



Rewarding Learning

General Certificate of Secondary Education
2022

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--	--

Double Award Science Biology

Unit B2

Foundation Tier



[GDW41]

GDW41

WEDNESDAY 15 JUNE, MORNING

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all ten** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **10(a)**.



1 Microorganisms can cause human diseases.

The list below gives methods used to treat or prevent the spread of some diseases.

condom	antibiotic	vaccination
--------	------------	-------------

(a) Complete the table below by writing the correct answers in the empty boxes.

Choose your answers from the list above.

Each word may be used more than once.

Disease	Method of prevention	Method of treatment
Flu		rest and fluids
HIV		antiviral drugs
Tuberculosis	vaccination	
Chlamydia		

[5]

(b) Some fungi can cause disease in humans and plants.

(i) Name the disease caused by fungi that affects the feet.

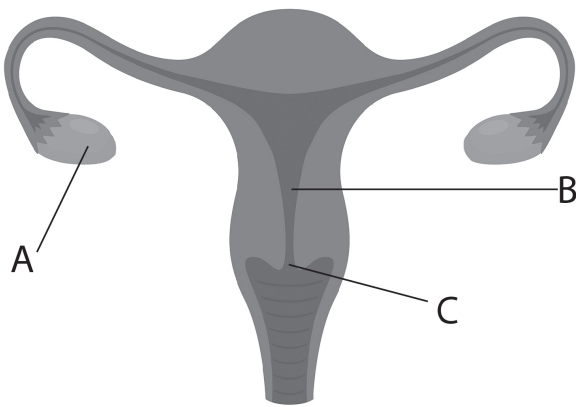
[1]

(ii) Name the disease caused by fungi that affects potatoes.

[1]



2 (a) The diagram below shows the female reproductive system.



© Getty Images

(i) Use the diagram to complete the table below by writing in the empty boxes.

Part	Name	Function
A		egg production
B		
C		dilates during birth

[4]

(ii) Draw an **X** on the diagram to show where fertilisation takes place. [1]

(b) Name the hormone released by **Part A** that controls egg production. [1]

[Turn over



3 Some human characteristics are named below.

The graphs show how variation in these human characteristics can be displayed.

(a) Use a **ruler** to draw a line from each human characteristic to the graph that displays the variation shown by that characteristic.

Human characteristic

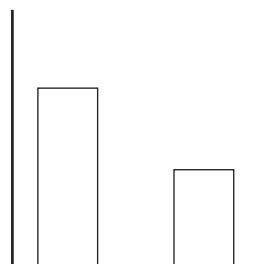
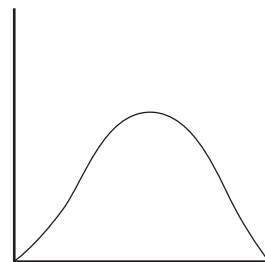
Right or left handed

Height

Length of thumb

Tongue rolling

Graph displaying variation



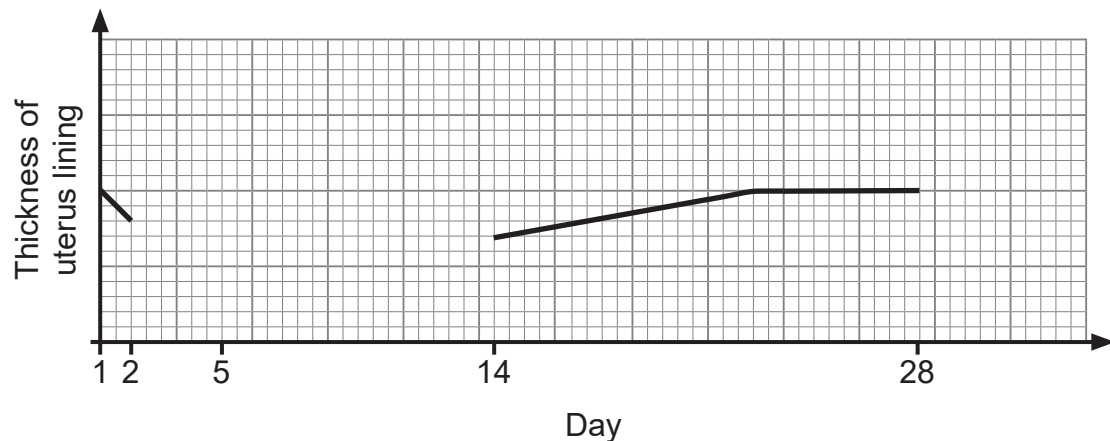
[4]

(b) Give **one** cause of variation in humans.

