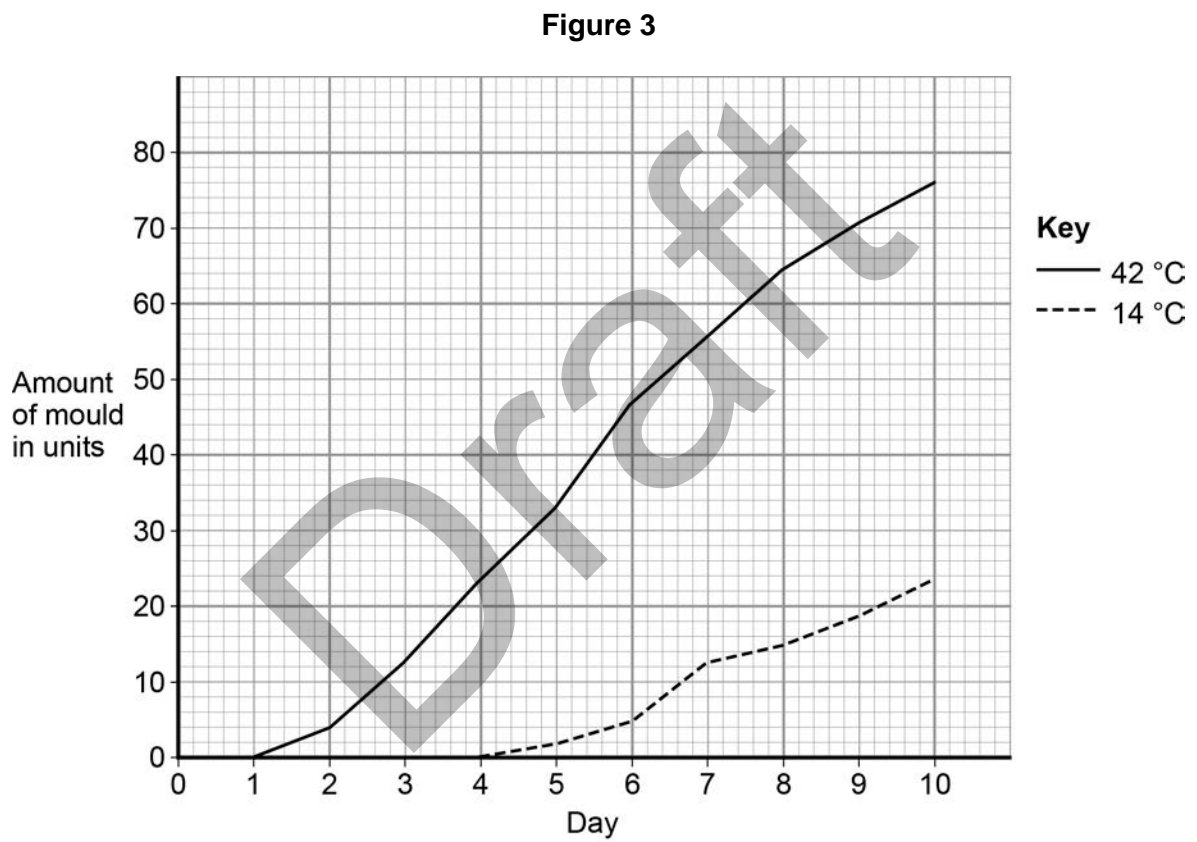


**0 4 . 3** Give **one** variable the student should control in the investigation.

[1 mark]

Another student did a similar investigation.

**Figure 3** shows the results.



**0 4 . 4** Determine the rate of mould growth at 42 °C between day 2 and day 7.

[2 marks]

Rate of mould growth = \_\_\_\_\_ units per day

**0 4 . 5** The growth of mould shows decomposition.

Give a conclusion about decomposition from the results in **Figure 3**.

