



General Certificate of Secondary Education
2019

Centre Number

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Candidate Number

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Biology

Unit 2
Foundation Tier



[GBL21]

GBL21

FRIDAY 7 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 in black ink only. **Do not write with a gel pen.**

Answer **all twelve** questions.

INFORMATION FOR CANDIDATES

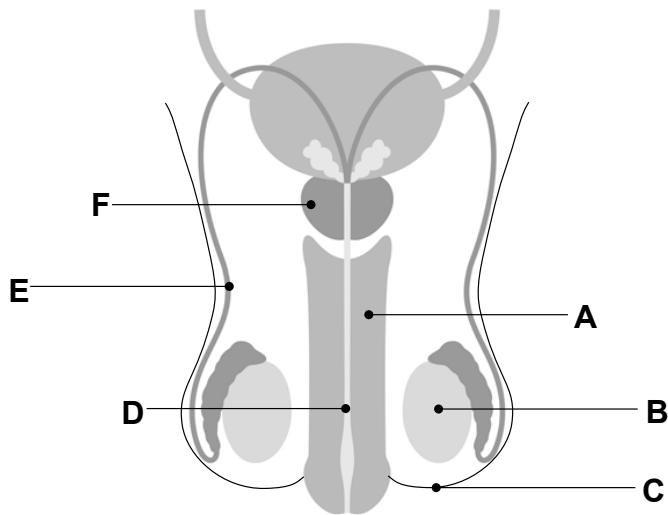
The total mark for this paper is 90.

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

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



1 The diagram shows the male reproductive system.



© Getty Images

Use the diagram to help complete the table.

Letter	Name of structure	Function
A	Penis	Places sperm into vagina
	Sperm tube	Transports sperm
B	Testis	
		Surrounds testes
	Prostate gland	Adds fluid to sperm

[5]



2 Sex hormones produce secondary sexual characteristics in males and females.

(a) Name the **male** sex hormone.

[1]

(b) Where in the body are the **female** sex hormones produced?

[1]

(c) Complete the table to show whether each secondary sexual characteristic occurs in females, males or both.

Part of the table has been completed for you.

Secondary sexual characteristic	Females	Males
Voice deepens	No	Yes
Breasts develop		
Sexual awareness increases		
Body becomes more muscular		

[3]

(d) (i) Give **one other** secondary sexual characteristic which occurs **only** in females.

[1]

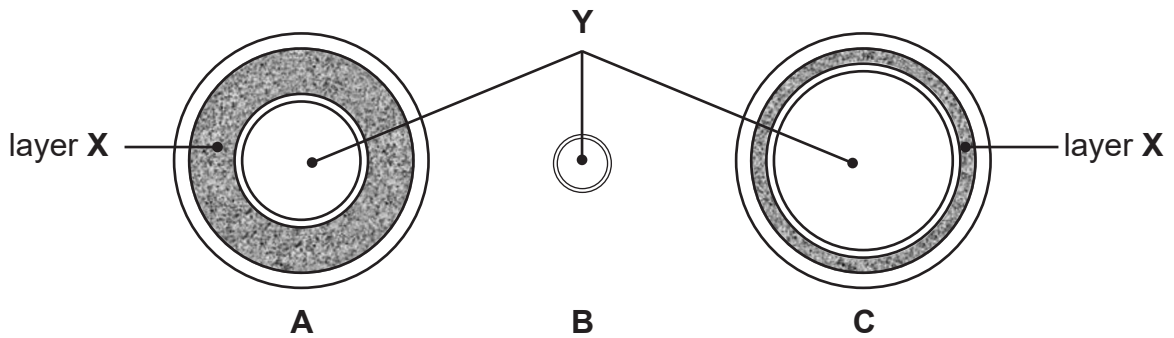
(ii) Give **one other** secondary sexual characteristic which occurs **only** in males.

[1]

[Turn over



3 The diagrams show three different types of blood vessels, **A**, **B** and **C**.



Source: Principal Examiner

Look at the diagrams.

(a) (i) Give **two similarities** between blood vessels **A** and **C**.

1. _____ [1]

2. _____ [1]

Blood flows through region **Y**.

(ii) Name region **Y**.

_____ [1]

(b) (i) Which diagram shows a capillary?

_____ [1]

(ii) Describe the role of capillaries in the circulatory system.

 _____ [1]



Layer **X** in blood vessel **A** is thicker than the same layer in blood vessel **C**.