[1]



- 4 The graph below shows the thickness of the uterus lining on some days in a 28-day menstrual cycle.



- (a) Complete the graph by drawing a line to show the thickness of the uterus lining between **Day 2** and **Day 14**.

The line has been started for you.

[2]

- (b) Name the event which occurs on **Day 14** of the menstrual cycle.

[1]

- (c) (i) Name the hormone responsible for building up and maintaining the thickness of the uterus lining between **Day 14** and **Day 28**.

Draw a circle around the correct hormone in the list below.

testosterone

insulin

progesterone

[1]

- (ii) Continue the line on the graph to show the thickness of the uterus lining after **Day 28** if pregnancy occurs.

[1]

[Turn over]



- 5 The photograph below shows a pea plant with flowers.



© Getty Images

Pea plants can have purple or white flowers.

In pea plants, the allele for purple flowers is dominant to the allele for white flowers.

Let **R** represent the allele for purple flowers.

Let **r** represent the allele for white flowers.

A pea plant, homozygous for purple flowers, is crossed with a pea plant that has white flowers.



- (a) Draw a Punnett square to show the genotypes of the offspring that would be produced from this cross.

[4]

A different pea plant that has purple flowers is crossed with a pea plant that has white flowers.

- (b) Give the genotype of this plant with purple flowers if some of the offspring have white flowers.

[1]

[Turn over]



