Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology/Science

Unit B1: Influences on Life

Higher Tier

Tuesday 16 May 2017 – Afternoon
Time: 1 hour

Paper Reference
5BI1H/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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 4 8 5 4 1 A 0 1 2 0

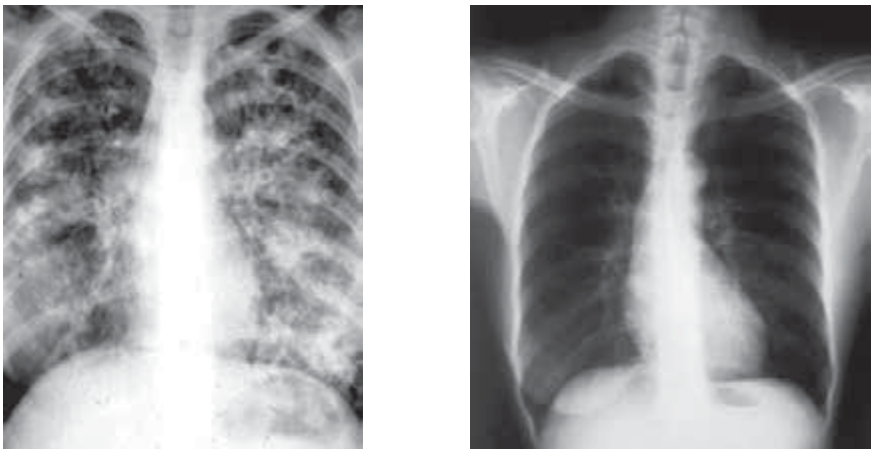
Pearson

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 ☒.

Cystic fibrosis

1 (a) The x-ray image on the left shows how cystic fibrosis can affect the human lungs.
The x-ray image on the right shows healthy human lungs.



cystic fibrosis lungs

healthy lungs

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

(1)

The lungs of a person who has cystic fibrosis can be blocked with

☒ **A** carbon monoxide

☒ **B** cilia

☒ **C** mucus

☒ **D** red blood cells

(ii) Explain why a person who has cystic fibrosis may have more lung infections than a person who does not have cystic fibrosis.

(2)

.....

.....

.....

.....

(iii) Weight loss is a symptom of cystic fibrosis.

Use words from the box to complete the following sentence.

(2)

large intestine	enzymes	acids
pancreas	hormones	stomach

A person who has cystic fibrosis may lose weight because .....

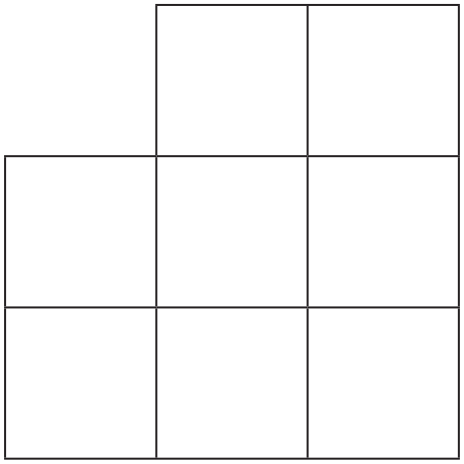
that digest insoluble food molecules are restricted from leaving the

..... to enter the small intestine.

(b) Genetic screening can be used to determine the probability of a child inheriting cystic fibrosis.

(i) Complete the Punnett square to show the inheritance of cystic fibrosis when both parents are heterozygous (Aa) for cystic fibrosis.

(2)



(ii) State the percentage probability that a child born to these parents will be a carrier of the cystic fibrosis gene.

