Smart Edge!
More Than Knowledge

OCR · GCSE COMBINED SCIENCE A (GATEWAY) J250

Biology — Foundation Tier, Paper 2

June 2025 exam series

QUESTION PAPER

OCR
Oxford Cambridge and RSA

Monday 9 June 2025 – Morning

GCSE (9–1) Combined Science A (Gateway Science)

J250/02 Biology (Foundation Tier)

Time allowed: 1 hour 10 minutes

F

You must have:
- a ruler (cm/mm)

You can use:
- a scientific or graphical calculator
- an HB pencil

J250/02

T18609721T7

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.

INFORMATION
- The total mark for this paper is **60**.
- The marks for each question are shown in brackets **[ ]**.
- Quality of extended response will be assessed in questions marked with an asterisk (*).
- This document has **24** pages.

ADVICE
- Read each question carefully before you start your answer.

OCR is an exempt Charity

Turn over

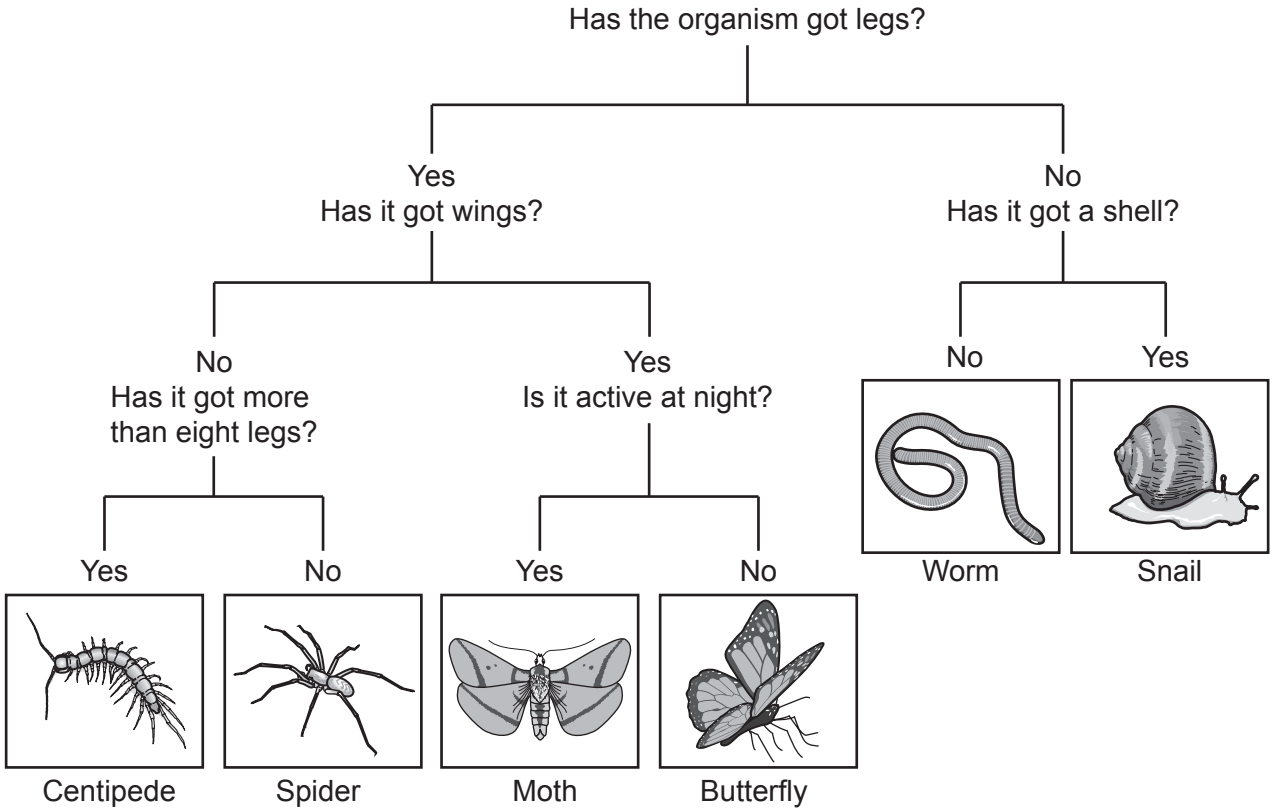
Section A

You should spend a **maximum** of **20 minutes** on this section.

