Write your name here

Surname	Other names

Centre Number | Candidate Number

Edexcel GCSE

Biology/Additional Science

Unit B2: The Components of Life

Higher Tier

Friday 1 March 2013 – Morning
Time: 1 hour

Paper Reference
5BI2H/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P41957A

1/1/1/1/

P 4 1 9 5 7 A 0 1 2 0

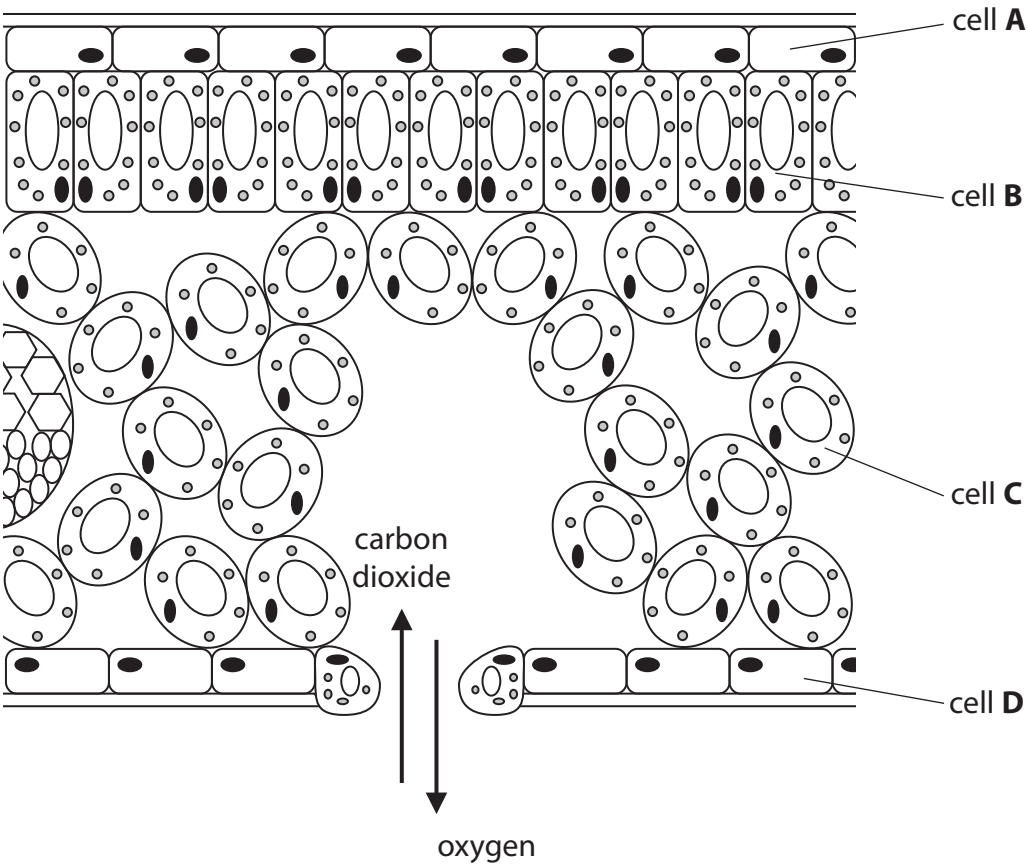
PEARSON

Answer ALL questions

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Plant processes

1 (a) The diagram shows a section through a leaf.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The cell that will make the **most** glucose is

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(ii) Describe how carbon dioxide enters the leaf.

(2)