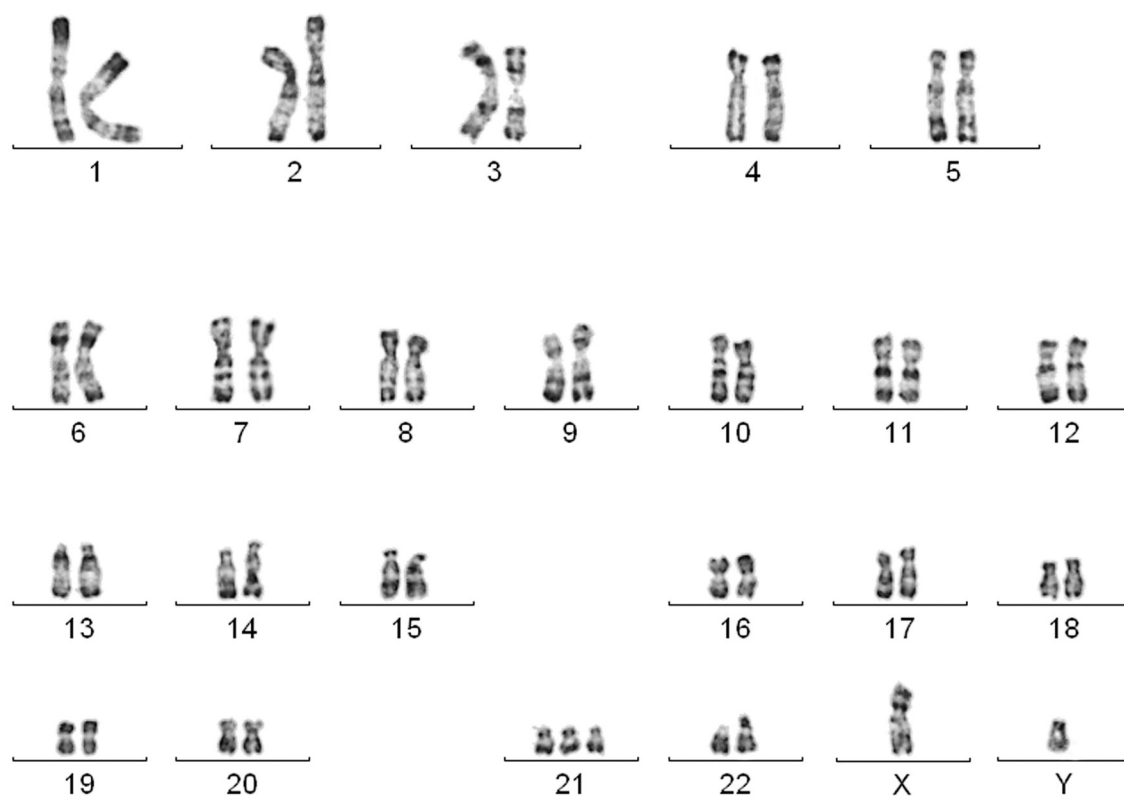
BLANK PAGE
DO NOT WRITE ON THIS PAGE

13124



24GDW4108

6 The photograph below shows the chromosomes from one cell of a baby.



© PR. Philippe Vago, ISM / Science Photo Library

(a) What evidence in the photograph shows that this baby

is a boy?

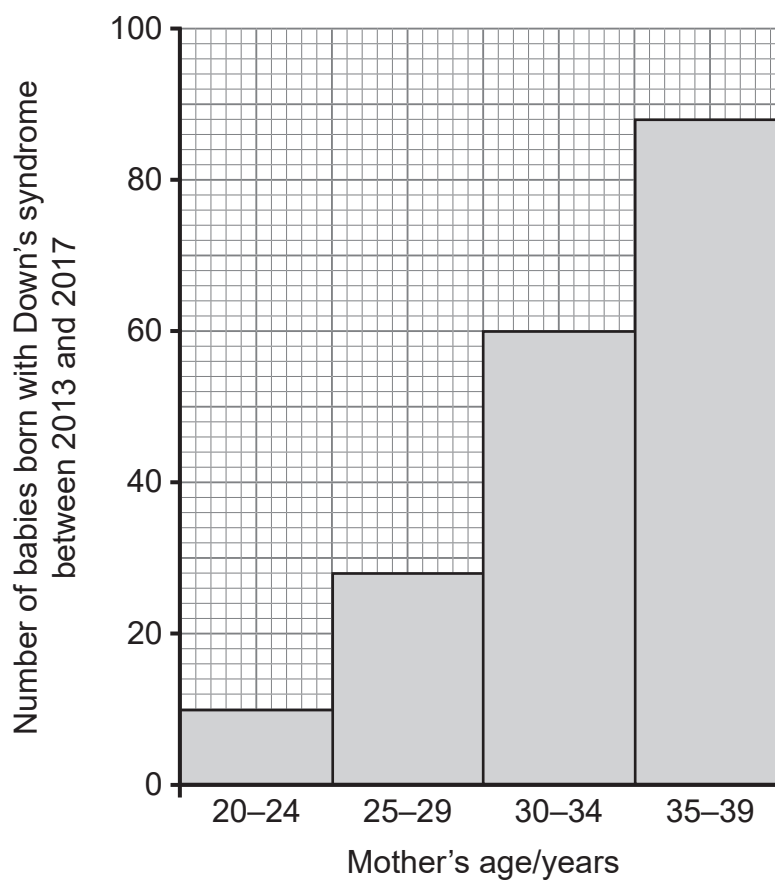
has Down's syndrome?

[2]

[Turn over



- (b) The graph below shows the number of babies born with Down's syndrome to mothers of different ages in Northern Ireland between 2013 and 2017.



Core Tables 2016, Supporting the Director of Public Health, Annual Report 2017 © Public Health Agency

- (i) Describe the trend shown in the graph.

Give data for mothers aged 20–24 and 35–39 to support your answer.

[2]



Between 2013 and 2017, there was a total of 111 531 babies born in Northern Ireland to mothers aged 20–39 years.

186 of these babies were born with Down's syndrome.

- (ii) Calculate the percentage (%) of babies born with Down's syndrome out of the total number of babies born.