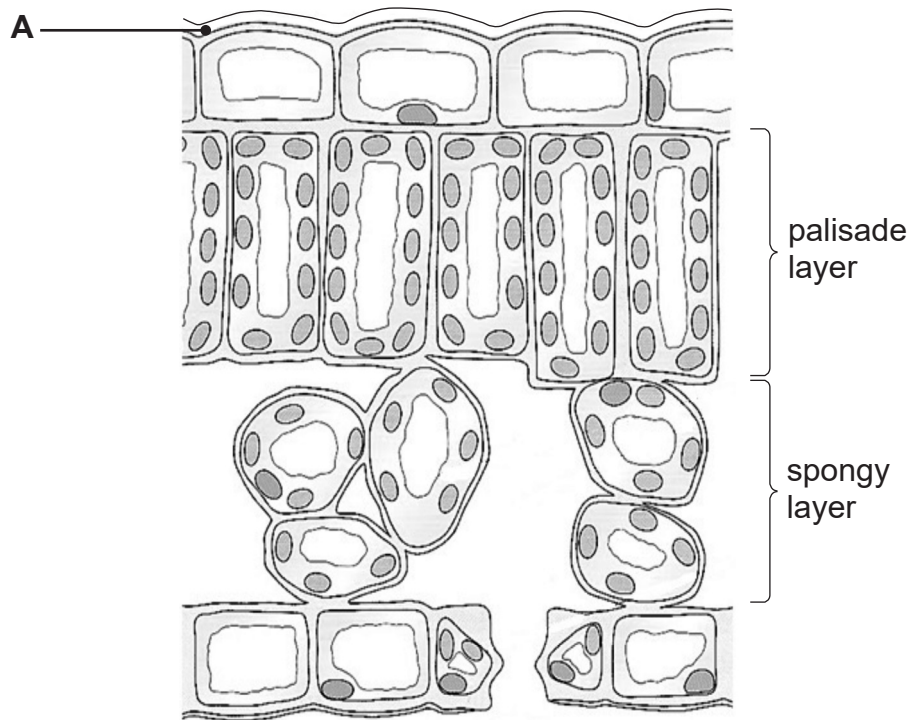
(iii) Explain why.

[2]

[Turn over



4 The diagram shows a section through a leaf.



© Science Scope Biology by Mark Winterbottom and Ceri Jones (ISBN: 9780340804766)
Published by Hodder Education, 2002. Reproduced with permission of the Licensor through PLSclear.

Look at the diagram.

(a) Name layer A.

[1]

(b) Plants have defence mechanisms to prevent the entry of harmful microorganisms into the leaf.

(i) Describe how layer A prevents the entry of harmful microorganisms.

[1]

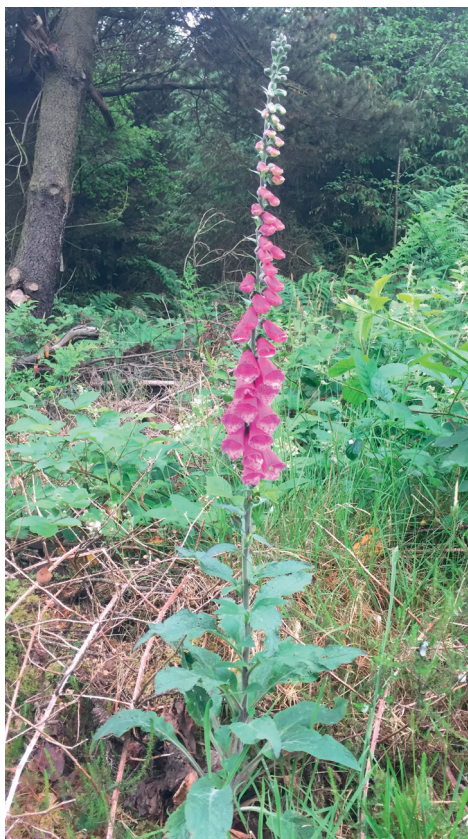
(ii) Draw an arrow on the diagram **above** to show **one other** route that microorganisms could use to enter a palisade layer cell.

[2]



Some other plants also produce chemicals to defend themselves.

The photograph shows a foxglove plant which produces the chemical digitalis.



Source: Chief Examiner

(c) Explain how digitalis helps defend the plant.

[1]

[Turn over



The human body also has defence mechanisms.