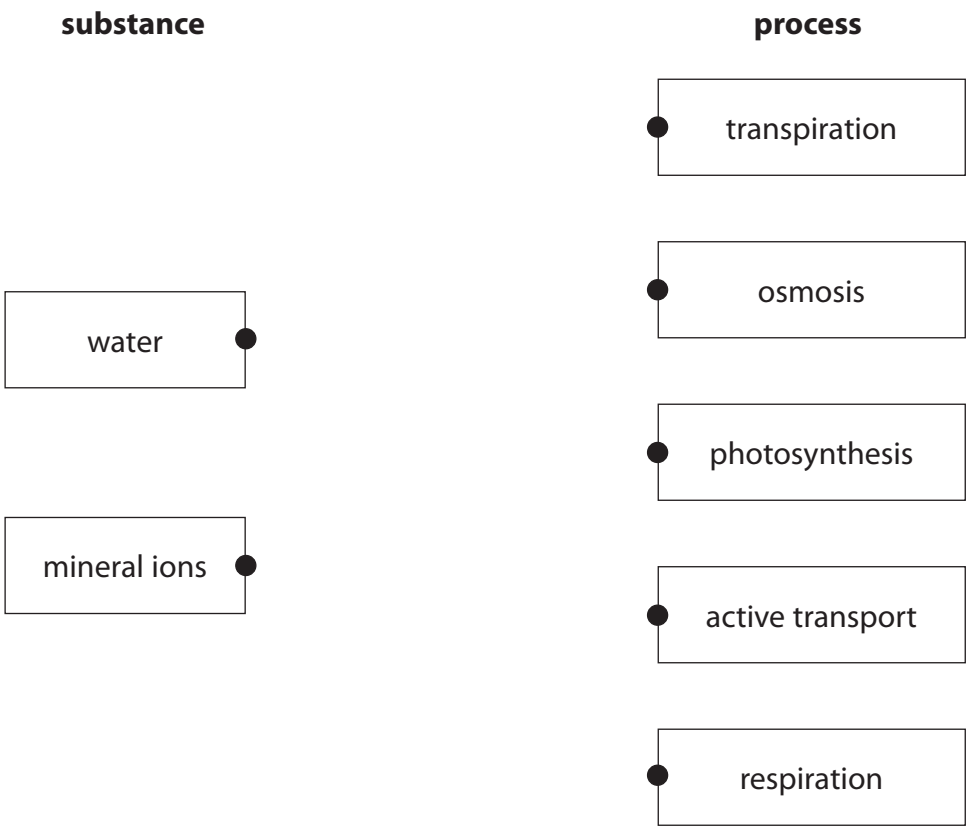
(iii) Describe the process that takes place in the leaf to produce oxygen.

(3)

(b) Root hair cells take in water and mineral ions from the soil.

Draw **one** straight line from each