

During step 1 the woman receives a hormone injection.

(b) What effect does this injection have on the ovaries?

_____ [1]

(c) Describe the process of *in vitro* fertilisation at step 3.

_____ [2]

(d) Suggest **two** reasons why the government introduced regulations which allow doctors to transfer only two embryos at step 5.

1. _____ [1]

2. _____ [1]

(e) Give **two** causes of infertility in males.

1. _____ [1]

2. _____ [1]

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Total Question 6	

[Turn over



- 7 The table shows the results of an experiment carried out to investigate the effect of placing potato cylinders into a range of sugar solutions kept at the same temperature for 24 hours.
All the potato cylinders were taken from the same potato.

Concentration of sugar solution/M	Initial mass of potato cylinder/g	Final mass of potato cylinder/g	Change in mass of potato cylinder/g	Percentage change in mass of potato cylinder
0.0	4.00	4.80	+0.80	+20.0
0.2	4.28	4.75	+0.47	
0.4	3.95	4.03	+0.08	+2.0
0.6	4.00	3.72	-0.28	-7.0
0.9	4.20	3.36	-0.84	-20.0

- (a) Use the information given to suggest **two** ways the experiment was a fair test.

_____ [2]

- (b) Complete the table by calculating the percentage change in mass of the potato cylinder placed in 0.2 M solution.
Show your working.

[2]

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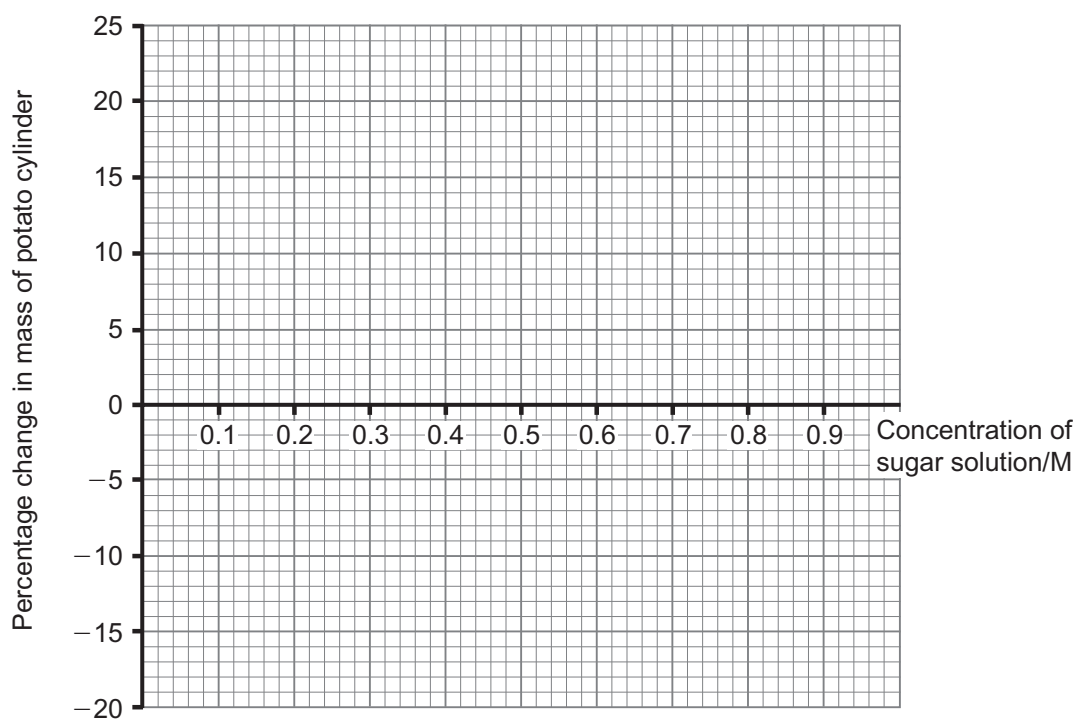


(c) Explain the percentage change in mass of the potato cylinder placed in 0.6 M solution.

