



General Certificate of Secondary Education  
2014–2015

Centre Number

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Candidate Number

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## Science: Single Award

Unit 1 (Biology)  
Higher Tier

[GSS12]

TUESDAY 24 FEBRUARY 2015, MORNING



### TIME

1 hour 15 minutes.

### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.  
Answer **all ten** questions.

### INFORMATION FOR CANDIDATES

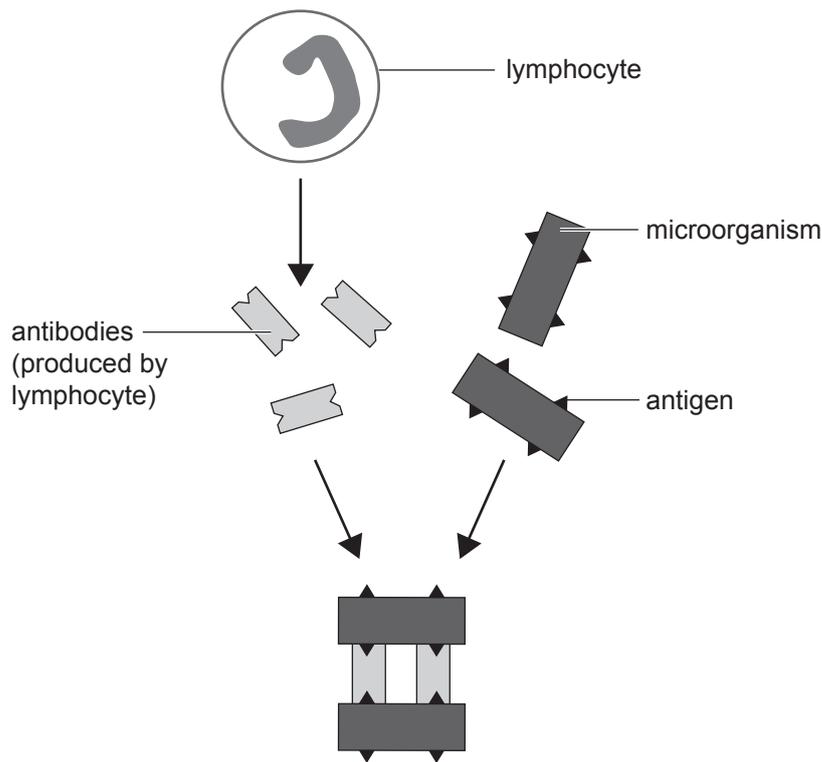
The total mark for this paper is 75.

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 Questions **4(a)** and **10(a)**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
<b>Total Marks</b>	

- 1 (a) The diagram below shows how lymphocytes (white blood cells) produce antibodies in response to infection by microorganisms.



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- (i) Using the diagram and your knowledge, describe and explain how antibodies fight infection.

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[3]

- (ii) Another type of white blood cell also fights infection by phagocytosis. Describe the process of 'phagocytosis'.

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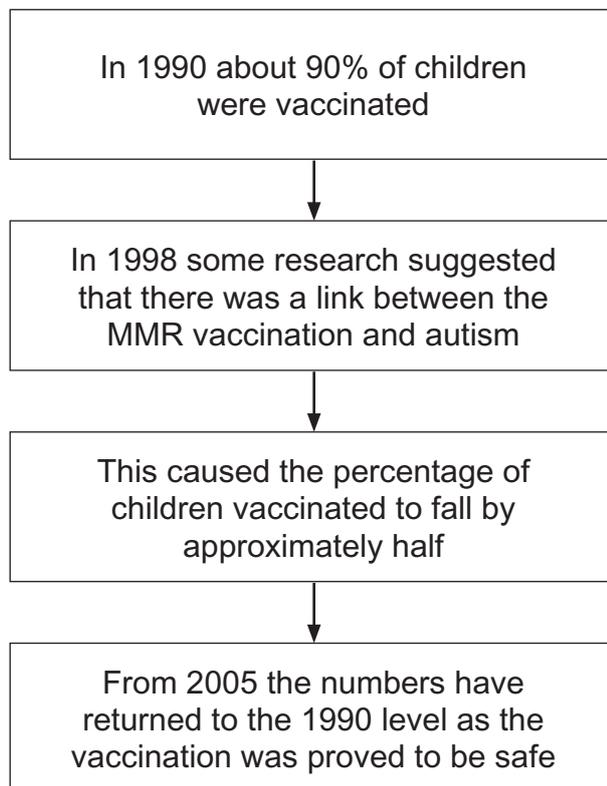


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[2]

Examiner Only	
Marks	Remark

- (b) The following flow chart outlines how the number of children being vaccinated for MMR changed between 1990 and the present.



