

General Certificate of Secondary Education January 2014

Mathematics

Unit T6 Paper 1

(Non-calculator)
Higher Tier





[GMT61]

GMT61

WEDNESDAY 15 JANUARY 9.15am-10.30am

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. You must answer the questions in the spaces provided. Do not write outside the box, around each page, on blank pages or tracing paper.

Complete in blue or black ink only. Do not write with a gel pen.

Answer all sixteen questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

You must not use a calculator for this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 50.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Functional Elements will be assessed in this paper.

Quality of written communication will be assessed in questions 14 and 16.

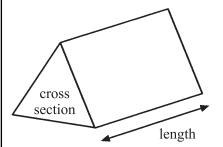
You should have a ruler, compasses and a protractor.

The Formula Sheet is on page 2.

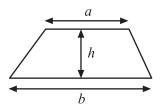


Formula Sheet

Volume of prism = area of cross section \times length



Area of trapezium $= \frac{1}{2}(a+b)h$



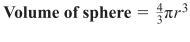
Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl

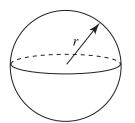
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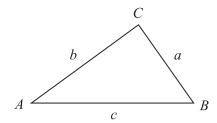
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Surface area of sphere = $4\pi r^2$



In any triangle ABC



Sine Rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule: $a^2 = b^2 + c^2 - 2bc \cos A$

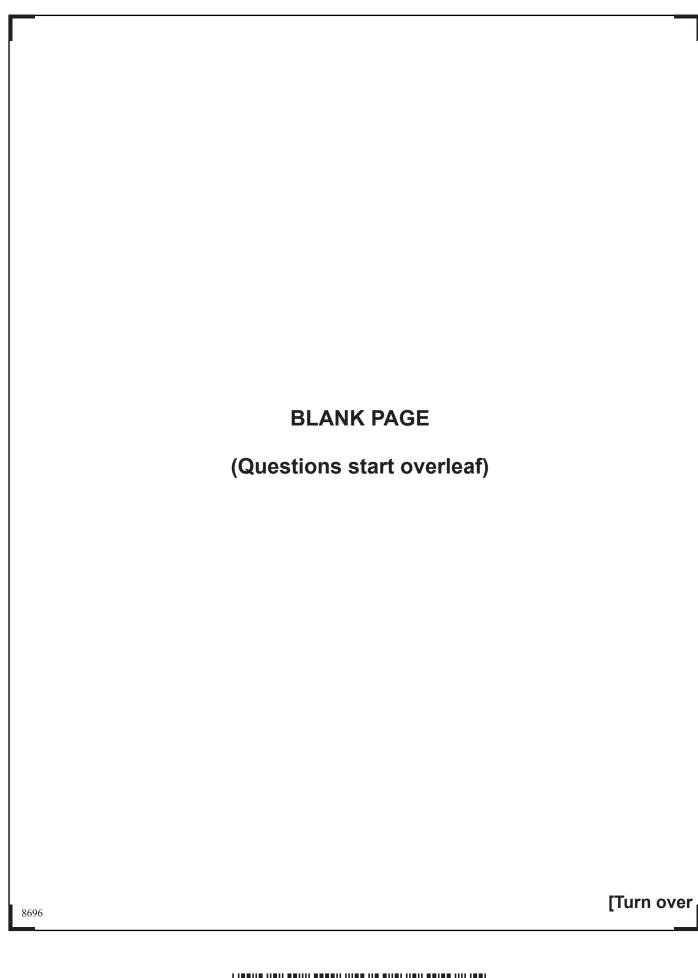
Area of triangle = $\frac{1}{2} ab \sin C$

Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$





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		$\frac{28.6 + 302.9}{116.1 - 115.6}$		- Marks K	omar K
		116.1–115.6			
	Show all your working.				
			Answer [2]		
				Total Ques	tion 2
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PQRS is a trapezium. PS and QR are perpendicular to the line PQ. **Examiner Only** Marks Remark PT = 5 cm, TQ = 6 cm, PS = 4 cm and QR = 6 cm. Diagram not drawn accurately 5 cm 6 cm 4 cm 6 cm S R Find the area of the (a) trapezium PQRS, Answer _____ cm² [2] **(b)** quadrilateral TQRS. Answer _____ cm² [2] Total Question 3 Januarian Reneralian R

