UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/06 Paper 6 (Extended), maximum raw mark 40

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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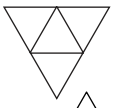
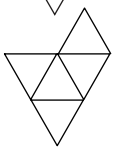
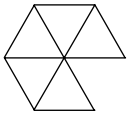
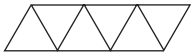
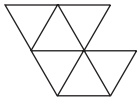
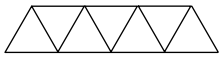
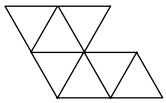
UNIVERSITY of CAMBRIDGE
International Examinations

A INVESTIGATION MAXIMISING THE PERIMETER			
1	**(a)** 4 joined equilateral triangles (not in row) e.g. 		Shapes may not be rotations or reflections of those given
	5 joined equilateral triangles (not in row) **e.g.**  **or** 	**1**	1 for both a 4 triangle and a 5 triangle diagram
	(b) (i) 6 joined equilateral triangles with a perimeter > 6 e.g.  or 	**1**	
	(ii) 7 joined equilateral triangles with a perimeter > 7 **e.g.**  **or** 	**1**	
	(c) (i)		
	Number of equilateral triangles: 2 | 3 | 4 | 5 | 6 | 7 | 8 Greatest perimeter (cm): 4 | **5** | **6** | **7** | **8** | **9** | 10	**1** **C**	**–1** any error or omission **C** opportunity
	(ii) 22 (cm)	**1**	
	(iii) 30 (triangles)	**1**	
	(d) $x + 2$ oe	**1**	Not $x = y = -1$ mark once only
2	**(a)** 14 (cm)	**1** **C**	**C** opportunity
	(b) (i)		
	Number of squares: 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 Greatest perimeter(cm): 6 | **8** | **10** | 12 | **14** | **16** | **18** | **20** | 22	**1**	**–1** any error or omission
	(ii) 36 (cm)	**1**	
	(iii) 15 (squares)	**1**	
	(c) $2x + 2$ oe	**1**	

3	**(a)** Number of regular hexagons: 2 | 3 | 4 | 5 | 6 Greatest perimeter (cm): **10** | **14** | **18** | **22** | 26 **(b)** $4x + 2$ oe	**1** **C** **1**	**–1** any error or omission **C** opportunity
4	$6x + 2$ oe	**1**	
5	**(a)** $(y - 2)x + 2$ oe **(b)** $x = 24, y = 3$ $x = 12, y = 4$ $x = 8, y = 5$ $x = 6, y = 6$ $x = 4, y = 8$ $x = 3, y = 10$ $x = 2, y = 14$ $x = 1, y = 26$	**2** **2FT** **C**	**1** for $y - 2$ seen ft their part **(a)** **1** for one or two correct pairs **C** opportunity
		C1	**1** for two C opportunities seen
			[Total: 20]

B	**MODELLING COVERING CAKES**		
1	**(a)** Volume = $x \times x \times y$ oe e.g. $V = x^2y$ $y = \frac{4000}{x^2}$	**1** **C**	 **C** opportunity
	(b) $S = x^2 + 4xy$ oe $S = x^2 + \frac{4x(4000)}{x^2}$ $S = x^2 + \frac{16000}{x}$	 **1** **1**	
	(c) correct sketch	**1 C**	**C** opportunity
	(d) (minimum surface area =) 1200 (cm^2) (x =) 20 (y =) 10	**1** **1** **1**	
2	**(a)** $V = \pi x^2 y$ (= 4000) $S = \pi x^2 + 2\pi xy$ $y = \frac{4000}{\pi x^2}$ or $\pi xy = \frac{4000}{x}$ oe $S = \pi x^2 + 2\pi x \frac{4000}{\pi x^2}$ $S = \pi x^2 + \frac{8000}{x}$	**1** **1** **1** **1** **C**	 **C** opportunity
	(b) correct sketch	**1 C**	**C** opportunity
	(c) (minimum surface area =) 1110 (cm^2) or better (1107.162…) (x =) 11 or better (10.8385…) (y =) 11 or better (10.8385…)	 **1** **1** **1**	
3	**(a)** Multiply by thickness	**1**	explanation
	(b) Not uniform thickness or Missing elements of volume	**1**	comment

4	Square based: top = 400 cm^2 : sides = 800 cm^2 Circular based: Top = 369(.05..) cm^2 : sides = 738(.1..) cm^2 Yes, both in ratio – top : sides = 1 : 2	**1** **1** **CFT**	for areas for areas **C** opportunity for statement that FT their areas
		C1	**1** for two opportunities seen
			[Total 20]