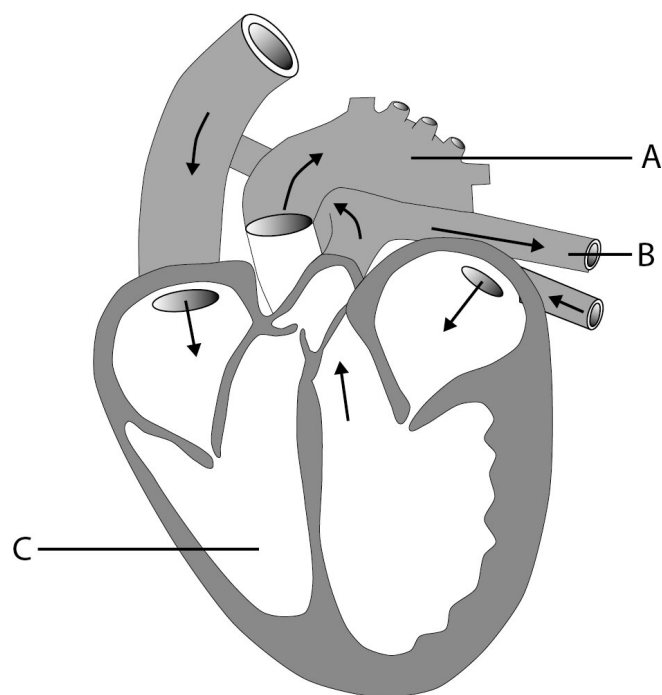
Show your working.

Give your answer to **two** decimal places.

_____ % [3]



- 7 (a) The diagram below shows a section through the heart.



© CCEA

- (i) Name blood vessels **A** and **B**.

A _____

B _____

[2]

- (ii) Name the heart chamber **C**.

[1]



- (b) The table below gives some features of three types of blood vessel: arteries, veins and capillaries.

Complete the table by writing a tick (✓) in a box if the feature is present.

Feature	Arteries	Veins	Capillaries
Most have valves			
Allow exchange of materials between blood and tissues			
Thickest walls			
Largest lumen diameter			
Presence of muscle and elastic fibres in walls			

[6]

[Turn over



8 Students carried out an investigation into osmosis.

They placed 100 g of different concentrations of sucrose solution into each of five beakers.

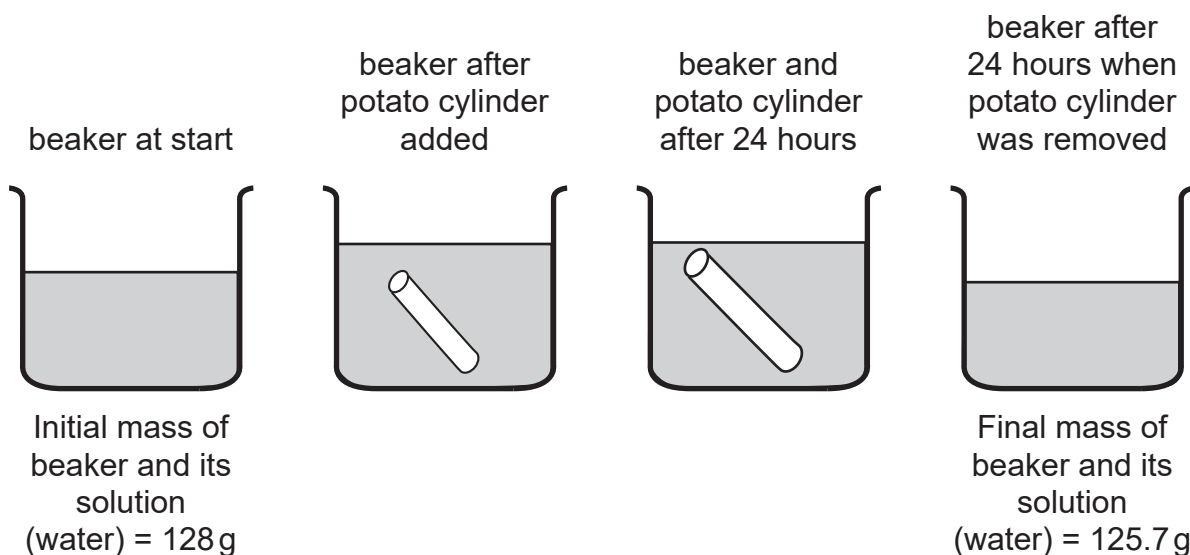
They recorded the mass of each **beaker and its solution**.

They cut five identical potato cylinders and placed one in each beaker.

After 24 hours they removed each potato cylinder and reweighed each beaker and its solution.

They calculated the **change in mass**, in grams, of each **beaker and its solution**.