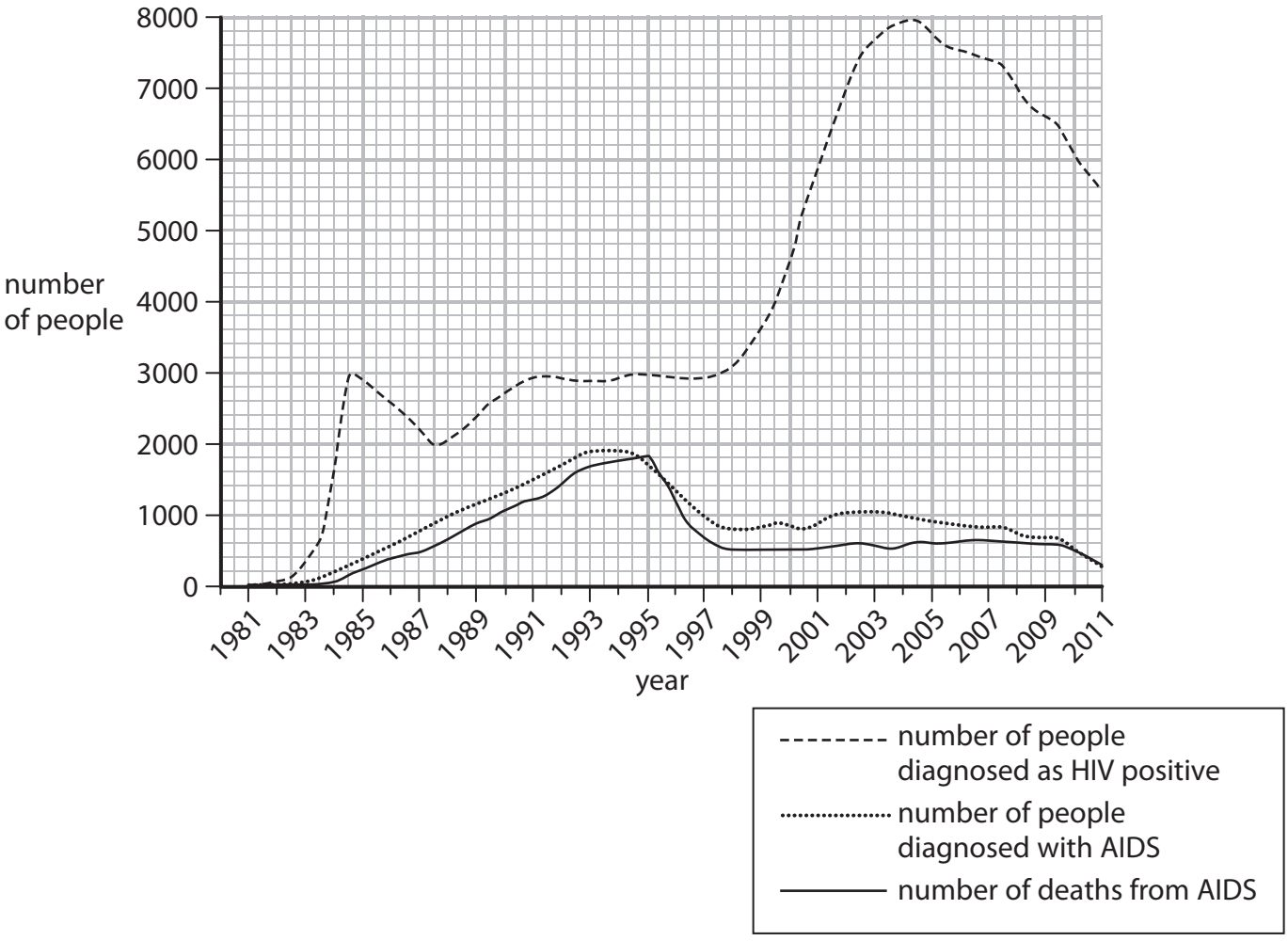
(1)

..... %

(Total for Question 1 = 8 marks)

Infection

2 (a) The graph shows data about people with HIV and people with AIDS from 1981 to 2011.



(i) Which statement about the graph is correct?

Put a cross (☒) in the box to indicate your answer.

(1)

☒ **A** There is a direct correlation between the number of people diagnosed as HIV positive and the number of people diagnosed with AIDS.

☒ **B** There is a direct correlation between the number of people diagnosed as HIV positive and the number of deaths from AIDS.

☒ **C** The number of people diagnosed with AIDS and diagnosed as HIV positive peaked at 7900.

☒ **D** The highest number of deaths from AIDS occurred in 1995.

(ii) Calculate the difference between the number of people diagnosed as HIV positive in 2005 and in 2011.

(2)

(iii) Suggest a reason for this difference in the number of people diagnosed as HIV positive.

(1)

(iv) Describe how HIV can be passed from person to person.

(1)

(b) A study found that the number of children hospitalised due to MRSA infections doubled between 2000 and 2007.

Explain why bacterial infections caused by MRSA have increased.

(3)

(Total for Question 2 = 8 marks)

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Water pollution

3 An environmental scientist investigated the pollution of a stream by recording the number of bloodworms at various locations in the stream.

(a) State the term used to describe organisms that show pollution levels in air or water.

(1)

.....

(b) She recorded the number of bloodworms found at five different distances along the stream and repeated these recordings three times.

The results of the investigation are shown in the table.

	number of bloodworms found			
distance along the stream / m	**repeat 1**	**repeat 2**	**repeat 3**	**mean**
5	1	3	2	2
25	2	0	1	1
55	12	20	19	17
75	15	15	18	
95	26	13	15	18

(i) Calculate the mean number of bloodworms at a distance of 75 m along the stream.

