AQA – Organisation – GCSE Biology Paper_1

1. June/2021/Paper_1F/No.4

0 4 Carbohydrates are needed as part of a balanced diet.

0 4 . 1 Which formula shows glucose?

[1 mark]

Tick (✓) **one** box.

$C_6H_{12}O_6$ ☐

CO_2 ☐

H_2O ☐

O_2 ☐

0 4 . 2 Which type of enzyme breaks down starch?

[1 mark]

Tick (✓) **one** box.

Carbohydrase ☐

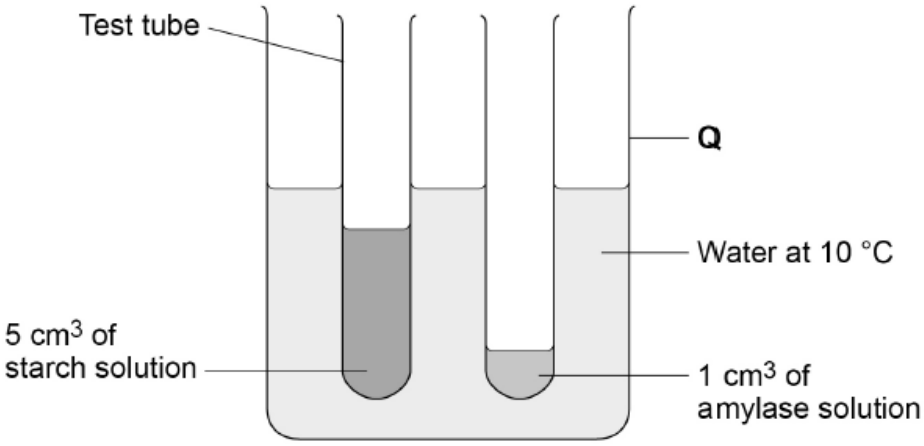
Lipase ☐

Protease ☐

A student investigated the effect of temperature on the activity of the enzyme amylase.

Figure 7 shows the apparatus used.

Figure 7



This is the method used.

1. Set up the apparatus as shown in **Figure 7**.
2. After 5 minutes, pour the starch solution into the amylase solution and mix.
3. Remove one drop of the amylase-starch solution mixture and place onto a spotting tile.
4. Immediately add two drops of iodine solution to the amylase-starch solution mixture on the spotting tile.
5. Record the colour of the iodine solution added to the amylase-starch solution mixture.
6. Repeat steps 3 to 5 every minute until the iodine solution is yellow-brown.

0 4 . 3 Name apparatus **Q** in **Figure 7**.

[1 mark]

0 4 . 4 Why were the starch solution and the amylase solution left for five minutes before mixing them together?

[1 mark]

Tick (✓) **one** box.

So that both solutions could reach 10 °C ☐

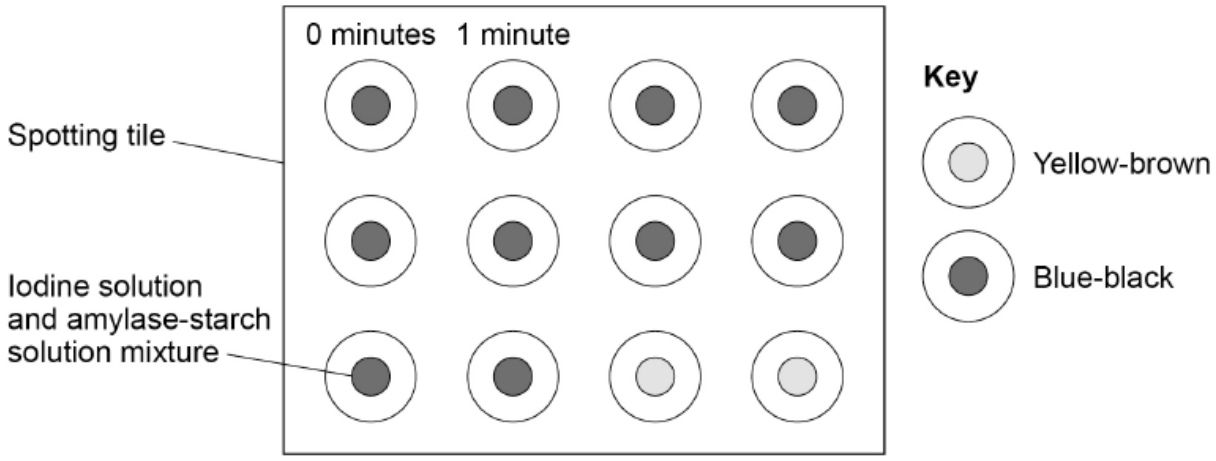
So that the student could calculate a mean ☐

So that the student could repeat the investigation ☐

So that the student had time to draw a table of results ☐

Figure 8 shows the results.