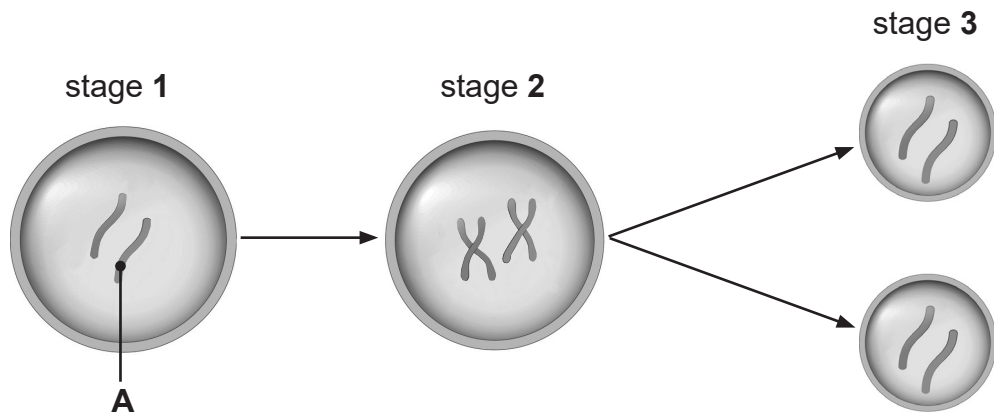
(d) Give **two** ways the human body prevents the entry of microorganisms.

1. _____ [1]

2. _____ [1]



5 (a) The diagram shows some stages of mitosis.



© Getty Images

Look at the diagram.

(i) Name structure **A**.

[1]

(ii) Name the process which has occurred between stages **1** and **2**.

[1]

(iii) Explain why the cells produced by mitosis at stage **3** are described as clones.

[1]

Mitosis allows organisms to grow.

(b) Give **one other** role of mitosis.

[1]

[Turn over



6 Flu is an example of a communicable disease.

(a) What is a communicable disease?

[1]

(b) Three types of microorganism are shown below.

Draw a **circle** around the type of microorganism which causes flu.

Bacterium

Fungus

Virus

[1]

(c) Describe how flu is spread.

[1]

(d) One way of reducing the spread of flu is through a vaccination programme.

The table shows the percentage of primary school children in the UK who received the flu vaccination and the number who had the flu from 2014 to 2016.

Year	Percentage of primary school children given a flu vaccination	Number of primary school children who had the flu per 100 000
2014	53.2	57
2015	57.9	49
2016	60.4	34



Look at the table.

- (i) Describe the relationship between the percentage of children vaccinated and the number with the flu.

[1]

In 2017, in a city with a population of 300 000 primary school children, 84 children had the flu.

- (ii) Calculate the number of primary school children **per 100 000** who had the flu in the city in 2017.

Show your working.

_____ [2]

The flu vaccine causes an individual to become immune to the disease.

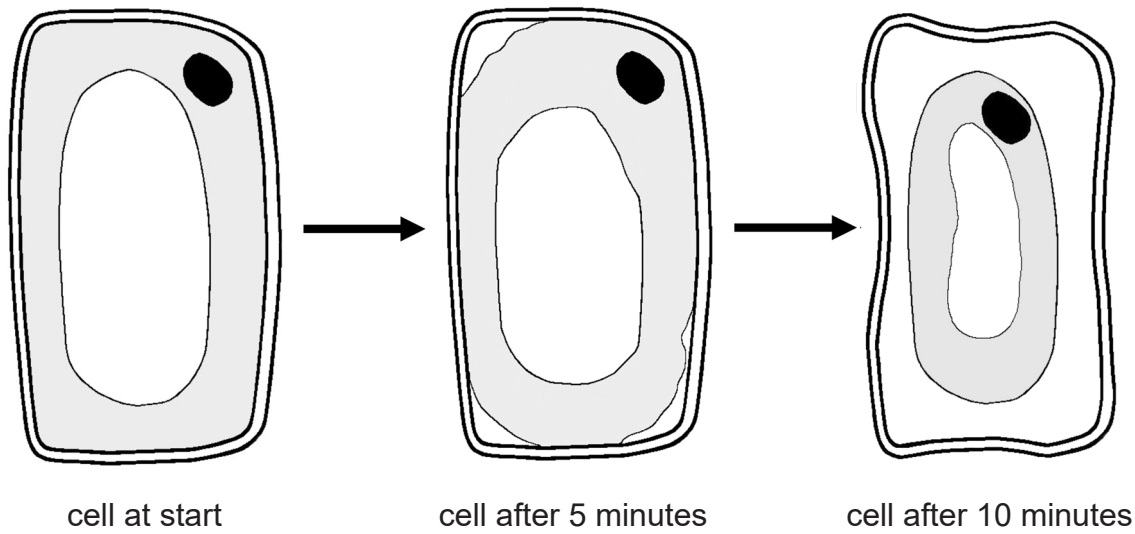
- (iii) Explain how.

