

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE SCIENCE BIOLOGY

H

Higher Tier

End of Year 10 test 2018

Time allowed: 1 hour

Materials

For this paper you must have:

- a ruler
- a scientific calculator.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The maximum mark for this paper is 60.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	

0 1

Starch is digested by the enzyme amylase.

A student did an investigation on amylase activity.

This is the method used.

1. Mix amylase solution and starch suspension at 20 °C in a boiling tube.
2. Remove a drop of the mixture every 30 seconds and test it for starch.
3. Continue testing every 30 seconds until no starch is detected.
4. Repeat the investigation at different temperatures.

0 1

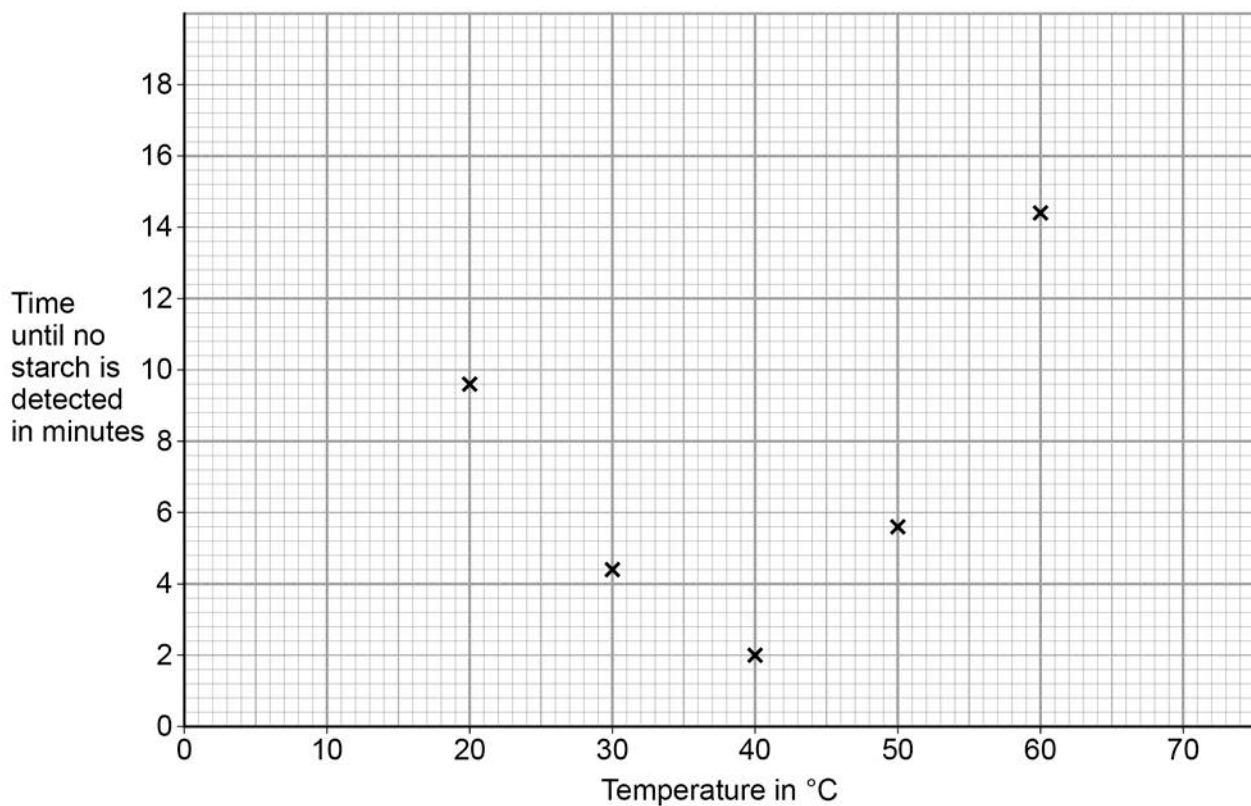
. 1

What apparatus should the student use to control the temperature of the mixture?

[1 mark]

Figure 1 shows the student's results.

