Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2025

Biology

Unit 2
Higher Tier

[GBL22]

GBL22

MONDAY 9 JUNE, MORNING

TIME

1 hour 30 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 questions in black ink and use a dark HB pencil for drawings and graphs.
Do not write with a gel pen.
Answer **all ten** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 90.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You may use a scientific calculator.
Quality of written communication will be assessed in Question **8(c)**.

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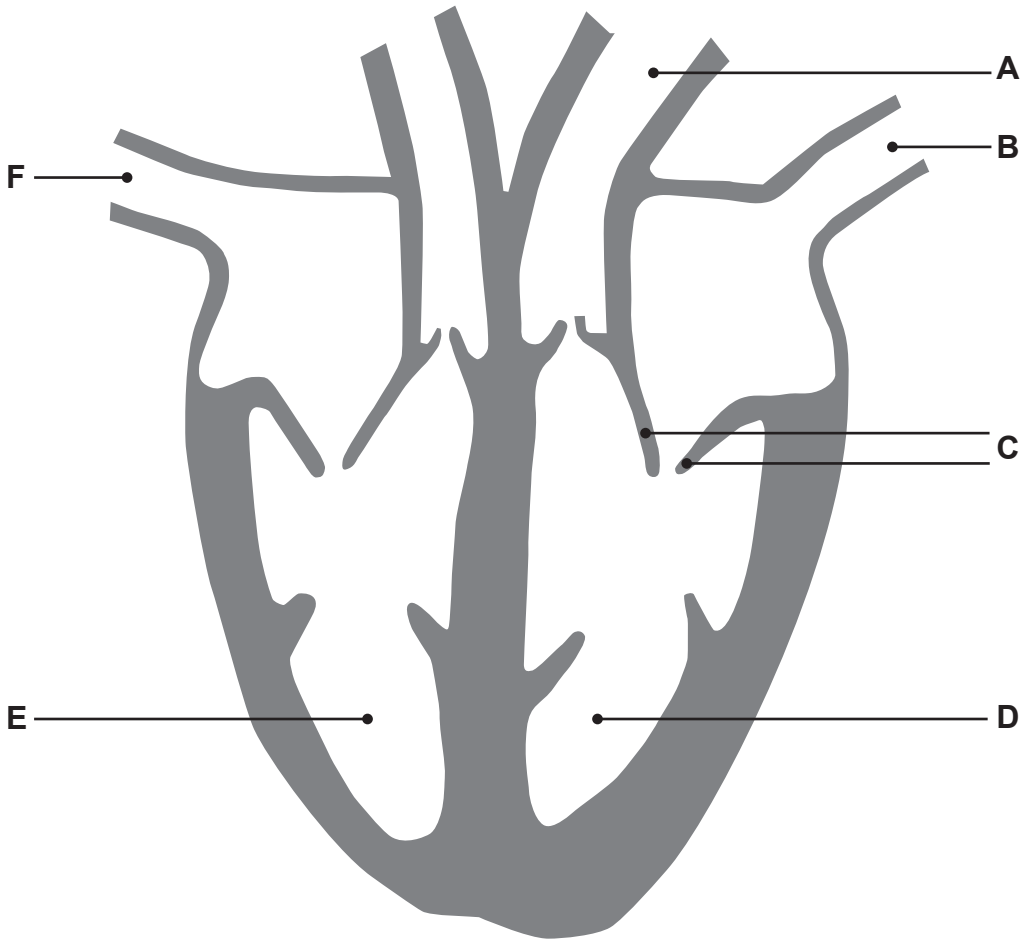
1 The diagram shows a section through the heart.



(a) Name blood vessels **A**, **B** and **F**.

A _____

B _____

F _____ [3]

(b) Name the **type** of structure labelled **C**.

Give the function of structure **C**.

Type of structure _____

Function _____

_____

_____ [3]

(c) **(i)** Describe how the pressure in chamber **D** differs from the pressure in chamber **E**.

_____ [1]

(ii) Give **two** differences between the composition of blood in heart chambers **D** and **E**.

1. _____

2. _____ [2]

2 Chlamydia is an example of a communicable disease caused by a microorganism.

(a) Give the **type** of microorganism which causes chlamydia.

_____ [1]

(b) Describe how chlamydia can spread from one person to another.