Figure 8



0 4 . 5 How many minutes did it take until the iodine solution and amylase-starch solution mixture was yellow-brown?

Use **Figure 8**.

[1 mark]

_____ minutes

0 4 . 6 How could a more accurate time be obtained?

[1 mark]

Tick (✓) **one** box.

Add more iodine solution to the spotting tile. ☐

Test the mixture with iodine solution every 30 seconds. ☐

Test the mixture with iodine solution for more time. ☐

Use two drops of amylase-starch solution mixture in each test. ☐

The student repeated the investigation at five different temperatures.

Table 2 shows the results.

Table 2

Temperature in °C	Time taken until iodine solution and mixture was yellow-brown in minutes
20	5
35	2
50	7
65	12
80	Remained blue-black

0 4 . 7 Which temperature did the enzyme work quickest at?

[1 mark]

Tick (✓) **one** box.

20 °C ☐

35 °C ☐

50 °C ☐

65 °C ☐

0 4 . 8 Explain why the iodine solution remained blue-black in the investigation at 80 °C.

[2 marks]

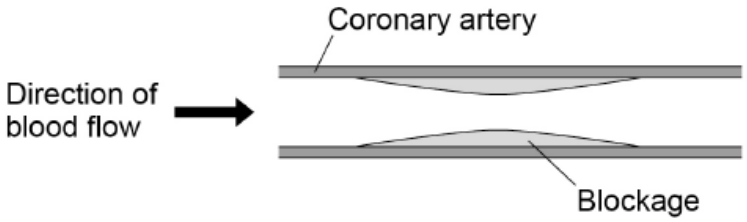
2. June/2021/Paper_1F/No.5

0 5 A high cholesterol concentration in the blood can lead to blockages inside arteries.

The coronary arteries supply blood to the heart muscle.

Figure 9 shows a coronary artery with a blockage.

Figure 9



0 5 . 1 Why could the blockage in **Figure 9** cause cells in the heart to die?

[2 marks]

Doctors can measure the concentration of cholesterol in the blood.

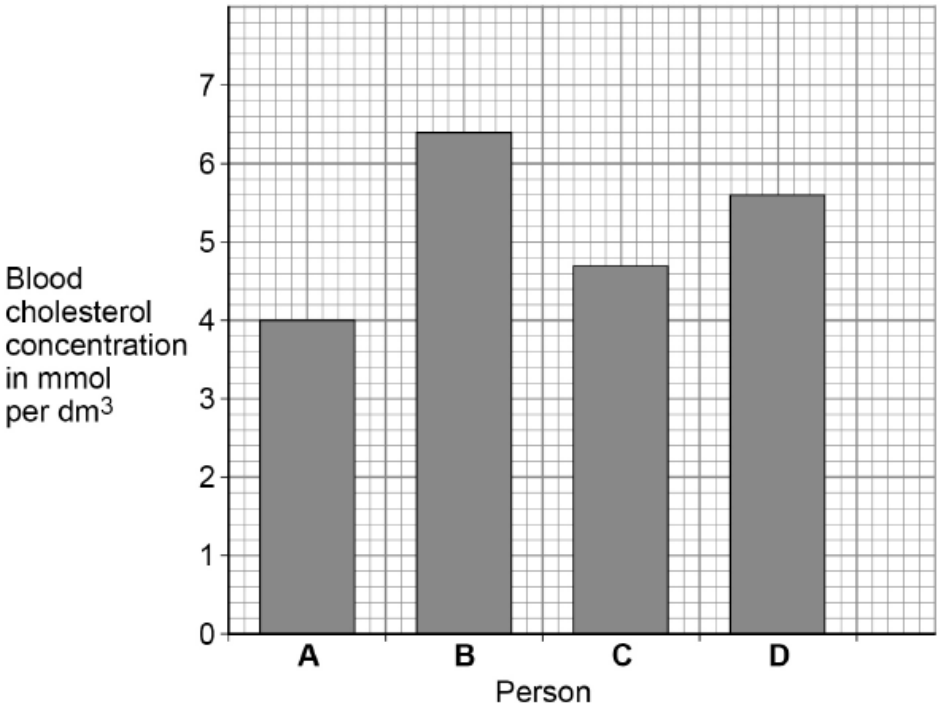
Table 3 shows four different blood cholesterol categories.