**[1 mark]**

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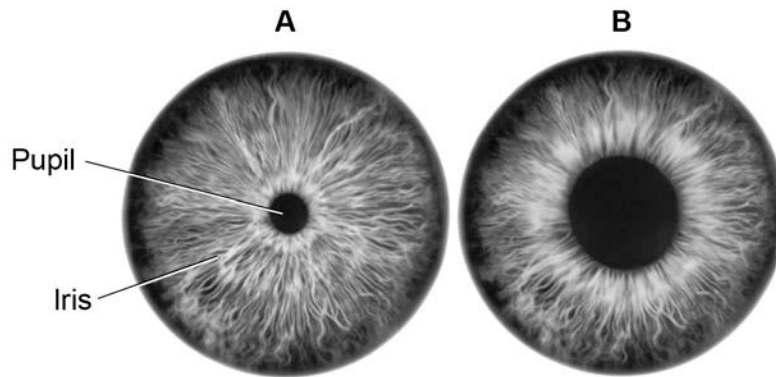
**Turn over for the next question**

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**0 5**

**Figure 4** shows a reflex in the iris of the human eye in response to changes in light levels.

**Figure 4**

**0 5****1**

Describe the changes in the pupil and iris going from **A** to **B** in **Figure 4**.

Explain how these changes occur.

Refer to the changes in light level in your answer.

**[4 marks]**

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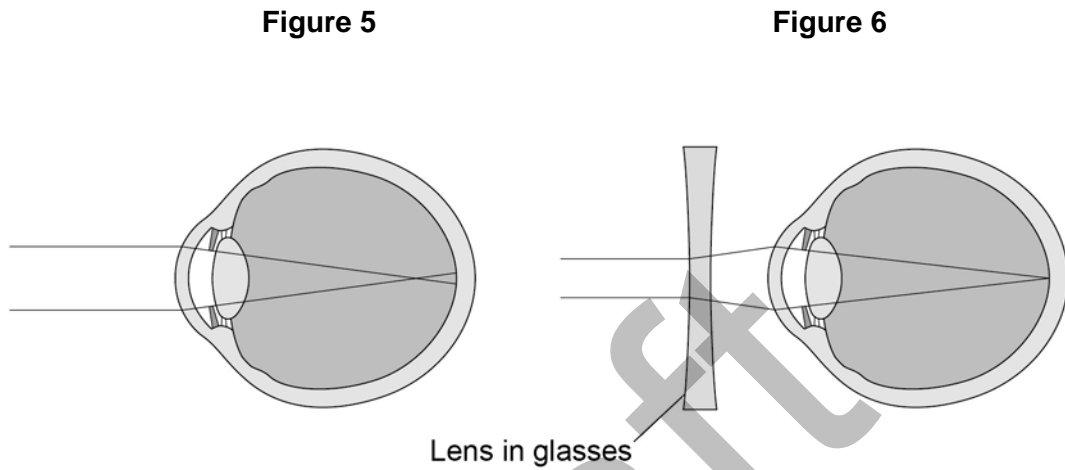
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**0 5** . **2** People with myopia cannot see distant objects clearly.

They can wear glasses to improve focus.

**Figure 5** shows light entering the eye in a person with myopia.

**Figure 6** shows how myopia is corrected with glasses.



Explain how myopia is corrected with glasses.

Use information in **Figure 5** and **Figure 6**.