(2)

.....

(ii) Describe what these results show about the pollution level of the stream.

(2)

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(iii) Which of these living organisms can be used to determine high oxygen levels in the water of the stream?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** blackspot fungi

☒ **B** lichens

☒ **C** sludgeworms

☒ **D** stonefly larvae

(c) Low oxygen levels in the stream can be caused by a process called eutrophication.

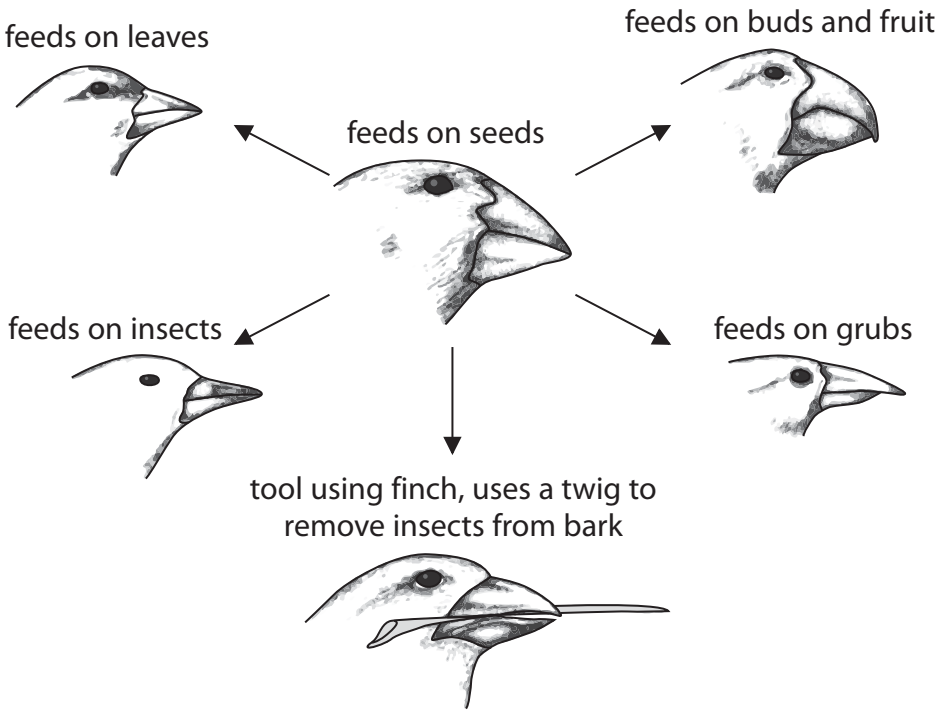
Explain how eutrophication can result in low oxygen levels in the water in the stream.

(4)

(Total for Question 3 = 10 marks)

Natural selection

4 (a) Charles Darwin studied finches on the Galapagos Islands.
The diagram shows the beak shapes and the food source of some of these finches.



(i) Explain how natural selection resulted in the different beak shapes of these finches.

(3)

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

(1)

These finches show speciation due to the

☒ **A** geographic isolation of the Galapagos Islands

☒ **B** overproduction of offspring

☒ **C** development of ring species

☒ **D** survival of the fittest

(b) Variation within a species can make classification of an organism difficult.

(i) Explain why hybridisation also makes classification of an organism difficult.

(2)

.....

.....

.....

.....

(ii) State one source of genetic variation in a species.

(1)

.....

(c) The photograph shows another organism found on the Galapagos Islands called the blue-footed booby.

© Totally Latin America

The blue-footed booby is classified into the kingdom Animalia.

Describe the main characteristics of organisms in the kingdom Animalia.

(3)

(Total for Question 4 =10 marks)

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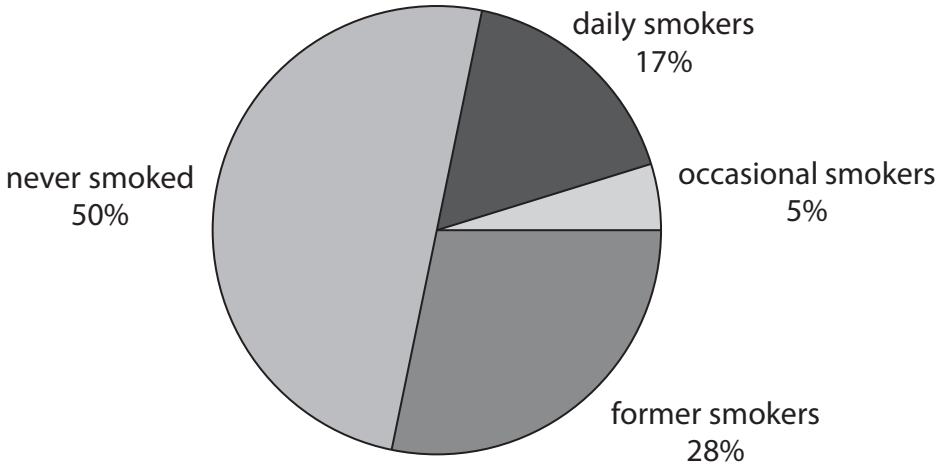
Drugs