Write your answer to each question in the box provided.

1 The diagram shows a key for identifying organisms.

Identify the organism that has **wings** and is **active at night**.



A Butterfly

B Centipede

C Moth

D Snail

Your answer ☐ **[1]**

2 What is the correct treatment for a disease caused by viruses?

A Antibiotics

B Antivirals

C Progesterone

D Insulin

Your answer ☐ **[1]**

3 Which of these is an example of **genetic engineering**?

A Captive breeding programmes for endangered species

B Farmers applying pesticides on their crops

C Scientists developing crops that are drought resistant

D Selecting pigs with high quality meat to breed together

Your answer ☐ **[1]**

4 Cardiovascular diseases are treated in different ways.

The table shows some treatments for cardiovascular disease.

	Treatment	**Description**
A	Heart bypass	A new blood vessel is inserted when the coronary artery is blocked.
B	Heart transplant	A new heart from a donor is inserted.
C	Statins	A pill is ingested which reduces cholesterol in the blood.
D	Stent	A small tube is inserted to open up a blocked blood vessel.

Which treatment does **not** involve surgery?

Your answer ☐ **[1]**

5 Which of these could be used to group living organisms in a natural classification system?

A DNA sequence

B Number of legs

C Presence of shell

D Size of tail

Your answer ☐ **[1]**

6 Which of these is a non-specific defence mechanism of the human body against pathogens?

A Making red blood cells

B Pancreas producing insulin

C Pupil changing size

D Stomach producing acid

Your answer ☐ **[1]**

7 Scientists have developed a detailed understanding of the human genome.

Which of these is a benefit from developing this understanding?

A Discovering new antibiotics

B Explaining why antibiotic resistant bacteria have evolved

C Predicting whether a person will develop a genetic condition

D Using embryonic stem cells for transplants

Your answer ☐ **[1]**

8 Many non-communicable human diseases are caused by an interaction with a lifestyle factor.

Which of these is **not** an example of this type of interaction?

A Allergies and exercise

B Cardiovascular disease and stress

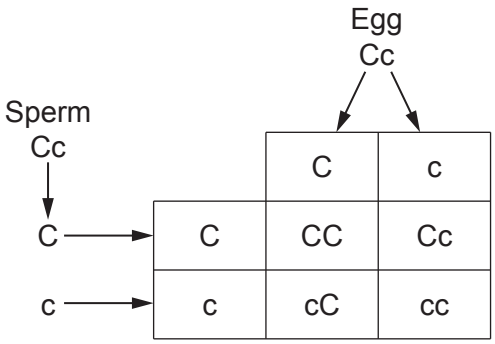
C Skin cancer and UV light

D Type 2 diabetes and diet

Your answer ☐ **[1]**

9 The diagram shows a genetic cross for inheriting cystic fibrosis.

Cystic fibrosis is a recessive inherited condition.



What percentage of the offspring will have cystic fibrosis?