- (i) Describe how the number of children having the MMR vaccination changed between 1990 and today.

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[2]

- (ii) How does the information suggest that not all parents are convinced that the MMR vaccination is safe today?

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[1]

- (c) Name the type of immunity produced by vaccinations.

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[1]

Examiner Only	
Marks	Remark

- 2 (a) Albinism is an inherited condition in which affected individuals are unable to make the skin pigment melanin. The melanin gives skin its colour, but more importantly, helps protect against the Sun's harmful UV rays.

Albinism is caused by a mutation in the gene that controls the production of melanin.

- (i) Name the core component in a gene that is damaged in a mutation.

\_\_\_\_\_ [1]

- (ii) Explain fully why people with albinism are advised to stay out of strong sunlight.

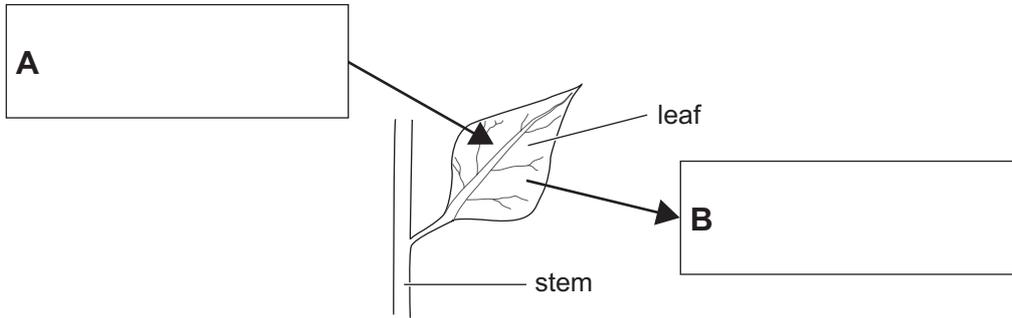
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

Examiner Only	
Marks	Remark



3 (a) The diagram below shows a leaf from a plant in darkness.

(i) Complete the diagram by naming the gases that enter (A) and leave (B) the leaf during **darkness**.



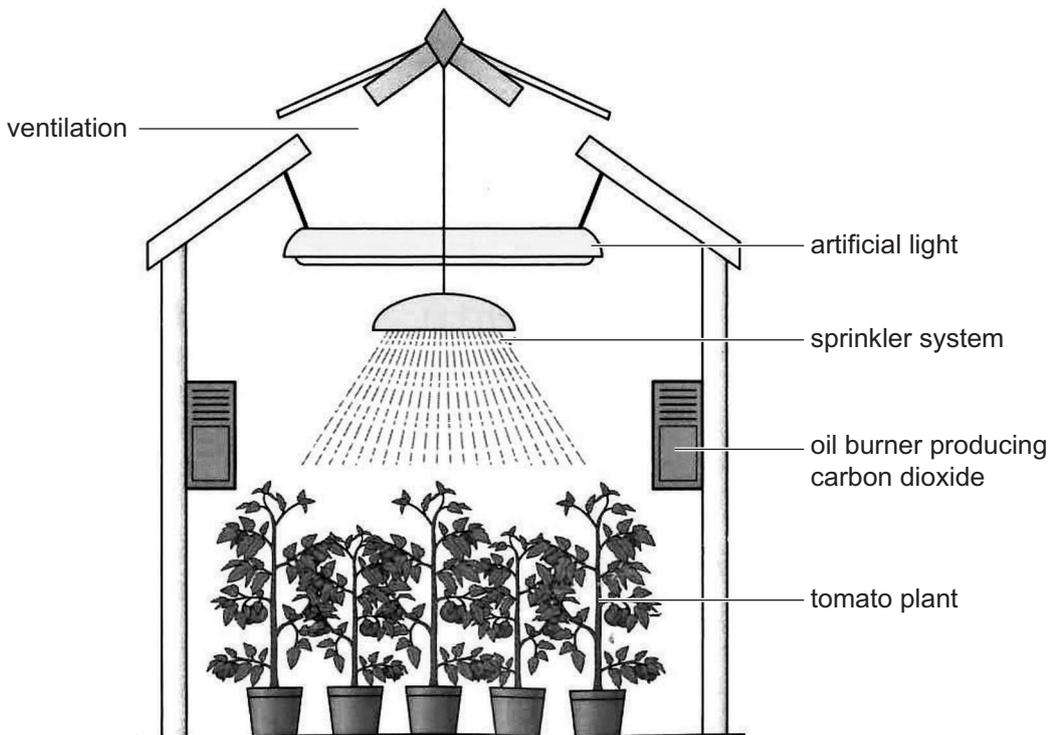
[1]

(ii) Name the process that causes this gas exchange.