4	Work out the value of $\frac{R(3S+T)}{5}$ when $R=-3$, $S=4$, $T=-2$		Examin Marks	er Only Remark
	Answer	_ [3]	Total Qu	estion 4
5	Which of the statements below describes the number $n^2 + 1$, where n represents any whole number? Explain your answer.			
	"always even" "always odd" "could be even or odd"			
	Answer			
	because			
		[2]		
			Total Qu	estion 5
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6	A box contains pens.	Examiner Only Marks Remark
	There are 8 black, 6 blue, 4 green and the rest are red. The probability of taking a red pen from the box is 1	Marks Remark
	The probability of taking a red pen from the box is $\frac{1}{10}$ How many red pens are in the box?	
	Answer [2]	Total Question 6
7	Find the reciprocal of 1.2	
	Answer [2]	
		Total Question 7
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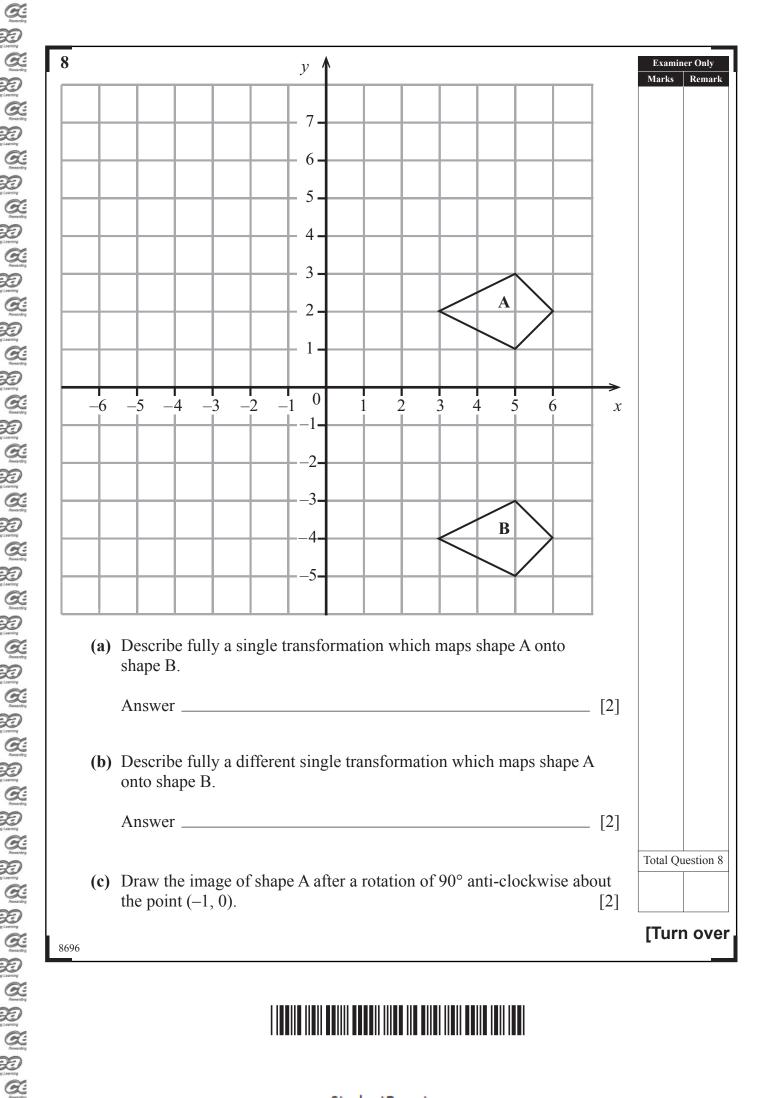
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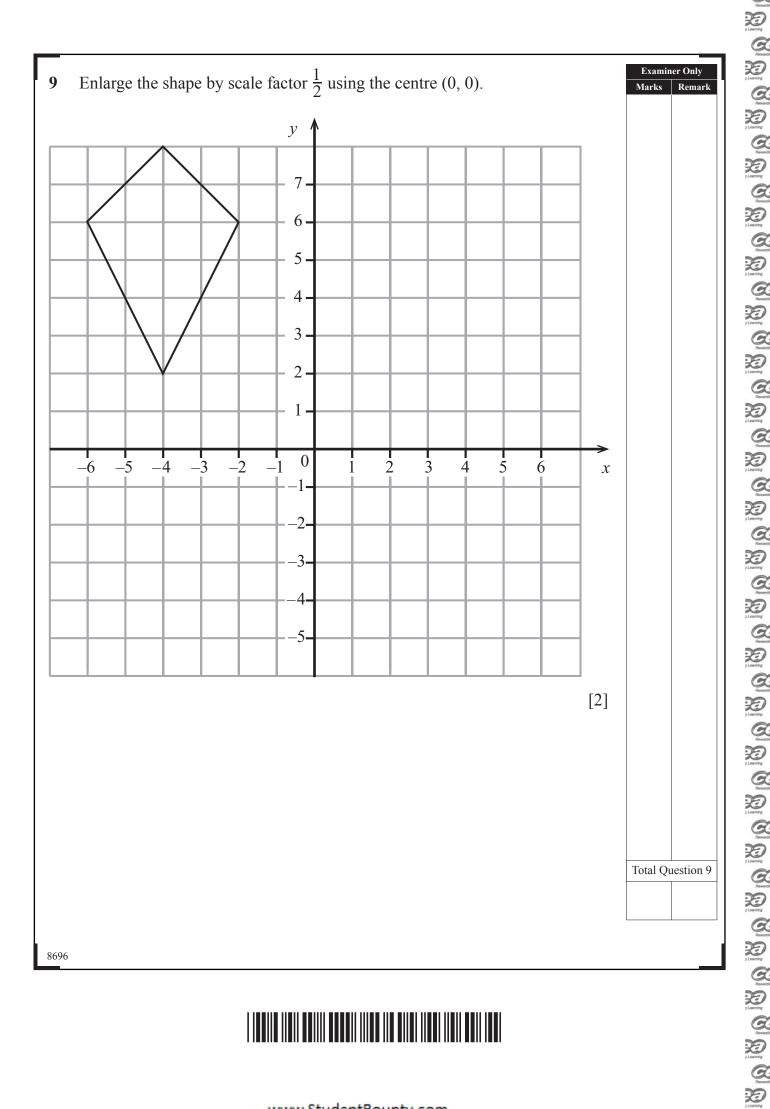
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10	Find the value of $(3.46 \times 10^{-3}) \times (2.5 \times 10^{-6})$, giving your answer in standard form.		Examin Marks	er Only Remark
	Answer	[2]		
			Total Qu	estion 10
8696			[Turr	n over