A 0%

B 25%

C 75%

D 100%

Your answer ☐ **[1]**

10 Which pathway shows how nitrates are used by plants to make proteins?

A Nitrates ⟶ amino acids ⟶ proteins

B Nitrates ⟶ carbohydrates ⟶ proteins

C Nitrates ⟶ DNA ⟶ proteins

D Nitrates ⟶ fatty acids ⟶ proteins

Your answer ☐ **[1]**

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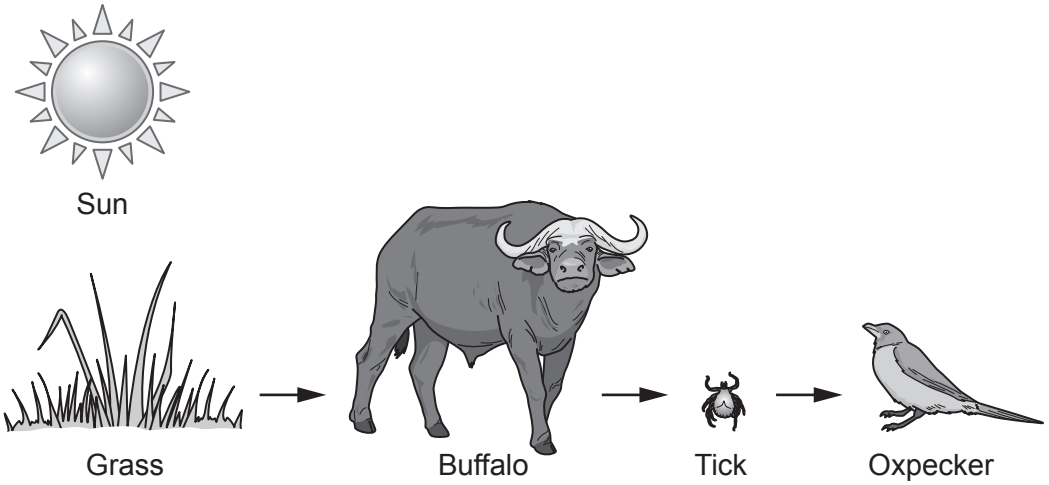
Section B

11 The grasslands of Africa are an example of an ecosystem.

Fig. 11.1 shows a food chain within this ecosystem.

Fig. 11.1



(a) Name an example of each of the following in the food chain shown in **Fig. 11.1**.

(i) A primary consumer.

..... **[1]**

(ii) An abiotic component.

..... **[1]**

(b) Describe the role of **grass** as a producer in this food chain.

.....

.....

.....

..... **[2]**

(c) Organisms depend on each other for survival. This is called **interdependence**.

Fig. 11.2 shows a buffalo and some oxpeckers.

Fig. 11.2

Ticks are small organisms that feed on, live on and harm the buffalo.

Oxpeckers sit on the buffalo eating the harmful ticks. They also warn the buffalo if danger is nearby.

Identify the type of relationship between these organisms using ideas about interdependence.

Ticks and buffalo .....

Oxpeckers and buffalo .....

[2]

12

(a) Name the sub-cellular structure which stores the genetic material in an animal cell.

..... **[1]**

(b) Complete the sentences to describe the genetic material.

Use words from the list.

diploid	**genes**	**genome**	**genotype**
haploid	**heterozygous**	**homozygous**	**variation**

The entire genetic material of an organism is called the ..... .

Human body cells have 23 pairs of chromosomes because they have two copies of each chromosome. These cells are called ..... .

Human gametes have only 23 chromosomes. These cells are called ..... .

Most observable characteristics are the result of multiple ..... .

[4]

(c) Phenotypes, such as height, are determined by genetics, the environment or a combination of both.

State a phenotype that is determined by each of the following.

Genetic only .....

Environmental only .....

Both genetics and the environment

.....

[3]