Table 3

Blood cholesterol concentration in mmol per dm^3	Cholesterol category
<4.6	Low
4.6–5.0	Normal
5.1–6.1	Medium
6.2 and above	High

Figure 10 shows the blood cholesterol concentration of four people.

Figure 10



0 5 . 2 Which person is in the medium cholesterol category?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 5 . 3 Which person is most at risk of having a heart attack?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 5 . 4 Give a reason for your answer to Question **05.3**.

[1 mark]

_____

_____

0 5 . 5 The blood cholesterol concentration of person **D** is greater than the blood cholesterol concentration of person **A**.

Calculate how many times greater.

Use **Figure 10**.

[2 marks]

_____

_____

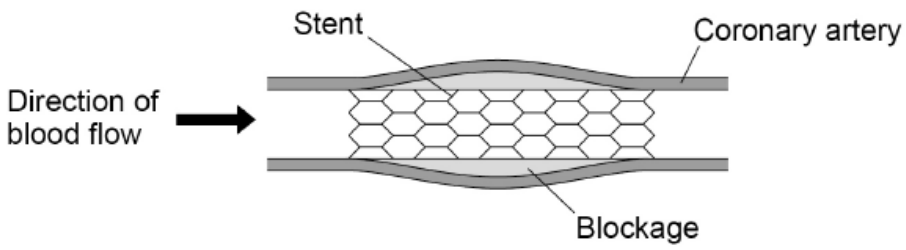
_____

_____

Number of times greater = _____

Figure 11 shows how a stent can be used to treat a person with a blockage in a coronary artery.

Figure 11



0 5 . 6 Explain how a stent works as a treatment for a person with a blockage in a coronary artery.

[2 marks]

Patients are given anti-clotting drugs after they have a stent fitted.

The drugs help to prevent clots forming in the blood.

0 5 . 7 Which part of the blood starts the blood clotting process?

[1 mark]

Tick (✓) **one** box.

- Antibodies ☐
- Plasma ☐
- Platelets ☐
- Red blood cells ☐

0 5 . 8 When a stent is fitted the doctor gives the patient an injection of anti-clotting drugs.

The patient then takes one anti-clotting tablet every day.

Anti-clotting drugs:

- are very effective
- can take a week to begin working fully
- have been used for over 60 years
- cost very little to make
- do **not** work effectively if the patient eats certain types of food.

The patient must have their blood tested every few weeks to check that the anti-clotting drugs are working.

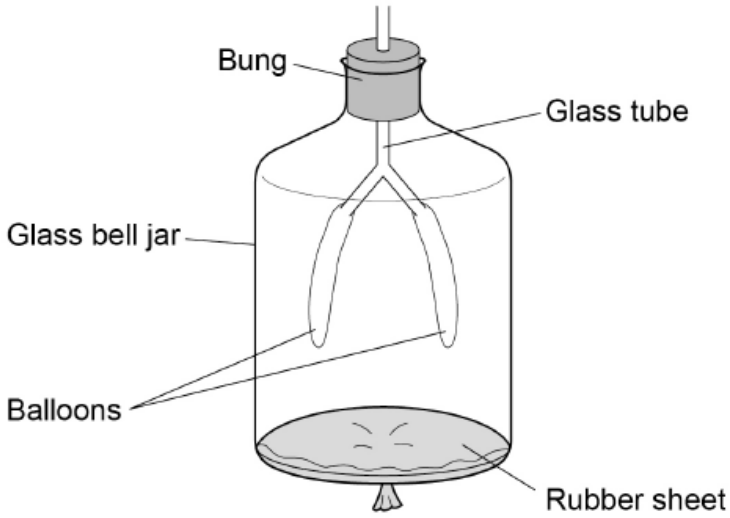
Evaluate the use of anti-clotting drugs in patients who have had a stent fitted.