**[2 marks]**

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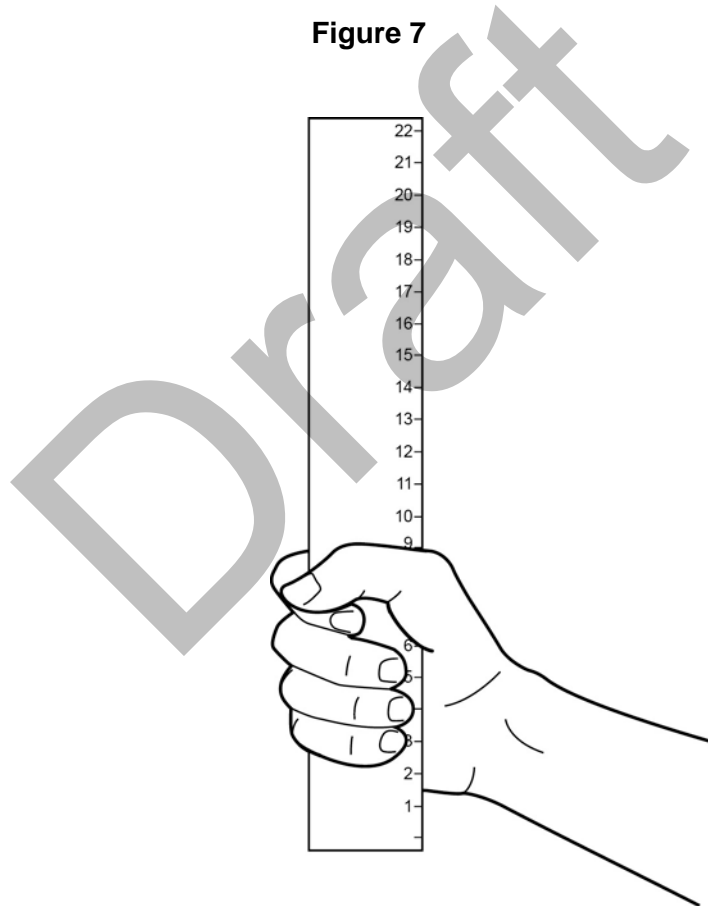
**0 6**

Two students investigated reflex action times.

This is the method used.

1. Student **A** sits with her elbow resting on the edge of a table.
2. Student **B** holds a ruler with the bottom of the ruler level with the thumb of Student **A**.
3. Student **B** drops the ruler.
4. Student **A** catches the ruler and records the distance, as shown in **Figure 7**.
5. Repeat steps 1 to 4.

**Figure 7**





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**0 6** . **1** Suggest **two** ways the students could make sure the test would give valid results. **[2 marks]**

1 \_\_\_\_\_

2 \_\_\_\_\_

**Question 6 continues on the next page**

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Table 3 shows the Student A's results.

Table 3

Test Number	Distance ruler dropped in mm
1	117
2	120
3	115
4	106
5	123
6	125
7	106

0 6 . 2 What is the **median** result?

Tick **one** box.

- 106
- 115
- 117
- 123

[1 mark]

**0 6** . **3** The mean distance the ruler is dropped is 116 mm.

Calculate the mean reaction time.

[3 marks]

Use the equation:

$$\text{reaction time (s)} = \sqrt{\frac{\text{mean drop distance (cm)}}{490}}$$

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Mean reaction time = \_\_\_\_\_ s

**0 6** . **4** The students then measured Student **A**'s reaction time using a computer programme.

This is the method used.

1. The computer shows a red box at the start.
2. As soon as the box turns green the student has to press a key on the keyboard as fast as possible.
3. The test is repeated five times and a mean reaction time is displayed.

Student **A**'s mean reaction time was 110 ms.

The reaction time measured using the computer programme is more reliable than the reaction time measured using a dropped ruler.

Give **two** reasons why.

[2 marks]

1 \_\_\_\_\_

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2 \_\_\_\_\_

**Question 6 continues on the next page**

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**0 6** . **5** A woman has a head injury.

Her symptoms include:

- she cannot name familiar objects
- she cannot remember recent events.

Suggest which part of her brain has been damaged.

**[1 mark]**

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**0 6** . **6** A man has a head injury.

He staggers and sways as he walks.

Suggest which part of his brain has been damaged.

**[1 mark]**

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**Turn over for the next question**

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**0 7**

Organisms reproduce asexually or sexually.

Asexual reproduction produces offspring that are genetically identical to the parent.

Binary fission is a type of asexual reproduction.

Bacteria reproduce using binary fission.

**0 7 . 1**

A bacterial cell divides using binary fission and produces:

- 64 cells
- after 150 minutes

Calculate the time between each division.