_____ [3]

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(d) Draw a line graph of these results on the grid provided.



[3]





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- 8 The table shows the percentage of adults who have a high concentration of cholesterol in their blood.

Year	Percentage of adults who have a high concentration of cholesterol in their blood	
	Men	Women
1998	75	77
2005	58	61

Adapted from: www.heartstats.org

- (a) Describe **one** trend shown in the table.

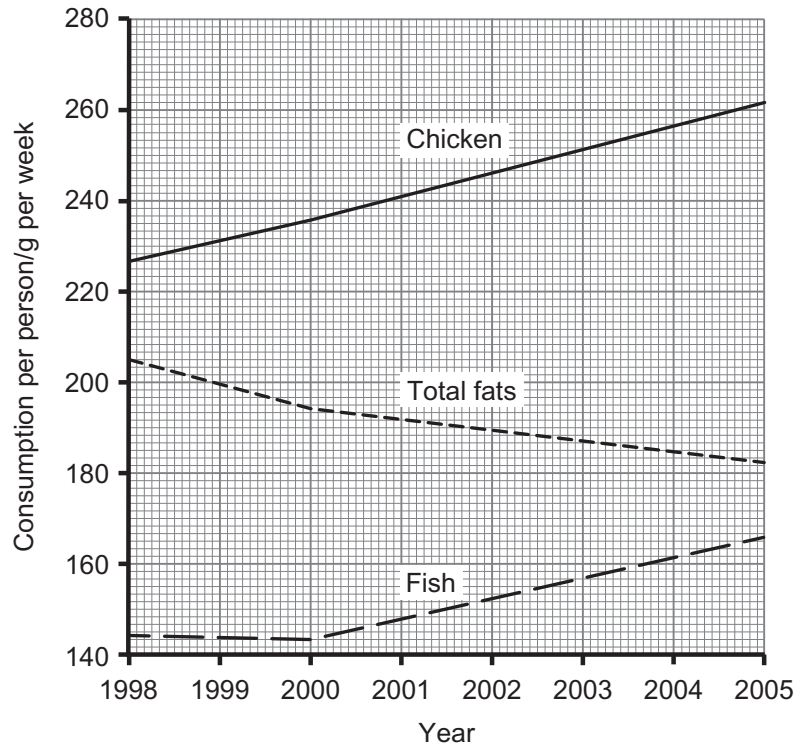
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One of the factors causing high cholesterol in blood is the fat in a person's diet.

The graph shows the consumption of fish, chicken and total fats between 1998 and 2005 by adults.



Source: www.heartstats.org

(b) Use data from the graph and the table to help explain why the percentage of adults who have a high concentration of cholesterol in their blood has changed between 1998 and 2005.

[4]

Examiner Only	
Marks	Remark

[Turn over



9 (a) Name the chamber of the heart which

receives deoxygenated blood from the vena cava.

[1]

pumps oxygenated blood into the aorta.

[1]

(b) Explain the role of the valve between the heart and the pulmonary artery.

[2]

(c) Name the blood vessel which returns blood from the brain to the heart.

[1]

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Marks Remark

Total Question 9

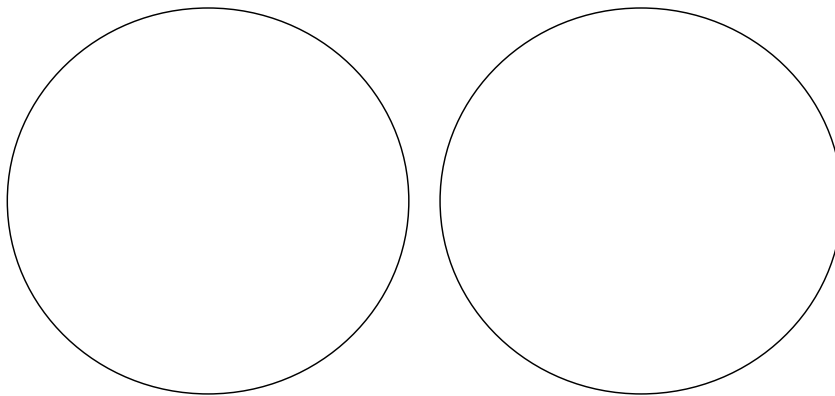
[Turn over



10 (a) The diagram shows chromosomes during cell division.