[4 marks]

3. June/2021/Paper_1F/No.6

0 6 **Figure 12** shows a model used to demonstrate human breathing.

Figure 12



0 6 . 1 Which part of the breathing system is represented by the glass tube?

[1 mark]

Tick (✓) **one** box.

- Alveoli ☐
- Capillaries ☐
- Lung ☐
- Trachea ☐

The model in **Figure 12** represents the human breathing system.

A teacher said:

"The model does **not** represent the human breathing system very well."

0 6 . 2 Give **two** reasons why the teacher is correct.

[2 marks]

1 _____

_____

2 _____

_____

A scientist investigated the effect of exercise on breathing rate.

This is the method used.

1. Record the breathing rates of 10 male non-smokers at rest.
2. Tell each man to run on a treadmill at the same speed for 8 minutes.
3. Record the breathing rate of each man every 2 minutes.
4. Continue to record the breathing rate of each man for 4 minutes after he stops running.

0 6 . 3 Give **two** variables the scientist controlled in the investigation.

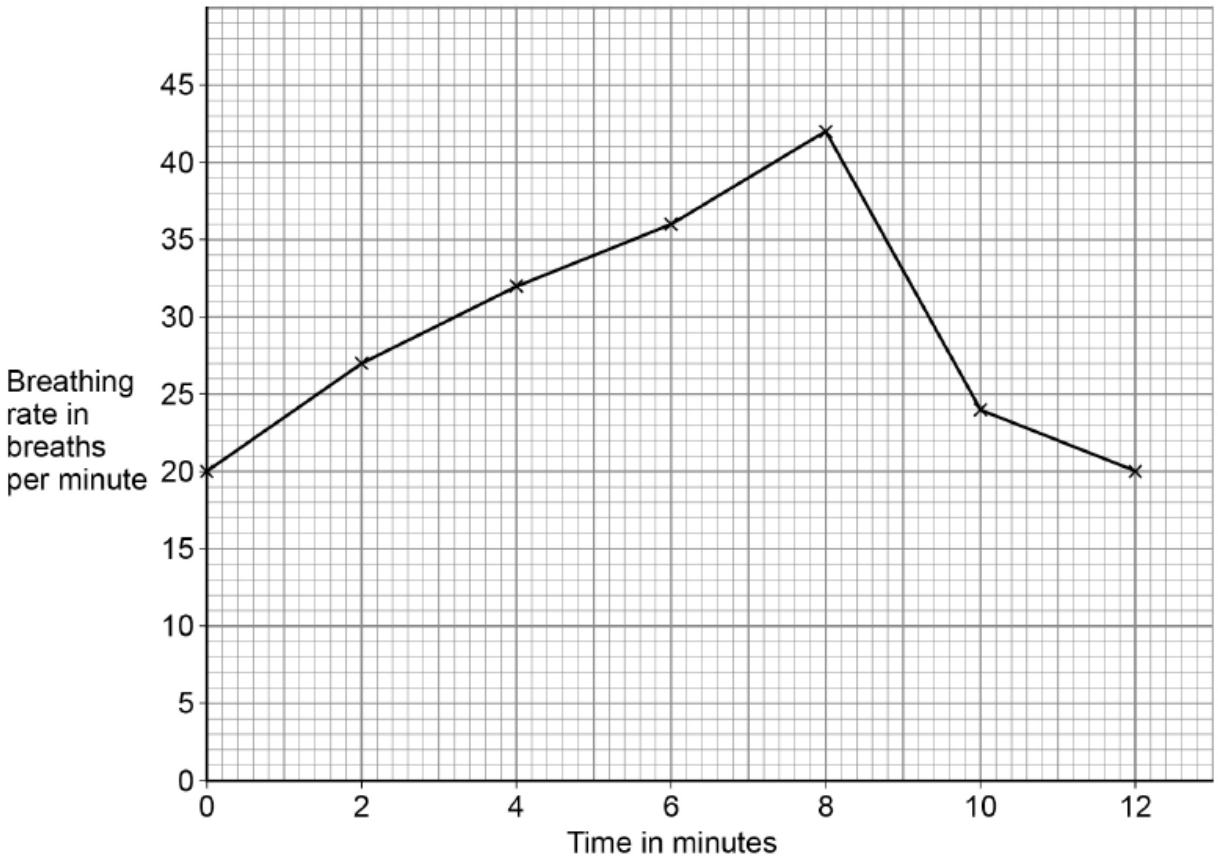
[2 marks]

1 _____

2 _____

Figure 13 shows the data collected from **one** of the men.

