

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GCSE**

**A163/01**

**TWENTY FIRST CENTURY SCIENCE  
BIOLOGY A / FURTHER ADDITIONAL  
SCIENCE A**

**Module B7 (Foundation Tier)**

**MONDAY 16 JUNE 2014: Morning**

**DURATION: 1 hour  
plus your additional time allowance**

**MODIFIED ENLARGED**

<b>Candidate forename</b>		<b>Candidate surname</b>	
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<b>Centre number</b>						<b>Candidate number</b>				
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**Candidates answer on the Question Paper.  
A calculator may be used for this paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Pencil  
Ruler (cm/mm)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

**Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**

**Use black ink. HB pencil may be used for graphs and diagrams only.**

**Answer ALL the questions.**

**Read each question carefully. Make sure you know what you have to do before starting your answer.**

**Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

## **INFORMATION FOR CANDIDATES**

**The quality of written communication is assessed in questions marked with a pencil (.**

**The number of marks is given in brackets [ ] at the end of each question or part question.**

**The total number of marks for this paper is 60.**

**Any blank pages are indicated.**

**BLANK PAGE**

## **Answer ALL the questions**

- 1 Robert is worrying about his blood pressure. He decides to measure his blood pressure every day. Blood pressure consists of two readings. Systolic pressure is when the heart muscle is contracting. Diastolic pressure is when the heart muscle is relaxing. The graph opposite shows Robert's blood pressure taken over sixty days.**

- (a) (i) Use the graph opposite to find Robert's blood pressure readings ON DAY 1.**

