Question Number	Scheme	Marks
3(a)	$58^2 = a + 5^3 \times b$, $65^2 = a + 10^3 \times b \Rightarrow a = ...$, or $b = ...$	M1
	$a = 3241,\ b = 0.984$	A1A1
		(3)
(b)	e.g. $85^2 = "3241" + "0.984" \times T^3 \Rightarrow T = ...$	M1
	$(T =)$ awrt 15.9	A1
		(2)
		(5 marks)

If the equation is misread and used consistently throughout the question with either indices of 2 or 3 e.g. $P^3 = a + bt^2$ or e.g. $P^2 = a + bt^2$ then only allow the M marks to be scored. The equation must be seen.

Note candidates who work with 58000 and 65000 in (a) and 85000 in (b) can score maximum (a) M0A0A0 (b) M1A1 for 15.9

(a) **Note that correct values for *a* and *b* scores full marks.**

M1 Forms two simultaneous equations in *a* and *b* (at least one equation must be correct) and proceeds to find a value for *a* (must be positive) or a value for *b* (which may be directly from a calculator).
May see e.g. $3364 = a + 125b$ or e.g. $4225 = a + 1000b$
You do not need to check the mechanics of any rearrangement.

A1 One of $a = 3241,\ b = 0.984$ (or $\frac{123}{125}$) (may be embedded in the equation)

A1 $a = 3241,\ b = 0.984$ (or $\frac{123}{125}$) (may be embedded in the equation) isw once the correct values paired correctly with *a* and *b* are seen.

SC $b = 3241,\ a = 0.984$ (wrongly paired) score M1A1A0

(b) **Note candidates who work with 58000 and 65000 in (a) and 85000 in (b) can score maximum (a) M0A0A0 (b) M1A1 for 15.9**

Note awrt 15.9 with no working is M0A0

M1 Forms a correct equation for their *a* and their *b* and proceeds to find a value for *T*
Condone use of 3240 (3241 to 3sf)

If their *a* is 3 241 000 000 (or 3 240 000 000 to 3sf) and *b* is 984 000 condone miscopying/transcription errors provided the intention was clear to use these.

A1 awrt 15.9 following a correct equation seen. isw if they subsequently round to e.g. 16
Allow awrt 15.9 using 85000 if their *a* is 3 241 000 000 (or 3 240 000 000 to 3sf) and *b* is 984 000

Question Number	Scheme	Marks
4(i)(a)	ay^3	B1
		(1)
(i)(b)	$\dfrac{5}{\left(3a^{1-x}\right)^{-2}}=\dfrac{45}{\ldots}$ $\left(\ldots a^{1-x}\right)^{-2}=a^{-2}\times a^{2x}$ $=\dfrac{45a^2}{y^2}$	B1 M1 A1
		(3)
(ii)(a)	e.g. $3^{4t+2}=\left(3^{2t}\right)^2\times 9=9p^2$ (see notes) $\Rightarrow 27\times p^2+3=82\times p\Rightarrow 27p^2-82p+3=0$ *	M1 A1*
		(2)
(ii)(b)	Solves the quadratic $\Rightarrow$ 3, $\dfrac{1}{27}$ --- $\left(3^t\right)^2=3$ or $9^t=3\Rightarrow t=\dfrac{1}{2}$ or $\left(3^t\right)^2=\dfrac{1}{27}\Rightarrow 3^t=\dfrac{1}{3\sqrt{3}}\Rightarrow t=-\dfrac{3}{2}$ or $9^t=\dfrac{1}{27}\Rightarrow t=-\dfrac{3}{2}$ --- $(t=)\ \dfrac{1}{2},\ -\dfrac{3}{2}$	B1 M1 A1
		(3)
		(9 marks)

Check answers by the questions but if there is a contradiction between by the question and the main body of the text then the main body of the text takes precedence

(i)

(a)

B1 ay^3 or y^3a Condone $a(y)^3$. Do not isw and do not accept e.g. $a\times y^3$ or e.g. a^1y^3

(b) **Note a correct answer with no working can score full marks in this part only**

B1 Correct coefficient of 45. Sight of 45 can imply this mark but do not allow e.g. -45, $\dfrac{1}{45}, \dfrac{45}{9}$

M1 Uses index laws to proceed from $\left(a^{1-x}\right)^{-2}\rightarrow$ e.g. $\left(\dfrac{a}{a^x}\right)^{\pm 2}$ or $\dfrac{a^2}{y^2}$ or $a^{-2}\div a^{-2x}$

If they write as a product then look for $\left(a^{1-x}\right)^{-2}\rightarrow$ e.g. $\left(a\times a^{-x}\right)^{\pm 2}$ or $a^2\times y^{-2}$ or $a^{-2}\times a^{2x}$ (i.e. the signs of the indices cannot be the same)

Do not be concerned with any coefficients which are not in the indices. e.g. $5a^2\div 3y^2$ is M1

Do not penalise if they make subsequent errors or they have multiple attempts. Score for sight of the expression. Do not be concerned as to whether it is on the numerator or denominator of the fraction.

A1 $\dfrac{45a^2}{y^2}$ or simplified equivalent including e.g. $\dfrac{45y^{-2}}{a^{-2}}$, $45a^2y^{-2}$ but not $45\left(\dfrac{a}{y}\right)^2$. isw once a correct answer is seen.