11	(a)	Complete the table of values for $y = 3x - x^2 - 1$
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x	-2	-1	0	1	2	3	4
У		- 5	-1	1	1		-5

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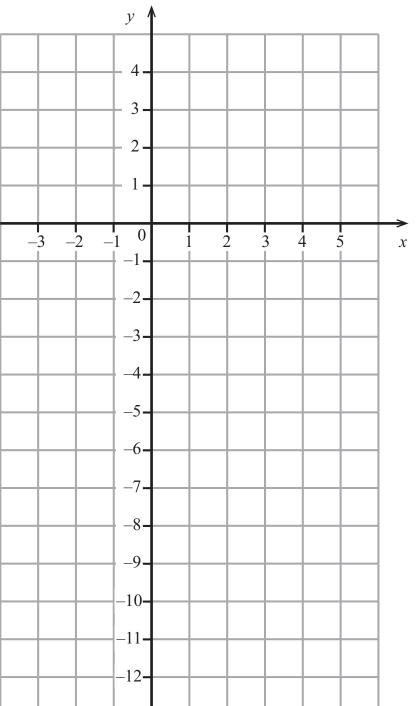
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Examiner Only

Marks Remark

(b) On the grid below, draw the graph of $y = 3x - x^2 - 1$ between x = -2 and x = 4



[2]

	(c) Use your graph to work out the values of x for which $y = -3$	Examin Marks	er Only Remark
	Answer $x =$ [2]	Total Qu	estion 11
12	Simplify $(5y^3)^2$ Answer [2]	Total Que	estion 12
13	A wooden spear of length 130 cm is made from a cylinder and a cone. The cylinder has radius 3 cm and length 120 cm. Calculate the volume of the spear, giving your answer in terms of π .	Total Que	estion 13
8696	Answer cm ³ [5]	[Turr	over



Qu	Quality of written communication will be assessed in this question. Examiner Only Marks Remark								
14	Mai swe	rtha has a bag of fruit sweets. There are 5 red, 4 green and 3 yellow eets.							
	(a)	Martha says, "I hate green sweets. If I take a green sweet, I am going to put it back in the bag and try again."							
		What is the probability that Martha takes two green sweets in succession?							
		Answer [2]							
	(b)	If Martha had said, "I hate green sweets. If I take a green sweet, I am going to throw it out and try again," would the probability of taking two green sweets in succession increase or decrease? Justify your answer.							
		Answer because							
		[2]							
			Total Qu	estion 14					
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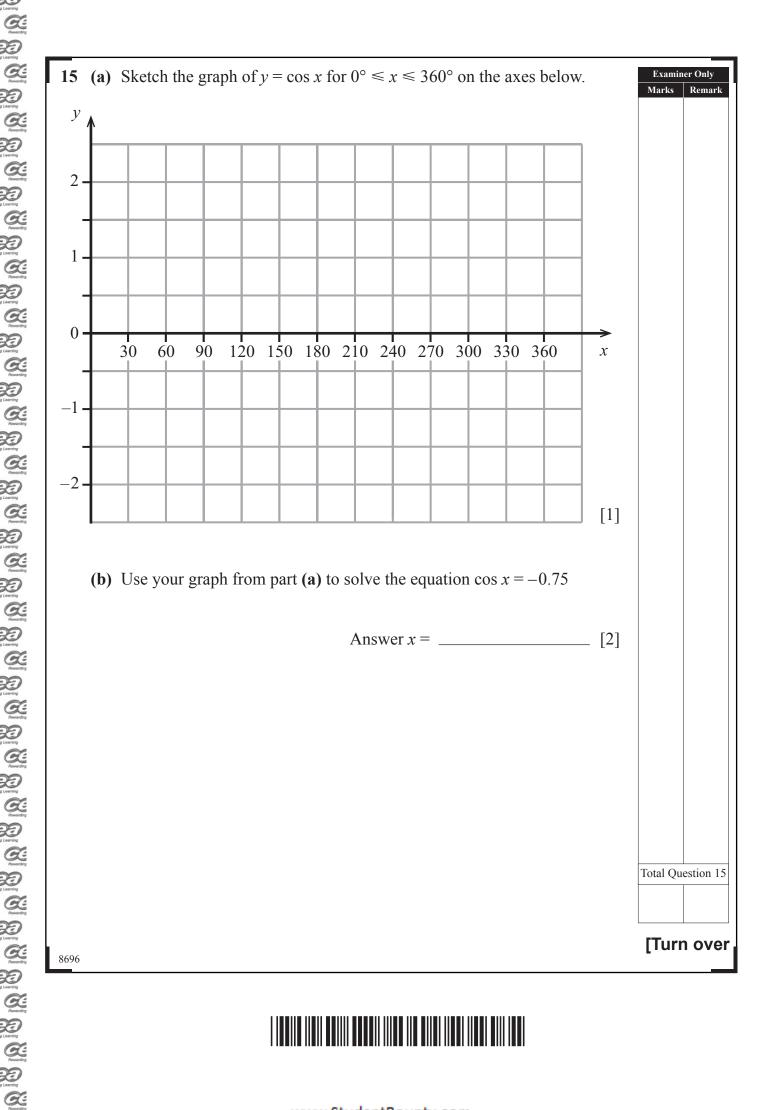
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16 Emer says she has worked out that $3-\sqrt{5}$ is a square root of $14-6\sqrt{5}$ Showing all your work clearly prove that Emer is correct.	k
Showing all your work clearly prove that Emer is correct.	
THIS IS THE END OF THE QUESTION PAPER	
	