_____

_____ [1]

(c) The table shows the number of people diagnosed with chlamydia in Northern Ireland between 2017 and 2020.

Year	Number of people diagnosed with chlamydia
2017	1684
2018	1787
2019	1863
2020	775

(i) Calculate the percentage increase in the number of people diagnosed with chlamydia between **2017** and **2018**.

Give your answer to **one decimal place**.

Show your working.

_____ % [4]

(ii) Suggest **two** possible reasons why the number of people diagnosed with chlamydia decreased from 2019 to 2020.

1. _____

_____

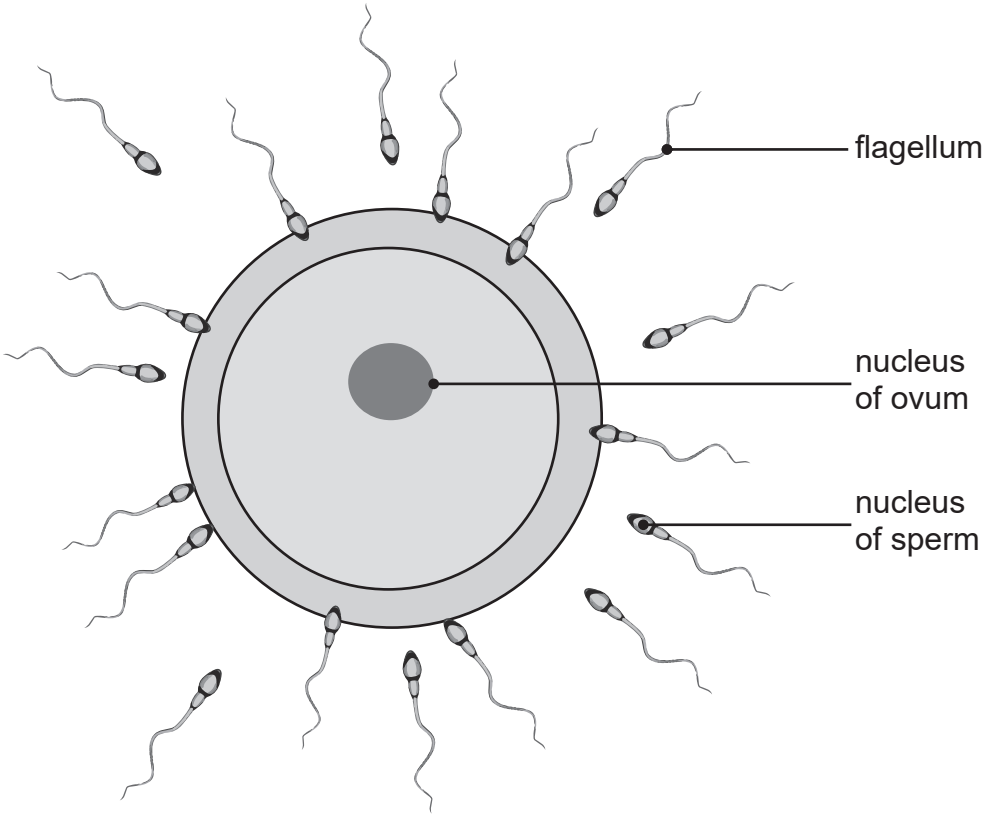
2. _____

_____ [2]

(d) Give the type of treatment used for chlamydia.

_____ [1]

3 **(a)** The diagram shows an ovum surrounded by sperm cells.



(i) Name the type of cell division which produces ova and sperm.

_____ [1]

(ii) Give the term used to describe the number of chromosomes inside the nucleus of an ovum and a sperm.

_____ [1]

A flagellum adapts the sperm to swim to an ovum.

(b) (i) Describe and explain **one other** way a sperm is adapted to swim to an ovum.

_____

_____

_____

_____ [2]

Fertilisation occurs when the nucleus of an ovum fuses with the nucleus of a sperm.

(ii) Name the cell produced by fertilisation.

_____ [1]

(iii) Give **evidence** from the diagram which suggests that fertilisation of this ovum is likely to be successful.

_____

_____ [1]

4 A plant cell was placed in water for one hour.

(a) Give the term used to describe the appearance of this cell after one hour in water.

_____ [1]

(b) **(i)** Name the part of a plant cell that is selectively permeable.

_____ [1]

(ii) Describe and explain the effect of moving a plant cell from water into a strong sugar solution.