5 The pie chart shows the results of an investigation into the tobacco-smoking habits of 20 000 people in 2008.



(a) (i) Calculate the number of individuals who were daily smokers in 2008.

(2)

.....

(ii) The same 20 000 people were asked again in 2013 about their tobacco-smoking habits. The percentage of former smokers had risen from 28% to 36%.

Suggest one reason why these people gave up smoking tobacco.

(1)

.....

.....

(b) Tobacco smoke contains carbon monoxide.

Explain how carbon monoxide affects a person's ability to exercise.

(3)

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*(c) Tobacco contains nicotine, which is a drug.

Describe how the four groups of drugs affect the human body.

(6)

(Total for Question 5 = 12 marks)

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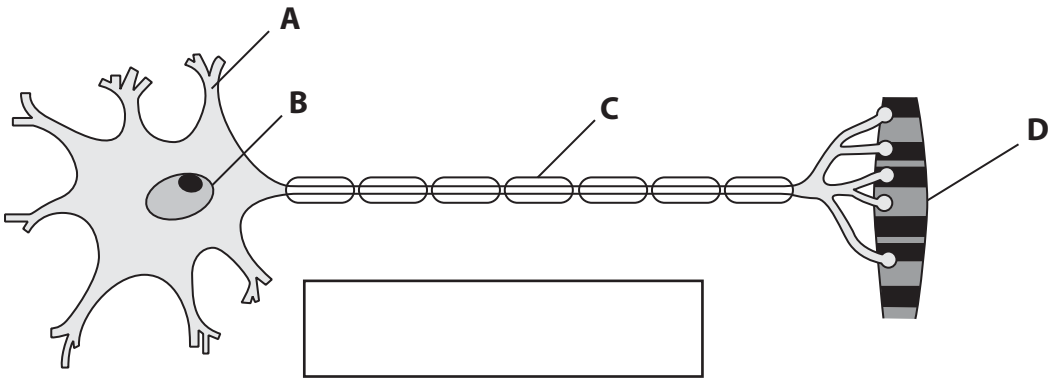
The nervous system

6 The diagram shows a motor neurone.

(a) (i) Draw an arrow in the box to show the direction of travel of the electrical impulse in this motor neurone.

(1)



(ii) Which letter labels the dendron in this motor neurone?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(b) (i) Name the **two** parts of the body that make up the central nervous system (CNS).

(1)

.....

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

(1)

Sensory neurones carry electrical impulses from

☒ **A** effector cells to the CNS

☒ **B** the CNS to effector cells

☒ **C** receptor cells to the CNS

☒ **D** the CNS to receptor cells

(c) Describe how a synapse is involved in the conduction of a nerve impulse.

(2)

.....

.....

.....

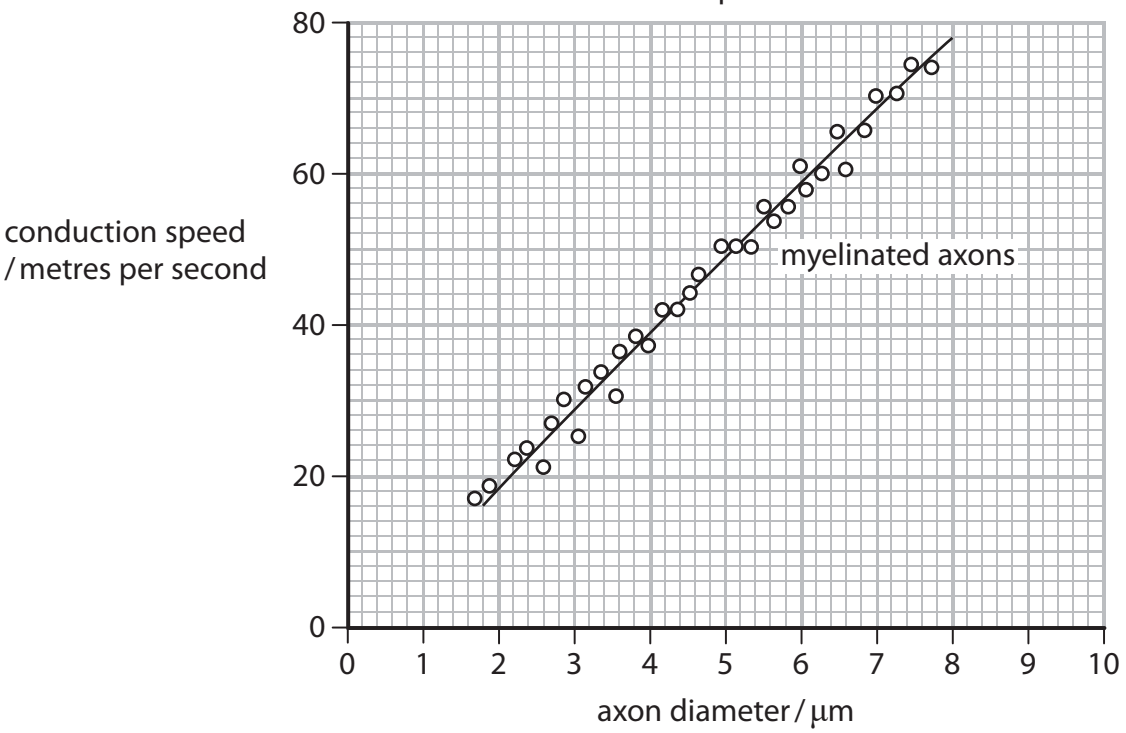
.....