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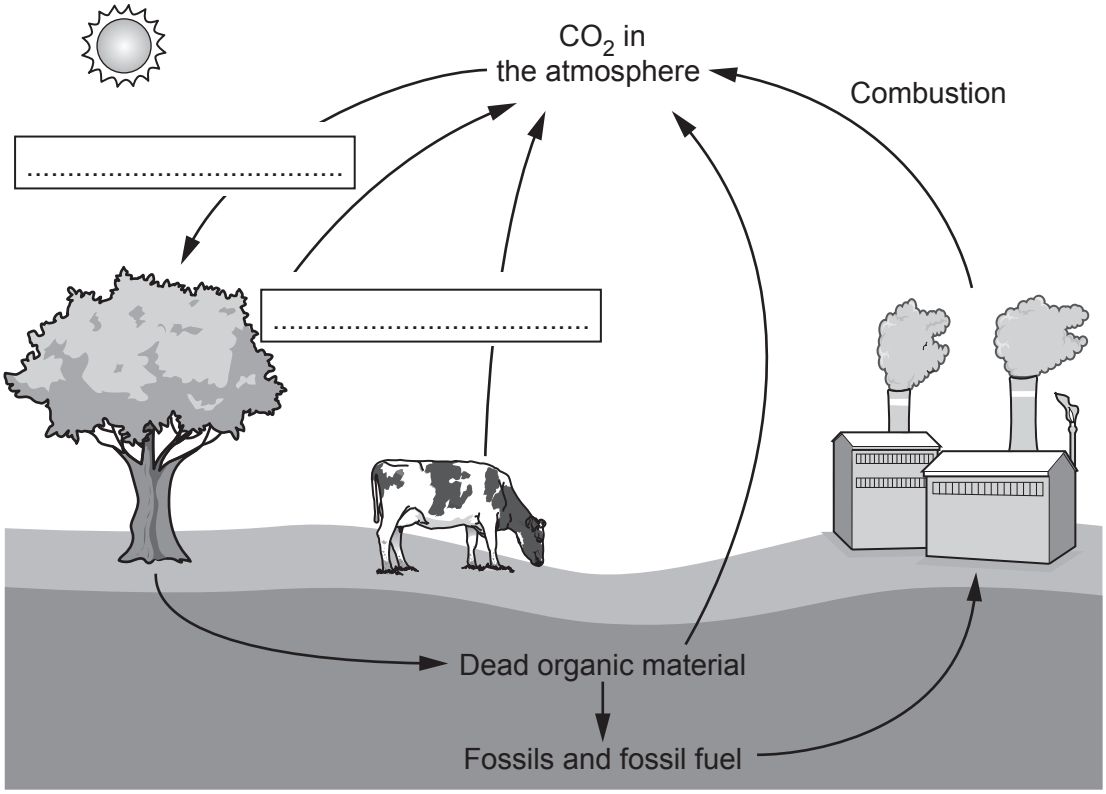
13

(a) The diagram shows the carbon cycle.

(i) Complete the **two** labels in the diagram to identify the processes involved in the carbon cycle.



[2]

(ii) Explain the role of **decomposers** in the carbon cycle.

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.....

.....

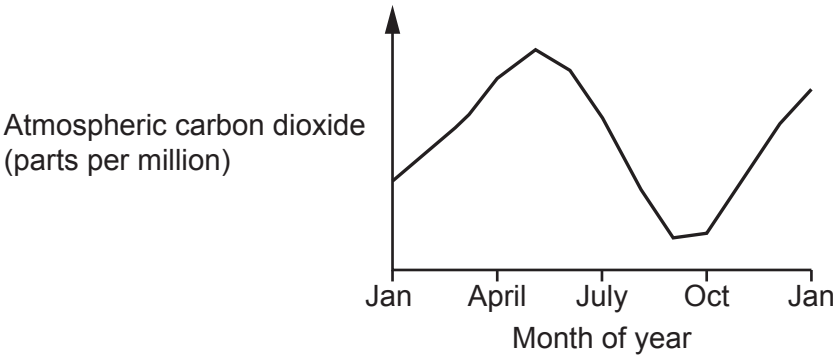
..... **[2]**

(iii) Decomposition can take place aerobically or anaerobically.

What is meant by the term **anaerobically**?

..... **[1]**

(b) The graph shows the changes in carbon dioxide levels in the atmosphere during a year.



Identify the process which causes the changes in carbon dioxide in the atmosphere from April to October.

Tick (✓) **one** box.

Combustion ☐

Decomposition ☐

Photosynthesis ☐

Respiration ☐

[1]

(c) Human activity has led to rising carbon dioxide levels in the atmosphere.