Figure 13



0 6 . 4 Calculate the percentage increase in the man's breathing rate between 0 minutes and 8 minutes.

[3 marks]

Use the equation:

$$\text{percentage increase} = \frac{(\text{breathing rate at 8 minutes} - \text{breathing rate at 0 minutes})}{\text{breathing rate at 0 minutes}} \times 100$$

Percentage increase = _____ %

0 6 . 5 Explain why the man's breathing rate increased when he was running.

[2 marks]

0 6 . 6 Give **one** measurement that could be taken to show a different effect of exercise on the body.

Do **not** refer to breathing rate in your answer.

[1 mark]

_____

0 6 . 7 The men in the investigation were all non-smokers.

Give **one** effect that smoking can have on the body.

[1 mark]

_____

_____

4. June/2021/Paper_1F/No.9

0 9 Body Mass Index (BMI) is a way of finding out if a person's body mass falls within a healthy range for their height.

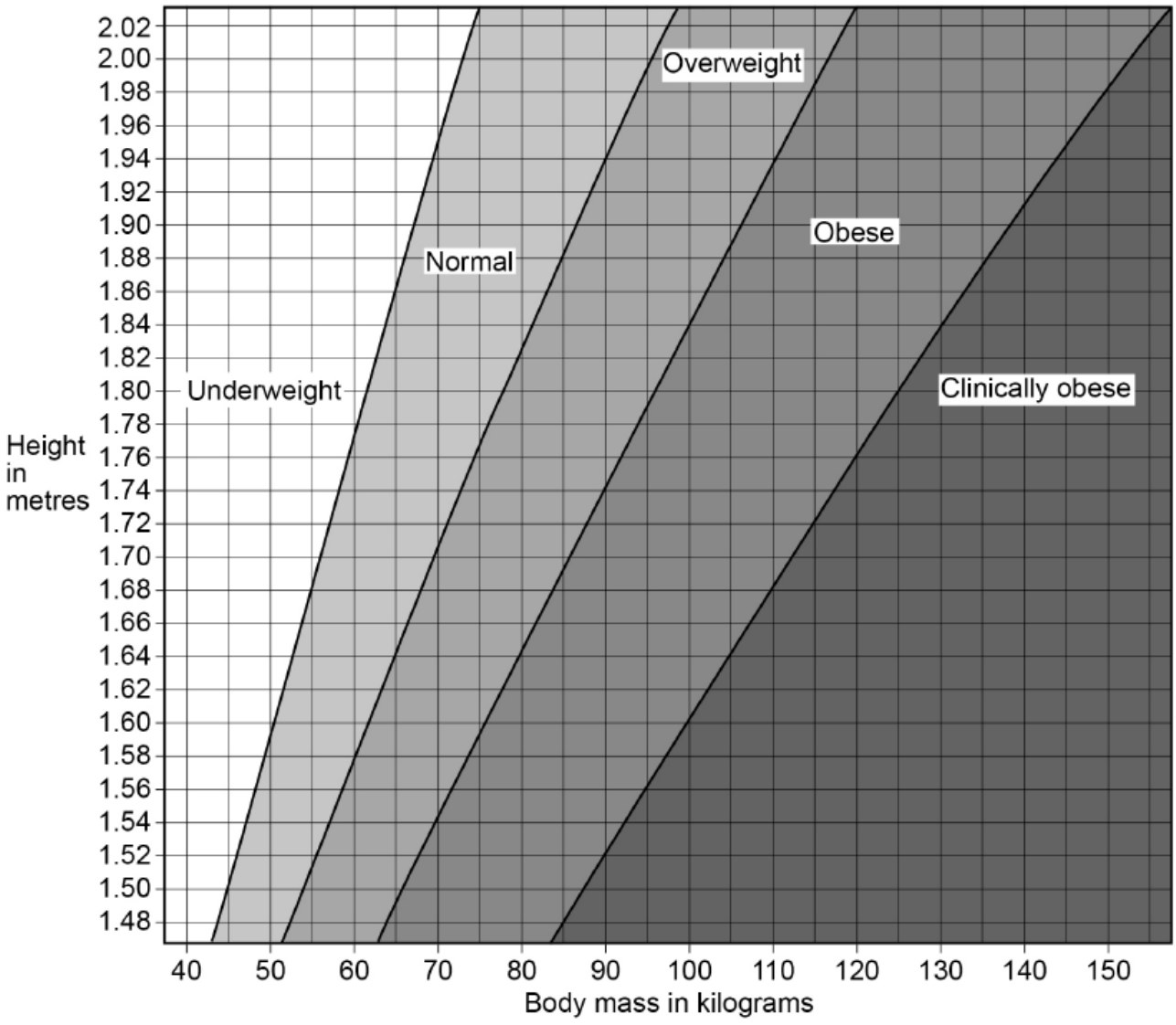
Table 4 shows information about two people.