substance to the process by which it enters the root hair cell.

(2)



(Total for Question 1 = 8 marks)

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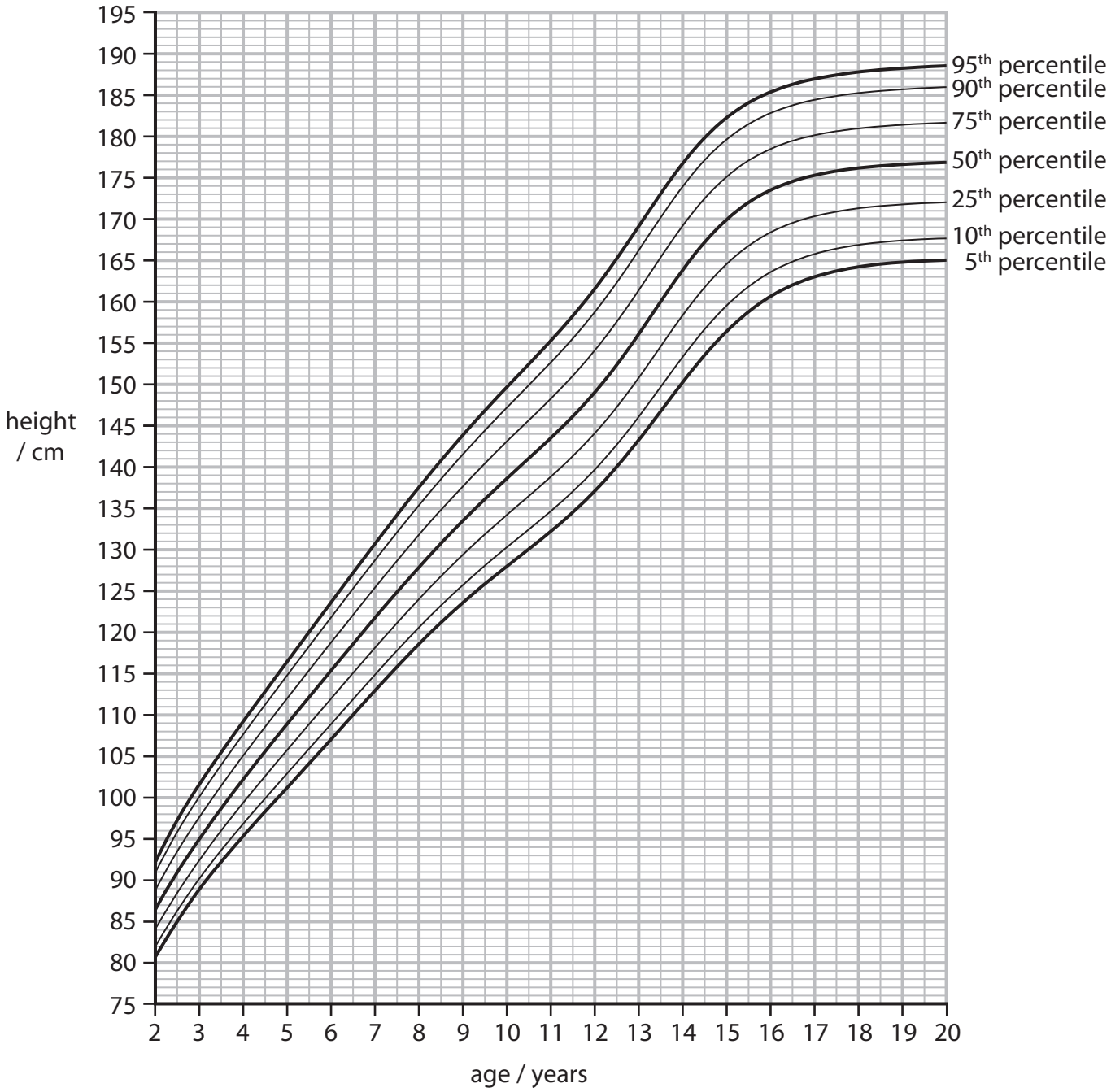
Question 2 is on the next page