.....

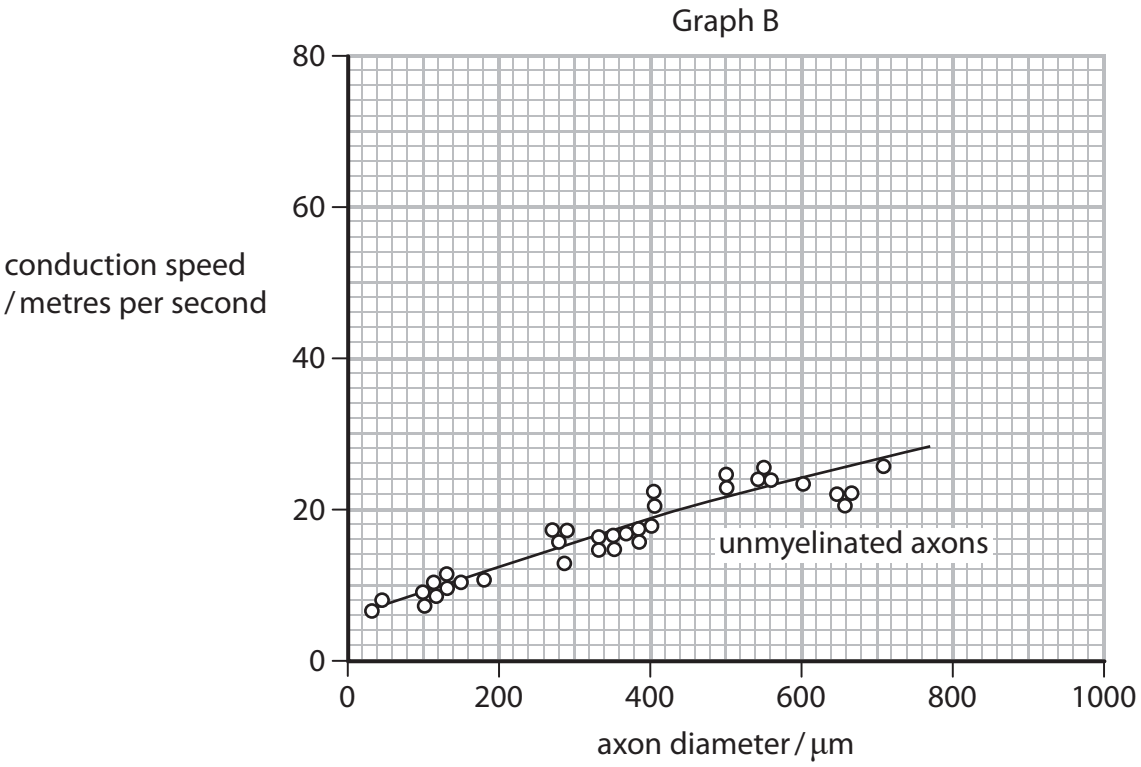
*(d) Graph A shows the relationship between the conduction speed and the diameter of myelinated axons (axons with a myelin sheath).

Graph B shows the relationship between the conduction speed and the diameter of unmyelinated axons (axons without a myelin sheath).

Graph A



Graph B



Compare the conduction speed and diameter of these axons to explain the role of the myelin sheath.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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