Figure 1



0 1 . 2 Complete **Figure 1** by drawing a line of best fit. [1 mark]

0 1 . 3 The starch suspension contained 0.8 g of starch.
Calculate the mean rate of starch digested at 33 °C. [2 marks]

Mean rate of starch digested = _____ grams per minute

0 1 . 4 Describe **two** ways the student could improve the **precision** of his data. [2 marks]

1 _____

2 _____

0 1 . 5 Explain why the rate of starch digested per minute at 60 °C is lower than the rate at 40 °C. [2 marks]

0 1 . 6 Predict the time taken until no starch is detected at 10 °C.
Use information from **Figure 1**. [1 mark]

Time until no starch is detected = _____ minutes

0 2

This question is about transport in organisms.

0 2

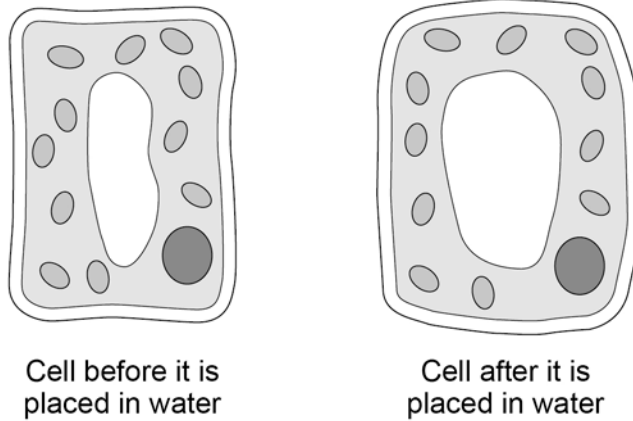
. 1

A student investigates what happens to a plant cell when it is placed in water.

The student looks at the plant cell through a microscope.

Look at **Figure 2**.

Figure 2



Explain why the plant cell swells up when the cell is placed in water.

[4 marks]

0 2 . 2

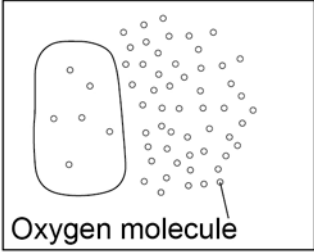
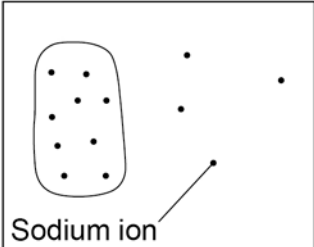
Fish that live in fresh water absorb substances through the epithelial cells in their gills.

Figure 3 shows the concentration of two different substances inside and outside a gill epithelial cell.

Draw **one** line from each substance to the process used to move it into the gill epithelial cell.

[2 marks]

Figure 3

Substance	Process used
 <p>Oxygen molecule</p>	<input type="checkbox"/> Active transport <input type="checkbox"/> Diffusion
 <p>Sodium ion</p>	<input type="checkbox"/> Excretion <input type="checkbox"/> Transpiration

Question 2 continues on the next page

Turn over ►

0 2 . 3

An animal called an axolotl lives in fresh water when it is young.

Figure 4 shows a young axolotl.

Figure 4



Structure **X** helps in the exchange of substances between the axolotl and the water.

Explain how structure **X** helps to ensure rapid absorption of substances the axolotl needs for growth.

[3 marks]

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED**

Turn over ►

0 3

Yeast is an organism that respire anaerobically.

0 3

. 1 Complete the word equation for anaerobic respiration in yeast.

[1 mark]

Glucose \longrightarrow _____ + _____

A student investigated the effect of glucose concentration on the rate of anaerobic respiration in yeast.

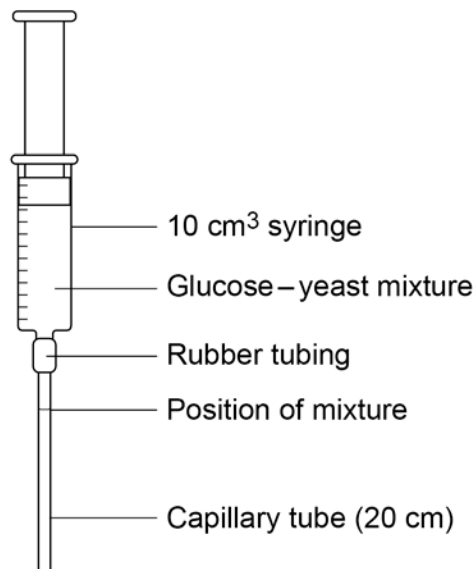
This is the method used.