(i) **Complete the diagrams** below by drawing the chromosomes of the daughter cells that would be produced when this cell divided by mitosis.



[2]

Mitosis is used in asexual reproduction and cloning.

(ii) Give **two** other ways mitosis is used in living organisms.

1. _____

[1]

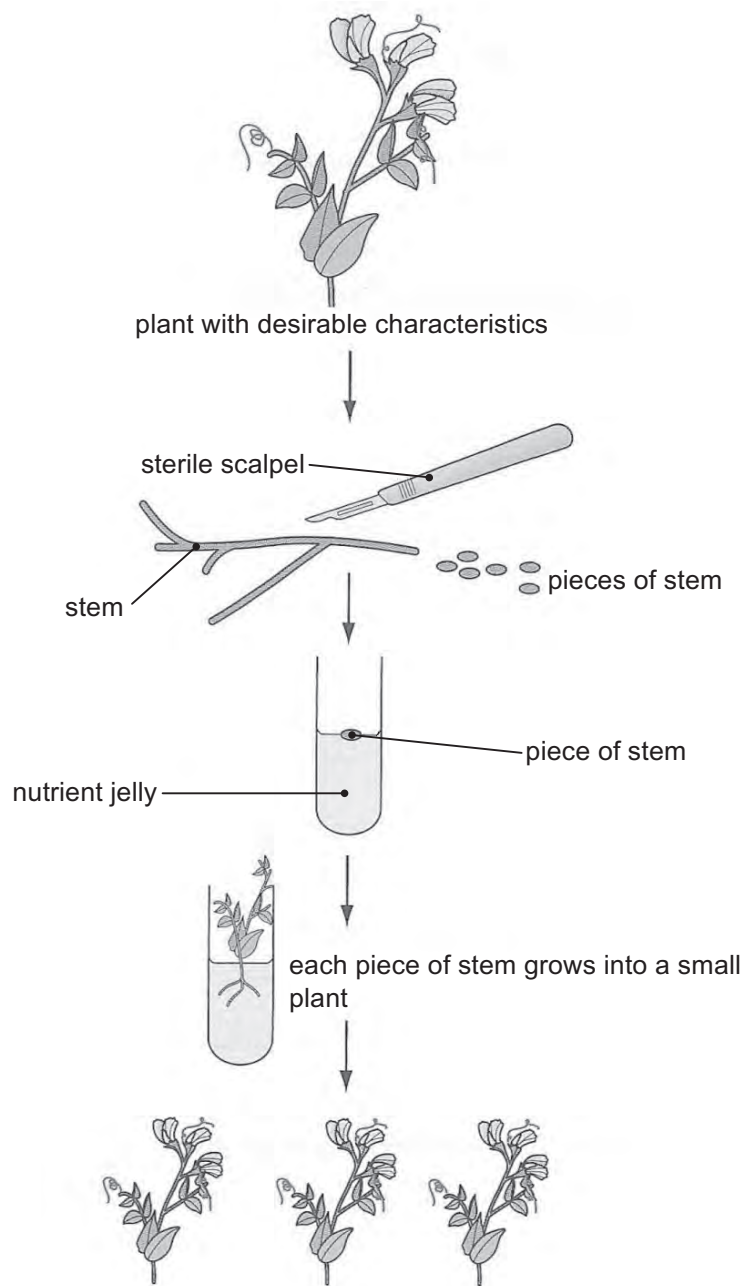
2. _____

[1]

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Marks	Remark



(b) The diagram shows some steps involved in cloning plants.



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- (i) Suggest why the scalpel used to cut the pieces of plant stem must be sterile.