**systolic** \_\_\_\_\_

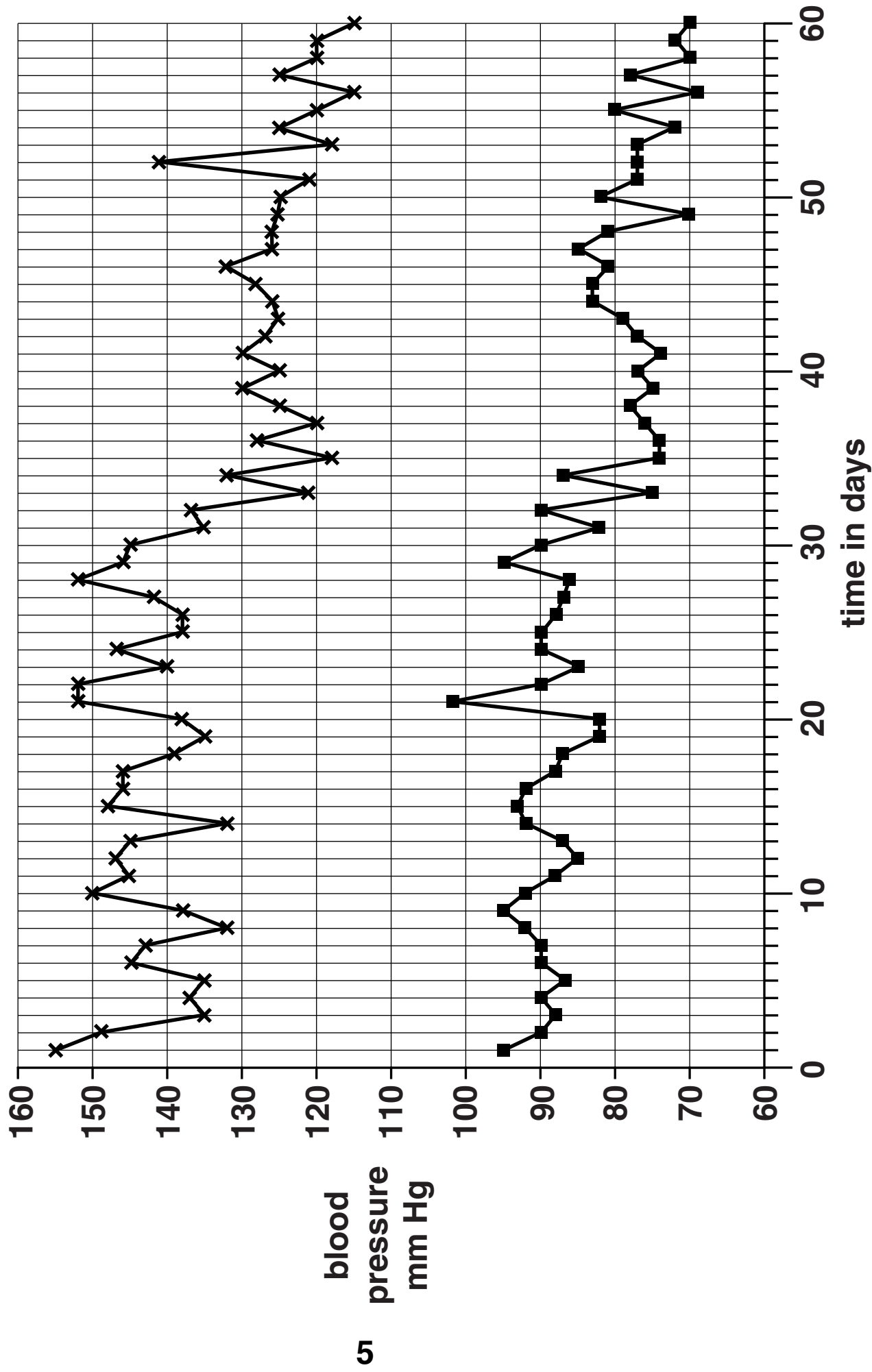
**diastolic** \_\_\_\_\_

**[1]**

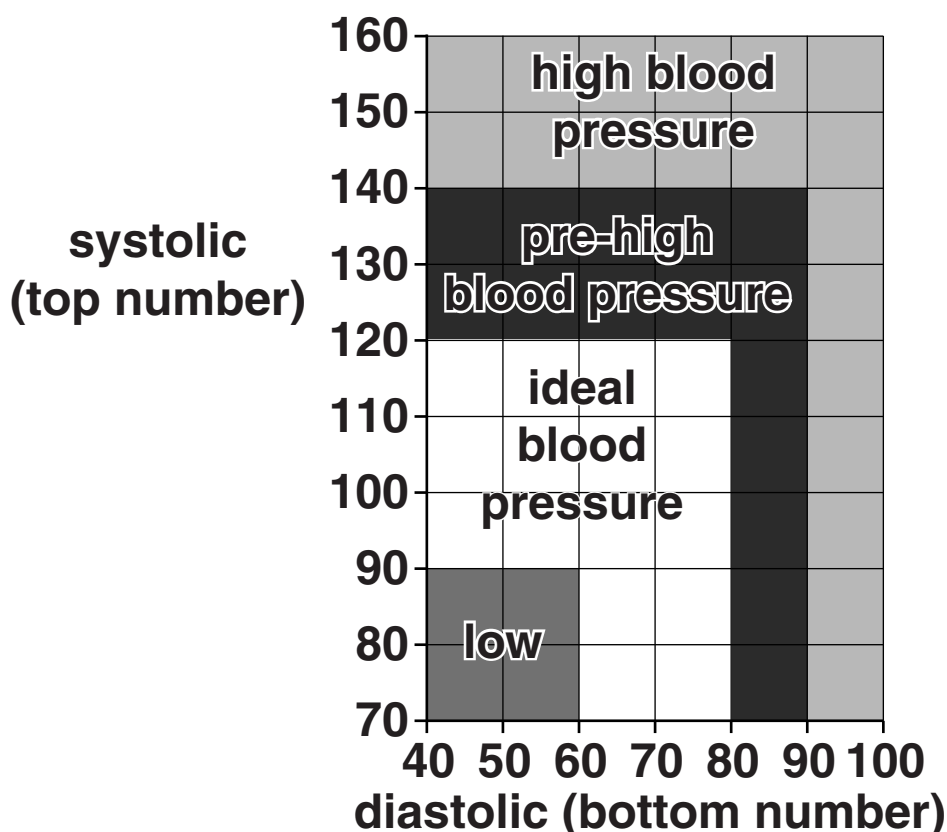
# KEY

—x— systolic

—■— diastolic



- (ii) Robert looks at a chart about blood pressure readings.



Use this chart and your answer to part (i) to describe Robert's blood pressure ON DAY 1. Put a tick (✓) in the correct box below.

	low	ideal	pre-high	high
Robert's blood pressure on day 1				

[1]

- (b) At some point during the sixty days, Robert's doctor gave him some medicine to reduce his blood pressure. On which day do you think that Robert started to take his medicine?

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

- (c) Robert's blood pressure changes from day to day.  
Suggest one OTHER reason why.

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

- (d) Robert's average systolic blood pressure for the first seven days was 142.7 mm Hg.  
The table shows his systolic blood pressure for the last seven days.

- (i) Complete the table by calculating Robert's average (mean) systolic blood pressure readings for the last seven days.

Day	Robert's systolic blood pressure in mm Hg
54	125
55	120
56	115
57	125
58	120
59	120
60	115
mean	

[2]

- (ii) Suggest why scientists often calculate the mean of a set of data.