This contributes to global warming and reduces global biodiversity.

Describe **two** ways in which human activity can reduce **local** biodiversity.

1 .....

.....

2 .....

.....

[2]

14

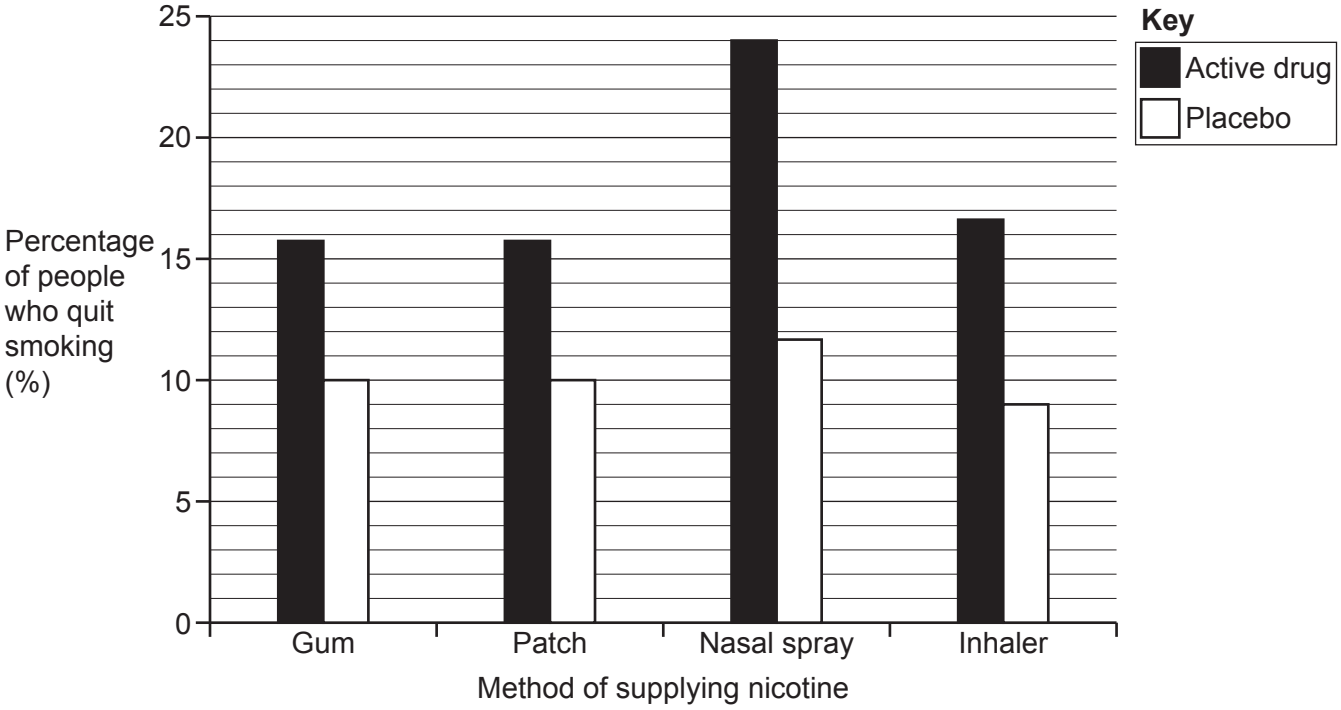
(a)* Smoking is a risk factor for lung cancer.

Nicotine is given to people to help them quit smoking. The nicotine is supplied using different methods.

A study looked at the effectiveness of four of these methods.

A placebo was given to some people as part of the study. A placebo looks like the drug being tested but has no medical effect.

The bar chart shows the results.



What does the study show about the effectiveness of the different methods to help people to give up smoking?

In your answer:

- Compare the effectiveness of different methods.
- Explain the role of the placebo and what its results show.
- Use data to support your conclusions.