_____ [1]

Examiner Only	
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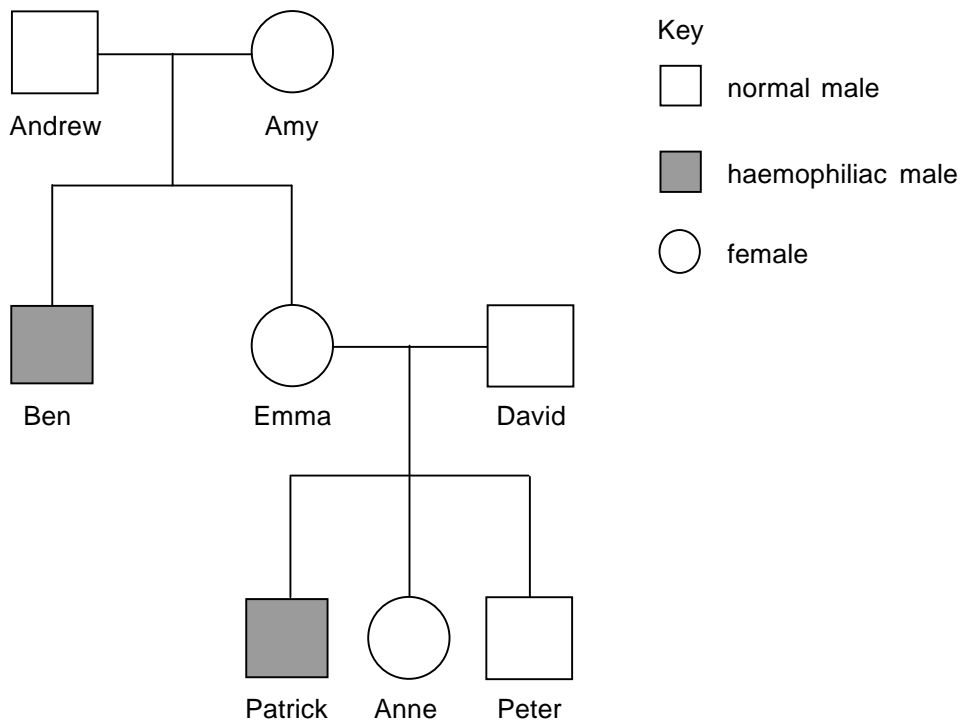
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11 Haemophilia is a recessive sex-linked inherited disorder.

The diagram shows a family tree.



Use the following symbols to help answer the questions.

X^H for the normal allele.

X^h for the recessive haemophiliac allele.

(a) Use evidence from the diagram to explain why Amy must be a carrier of haemophilia.

[2]

Examiner Only	
Marks	Remark



(b) Explain using the Punnett square, the genotypes and phenotypes of each of Emma and David's children.

		David's gametes	
Emma's gametes			

[4]

Phenotypes

Patrick _____ [1]

Peter _____ [1]