_____

_____

_____

_____

_____

_____

_____

_____ [4]

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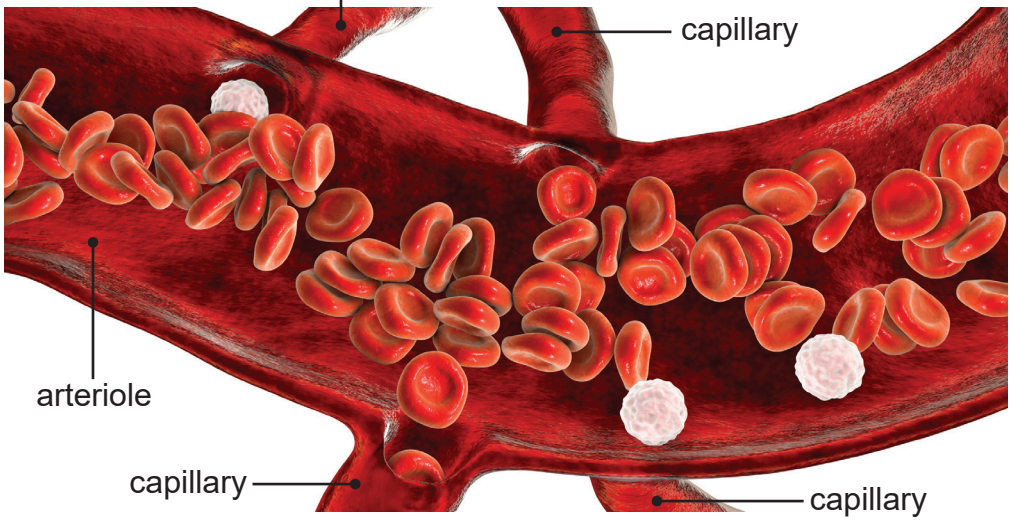
(Questions continue overleaf)

5 **(a)** An arteriole is a small blood vessel which branches off an artery and leads to capillaries.

The illustration shows red blood cells leaving an arteriole and entering the capillaries.



(i) Use evidence from the illustration to describe and explain how the **shape** of a red blood cell adapts it for gas exchange.

Description _____

_____

Explanation _____

_____ [2]

The average speed of blood flow in an arteriole is 2.4 millimetres per second and in a capillary it is 0.6 millimetres per second.

The average speed of blood flow is lower in a capillary than in an arteriole.

(ii) Calculate how many times lower.

Show your working.

_____ times [2]

(iii) Use evidence from the illustration to explain how the size of a red blood cell, compared to the size of a capillary, adapts it to increase the rate of gas exchange in a capillary.

_____

_____

_____

_____ [2]

(b) Plasma transports water to the capillaries.

Water leaves the capillaries and enters the body cells.

(i) Name **one other** substance which **leaves** the capillaries and enters the body cells.

_____ [1]

(ii) Name **two other** substances which are transported in the plasma.

1. _____

2. _____ [2]

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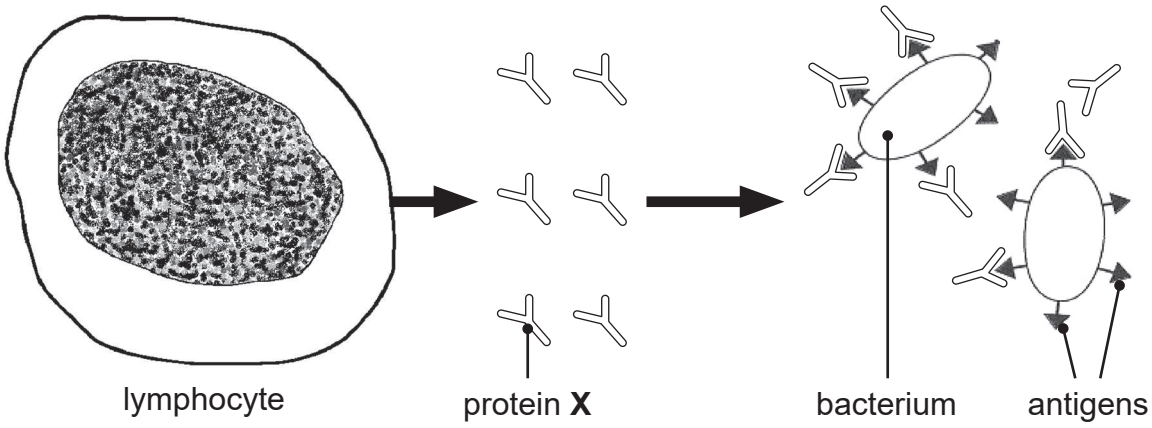
(Questions continue overleaf)

6 **(a)** The diagram shows the first response of a lymphocyte to bacteria.