1. Put 10 cm³ of yeast suspension in a beaker.
2. Add 10 cm³ of 0.5 % glucose solution and mix.
3. Put 10cm³ of the mixture into a syringe.
4. Press the syringe until the mixture is visible at the end of the capillary tubing.
5. Record the starting position of the mixture.
6. Leave the syringe for 10 minutes.
7. Record the end position of the mixture.
8. Repeat steps 1–7 for four different concentrations of glucose solution.

The student repeated the investigation a further two times.

Figure 5 shows the apparatus the student used.

Figure 5



0 3 . 2

Give **two** factors the student controlled in the investigation.**[2 marks]**

1

2

0 3 . 3

Give **one** other factor the student should have controlled in the investigation.**[1 mark]****Question 3 continues on the next page****Turn over ►**

Table 1 shows the student's results.

Table 1

Concentration of glucose in %	Volume of gas collected in 10 minutes in cm ³			Mean volume of gas collected in 10 minutes in cm ³
	1	2	3	
0.5	0.12	0.16	0.18	0.16
1.0	0.54	0.48	0.48	0.50
1.5	0.72	0.78	0.44	0.75
2.0	0.90	0.98	0.04	X
2.5	1.00	1.00	0.94	0.98

0 3 . 4 Calculate **X** in **Table 1**.

[1 mark]

X = _____ cm³

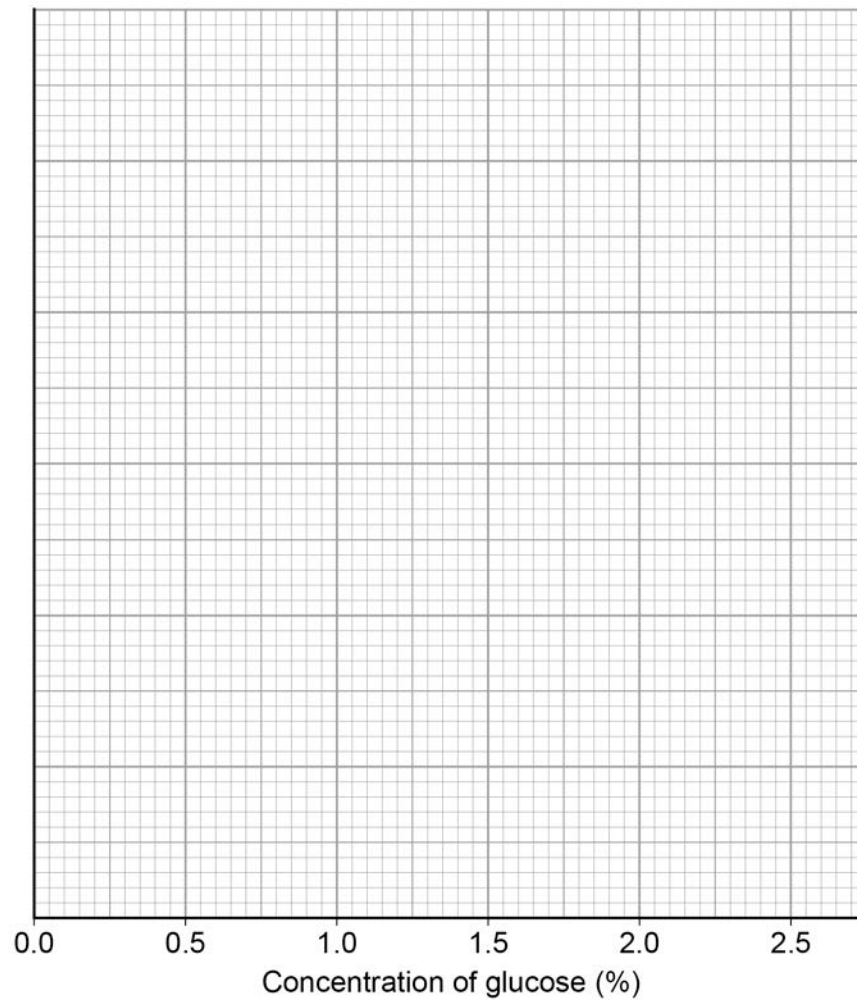
0 3 . 5 Plot the data from **Table 1** on **Figure 6**.