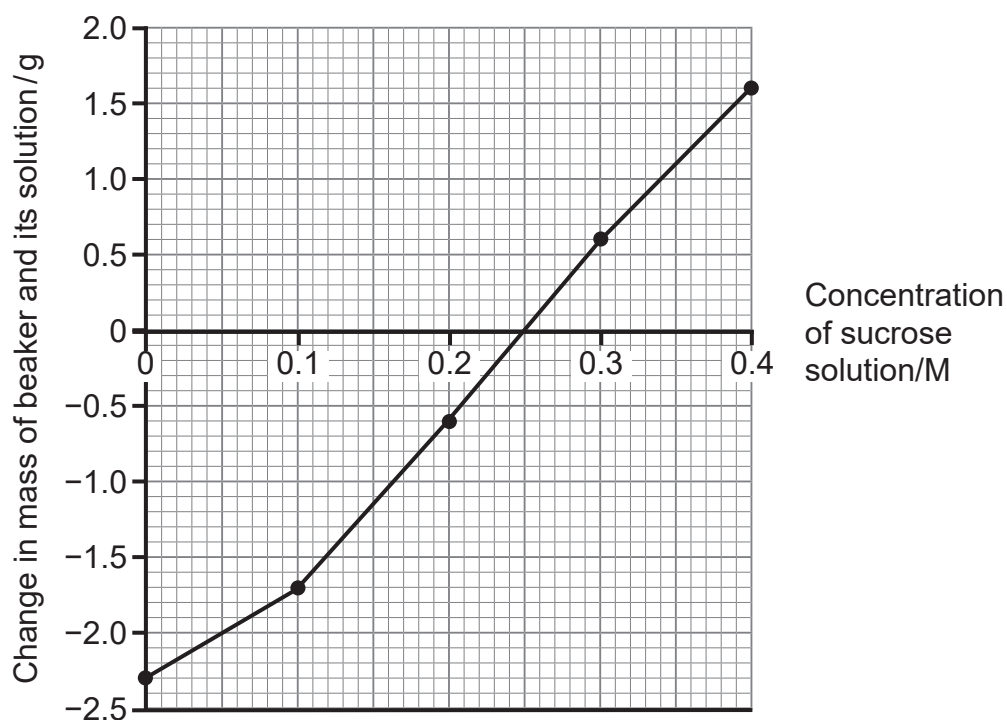
The diagram shows the experiment when the beaker contained water (0.0 M sucrose solution).



Source: Principal Examiner



The graph below shows the change in mass of each **beaker and its solution** after 24 hours.



Source: Principal Examiner

The change in mass of the beakers and their solutions after 24 hours are linked to the changes in mass of the **potato cylinders**.

- (a) Complete the table below. Write **increased**, **decreased** or **not changed** in the empty boxes to show the effect of the different concentrations of sucrose solutions on the mass of each **potato cylinder** after 24 hours.

Use the diagram opposite and the graph to help you.

Concentration of sucrose solution / M	Mass of potato cylinder has:
0.0 (water)	
0.25	
0.3	
0.4	decreased

[3]