**[2 marks]**

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Time between each division = \_\_\_\_\_ minutes

**0 7 . 2**

Sexual reproduction produces variation between offspring.

Describe how sexual reproduction causes variation.

**[1 mark]**

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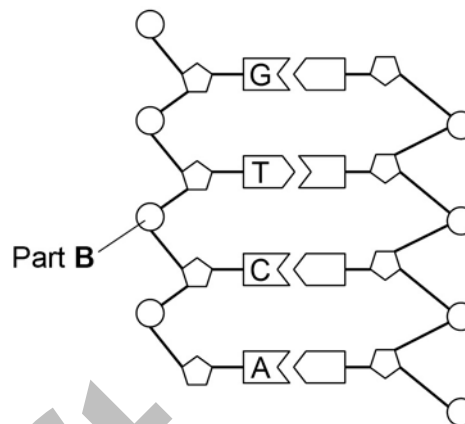
**Figure 8** shows the appearance and structure of a small piece of DNA.

**Figure 8**

**Image of a small section of DNA**



**Structure of a small section of DNA**



**0 7 . 3** What is Part **B**?

Tick **one** box.

- Nucleotide
- Phosphate
- Sugar

**[1 mark]**

**0 7 . 4** In **Figure 8** the structure of DNA shows four different bases A, C, G and T.

What is the complementary base for **A**?

**[1 mark]**

**Question 7 continues on the next page**





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**0 7 . 7** A recessive allele causes syndrome H.

A heterozygous woman and a homozygous recessive man want to have a child.

Draw a Punnett square diagram to find out the probability of the child having syndrome H.

Identify any children with syndrome H.

**[5 marks]**

Use the following symbols:

**A** = dominant allele

**a** = recessive allele

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Probability = \_\_\_\_\_

**Turn over for the next question**



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**0 8** . **2** Some people think the farming methods shown in **Figure 10** are unethical.

Suggest **two** other possible disadvantages of intensive farming techniques.

**[2 marks]**

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

**Question 8 continues on the next page**

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A newspaper reported that:

**'Food security is a serious problem in remote communities in Canada. This is because Aboriginal communities are eating fewer traditional foods.'**

One traditional food eaten by Aboriginal communities in Canada is seal.

Look at **Table 4**.

**Table 4**

<b>Year</b>	<b>Number of seals caught in thousands</b>
2004	362
2005	316
2006	348
2007	224
2008	215
2009	91
2010	67

**0 8** . **3**

Calculate the percentage (%) decrease in the number of seals caught from 2004 to 2010.

**[2 marks]**

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Decrease in seals = \_\_\_\_\_ %

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**0 8** . **4** The conclusion in the newspaper might **not** be correct.

Suggest **two** reasons why.

**[2 marks]**

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

**Turn over for the next question**

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0 9

Homeostasis controls the internal conditions of the body.

0 9 . 1

Explain how blood glucose levels are controlled in the body.

[4 marks]

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0 9 . 2

People with Type 1 diabetes or Type 2 diabetes cannot control their blood glucose concentration.

Give the reason why for each type.

[2 marks]

Type 1 diabetes

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Type 2 diabetes

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**0 9** . **3** Symptoms of diabetes include glucose in the urine and unexpected weight loss.

Suggest why loss of glucose in the urine might lead to weight loss.

**[3 marks]**

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**0 9** . **4** People with symptoms of diabetes can have a urine test to check for the presence of glucose in urine.

Diabetes can also be diagnosed with a blood test to measure the concentration of blood glucose.

Suggest why a blood test is more reliable than a urine test.

**[1 mark]**

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**0 9** . **5** A blood test called the glucose tolerance test checks how well the body processes glucose.

Concentrations of glucose in the blood are measured before and after drinking a glucose drink.

Patients are not allowed to eat food for 8 hours before the test.

Suggest why patients are **not** allowed to eat for 8 hours before the test.