You should:

- label the y-axis
- use a suitable scale
- draw a line of best fit.

[4 marks]

Figure 6



0 3 . 6 Describe the patterns shown in the student's data.

[2 marks]

0 4

Environmental factors affect the rate of water loss from plants.

0 4 . 1

Explain why increasing temperature increases the rate of water loss from plants.

[2 marks]

0 4 . 2

Give **three** other environmental factors that would increase the rate of water loss from plants.**[3 marks]**

1

2

3

0 4 . 3

The movement of water through a plant is called transpiration.

What is **translocation**?**[1 mark]**

Turn over for the next question

6

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Turn over ►

0 5

The heart keeps blood circulating round the body.

0 5 . **1**

A man has two problems with his heart:

1. his heart is beating irregularly
2. fatty deposits are building up inside the walls of his coronary arteries.

The man does **not** need a heart transplant.

Explain how the **two** problems could be treated to prevent a heart attack.

[4 marks]

0 5 . 2 A 60-year-old woman has chest pains.

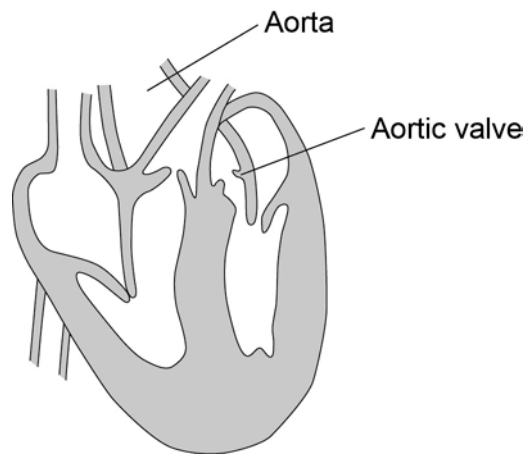
The pain is worse when she walks, and she often feels tired.

The woman has aortic valve stenosis.

A valve with stenosis has become stiff and narrow.

Figure 7 shows the position of the aortic valve.

Figure 7



Explain why aortic valve stenosis causes chest pains.

[3 marks]

Question 5 continues on the next page

Turn over ►

0 5 . 3 The woman needs to have an aortic valve replacement.

Table 2 shows information about two types of aortic valve replacement.

Table 2

	VRS	TAVI
Type of anaesthetic used	General anaesthetic	Local anaesthetic
How the heart valve is accessed	Chest is opened. Heart is stopped and a machine circulates blood around the body. Diseased valve is removed and replaced with the new heart valve.	A hollow tube (catheter) with a balloon at its tip is inserted into an artery in the chest and pushed through to the valve. The balloon is inflated to open the new valve inside the diseased valve. The balloon is deflated and removed.
Who has this type of surgery	All ages. Not suitable for high-risk patients due to use of general anaesthetic.	Mostly used for high-risk patients, eg older patients.
*Mean percentage of people who died whilst in hospital	2.1%	5.1%
*Risk of death five years after surgery	62.4%	67.8%

* Data taken from one clinical trial.

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0 6

In 2014 an outbreak of Tobacco Mosaic Virus (TMV) at a plant producer caused the loss of 15 million petunia plants in 3 weeks.

TMV infection was initially found in only one plant.

0 6**1**

Explain how the spread of TMV to the other plants could have been prevented.

[3 marks]

Question 6 continues on the next page

Turn over ►

Many farmers use water collected from the soil to water their crops.

TMV can be found in the water that is collected.

When the collected water is used on crop plants it can spread the virus very rapidly.

Scientists have investigated the effectiveness of a type of filter called slow sand filters (SSFs) in removing TMV from recycled water.