[3]

[Turn over



- 7 The drawings show the changes in a plant cell when it is moved from water into a concentrated sugar solution for 10 minutes.



Source: Chief Examiner

Look at the drawings.

- (a) (i) Give the time when the cell is fully plasmolysed.

Time _____ [1]

- (ii) Give **two** pieces of evidence from the drawings to explain your choice.

1. _____ [1]

2. _____ [1]



(b) (i) Name the process which caused plasmolysis in the cell.

[1]

(ii) Explain how this process caused the changes shown in the plasmolysed cell.

[3]



8 The gene for coat colour in mice has two alleles.

(a) What is an allele?

[1]

The allele for brown coat colour is dominant to the allele for white coat colour.

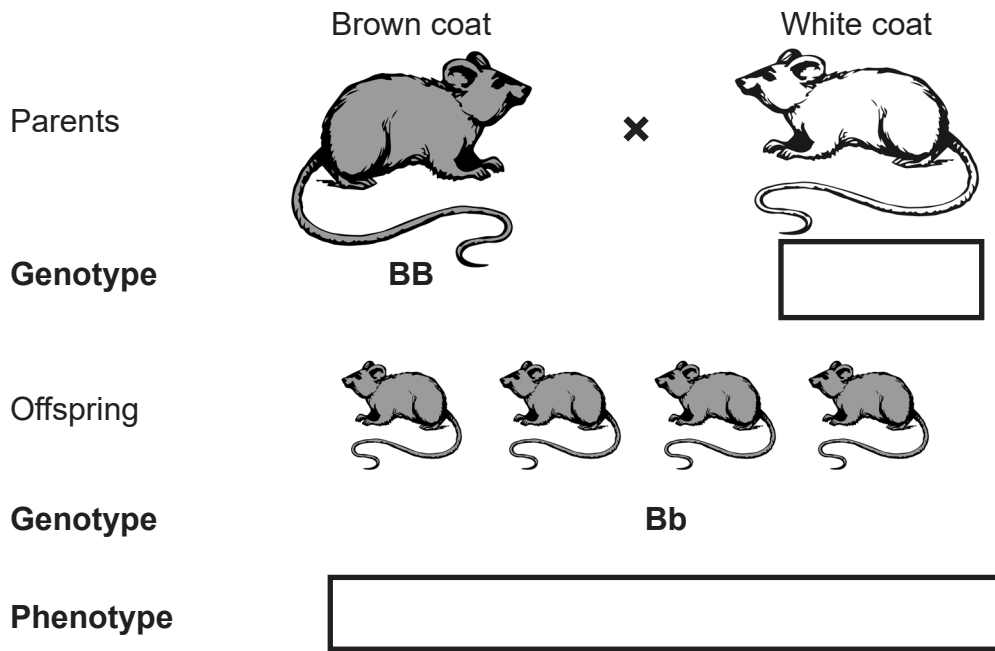
Let **B** be the allele for brown coat colour.

Let **b** be the allele for white coat colour.

(b) Give the genotype of a mouse that is heterozygous for coat colour.

[1]

The diagram shows a cross between a brown and a white mouse.



© Getty Images



(c) Complete the diagram opposite to show:

- the genotype of the parent white mouse and [1]
- the phenotype of the offspring. [1]

(d) Two of the offspring were then crossed.

(i) Complete the Punnett square to show the possible offspring of this cross.

Gametes

		B	b
B			
b			

Gametes

[2]

(ii) What is the ratio of brown to white mice produced in this cross?

[1]

