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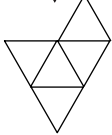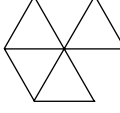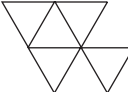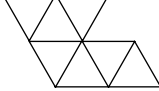
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Mark schemes must be read in conjunction with the question papers and the report on the examination.

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A INVESTIGATION MAXIMISING THE PERIMETER

1 (a) 4 joined equilateral triangles (not in row) e.g.

5 joined equilateral triangles (not in row)   **e.g.**   **or**

1 | Shapes may <u>not</u> be rotations or reflections of those given

1 for both a 4 triangle <u>and</u> 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)						1 C	–1 any error or omission C opportunity

Number of regular hexagons	2	3	4	5	6
Greatest perimeter (cm)	10	14	18	22	26

	(b) $4x + 2$ oe	1	

4	$6x + 2$ oe	1	

5	(a) $(y – 2)x + 2$ oe	2	1 for $y – 2$ seen
	(b) $x = 24, y = 3$ $x = 12, y = 4$ $x = 8, y = 5$ $x = 6, y = 6$ $x = 4, y = 8$ $x = 3, y = 10$ $x = 2, y = 14$ $x = 1, y = 26$	2FT C	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. $V = x^2y$		
		$y = \dfrac{4000}{x^2}$	**1**	
			C	**C** opportunity
	(b)	$S = x^2 + 4xy$ oe		
		$S = x^2 + \dfrac{4x(4000)}{x^2}$	**1**	
		$S = x^2 + \dfrac{16000}{x}$	**1**	
	(c)	correct sketch	**1 C**	**C** opportunity
	(d)	(minimum surface area =) 1200 (cm^2)	**1**	
		(x =) 20	**1**	
		(y =) 10	**1**	
2	**(a)**	$V = \pi x^2 y$ (= 4000)	**1**	
		$S = \pi x^2 + 2\pi xy$	**1**	
		$y = \dfrac{4000}{\pi x^2}$ or $\pi xy = \dfrac{4000}{x}$ oe	**1**	
		$S = \pi x^2 + 2\pi x\dfrac{4000}{\pi x^2}$	**1**	
		$S = \pi x^2 + \dfrac{8000}{x}$	**C**	**C** opportunity
	(b)	correct sketch	**1 C**	**C** opportunity
	(c)	(minimum surface area =) 1110 (cm^2) or better (1107.162…)	**1**	
		(x =) 11 or better (10.8385…)	**1**	
		(y =) 11 or better (10.8385…)	**1**	
3	**(a)**	Multiply by thickness	**1**	explanation
	(b)	Not uniform thickness or Missing elements of volume	**1**	comment

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