Table 4

Person	Body mass in kg	Height in m	BMI in kg/m^2
A	63	1.65	23.1
B	92	1.71	**X**

Figure 18 shows five BMI categories for adults.

Figure 18



0 9 . 1 Which is the BMI category of person **A** in **Table 4**?

[1 mark]

Tick (✓) **one** box.

Clinically obese ☐

Normal ☐

Obese ☐

Overweight ☐

Underweight ☐

0 9 . 2 Calculate value **X** in **Table 4**.

Use the equation:

$$\text{BMI} = \frac{\text{body mass}}{\text{height}^2}$$

Give your answer to 3 significant figures.

[3 marks]

X = _____ kg/m^2

Scientists think there is a link between BMI and life expectancy.

Table 5 shows information about predicted life expectancy of men after the age of 50.

Table 5

BMI Category	Predicted number of years living in good health after the age of 50	Predicted number of years living in bad health after the age of 50
Normal	19.06	4.98
Overweight	18.68	5.32
Obese	16.37	7.08
Clinically obese	13.07	10.10

0 9 . 3 Describe **two** patterns shown in **Table 5** about the effects of BMI category.

[2 marks]

1 _____

_____

_____

2 _____

_____

_____

The number of people who are obese in the UK is increasing.

0 9 . 4 Explain the financial impact on the UK economy of an increasing number of people who are obese.

[2 marks]

0 9 . 5 A person who is obese is more at risk of arthritis.

Arthritis is a condition that damages joints.

Suggest how arthritis could affect a person's lifestyle.

[1 mark]

0 9 . 6 A person who eats a diet high in saturated fat might become obese.

Name **two** health conditions that might develop if a person eats a diet high in saturated fat.

Do **not** refer to arthritis in your answer.

[2 marks]