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

- (iii) Write down the range of systolic readings of Robert's blood pressure during the last seven days.**

from \_\_\_\_\_ to \_\_\_\_\_ [1]

- (iv) Use the data to provide evidence that the medicine reduced Robert's blood pressure.**

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

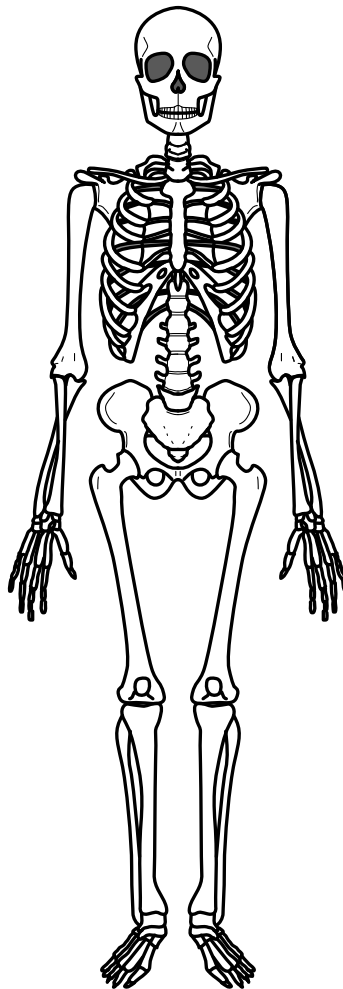
**[TOTAL: 10]**



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**QUESTION 2 BEGINS ON PAGE 10**

**2 Look at the diagram of the human skeleton.**



- (a) Write about the importance of the skeleton.  
In your answer include:  
the different functions of the skeleton  
how joints in the skeleton work.**



**The quality of written communication will be assessed in your answer.**

**[6]**

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**(b) Excessive exercise can cause injuries to joints.**

**(i) One of these injuries is a sprain.  
Describe the symptoms and basic treatment  
for a sprain.**

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[4]

**(ii) Write down TWO other injuries that can occur to a joint.**

\_\_\_\_\_

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

**[TOTAL: 12]**

**3 Red blood cells contain haemoglobin.**

- (a) Suggest a reason why red blood cells do not have a nucleus.**

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

- (b) Faulty gas fires can release carbon monoxide. Haemoglobin combines with carbon monoxide more quickly than haemoglobin combines with oxygen.**

**Explain why carbon monoxide is poisonous to humans.**

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

**[TOTAL: 4]**

**4 It is very important to control the level of sugar in the blood.**

**A person can become unconscious if there is too much or too little sugar in the blood.**

**Steve has a card that says he has type 1 diabetes.**

**Steve is found unconscious.**

**Suggest how diabetes could cause Steve to become unconscious.**

**Explain how he should be treated.**



**The quality of written communication will be assessed in your answer.**

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**[6]**

**[TOTAL: 6]**

**5 Most plants produce large numbers of seeds.**

**(a) Explain how this helps reproduction to be successful.**

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**[2]**

**QUESTION 5 CONTINUES ON PAGE 16**

**(b) Neil investigates whether using fertiliser increases seed production in plants.**

**He grows five plants without fertiliser and five plants with fertiliser.**

**He counts the number of seeds produced by each plant.**

**These are his results.**

**Each star (★) in the table represents one plant.**

<b>Number of seeds produced</b>	<b>Without fertiliser</b>	<b>With fertiliser</b>
<b>100</b>	<b>★</b>	
<b>110</b>	<b>★</b>	
<b>120</b>		
<b>130</b>	<b>★</b>	<b>★</b>
<b>140</b>		<b>★</b>
<b>150</b>	<b>★</b>	<b>★</b>
<b>160</b>		<b>★</b>
<b>170</b>		<b>★</b>
<b>180</b>	<b>★</b>	
<b>mean</b>	<b>134 seeds</b>	<b>150 seeds</b>



- (i) Compare the **RANGES** of results for plants with and without fertiliser.

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[2]

- (ii) Anita thinks that seed production is best in plants **WITHOUT** fertiliser.  
Suggest **ONE** feature of Neil's results that might make her think this.

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[1]

- (iii) Neil thinks that seed production is best in plants **WITH** fertiliser.  
Suggest **ONE** feature of his results that might make him think this.

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[1]

- (iv) Neil wants to get a better estimate of the effect of fertiliser on the plants.  
Suggest **TWO** ways he could extend his investigation to get this information.