(i) Name protein **X**.

_____ [1]

(ii) Name the type of immunity shown in the diagram.

_____ [1]

If the same type of bacteria invades the body again, a secondary response takes place.

(iii) Describe the immune response which takes place when the same type of bacteria invades the body a second time.

_____

_____

_____

_____

_____

_____ [3]

(b) **(i)** Name **one other** type of white blood cell.

_____ [1]

(ii) Describe the role of these white blood cells in defending the body against disease.

_____

_____

_____

_____ [2]

7 **(a)** Complete the following description of evolution.

Evolution is described as a continuing process of natural selection that leads to gradual changes in organisms over _____ .

This may result in the formation of a new species which is better _____ to survive. The failure of a species to adjust to environmental change may result in that species becoming _____ . [3]

(b) The table shows some information about the evolution of the giraffe.

Millions of years ago	Bones in neck	Body	Height / m
1			5.7
10			2.3
20			1.7

(i) Use **evidence and data** from the table to describe the changes which have occurred during the evolution of the giraffe.

_____

_____

_____

_____

_____

_____ [3]

(ii) Suggest how this evolution is an advantage to the giraffe.

_____

_____ [1]

The study of fossils provides evidence for evolution.

(iii) What is a fossil?

_____

_____ [1]

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8 A recessive allele in goats causes them to faint when they are startled.

(a) Explain what is meant by a recessive allele.

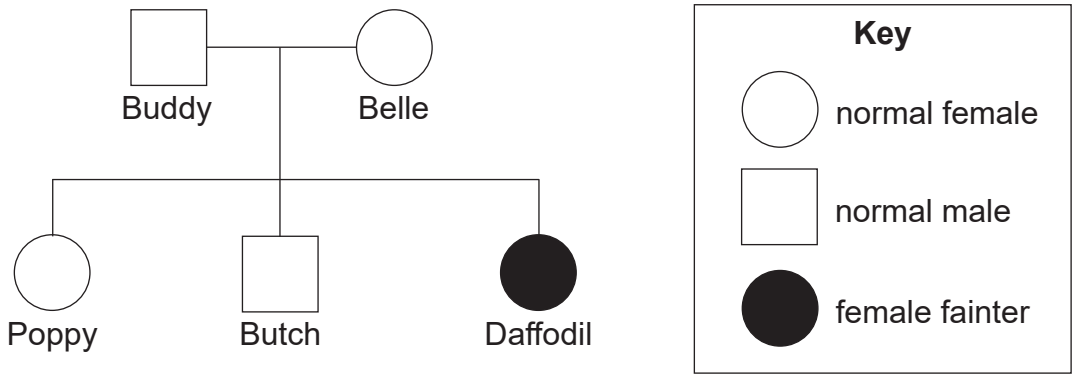
Recessive _____

_____

Allele _____

_____ [2]

The pedigree diagram shows the kids (offspring of goats) produced by two goats, Buddy and Belle.



(b) Use information from the pedigree diagram to complete the Punnett square.

Use the letter **A** to represent the normal allele and the letter **a** to represent the allele for fainting.

		Buddy	
Belle			

[3]

Poppy is a normal (non-fainter) goat.

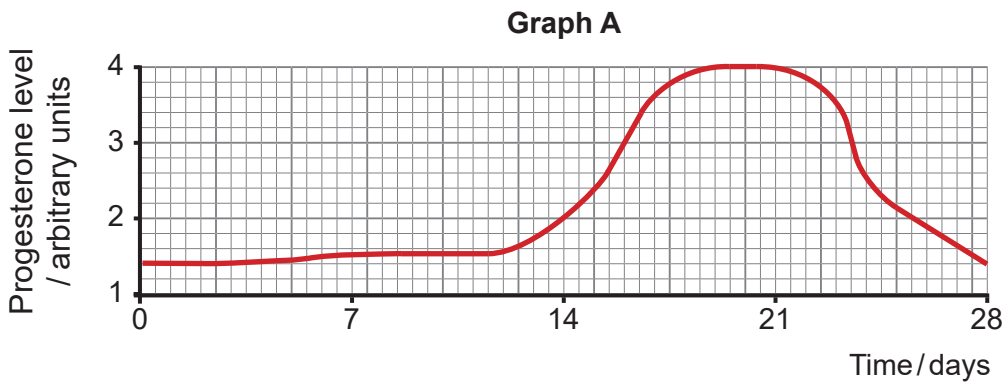
(c) Describe how a breeder could determine the genotype of Poppy.