SSFs have microorganisms in them that can remove pathogens from the water as it passes through.

The scientists added TMV to water from soil and passed it through an SSF.

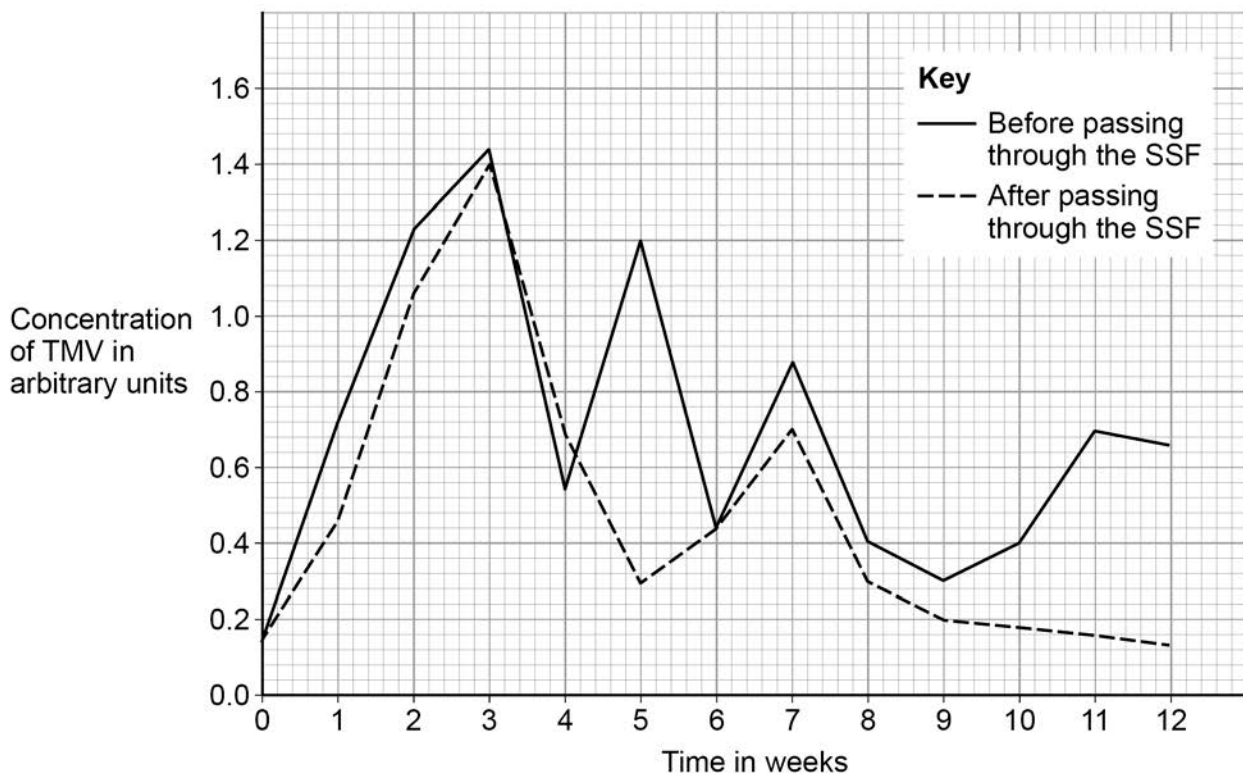
The scientists recorded the concentration of TMV in the water before and after it was passed through the SSF.

The investigation lasted 12 weeks.

The safe level of TMV in the water is taken as 0.20 arbitrary units.

Figure 8 shows the results.

Figure 8



0 6 .

2

Calculate the percentage decrease in TMV after the water passes through the SSF at 2 weeks.

Give your answer to 3 significant figures.

[4 marks]

Percentage decrease = _____

0 6 .

3

Give **two** conclusions you can make from the data shown in **Figure 8**.

[2 marks]

1

2

0 6 .

4

As soon as the SSF was set up (week 0) the scientists recorded the first set of results.

Why did the scientists record the first set of results as soon as the SSF was set up?

[1 mark]

Turn over for the next question

10

Turn over ►

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Figure 9 Root tip cells © Ed Reschke/Getty Images

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