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..... **[6]**

(b) Smoking cigarettes can cause lung cancer.

Complete the sentences to explain why.

Use words from the list.

cell division	**meiosis**	**mutation**
protein synthesis	**reduction**	

Cigarettes contain cancer causing chemicals which can cause DNA ..... .

This leads to uncontrolled ..... .

[2]

15 A student investigates the effect of soil pH on the growth of dandelion plants.

They measure the height of different dandelion plants grown in soils with different pH.

The table shows their results.

Soil pH	Dandelion height (cm)			
	1	2	3	Mean
2	0.6	0.8	1.0	0.8
4	3.2	3.4	3.0	3.2
6	10.5	10.3	10.6	10.5
8	5.0	3.8	5.0	4.6
10	2.0	2.2	1.8	.....

(a)

(i) Calculate the mean dandelion height for the soil at pH 10.

Write your answer in the table.

[1]

(ii) The student identifies an outlier in the results.

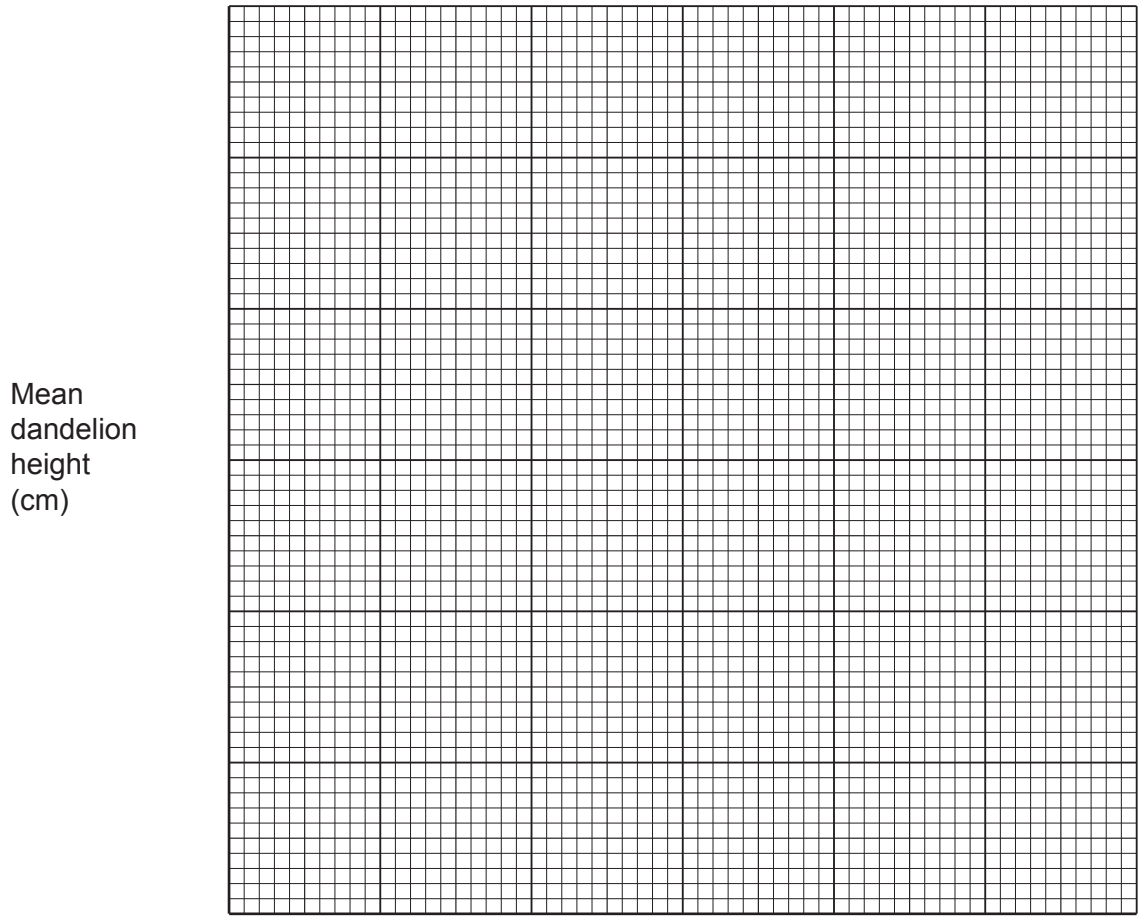
Tick (✓) **one** correct set of results to identify the outlier.