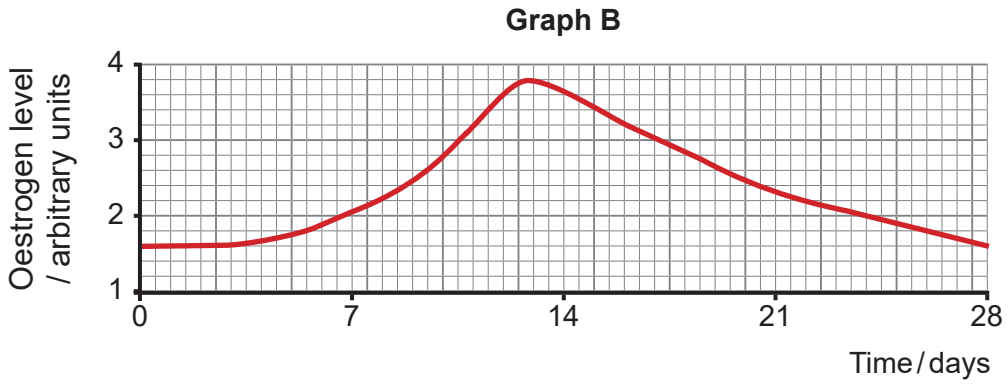
In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

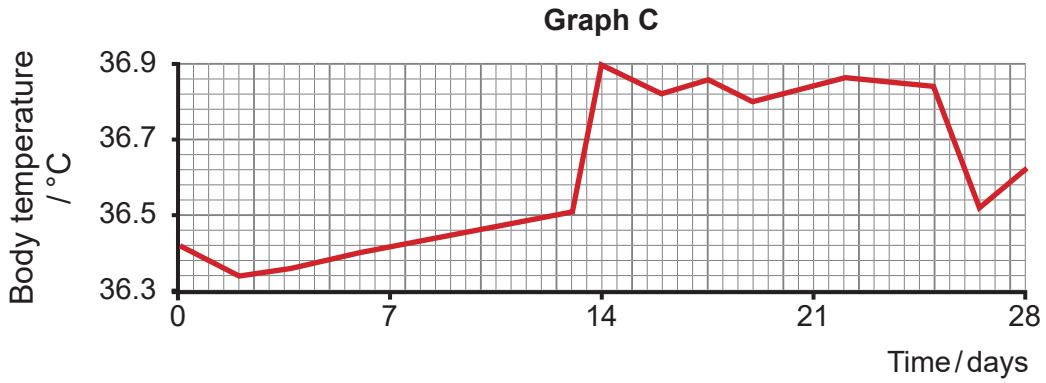
[6]

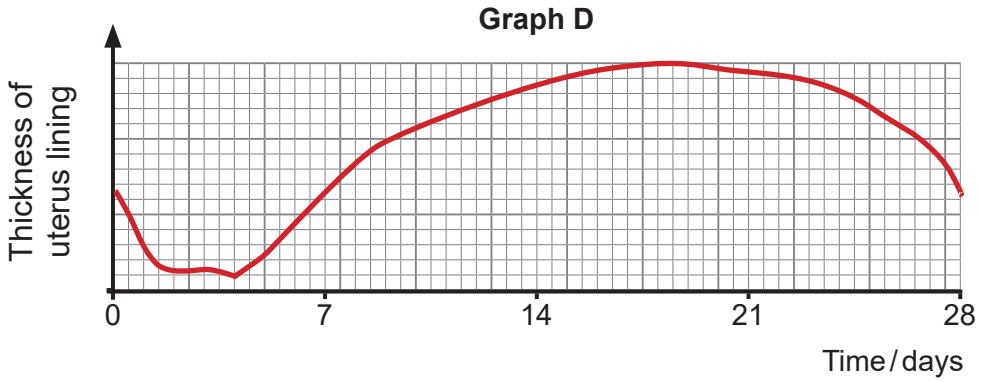
[Turn over

9 The graphs show some changes which occur during a 28-day menstrual cycle.









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(a) In this 28-day menstrual cycle, **menstruation** takes place between **day 0 and day 4**.