**[1 mark]**

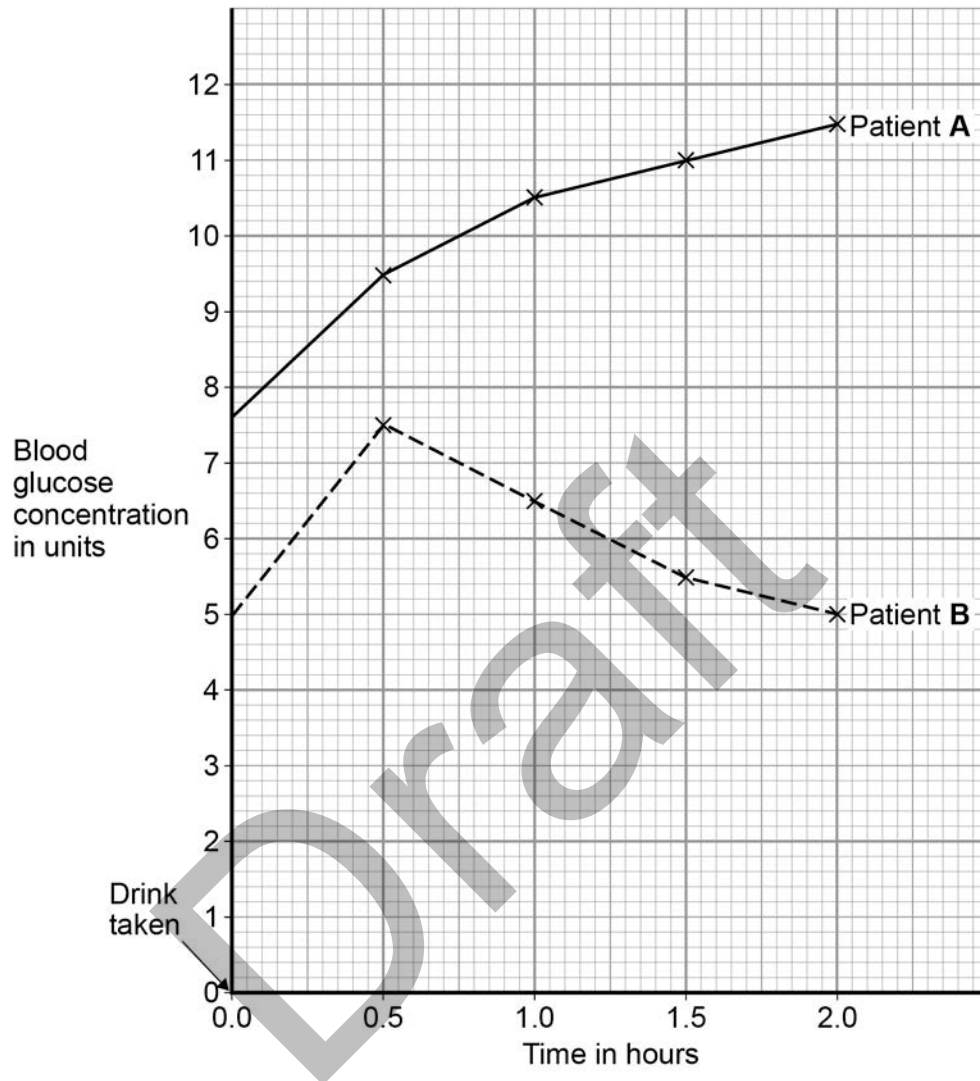
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**Question 9 continues on the next page**

**0 9 . 6** Figure 11 shows the results of a glucose tolerance test for two patients, A and B.

**Figure 11**



Which patient has diabetes?

Justify your answer.

**[2 marks]**

Patient \_\_\_\_\_

Justification \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**Turn over for the next question**

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1 0

Endocrine glands produce hormones.

1 0

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Describe the action and importance of the hormone **thyroxine** in the body.

[3 marks]

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. 2

Describe the roles of FSH in the menstrual cycle.

[2 marks]

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