\_\_\_\_\_

[1]

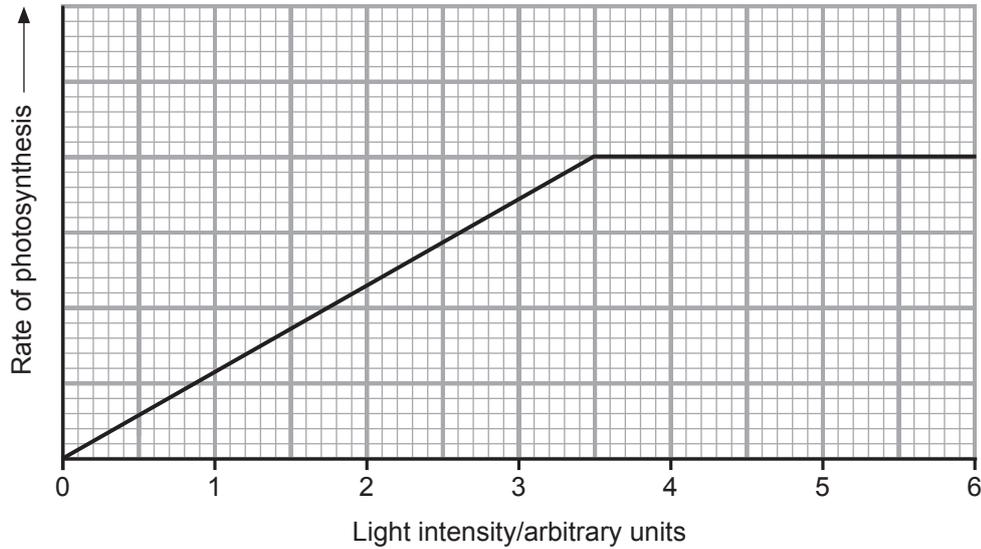
(b) The diagram below shows tomato plants growing in a glasshouse.



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 ISBN: 9780340983805. Reproduced by permission of Hodder Education.

Examiner Only	
Marks	Remark

The graph below shows the effect of light intensity on the rate of photosynthesis in tomato plants in a glasshouse. In glasshouses, the light intensity can be increased by using artificial lighting.



- (i) From the graph, state the best light intensity to use that would give the most profit if the tomatoes were grown for sale. Explain your choice.

Light intensity \_\_\_\_\_ arbitrary units

Explanation \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

- (ii) Apart from artificial lighting to increase light intensity, explain **one** other way in which glasshouses are adapted for increasing the rate of plant growth.

\_\_\_\_\_  
 \_\_\_\_\_ [1]

Examiner Only	
Marks	Remark



- 5 (a) The table below shows the amount of some food groups in **100 g** of a soft drink.

Food group	Amount/g
protein	0.10
sugar (carbohydrate)	13.00
fat	0.11
fibre	0.20
iron (mineral)	0.09

- (i) Name the food group that is present in the smallest quantity.

\_\_\_\_\_ [1]

Not all the food groups contained in the drink are given in the table.

- (ii) Calculate the percentage of those shown.

\_\_\_\_\_ % [1]

- (iii) Suggest what makes up most of the rest of the drink.

\_\_\_\_\_ [1]

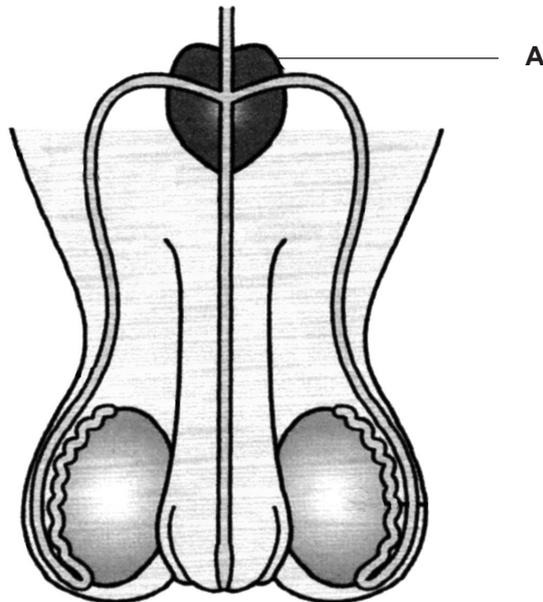
- (b) Name the hormone that the body would produce after taking this drink. Explain your answer.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

Examiner Only

Marks Remark

6 (a) The diagram below shows the male reproductive system.