[Turn over



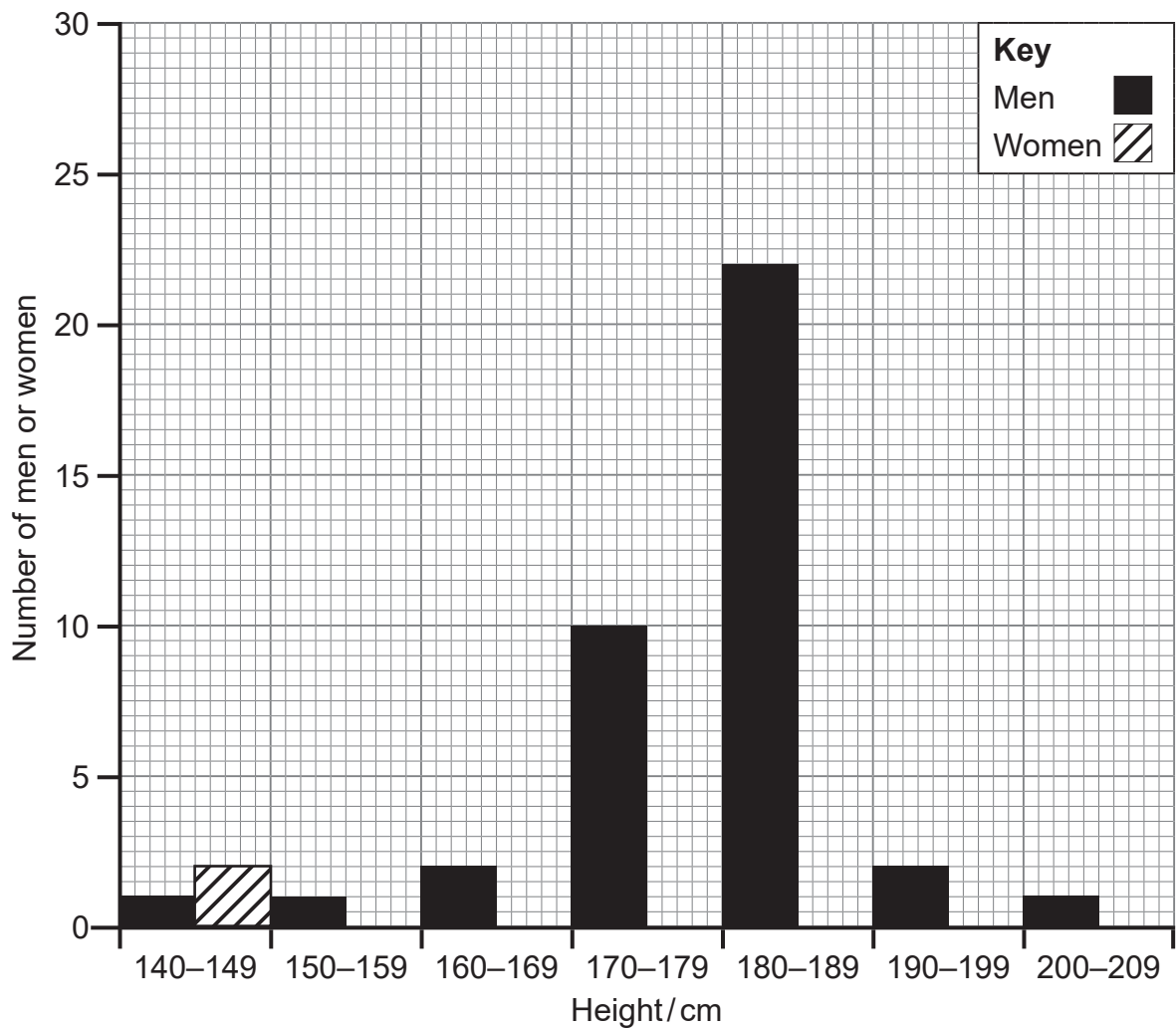
9 The table shows the height of the men and women in a village.

Height/cm	Number of men	Number of women
140–149	1	2
150–159	1	3
160–169	2	25
170–179	10	5
180–189	22	0
190–199	2	0
200–209	1	0

(a) Use the data in the table to complete the graph below by drawing the bars for the number of women.

The first bar for women has been completed for you.

[3]



Look at the table and the graph.

(b) Give **two** differences in the variation of height between the men and women from the village.

1. _____ [1]

2. _____ [1]

The graph shows that height is an example of continuous variation.

(c) Explain how.

Use evidence from the table or graph to support your answer.

_____ [3]

(d) Give the **two** types of factors which cause variation in living organisms.

1. _____ [1]

2. _____ [1]

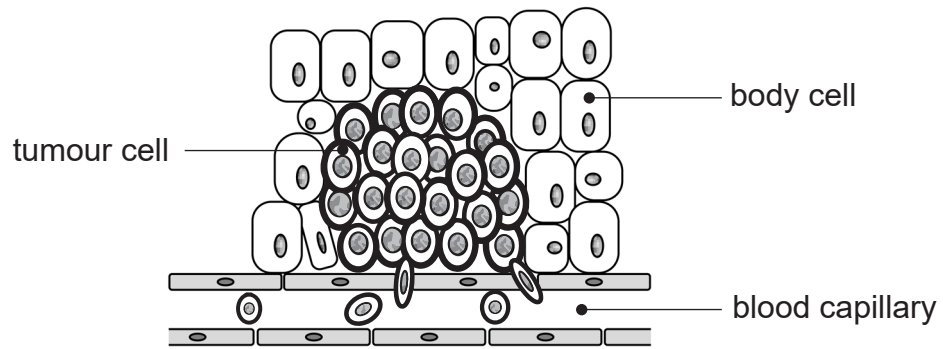
[Turn over



11 (a) What is cancer?