Total Question	16

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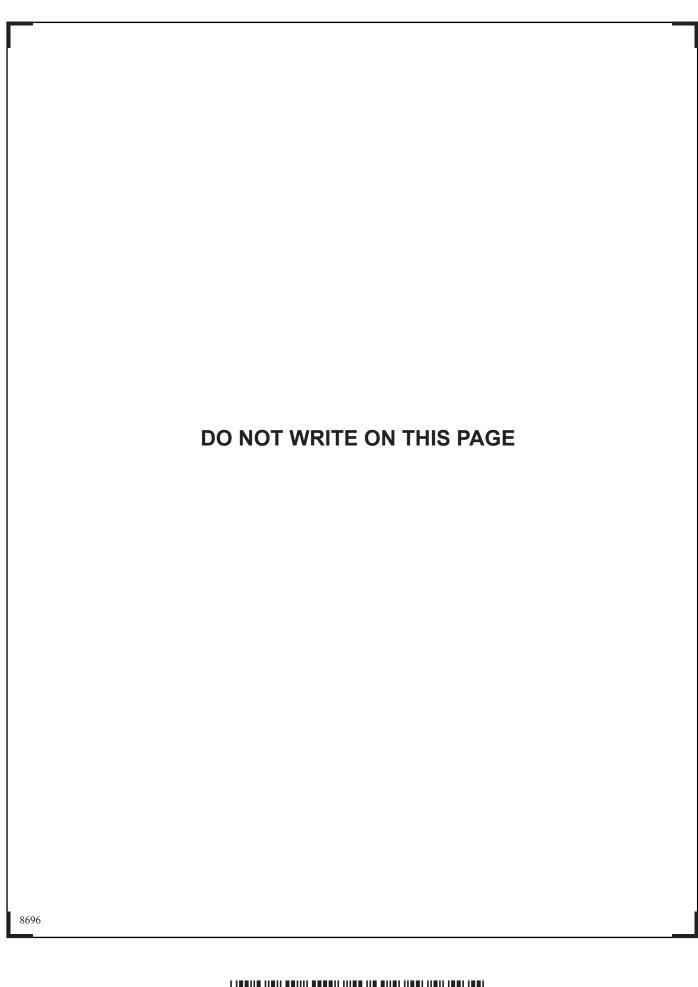
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