Anne _____

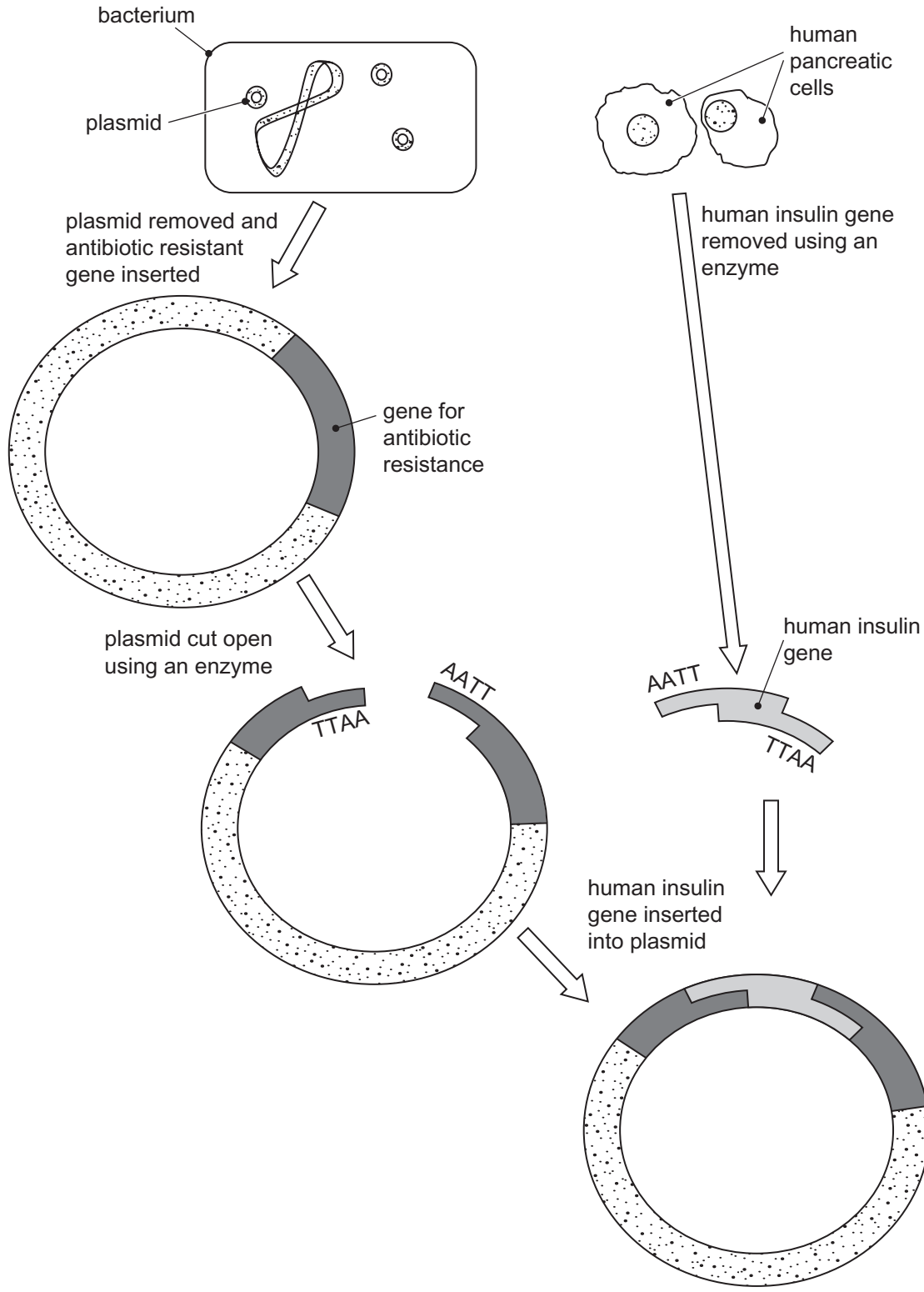
_____ [2]

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Total Question 11	

[Turn over



12 The diagram shows some of the steps involved in the production of a genetically modified bacterium containing the human insulin gene.



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(e) Give **three** stages involved in downstream processing once the insulin has been produced in the fermenter.

[3]

Before genetically engineered human insulin was available, people with diabetes used animal insulin.

(f) Give two advantages of using genetically engineered human insulin rather than animal insulin.

1. _____

2. _____

[2]

(g) Suggest **two other** factors which scientists have to take into consideration when making decisions about implementing new scientific techniques.

[2]

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Total Question 12	

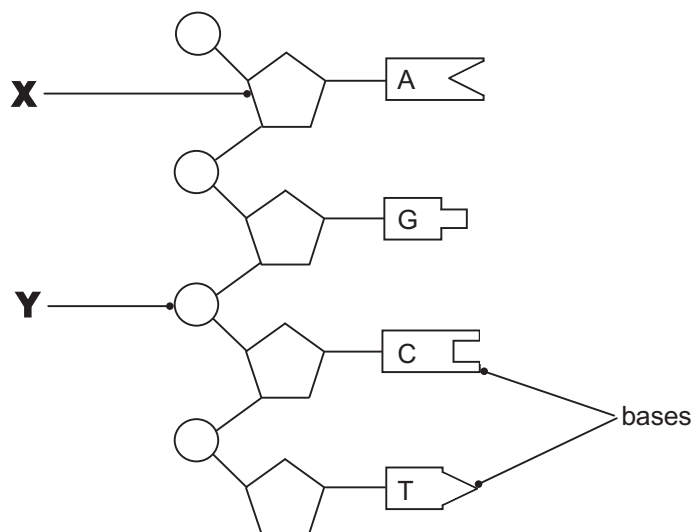




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13 The diagram shows part of a strand of DNA.