[Turn over



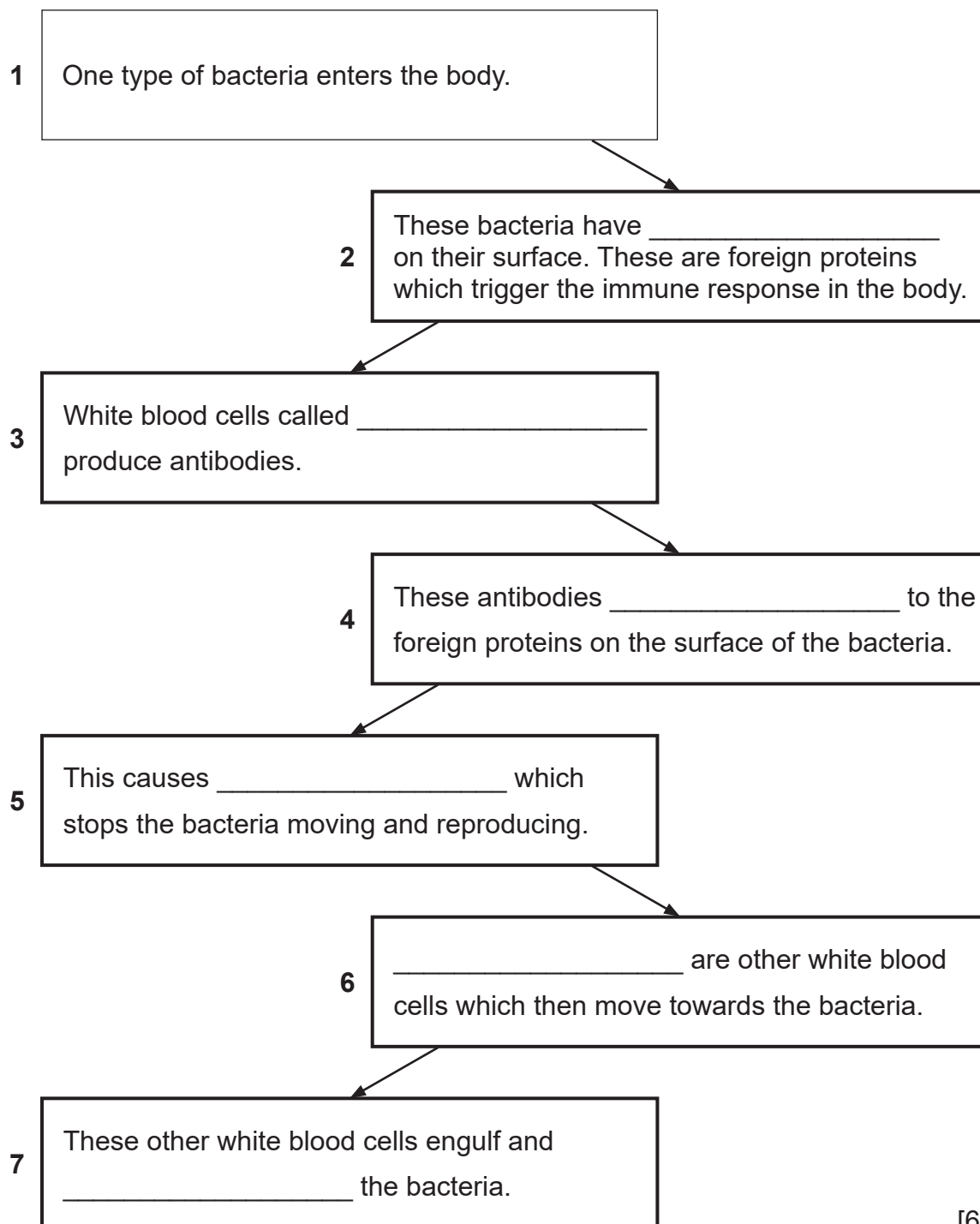
(b) Explain the results for the potato cylinder in water (0.0 M sucrose solution).

[3]



- 9 (a) The diagram below gives the sequence of events when a person is infected by one type of bacteria for the **first time**. This is called the primary response.

Complete the diagram by writing the missing words in the blank spaces in boxes 2 to 7.



[6]

[Turn over]



A secondary response occurs when the same person is infected by the same type of bacteria a second time.

- (b) Describe how antibody production in the secondary response **differs** from antibody production in the primary response.

[3]





BLANK PAGE

DO NOT WRITE ON THIS PAGE

(Questions continue overleaf)



10 (a) Mitosis and meiosis are two types of cell division.

- Give **one** place in the body where each type of cell division occurs.
- Give four statements that are **true** for mitosis but **not true** for meiosis.

In this question you will be assessed on your written communication skills and your use of specialist scientific terms.

One place in the body where each type of cell division occurs.

Mitosis

Meiosis

Four statements that are **true** for mitosis but **not true** for meiosis.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

[6]

Uncontrolled cell division can result in two different types of tumour.

(b) Give **two** features of a benign tumour and name the other type of tumour that can form as a result of uncontrolled cell division.

Two features of a benign tumour.

Name of other type of tumour.

[3]

All body cells will die if they do not receive a blood supply.

In medical trials, some tumours are being treated with drugs that reduce the blood supply to the cells in the tumour.

(c) Suggest why a reduction in blood supply causes these cells to die.

[2]



THIS IS THE END OF THE QUESTION PAPER

BLANK PAGE

DO NOT WRITE ON THIS PAGE





BLANK PAGE

DO NOT WRITE ON THIS PAGE

13124



24GDW4123

DO NOT WRITE ON THIS PAGE

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Total Marks	
-------------	--

Examiner Number

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.