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[2]

[TOTAL: 8]

**6 Helene is a deep sea diver.**

**She reads these two articles in a magazine.**



**The deeper you dive, the greater the pressure of the water.**

**The longer you stay under water, the more air dissolves in your blood.**

**Air bubbles in the blood can block blood flow to organs causing pain and damage.**



**Fizzy drinks get their fizz from a gas that is dissolved in the drink under great pressure.**

**When the bottle is opened the pressure is released and bubbles of gas appear in the drink.**

**If the bottle is opened slowly fewer bubbles appear in the drink.**

**Helene plans to dive with a supply of air.**

**Predict what might happen in Helene's body as she returns to the surface.**

**Explain any possible problems and how she might avoid them.**

**Use information from the articles in your answer.**



**The quality of written communication will be assessed in your answer.**

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**[6]**

**[TOTAL: 6]**

- 7 Genetic modification is where a gene from one organism is transferred to another organism.  
The gene continues to work.  
Genetic modification can be used to make crop plants resistant to herbicides.**

**(a) The stages in this process are listed in the correct order.**

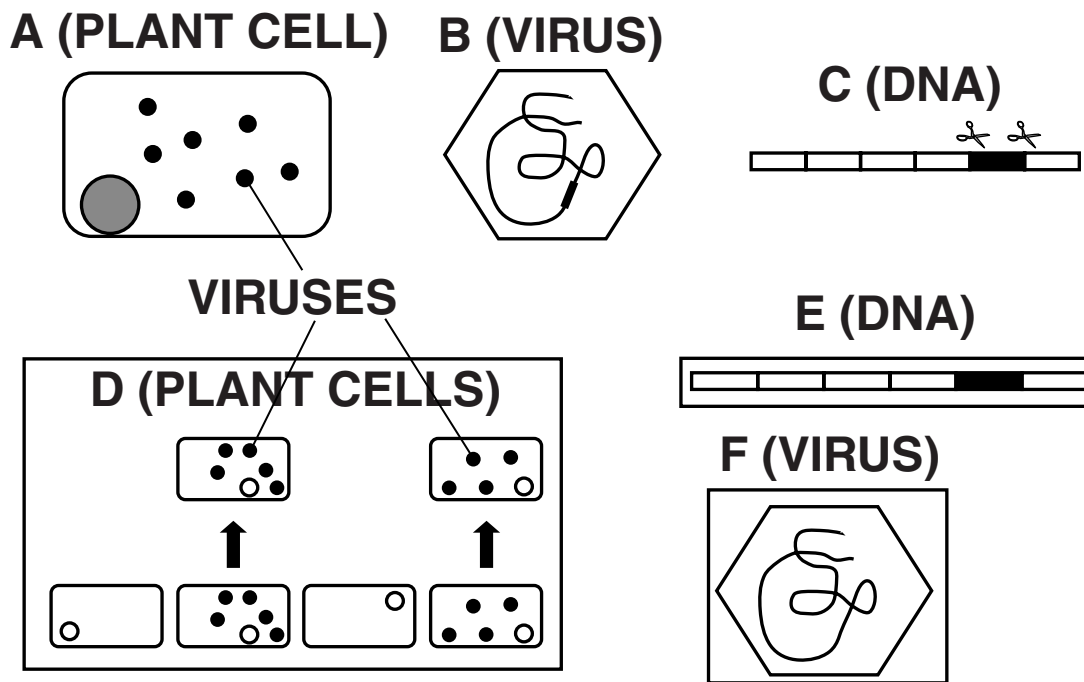
<b>1</b>	<b>Find the herbicide resistant gene.</b>
<b>2</b>	<b>Isolate and remove the gene from the original DNA.</b>
<b>3</b>	<b>Find a suitable virus vector.</b>
<b>4</b>	<b>Insert the gene into the vector.</b>
<b>5</b>	<b>Replicate the vector in a plant cell.</b>
<b>6</b>	<b>Select cells with the herbicide resistant gene.</b>

**The diagrams opposite show the stages in this process. THEY ARE NOT DRAWN TO SCALE.  
They are not in the correct order.**

**Write down the correct order of the diagrams.  
The first one has been done for you.**

**E**      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
                 \_\_\_\_\_      \_\_\_\_\_

**[4]**



(b) Suggest why scientists would want to make a crop plant resistant to a herbicide.

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[3]

[TOTAL: 7]

**8 This question is about open and closed loop ecosystems.**

**(a) One of these statements best describes a closed loop system.**

**Put a tick (✓) in the box next to the BEST statement.**

**The output is always greater than the input.**

☐

**The input is always greater than the output.**

☐

**The input and output are always constant.**

☐

**The output from one part of the system becomes the input for another part of the system.**

☐

**[1]**

**(b) No ecosystem can be a perfect closed loop as some output is always lost.**

**Describe two different ways in which output can be lost from an ecosystem.**

**1** \_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

**[2]**

- (c) Rafael is a farmer living in the Brazilian rainforest. Suggest two ecosystem services that Rafael and his family gain from the rainforest.**

**1** \_\_\_\_\_

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

- (d) Rafael wants to manage his farming in a sustainable way. Explain how Rafael can do this.**

\_\_\_\_\_

\_\_\_\_\_

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

**[TOTAL: 7]**

**END OF QUESTION PAPER**



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