Exponential Growth & Decay (inc Compound Interest)

Mark Scheme 1

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Number
Sub-Topic	Exponential Growth & Decay (inc Compound Interest)
Booklet	Mark Scheme 1

Time Allowed: 69 minutes

Score: /57

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1 (a)	7.74 or 7.738 to 7.739 [billion]	**2**	**M1** for $7.23 \times \left(1+\frac{1.14}{100}\right)^6$
(b)	2042	**2**	**B** for 28 or 28.6…or 29 or answer 2043

2 **(a)**	57 122	**2**	**M1** for $20\,000 \times (1+\frac{30}{100})^4$ oe
(b)	15	**2**	**M1** for two substitutions greater than 4 e.g. $20\,000 \times (1+\frac{30}{100})^k$ where $k > 4$

3 **(a)**	**(i)**	640×1.02^6 oe $= 720.7\ldots$	**M1** **B1**	Must be seen
	(ii)	3.02 or 3.020 to 3.024… nfww	**4**	**M3** for $[x =]\ \sqrt[4]{721 \div 640}$ or better (implied by answer of 1.03[02…] or $r = 0.0302$[4…] or **M2** for $(\textit{their } x)^4 = 721 \div 640$ or **M1** for $640 \times (\textit{their } x)^4 = 721$ oe
(b)		874.8[0] final answer	**2**	**M1** $1200 \times (1 - 0.1)^3$ oe

4	44 300 cao	**3**	**M1** for $50\,000 \times (0.97)^4$ oe and **B1** for 44260 or better or **SC1** for correct method for 3% increase with final answer of 56300

5	[0.]08	**4**	**M3** for $200\times\left(1+\frac{2}{100}\right)^2-200-\frac{200\times2\times2}{100}$ oe or **M1** for $200\times\left(1+\frac{2}{100}\right)^2$ **and M1** for $\frac{200\times2\times2}{100}$ [+200]

6	13891.5[0]	**3**	**M2** for $12000\times\left(1+\frac{5}{100}\right)^3$ oe or **M1** for $12000\times\left(1+\frac{5}{100}\right)^n$ oe $n\geqslant2$

7	454.27 cao final answer	**3**	**M1** for $420\times(1+\frac{4}{100})^2$ oe and **A1** for 454 or 454.2 to 454.3 or **SC2** for answer 34.27 or **SC1** for answer 34.2 to 34.3

8	6632.55 cao final answer	**3**	**M2** for $6250\times(1+\frac{2}{100})^3$ oe **or M1** for $6250\times(1+\frac{2}{100})^2$ oe **SC2** for answer 382.55 final answer

9	543.19	**3**	**M2** for 500×1.028^3 oe or long method or **M1** for 500×1.028^n, $n=2$ or 4

10	17.05 **cao www**	**4**	**M1** for $280 \times (1 + \frac{3}{100})^2$ oe **M1** subtracting 280 from $280(1 + \frac{k}{100})^2$ any k **A1** for 17.052 or **SC2** 297.05 on answer line

11	882	**2**	**M** $800 \times 1.05 \times 1.05$

12	127.31 cao	**3**	**M** for 120×1.03^2 **A1** for 127.308 If **M0** award **SC2** for 7.31 or 247.31

13	\$674.92, 674.9(0) or 675	3	**M2** $600 \times (1 + (4/100))^3$ or better oe or **M1** 600×1.04^2 oe

14	216.32 cao	2	**M1** $200 \times (1 + (4/100))^2$ oe

15	\$11.50	3	**M1** $198 \times r^3$ r can be anything **dep M1** r = 1.019 and subtracting 198 **SC2** 209.50 on answer line

16	(a) 2300 (b) 8.64	2* 3*	**M1** 5 x 2000 x 3 ÷ 100 **M1** 2000×1.049^3 oe (2098, 2200.80, 2308.64) **dep M1** (for C I method) subtraction of (a)