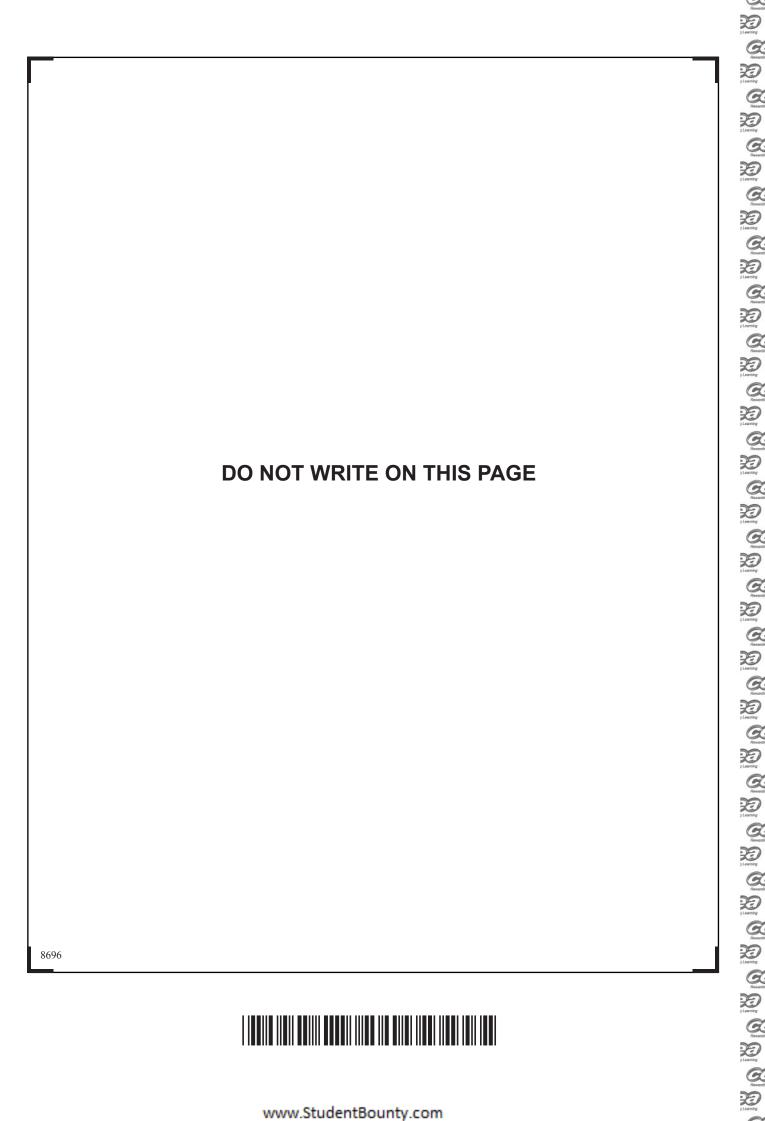
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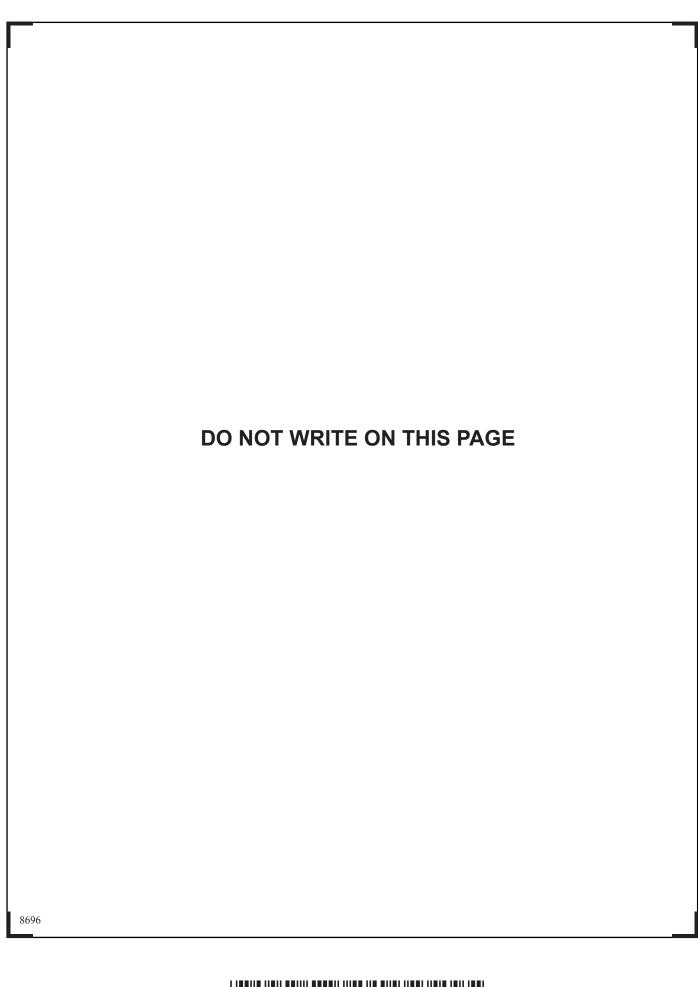
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