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(i) Name and give the function of the structure labelled **A**.

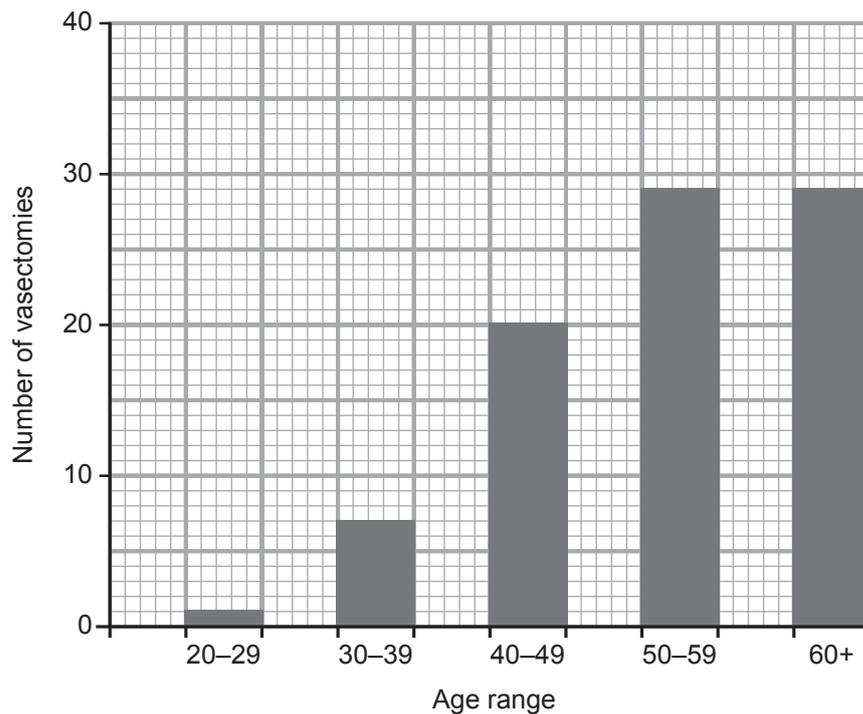
Name \_\_\_\_\_

Function \_\_\_\_\_ [2]

(ii) Label with the letter **X**, the parts of the reproductive system that are cut during a vasectomy. [1]

Examiner Only	
Marks	Remark

- (b) The bar chart below shows the number of men, in particular age groups, who have had vasectomies in a hospital in one year.



- (i) Describe fully the trend shown by this information.

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[2]

- (ii) Suggest **one** reason why no men under 20 years old had a vasectomy.

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[1]

- (c) Progesterone is a reproductive hormone produced in females. Describe and explain **one** function of progesterone.

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[2]

Examiner Only

Marks Remark

- 7 (a) Atmospheric carbon dioxide levels were recorded every five years from 1980 to 2000 as shown in the table below.

Atmospheric carbon dioxide/parts per million (ppm)			
Year	Annual average	Summer average	Winter average
1980	342	337	348
1985	348	343	353
1990	354	350	359
1995	359	353	363
2000	365	360	369

- (i) Predict what the **annual average** value for carbon dioxide would have been in 2010.

\_\_\_\_\_ ppm [1]

- (ii) Describe the difference between the winter and summer averages. Suggest **one** reason for this difference.

\_\_\_\_\_

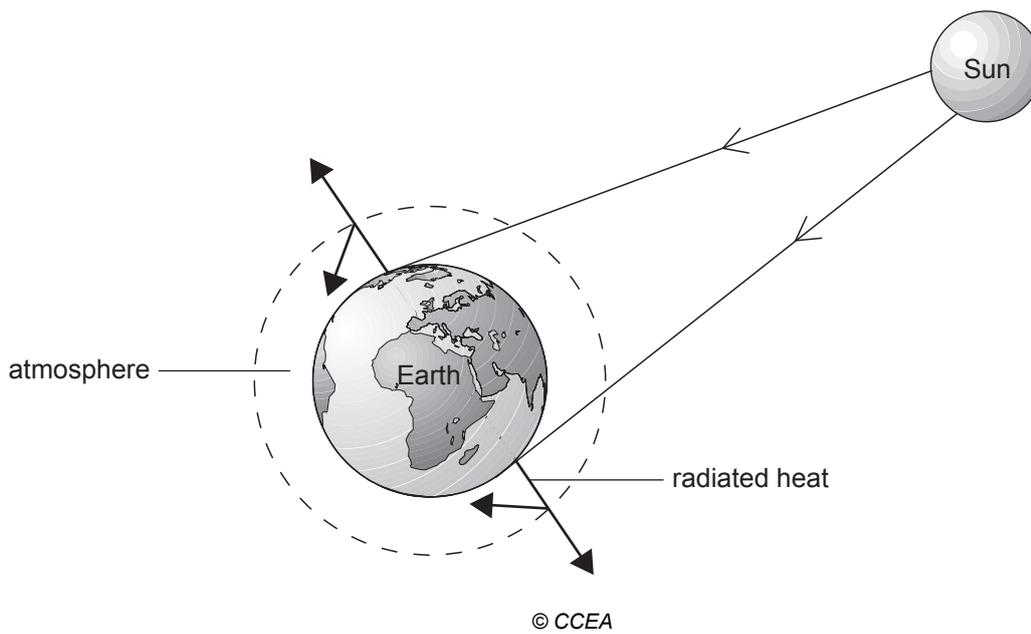
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\_\_\_\_\_ [2]