(a) Name the chemicals **X** and **Y**.

X _____ [1]

Y _____ [1]

(b) What term is used to describe the three-dimensional shape of a DNA molecule?

_____ [1]

Examiner Only

Marks Remark



(c) Describe how using different lines of evidence led scientists to the discovery of the structure of DNA.

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

[6]

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(d) The results of research into the percentage of each of the bases present in the DNA of five people are shown in the table.

Person	Percentage of base in DNA			
	A	T	G	C
1	30.9	29.7	19.9	20.1
2	28.9	29.8	22.4	19.5
3	29.2	29.6	19.1	21.3
4	29.7	30.1	21.2	21.0
5	28.3	29.3	20.4	19.6
Average	29.4	29.7	20.6	

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(i) **Complete the table** by calculating the average percentage of the base C. [1]

(ii) Suggest why the results for each base are considered to be reliable.

_____ [1]

(iii) What **two conclusions** can be made from these results about the percentage of the bases present in these samples of DNA?

1. _____ [1]

2. _____ [1]

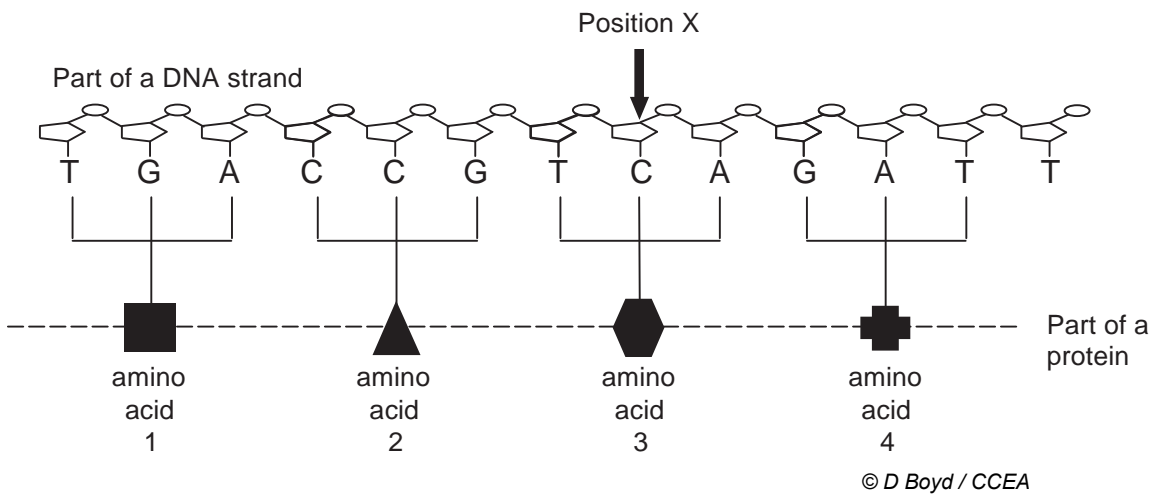
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(e) The diagram shows how the bases on part of a DNA strand are used as a code.

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(i) Explain the effect of a random change in the DNA molecule at position X from base C to G.

_____ [2]

(ii) What name is given to such a change in the DNA molecule?

_____ [1]

(iii) Give the cause and effect of such a change in the DNA of skin cells.

Cause _____ [1]

Effect _____ [1]

[Turn over



(iv) Suggest **two** possible consequences of a random change in the DNA molecule during meiosis.

[2]

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Total Question 13

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Examiner Number

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