(i) Describe what happens to the uterus lining during this time.

_____ [1]

(ii) Use evidence from graphs **A**, **B** and **C** to suggest **two** factors which could cause menstruation to take place.

No data is required in your answer.

1. _____

_____

2. _____

_____ [2]

(b) Following menstruation, the oestrogen level (graph **B**) changes.

(i) Describe this change in the oestrogen level and give the effect of this change on the uterus lining.

_____

_____

_____

_____ [2]

(ii) Explain the importance of this change in the lining of the uterus if fertilisation had occurred.

_____

_____

_____ [1]

[Turn over

(c) Ovulation takes place on day 14.

(i) Describe the change in body temperature (graph **C**) between day 13 and day 14.

Use **data** to support your answer.

_____

_____

_____ [2]

(ii) Suggest how monitoring body temperature could be used to reduce the chances of becoming pregnant.

_____

_____

_____

_____ [2]

One type of contraceptive pill contains high levels of both progesterone and oestrogen.

(d) Use evidence from graphs **A and B** to suggest how this type of contraceptive pill works.

_____

_____

_____

_____

_____

_____ [3]

10 **(a)** Give the term used to describe the entire genetic material of an organism.

_____ [1]

(b) Describe the structure of DNA.

_____

_____

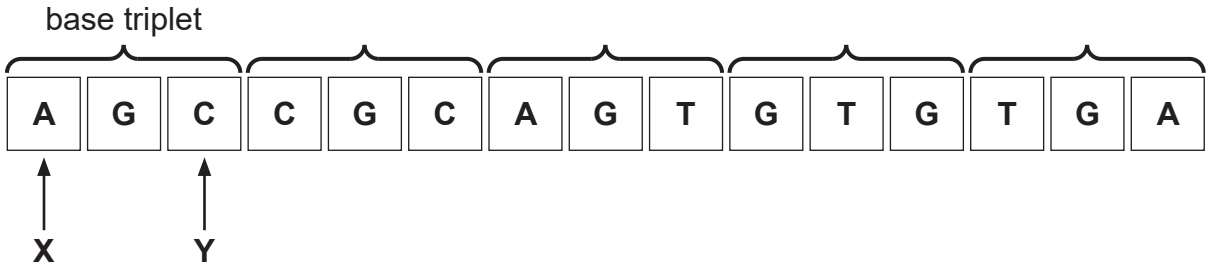
_____

_____

_____

_____ [3]

(c) The diagram shows the sequence of bases in a short length of DNA which codes for a particular protein.



The table shows the amino acids coded for by each DNA base triplet.

DNA base triplet	Amino acid
AGA	serine
AGG	serine
AGT	serine
AGC	serine
CGC	alanine
GCA	arginine
GTG	histidine
GAA	leucine
GAG	leucine
GAT	leucine
GAC	leucine
TGA	threonine
TGT	threonine

Changing the **third base** of the base triplet at position **Y** may be less harmful to the organism than changing the **first base** of the same base triplet, at position **X**.

(i) Use **evidence** from the table to explain why.

_____

_____

_____

_____

_____

_____ [3]

(ii) Complete the sequence of **amino acids** produced if the base at **position Y** was removed from the short length of DNA.

Two amino acids have been given.

	arginine		threonine

[2]

(iii) Suggest why **removing** the base at position Y may be more harmful to an organism than **changing** the base to a different base, at position Y.

_____

_____

_____

_____ [2]

THIS IS THE END OF THE QUESTION PAPER

SOURCES

Question 1: Chief Examiner
Question 2(c): www.publichealth.hscni.net
Question 3: © Getty Images
Question 5(a): © Getty Images
Question 6(a): Chief Examiner
Question 7(b): Source: Adapted from https://royalsocietypublishing.org/doi/full/10.1098/rsos.150393
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Question 10(c): Principal Examiner

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Question Number	Marks
1	
2	
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Total Marks	

Examiner Number

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