Examiner Only	
Marks	Remark

(b) The following diagram shows how global warming occurs.



Using the diagram and your knowledge, explain how global warming occurs.

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[3]

(c) Apart from temperature, name **one** abiotic factor that can be used to monitor global warming.

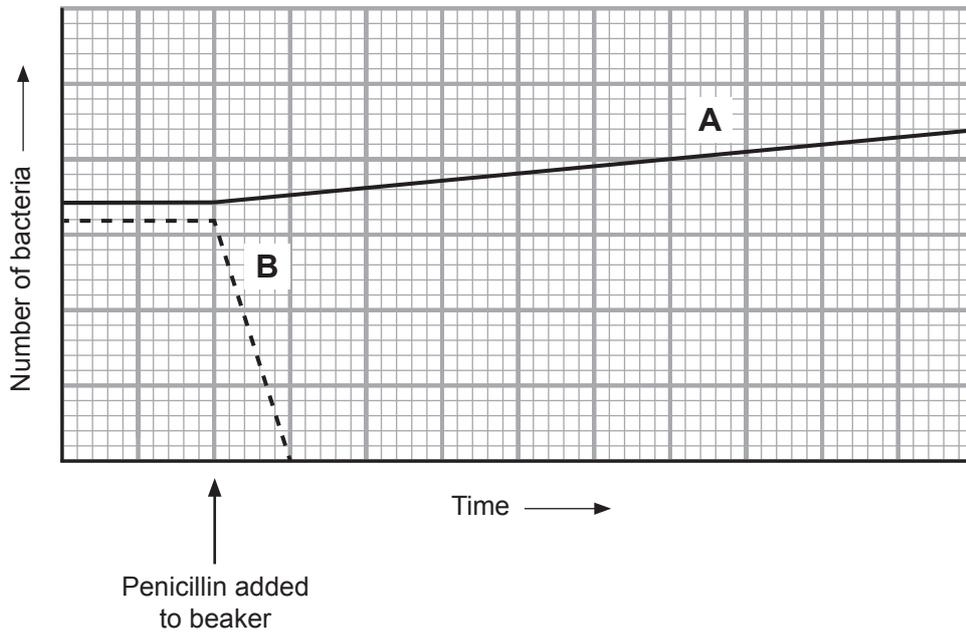
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[1]

Examiner Only	
Marks	Remark



Scientists cultured (grew) two types of bacteria (**A** and **B**) in a beaker. The following graph shows how the numbers of the two types changed after penicillin was added to the beaker.



Examiner Only	
Marks	Remark

(ii) Describe and explain the changes that took place after adding penicillin.

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[3]

(c) There are three stages in the development of a drug before licensing. List these stages, in order, up to the drug being licensed. [1]

\_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → licensed

- 9 (a) In parts of Ireland, an agreement has been made between conservationists and local councils not to cut some roadside hedgerows and their grass verges for a number of years. Conservationists are pleased to note that this is causing a rapid increase in biodiversity with the uncut hedgerows and verges producing a 'splash of colour' in the summer.

(i) Suggest what the 'splash of colour' represents.

\_\_\_\_\_  
\_\_\_\_\_ [1]

(ii) Describe how you could carry out an investigation to compare biodiversity between uncut and cut areas.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

(iii) Suggest **one** safety concern for road users if hedgerows and verges are not cut.

\_\_\_\_\_  
\_\_\_\_\_ [1]

(b) The plants in hedgerows and verges are the producers in food chains. Describe the flow of energy through food chains.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

Examiner Only

Marks

Remark







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