Growth

2 Height can be used to monitor growth.

(a) The graph shows a percentile chart for height for males aged between 2 and 20 years.



(i) Describe how the height of males changes from the age of 2 to 20 years.

(2)

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(ii) Calculate the difference in height of an 11 year old male in the 95th percentile and an 11 year old male in the 5th percentile.

(2)

answer = ... cm

(iii) Explain what is meant by the 95th percentile on this graph.

(2)

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(b) Protein is needed for growth.

(i) Name the first stage of protein synthesis.

(1)

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(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The second stage of protein synthesis produces a

(1)

☒ **A** polypeptide made of amino acids

☒ **B** polypeptide made of bases

☒ **C** strand of mRNA made of amino acids

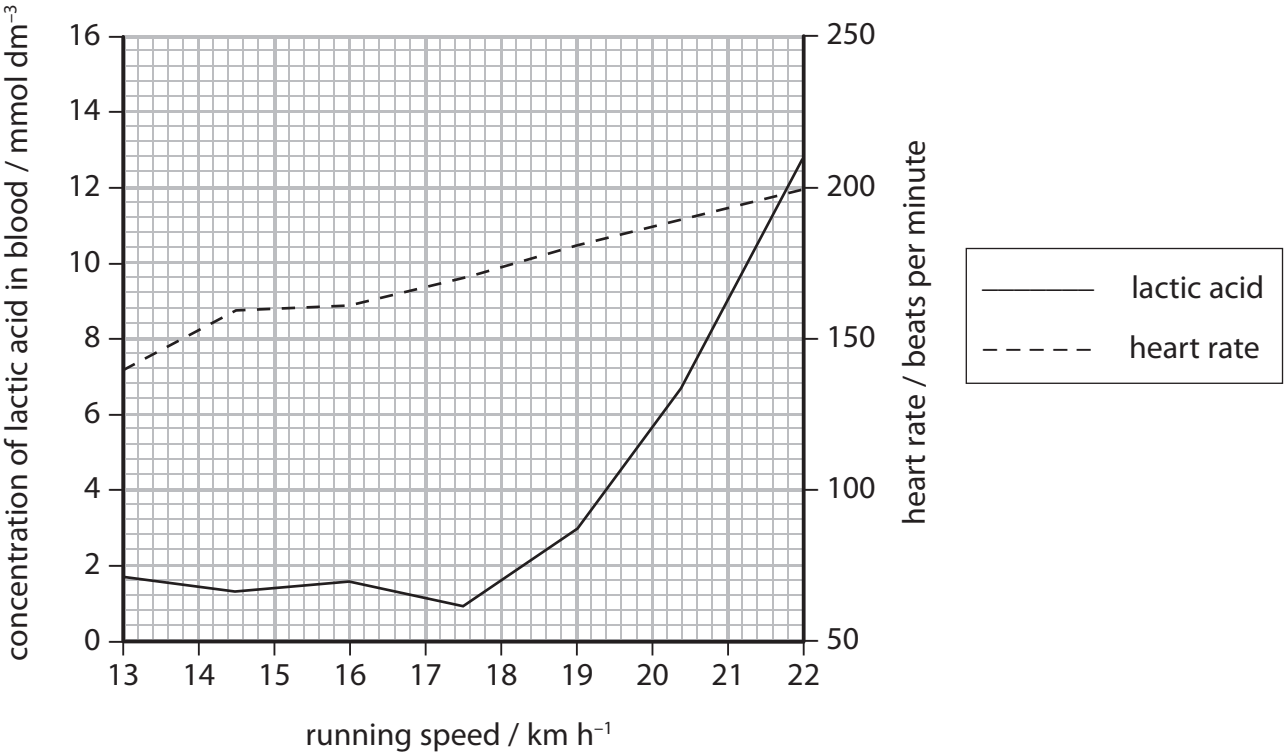
☒ **D** strand of mRNA made of bases

(Total for Question 2 = 8 marks)

Distance running

3 In an investigation, a person ran at different speeds.

(a) The graph shows the concentration of lactic acid in the blood and the heart rate of this person while running.



(i) When the running speed is 22 km h^{-1}, the stroke volume of the runner is 0.18 dm^3.

Calculate the cardiac output of the runner using the equation.

cardiac output = stroke volume × heart rate

(2)

answer = ... dm^3 per minute

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

When the heart rate is at its maximum the concentration of lactic acid in the blood is

(1)

☒ **A** 11.2 mmol dm^{-3}

☒ **B** 12.8 mmol dm^{-3}

☒ **C** 200.0 mmol dm^{-3}

☒ **D** 210.0 mmol dm^{-3}

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

The graph shows that

☒ **A** as the heart rate increases the concentration of lactic acid increases

☒ **B** as the concentration of lactic acid increases the heart rate decreases

☒ **C** the concentration of lactic acid increases as running speed increases

☒ **D** the concentration of lactic acid is not dependent on heart rate

(iv) Explain why the concentration of lactic acid changes at running speeds greater than 18 km h^{-1}.

(3)

(b) After running the person rested.

Explain why the concentration of lactic acid in the blood changes whilst resting.

(3)

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(Total for Question 3 = 10 marks)

Herbicide-resistant weeds

4 Genetic engineering can be used to produce plants that are resistant to herbicide.

One herbicide works by preventing the activity of an enzyme.

Some bacteria have a form of this enzyme that is not affected by the herbicide.

(a) Suggest how genetic engineering can be used to produce plants resistant to this herbicide.

(3)

(b) This herbicide is sprayed onto the leaves of plants.

Suggest which vessel could transport the herbicide from the leaf to other parts of the plant.

(1)