[2]

The diagram shows a malignant tumour.



Source: Chief Examiner

Look at the diagram.

(b) Give **two** differences between the structure of body cells and tumour cells.

1. _____

_____ [1]

2. _____

_____ [1]

[Turn over

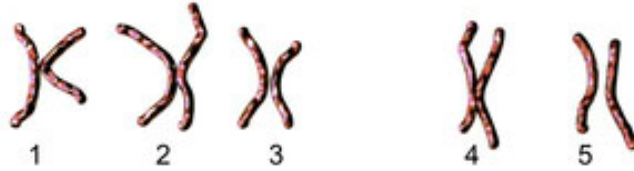


(c) The drawings show the chromosomes of a normal body cell and the chromosomes of a cancer tumour cell from the same person.

Row

Normal body cell

1



2



3



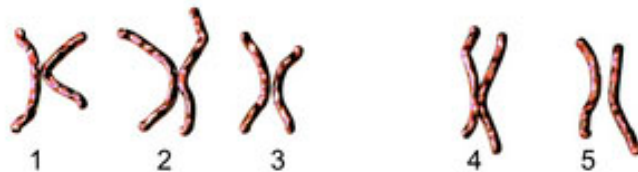
4



Row

Cancer tumour cell

1



2



3



4



Look at the drawings.

(i) How can you tell the person is male?

_____ [1]

Look at rows 1 and 2 in both drawings.

(ii) Give the numbers of **two** chromosome pairs that differ in the cancer tumour cell compared to those in the normal body cell.

_____ and _____ [1]

(iii) What term describes these random changes in the chromosomes (DNA) of a cancer tumour cell?

_____ [1]

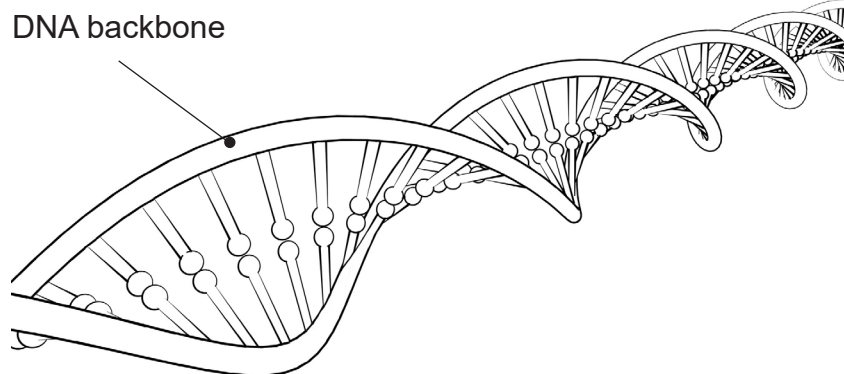
(d) Explain why screening programmes are important in the treatment of cancer.

_____ [2]

[Turn over



12 (a) The diagram shows a model of part of a DNA molecule.



© Getty Images

Look at the diagram.

(i) What term describes the shape of the DNA molecule?

_____ [1]

(ii) Name the **two** molecules that make up the backbone of the DNA molecule.

_____ and _____ [2]

(iii) Name the part of the cell where DNA is found.

_____ [1]

(iv) Describe how the DNA of individuals differs.

_____ [2]



(b) The table shows the percentage of bases in the DNA of different organisms.

Organism	Adenine	Cytosine	Guanine	Thymine
Human	30.9	19.8	19.9	29.4
Grasshopper	29.3	20.8	20.6	29.3
Yeast	31.3	17.1	18.7	32.9
Bacterium		18.0		

(i) Complete the table for bacterial DNA using the base pairing rules. [3]

Show your working.

(ii) Give **three** conclusions about the percentage of the base cytosine in these four organisms.

1. _____

[1]

2. _____

[1]

3. _____

[1]



THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
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5	
6	
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10	
11	
12	

Total Marks	
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Examiner Number

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