1 _____

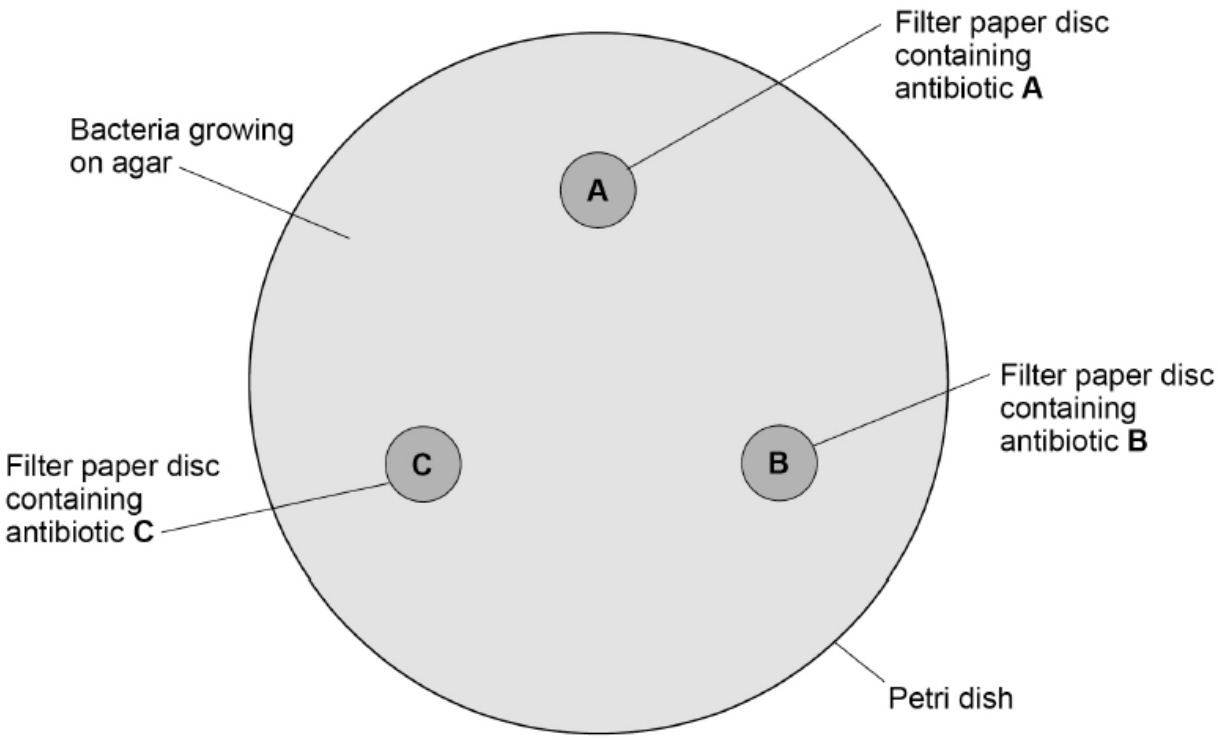
2 _____

5. June/2021/Paper_1H/No.2

0 2 A student investigated the effectiveness of three different antibiotics.

Figure 3 shows how the student set up an agar plate.

Figure 3



The student used aseptic techniques to make sure that only one type of bacterium was growing on the agar.

0 2 . 1 Describe **two** aseptic techniques the student should have used.

[2 marks]

1 _____

_____

_____

2 _____

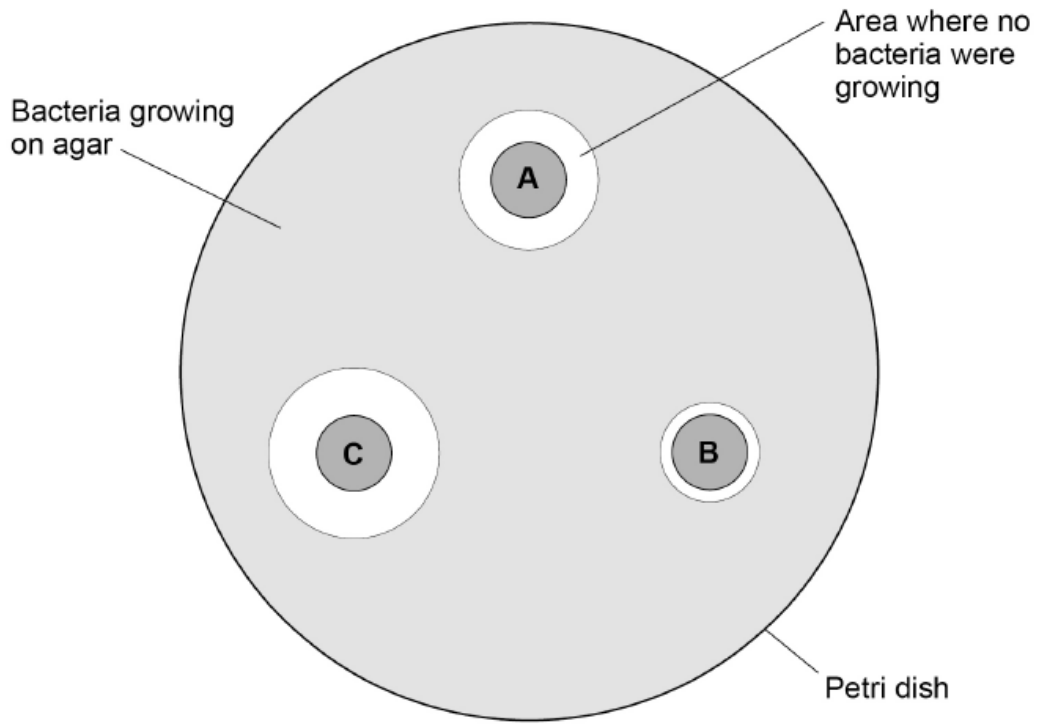
_____

_____

The student placed the agar plate in an incubator at 25 °C for 48 hours.