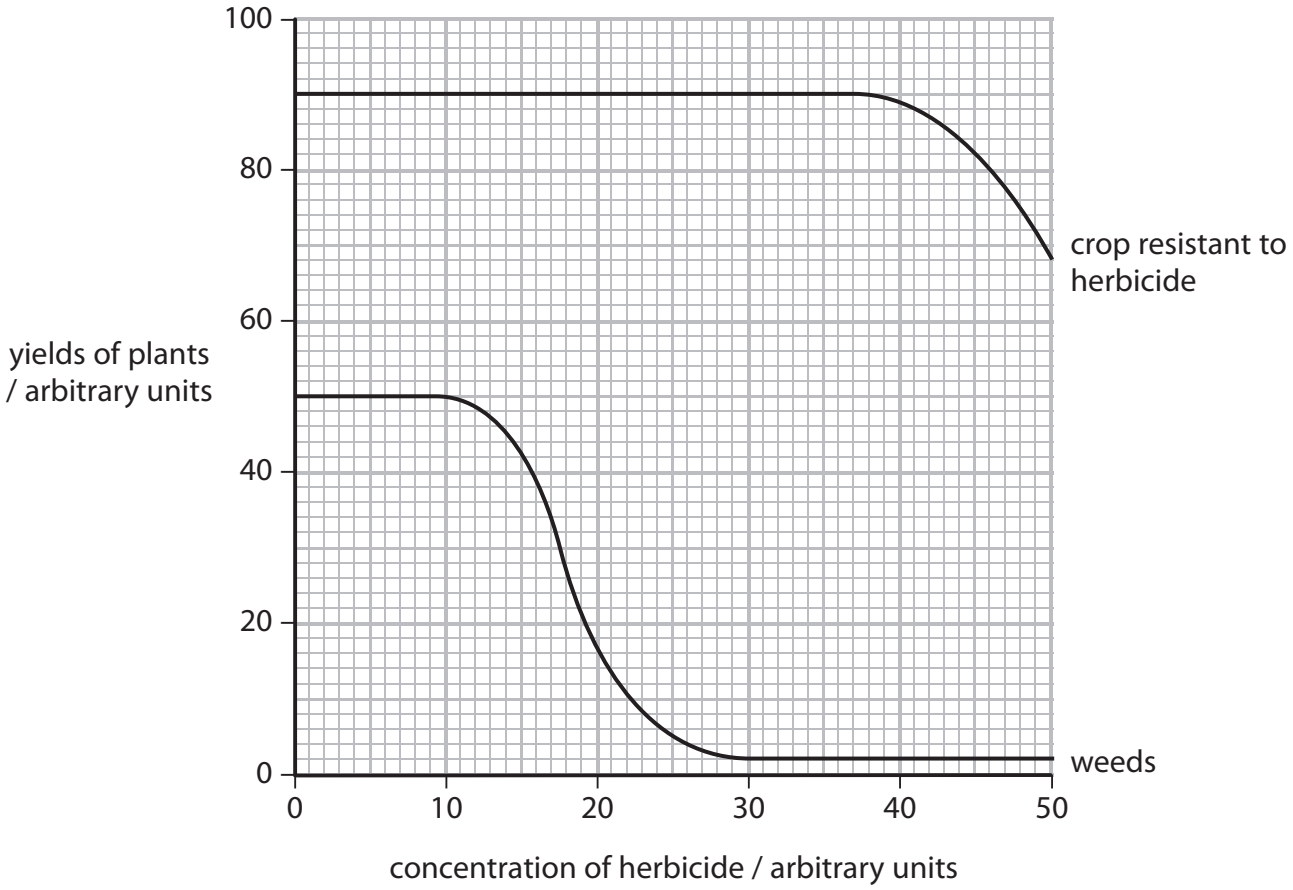
(c) Fields of crops have weeds growing in them.

In an investigation, crops resistant to a herbicide were grown in different fields.

The crops were sprayed with different concentrations of the herbicide.

The mass of the crops and weeds were recorded.

The graph shows the results of this investigation.



(i) Describe the effects of the herbicide on the yield of weeds.

(2)

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(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The most appropriate concentration of herbicide to use is

(1)

☒ **A** 10 arbitrary units

☒ **B** 30 arbitrary units

☒ **C** 40 arbitrary units

☒ **D** 50 arbitrary units

(d) The table shows the number of species of weeds resistant to this herbicide from 1996 to 2004.

	Year				
	1996	**1998**	**2000**	**2002**	**2004**
Number of species of weeds resistant to this herbicide	1	2	3	5	8

(i) Describe the trend shown in the data.

(1)

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(ii) Suggest reasons for this trend.

(2)

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(Total for Question 4 = 10 marks)

Digestion

5 (a) Complete the sentence by putting a cross (☒) in the box next to your answer.

Food is moved through the digestive system by

(1)

- ☒ **A** diffusion
- ☒ **B** digestion
- ☒ **C** peristalsis
- ☒ **D** active transport

(b) State **two** roles of bile in digestion.

(2)

1 .....

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2 .....

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*(c) Describe the roles of the enzymes involved in digestion.

(6)

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(d) Explain how the structure of the villi allows efficient absorption in the small intestine.

(3)

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(Total for Question 5 = 12 marks)

DNA

6 (a) Describe how a section of DNA determines the structure of a protein.

(4)

*(b) Describe the structure of DNA, including the roles of the scientists involved in its discovery.

(6)

Human DNA was sequenced during the Human Genome Project.

(c) Explain how the Human Genome Project has contributed to advances in medicine.

(2)

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(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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