**General Certificate of Education (A-level)
June 2013**

Use of Mathematics   **UOM4/1**

(Specification 5350)

Applying Mathematics

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Key to mark scheme abbreviations

M	mark is for method
m or dM	mark is dependent on one or more M marks and is for method
A	mark is dependent on M or m marks and is for accuracy
B	mark is independent of M or m marks and is for method and accuracy
E	mark is for explanation
√or ft or F	follow through from previous incorrect result
CAO	correct answer only
CSO	correct solution only
AWFW	anything which falls within
AWRT	anything which rounds to
ACF	any correct form
AG	answer given
SC	special case
OE	or equivalent
A2,1	2 or 1 (or 0) accuracy marks
$-x$ EE	deduct x marks for each error
NMS	no method shown
PI	possibly implied
SCA	substantially correct approach
c	candidate
sf	significant figure(s)
dp	decimal place(s)

No Method Shown

Where the question specifically requires a particular method to be used, we must usually see evidence of use of this method for any marks to be awarded.

Where the answer can be reasonably obtained without showing working and it is very unlikely that the correct answer can be obtained by using an incorrect method, we must award **full marks**. However, the obvious penalty to candidates showing no working is that incorrect answers, however close, earn **no marks**.

Where a question asks the candidate to state or write down a result, no method need be shown for full marks.

Where the permitted calculator has functions which reasonably allow the solution of the question directly, the correct answer without working earns **full marks**, unless it is given to less than the degree of accuracy accepted in the mark scheme, when it gains **no marks**.

Otherwise we require evidence of a correct method for any marks to be awarded.

Question	Solution	Marks	Total	Comments
1(a)(i)	(42 475 – 35 475 =) 7000	B1	1	
(ii)	$\dfrac{7000}{42\,475} = 0.165 = 16.5\,\%$	M1 A1ft	2	ft only if their (a)(i) 7 000 ± 100
(b)	when you get paid more money you pay a greater **proportion** in income tax	B1	1	
	Total		**4**	
2(a)	the tax rate is $20\,\% = 0.2$ so 0.8 gives the proportion that is untaxed	B1 B1	2	
(b)	$I = 9990 + 0.6S$ $= 9990 + 0.6 \times 80\,000 = 57\,990$	M1 A1	2	(alternatively working from first principles)
(c)	$4000 = 9990 + 0.6S$ $S = \dfrac{40\,000 - 9990}{0.6} = 50\,017$	M1 A1	2	(any correct equation with 40 000 substituted)
	Total		**6**	
3	horizontal straight line $T = 7475$ for S from 90 000 to 100 000	B1		(within half square)
	straight line starting joining (100 000, their 7475) to (114 950, 0)	B1		tolerance within one square
	horizontal straight line along axis for $S \geq 114\,950$	B1	3	can be implied by previous section of graph clearly ending on axis before 120 000
	Total		**3**	
4	$I = 0.8 \times 35\,000, + 0.6 \times 11\,500, + 0.5\,(S - 150\,000)$ $= 28\,000 + 69\,000 + 0.5S - 75\,000$ $= 22\,000 + 0.5S$ $I = a + 0.5S$	M1M1 M1 A1	4	SC 2 for sight of $a = 0.5$
	(alternative method) when $S = 150\,000$, $I = 97\,000$ $97\,000 = a + 75\,000$ $a = 22\,000$ $I = 22\,000 + 0.5S$	M1A1 M1 A1	4	
	Total		**4**	

Question	Solution	Marks	Total	Comments
5	$I = A + (1-r)B + (1-t)(S-(A+B))$	M1		
		M1		substituting A, B
	$= 10\,000 + 0.75 \times 50\,000 + 0.55 \times 20\,000$	M1		substituting $(1-r)$
		M1		substituting $(1-t)$
	$= 58\,500$	A1	5	
	Total		**5**	
6(a)	$I = 0.75S$	B1	1	oe not simplified
(b)	$I = 9990 + 0.6S$	M1		oe
	$0.75S = 9990 + 0.6S$	M1		equating
	$0.15S = 9990$	M1		rearranging
	$S = \dfrac{9990}{0.15} = 66\,600$	A1	4	
	Total		**5**	
7(a)	horizontal translation 20 000 units to the left	B1		accept vector answer
(b)	stretch scale factor 350 in the vertical direction	B1		
(c)	translation vertically 50 000 units downwards	B1	3	
	Total		**3**	
	TOTAL		**30**	