Figure 4 shows the agar plate after 48 hours.

Figure 4



0 2 . 2 Which antibiotic is the **least** effective?

Give a reason for your answer.

[1 mark]

Least effective antibiotic _____

Reason _____

_____

_____

0 2 . 3 Calculate the area where no bacteria were growing for antibiotic **C**.

Use $\pi = 3.14$

Give the unit.

[5 marks]

Area = _____ Unit _____

0 2 . 4 Suggest **one** way the student could improve the investigation.

[1 mark]

6. June/2021/Paper_1H/No.5

0 5 Amylase is an enzyme that breaks down starch.

0 5 . 1 Amylase is a polymer of smaller molecules.

Name the type of smaller molecule.

[1 mark]

_____

0 5 . 2 Name the **three** parts of the human digestive system that produce amylase.

[2 marks]

1 _____

2 _____

3 _____

0 5 . 3 Explain how amylase breaks down starch.

Answer in terms of the 'lock and key theory'.

[3 marks]

_____

_____

_____

_____

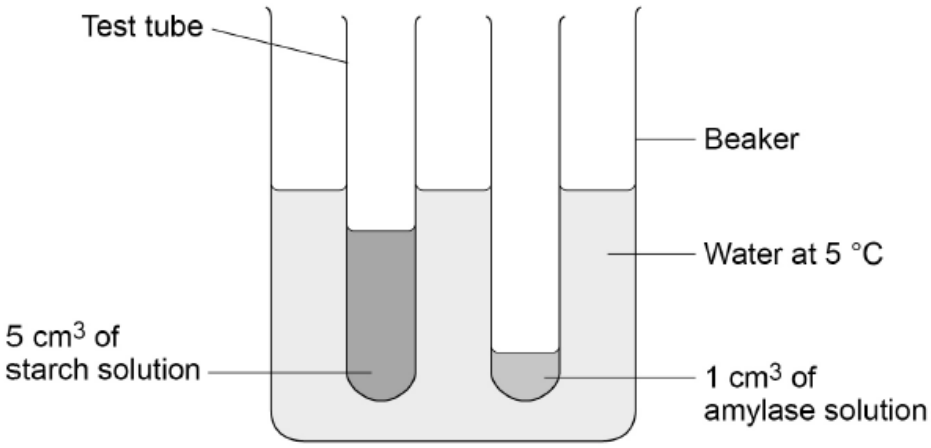
_____

_____

A student investigated the effect of temperature on the activity of amylase.

Figure 8 shows the apparatus used.

Figure 8



This is the method used.

1. Set up the apparatus as shown in **Figure 8**.
2. After 5 minutes, pour the starch solution into the amylase solution and mix.
3. Remove one drop of the starch-amylase mixture and place onto a spotting tile.
4. Immediately add two drops of iodine solution to the starch-amylase mixture on the spotting tile.
5. Record the colour of the iodine solution added to the starch-amylase mixture.
6. Repeat steps 3 to 5 every minute until the iodine solution stays yellow-brown.
7. Repeat steps 1 to 6 using water at different temperatures.

0 5 . 4 Name **two** control variables the student used in the investigation.

[2 marks]

1 _____

2 _____

0 5 . 5 Why did the student leave the starch solution and amylase solution for 5 minutes before mixing them?

[1 mark]

_____

_____

Table 3 shows the results of the investigation.

Table 3

Temperature in °C	Time taken until iodine solution stays yellow-brown in minutes
5	did not become yellow-brown
20	5
35	2
50	7
65	14
80	did not become yellow-brown

0 5 . 6 What conclusion can be made about the effect of temperature on amylase activity between 20 °C and 65 °C?

[1 mark]

0 5 . 7 Explain the results at 5 °C and at 80 °C.

Use **Table 3**.

[5 marks]

0 5 . 8 The student investigated the effect of temperature on amylase activity.

Describe how the student could extend the investigation to determine the effect of a different factor on amylase activity.

[2 marks]