UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

4024 MATHEMATICS (SYLLABUS D)

4024/11   Paper 11, maximum raw mark 75

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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Qu	Answers	Mark	Part Marks
1	(a) $\dfrac{13}{18}$ oe	1	
	(b) $\dfrac{22}{27}$ oe	1	
2	(a) 9	1	
	(b) 12	1	
3	(a) 63	1	
	(b) $\dfrac{28}{\pi}$	1	
4	64	2	M1 for $(60 + 20) \div$ (total time)
5	(a) C	1	
	(b) $(0)40^{(°)}$	1	
6	(a) $x < 3.5$	1	
	(b) 3	1ft	ft from their (a)
7	TRUE TRUE FALSE Valid Example	2	B1 for TRUE TRUE or FALSE with valid example evaluated
8	(a) 49	1	
	(b) 18	1	
9	(a) 6.5	1	
	(b) 6	2	B1 for 7.5 seen
10	(a) (0).012	1	
	(b) 300	1	
	(c) 3 cao	1	
11	Congruent triangles established and conclusion	3	M1 for CO = OD or AO = OB M1 for $A\hat{O}C = B\hat{O}D$ A1 for both pairs of equal sides, equal angles, a valid reason and conclusion
12	(a) 1.5 , 6.5	1	
	(b) $x \geqslant 0, y \geqslant 4, x \leqslant 3$	2	C1 for two correct or all 3 inequalities consistently wrong, or =

13	(a)	(400 350)	2	C1 for 750 B1 for 400 or 350 seen
	(b)	<u>Total cost</u> (of each family's order).	1	
14		Correct histogram	3	B2 for three correct columns B1 for one correct column SC1 for correct frequency densities
15	(a)	40.81	1	
	(b) (i)	6.9(0)	1	
	(ii)	2.76	2	M1 for their **(b)(i)** ÷ 2.50
16	(a)	6 8 13	3	C2 for total 27 with their median 8 or C1 8 or total 27 or B1 for 27 seen or M1 for a relevant equation containing such as x and $x +7$ or $y – 7$ and y
	(b)	17 cao	1	
17	(a)	$y = \dfrac{36}{x^2}$	2	C1 for $y = \dfrac{k}{x^2}$ B1 for $k = 36$ seen M1 for $y = \dfrac{k}{x^2}$ seen with any k
	(b)	9 cao	1	
	(c)	±6 cao	1	
18	(a)	50	1	
	(b)	65	1	
	(c)	45	1	
	(d)	225	1	
19	(a)	78	1	
	(b)	1.62×10^{11}	1	
	(c)	$5.32(2) \times 10^{21}$	2	C1 for figs 5322 or 5.3....× 10^{21}
20	(a)	4 : 25	1	
	(b)	2 : 5	1	
	(c)	7.5	2	M1 for $\dfrac{3}{CD} = \dfrac{2}{5}$ or better

21	(a)		$22 - 3n$	2	B1 for $-3n$ soi
	(b)	(i)	$(2x - 5y)(2x + 5y)$	1	
		(ii)	$(5a - 2)(x - a)$	2	M1 for the correct extraction of a common factor at any stage
22	(a)		Correct distance/time graph	3	B2 for any two correct lines or L_1 (10 10,0) to (a, 6), gradient m, $\quad$ L_2 (a, 6) to (b, 6) $\quad$ L_3 (b, 6) to (11 00,0) $\quad$ or (c, 0), gradient $-$ m. B1 for a horizontal line at d = 6 or a horizontal line, 14 mins, anywhere or $\dfrac{6}{20}$ soi
	(b)	(i)	10 48	1	
		(ii)	4	1	
23	(a)	(i)	$t^2 - 4t + 3 = 0$ correctly derived AG	1	Must see $(20t - 5t^2) = 15$
		(ii)	1, 3	2	C1 for one value correct , and no incorrect value given M1 for $(t - 1)(t - 3)$ oe seen
	(b)		4	2	M1 for $20t - 5t^2 = 0$ or better seen
24	(a)	(i)	0.75 oe	2	M1 for $5 - 6x \pm 2 = 2x + 1$ soi
		(ii)	$\dfrac{8}{15}$ oe	2	M1 for $\dfrac{5t}{2} = \dfrac{4}{3}$ or better
	(b)		$x = 2$ $\quad$ $y = -3$	3	C2 for one correct www M1 for elimination or substitution reaching such as $11x = k$ or $hx = 22$ or $11y = p$ or $qy = -33$