Soil pH	Dandelion height	Outlier
2	result 2	
6	result 2	
8	result 2	

[1]

(b) Plot a graph of the student's mean results. Choose appropriate scales. **[3]**

(c) Draw a curve of best fit. **[1]**



(d) What conclusions can be made from the student's results?

Include **data** in your answer.

.....

.....

.....

..... **[2]**

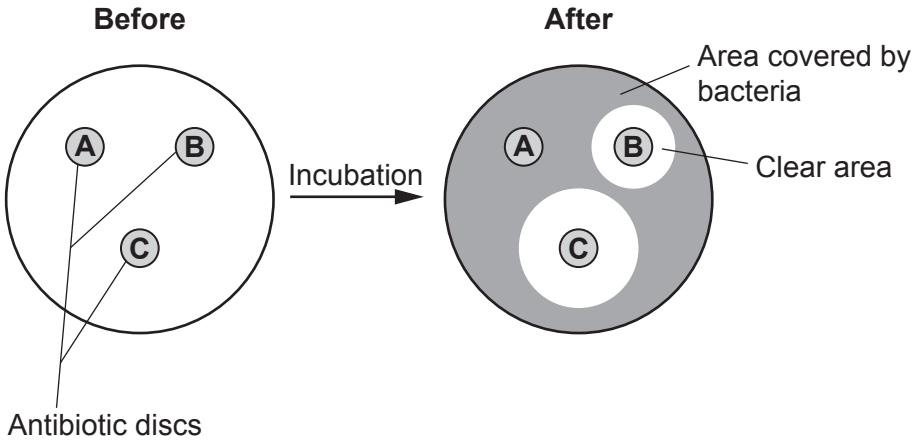
16

(a) A student wants to find how effective three antibiotics are for treating a range of bacterial infections.

This is their method:

- Spread bacteria across an agar plate.
- Soak discs with different antibiotics (**A**, **B** and **C**) and place them on the surface of the agar plate.
- Leave the plate to incubate for 5 days.

The student's results are shown in the diagram.



(i) Which antibiotics are the most and least effective at inhibiting bacteria growth?

Put a (ring) around the correct answers.

Most effective antibiotic	**A**	**B**	**C**
Least effective antibiotic	**A**	**B**	**C**

Explain your answers. Use the diagram.

.....

.....

..... **[2]**

(ii) Suggest **two** improvements to the method to increase **validity** of the investigation.

1 .....

.....

2 .....

.....

[2]

(b) Bacteria are one cause of communicable disease.

Outline the role of the immune system of the human body in defence against disease.

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..... **[2]**

(c) Tuberculosis (TB) is caused by bacteria. The bacteria usually attack the lungs.

It is estimated that 8.7 million people develop TB worldwide each year.

1.1 million of these people are estimated to have HIV.

(i) Calculate the percentage of people who develop TB worldwide each year who are estimated to have HIV.

Percentage ..... % **[2]**

(ii) Infection with HIV makes you more likely to develop TB.

State **one** reason why having HIV makes you more likely to develop TB.

.....

..... **[1]**

(d) Antibiotics are developed to kill bacteria.

Bacteria have appeared that antibiotics can not kill.

Explain how bacteria could have evolved to become antibiotic resistant.

Use ideas about **natural selection**.

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..... **[3]**

END OF QUESTION PAPER

EXTRA ANSWER SPACE

If you need extra space use these lined pages. You must write the question numbers clearly in the margin.