UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

0580 MATHEMATICS

| 0580/22 | Paper 2 (Extended), maximum raw mark 70 |

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.

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International Examinations

Abbreviations

cao   correct answer only
cso   correct solution only
dep   dependent
ft   follow through after error
isw   ignore subsequent working
oe   or equivalent
SC   Special Case
www   without wrong working
soi   seen or implied

Qu		Answers	Mark	Part marks
1		Wednesday 22 15 or 10 15pm	2	**B1** **B1**
2	(a)	I cao	1	
	(b)	I N cao	1	
3		$x - 5$ $\dfrac{x}{5}$ $\dfrac{5}{x}$ $5x$	2	**M1 evaluating** all 4 expressions for one value in the range. (1 and 2 are out of range)
4		25 (correct working essential)	2	**M1** for $18 + 4 + 3$ with denominator 12 must be soi (oe is possible)
5		64000 or 6.4×10^4	2	**SC1** for 63800 or 6.38×10^4 **or** figs 64 or 6.4×10^k in answer space.
6		1, 2, 3, 4	3	**M1** $10x < 45$ **A1** $x < 4.5$
7		4.46 or 4.456 to 4.459 cao	3	**B1** for 28 seen **M1**ft for $\dfrac{their\,28}{2\pi}$ oe or better.
8		13500 408	3	**M1** 135×10^2 or $408000 \div 10^3$ oe **A1 A1**
9		452	3	**M1** $\tan 78.3 = \dfrac{x}{58.4}$ **M1** "282" + 170	**SC2** 282 in **answer space**
10	(a)	50	1	
	(b)	15	2	**M1** finding area under graph **SC1** 15000
11		196	3	**M1** $y = k(x-3)^2$ **A1** $k = 4$	**M1** $y = \dfrac{(x-3)^2}{k}$ **A1** $k = \dfrac{1}{4}$

12	(a)	10(.0)	2	**M1** $\frac{1}{2} \times 8 \times 5 \times \sin 150$
	(b)	210	2	**M1** 30° correctly placed at *B* or *C* oe
13	(a)	15	2	**M1** for $\frac{(9-3)}{0.4}$ oe
	(b)	11.7(0)	2	**M1** for 9×1.3 oe
14	(a)	Shear, SF2, *x* axis invariant	3	**B1** shear **B1** SF2 **B1** *x* axis invariant
	(b)	$\begin{pmatrix} 1 & 2 \\ 0 & 1 \end{pmatrix}$	2ft	$\begin{pmatrix} 1 & k \\ 0 & 1 \end{pmatrix}$ 2 marks if $k = 2$ or their SF in (a) 1 mark for any other k, $k \neq 0$
15	(a)	29 to 29.5	1	
	(b)	20 to 20.5	1	
	(c)	14 to 14.5	1	
	(d)	$\frac{13}{15}$ oe or 0.867	2	**M1** 8 seen
16	(a)	0.7 to 0.8 and 5.2 to 5.4	2	**B1 B1**
	(b)	–2 to –1 but must have a tangent at $x = 1$ for full marks	3	**M1** drawing tangent at $x = 1$ **M1** for using *y*step/*x*step on their tangent wherever it is drawn
17	(a)	(–5, 0)	2	**B1** $(k, 0)$ or $(–5, k)$
	(b)	–2	1	
	(c)	$2\frac{1}{2}$ or $\frac{5}{2}$	2	**M1** $\frac{5}{4} = \frac{k}{2}$ oe
18	(a)	$2(x + 2)^3$ or $2x^3 + 12x^2 + 24x + 16$	2	**M1** v. clear evidence of f(x) × 2 then add 10
	(b)	$\sqrt[3]{(x + 5)} - 2$	3	**M1** correct first step **M1** correct second step
	(c)	0	2	**M1** g(–5) seen or $2 \times -5 + 10$
19	(a)	$3\frac{1}{2}$	2	**M1** $2x - 7 = 0$
	(b)	3 and –3	3	**M1** $x^2 - 8 = 1$ **A1** $x = 3$ **A1** $x = -3$
	(c)	5	2	**M1** $x - 2 = 3$