UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

4024 MATHEMATICS (SYLLABUS D)

4024/12 Paper 1, maximum raw mark 80

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.

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UNIVERSITY of CAMBRIDGE
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	**(a)**	$\frac{18}{25}$ cao	1	
	(b)	$\frac{2k_1}{5k_1}$ and $\frac{2k_2}{5k_2}$	1	
2	**(a)**	42	1	
	(b)	4	1	
3	**(a)**	Drawing of kite or isosceles trapezium	1	
	(b)	2 0	1	
4	**(a)**	9	1	
	(b)	144	1	
5		18	2	**B1** for $x^2y = k$ soi or for $2 \times 6^2 = y \times 2^2$ soi
6		$64 - 9\pi$ cao isw	2	**B1** for $\pi \times 3^2$ or for $64 - \pi r^2$
7	**(a)**	$(x) \leqslant 4$	1	
	(b)	–1, 0, 1	1	
8	**(a)**	0.95	1	
	(b)	2.8(0)	1	**SC1** for both 95 and 280
9	**(a)**	$\frac{31}{40}$ oe	1	
	(b)	$3\frac{3}{4}$ cao	2	**B1** for $\frac{5}{3} \times \frac{9}{4}$ oe

10 **(a)**	22	1	
(b)	300	2	**B1** for two of 20, 9, 0.6 seen
11 **(a)**	–3 cao	1	
(b)	$a = \frac{b^2}{b-c}$	2	**B1** for $ac = b(a - b)$ or $c = b - \frac{b^2}{a}$
12 **(a)**	$\begin{pmatrix} 5 \\ -10 \end{pmatrix}$ oe	1	
(b)	$(s =) 5$ $(t =) 2$	2	**C1** for one correct or **M1** for $\begin{pmatrix} 3s \\ -2s \end{pmatrix} + \begin{pmatrix} -3 \\ 12 \end{pmatrix} = \begin{pmatrix} 12 \\ t \end{pmatrix}$ oe
13 **(a)**	$\begin{pmatrix} 2 \\ -4 \end{pmatrix}$ oe	1	
(b)	Correct triangle	2	**B1** for two vertices correct or triangle correct size and orientation
14 **(a)**	(–3, 2.5) oe	1	
(b)	$y = \frac{1}{2}x + 4$ isw	2	**B1** for $m = \frac{1}{2}$ or $c = 4$ soi
15	28	3	**M1** for $CD^2 =$ their $(\sqrt{65})^2 - 4^2$ oe and **A1** for $CD = 7$ or **B1** for their$CD \times 4$ After 0 **SC1** for $(\sqrt{65})^2 = 65$
16 **(a)**	150°	2	**B1** for $\frac{360}{12}$ soi or $(12 - 2) \times 180$ soi
(b)	Equilateral triangle	1	
17 **(a)**	1.85	1	
(b) **(i)**	10 15 oe	1	
(ii)	10 hours 5 minutes	2	**B1** for 17 55 or 23 30 seen or **M1** for 24 00 – (13 25 + 4 30) + 4 oe
18 **(a)** **(i)**	11	1	
(ii)	–3	1	
(b)	$5^{-1}, 4^0, 2^3, 3^2$ oe	1	
(c)	64	1	

19	**(a) (i)**	-12	1	
	(ii)	$\sqrt[3]{x+4}$ oe	1	
	(b)	$a^2 - 7a + 11$	2	**B1** for $(a-2)^2 - 3(a-2) + 1$
20	**(a)**	1.1×10^8	1	
	(b)	Senegal South Korea	2	**C1** for one correct in the correct place
	(c)	3.4×10^7	1	
21	**(a)**	Tree diagram correct	2	**B1** for both $\frac{10}{25}$, $\frac{15}{25}$ oe correct or both $\frac{20}{30}$, $\frac{10}{30}$ oe correct
	(b)	$\frac{8}{15}$ cao	2	**M1** for $\frac{10}{25}\times\frac{10}{30}+\frac{15}{25}\times\frac{20}{30}$ oe
22	**(a)**	11, 14, 17	1	
	(b)	$3n + 2$	1	
	(c)	27 cao	2	**M1** for $3p + 2 = 83$ ft
23	**(a)**	Correct frequency polygon	2	Frequency axis scaled to show 4, 8, 7, 4, 2 Plots at midpoints 2, 6, 10, 14, 18 and joined by straight lines **B1** for 1 mis plot , everything else correct or if plots not joined, everything else correct or if there is no vertical scale, everything else correct or for 5 correct frequencies not at midpoints but correctly spaced, everything else correct. or **SC1** for a completely accurate frequency polygon seen alongside other graphs on the same diagram.
	(b)	$4 < t \leqslant 8$	1	
	(c)	13	1	
	(d)	Convincing explanation	1	e.g. longest time is in the group $16 < t \leqslant 20$, but may not be 20

24	**(a)**	245	1	
	(b)	220	1	
	(c)	465	3	**B2** for 4965 or **M2** for $\frac{25}{100} \times 4500 + 320 \times 12 - 4500$ or **B1** for 1125 or 3840 seen
25	**(a)** **(i)**	$(x + 4)(x - 3)$	1	
	(ii)	$(5x + 2y)(5x - 2y)$	1	
	(b)	$\frac{3}{2p}$ oe	1	
	(c)	$x = 4 \quad y = -2$	3	**C2** for one correct or **M1** for correct method to eliminate one variable