Question number	Scheme	Marks	
2.	(a) 2	B1	(1)
	(b) x^9 seen, or $(\text{answer to (a)})^3$ seen, or $(2x^3)^3$ seen.	M1	
	$8x^9$	A1	(2)
			3
	(b) M: Look for x^9 first… if seen, this is M1. If not seen, look for $(\text{answer to (a)})^3$, e.g. 2^3… this would score M1 even if it does not subsequently become 8. (Similarly for other answers to (a)). In $(2x^3)^3$, the 2^3 is implied, so this scores the M mark. <u>Negative answers</u>: (a) Allow -2. Allow ± 2. Allow '2 or -2'. (b) Allow $\pm 8x^9$. Allow '$8x^9$ or $-8x^9$'. N.B. If part (a) is wrong, it is possible to 'restart' in part (b) and to score full marks in part (b).		

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Mark Scheme

<table>
<tr><th>Question Number</th><th>Scheme</th><th>Marks</th></tr>
<tr><td>1 (a)

(b)</td><td>$\mathbf{5}$ $\qquad\qquad$ (± 5 is B0)

$\frac{1}{(\text{their } 5)^2}$ or $\left(\frac{1}{\text{their } 5}\right)^2$

$= \frac{1}{25}$ or 0.04 $\qquad$ ($\pm\frac{1}{25}$ is A0)</td><td>B1
(1)
M1

A1
(2)
[3]</td></tr>
<tr><td>(b)</td><td>M1 $\quad$ follow through their value of 5. Must have reciprocal and square.

5^{-2} is <u>not</u> sufficient to score this mark, unless $\frac{1}{5^2}$ follows this.

A negative introduced at any stage can score the M1 but not the A1,
e.g. $125^{-2/3} = \left(-\frac{1}{5}\right)^2 = \frac{1}{25}$ $\quad$ scores M1 A0
$\qquad 125^{-2/3} = -\left(\frac{1}{5}\right)^2 = -\frac{1}{25}$ $\quad$ scores M1 A0.
Correct answer with no working scores both marks.

<u>Alternative</u>: $\frac{1}{\sqrt[3]{125^2}}$ or $\frac{1}{\left(125^2\right)^{1/3}}$ $\quad$ M1 (reciprocal and the correct number squared)
$\left(= \frac{1}{\sqrt[3]{15625}}\right)$
$= \frac{1}{25}$ $\qquad$ A1</td><td></td></tr>
</table>

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Core Mathematics C1 6663
Mark Scheme

Question Number	Scheme	Marks
1. **(a)**	$16^{\frac{1}{4}}=2$ or $\dfrac{1}{16^{\frac{1}{4}}}$ or better	M1
	$\left(16^{-\frac{1}{4}}=\right)\ \dfrac{1}{2}$ or 0.5 (ignore $\pm$)	A1
		(2)
(b)	$\left(2x^{-\frac{1}{4}}\right)^4=2^4x^{-\frac{4}{4}}$ or $\dfrac{2^4}{x^{\frac{4}{4}}}$ or equivalent	M1
	$x\left(2x^{-\frac{1}{4}}\right)^4=2^4$ or 16	A1 cao
		(2) **4**
	Notes	
(a)	M1 for a correct statement dealing with the $\frac{1}{4}$ or the $-$ power This may be awarded if 2 is seen or for reciprocal of their $16^{\frac{1}{4}}$ s.c ¼ is M1 A0 , also 2^{-1} is M1 A0 $\pm\frac{1}{2}$ is not penalised so M1 A1	
(b)	M1 for **correct** use of the power 4 on both the 2 and the *x* terms A1 for cancelling the *x* and simplifying to one of these two forms. Correct answers with no working get full marks	

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Mark Scheme

Question Number	Scheme	Marks
1. **(a)**	5 (or ± 5)	B1 (1)
(b)	$25^{-\frac{3}{2}} = \dfrac{1}{25^{\frac{3}{2}}}$ **or** $25^{\frac{3}{2}} = 125$ or better $\dfrac{1}{125}$ or 0.008 (or $\pm\dfrac{1}{125}$)	M1 A1 (2) **3**
	Notes (a) Give B1 for 5 or ± 5 Anything else is B0 (including just –5) (b) M: Requires reciprocal OR $25^{\frac{3}{2}} = 125$ Accept $\frac{1}{5^3}$, $\frac{1}{\sqrt{15625}}$, $\frac{1}{25\times5}$, $\frac{1}{25\sqrt{25}}$, $\frac{1}{\sqrt{25}^3}$ for M1 Correct answer with no working (or notation errors in working) scores both marks i.e. M1 A1 M1A0 for - $\dfrac{1}{125}$ without $+\dfrac{1}{125}$	

Question Number	Scheme	Marks
2. (a)	$\left\{(32)^{\frac{3}{5}}\right\} = \left(\sqrt[5]{32}\right)^3$ or $\sqrt[5]{(32)^3}$ or 2^3 or $\sqrt[5]{32768}$	M1
	$= 8$	A1
		[2]
(b)	$\left\{\left(\dfrac{25x^4}{4}\right)^{-\frac{1}{2}}\right\} = \left(\dfrac{4}{25x^4}\right)^{\frac{1}{2}}$ or $\left(\dfrac{5x^2}{2}\right)^{-1}$ or $\dfrac{1}{\left(\dfrac{25x^4}{4}\right)^{\frac{1}{2}}}$ ***See notes below***	M1
	$= \dfrac{2}{5x^2}$ or $\dfrac{2}{5}x^{-2}$ ***See notes for other alternatives***	A1
		[2]
		4
	Notes	
(a)	**M1**: for a full correct interpretation of the fractional power. **Note:** $5\times(32)^3$ is M0. **A1:** for 8 only. **Note:** Award M1A1 for writing down 8.	
(b)	**M1:** For use of $\dfrac{1}{2}$ OR use of -1 **Use of $\dfrac{1}{2}$:** Candidate needs to demonstrate the they have rooted all three elements in their bracket. **Use of -1:** Either Candidate has $\dfrac{1}{\text{Bracket}}$ or $\left(\dfrac{Ax^C}{B}\right)$ becomes $\left(\dfrac{B}{Ax^C}\right)$. Allow M1 for... • $\left(\dfrac{4}{25x^4}\right)^{\frac{1}{2}}$ or $\left(\dfrac{5x^2}{2}\right)^{-1}$ or $\dfrac{1}{\left(\dfrac{25x^4}{4}\right)^{\frac{1}{2}}}$ or $\sqrt{\left(\dfrac{4}{25x^4}\right)}$ or $\dfrac{1}{\sqrt{\left(\dfrac{25x^4}{4}\right)}}$ or $\left(\dfrac{\frac{1}{25x^4}}{\frac{1}{4}}\right)^{\frac{1}{2}}$ or $\dfrac{\frac{1}{5x^2}}{\frac{1}{2}}$ or $\dfrac{\frac{1}{5}x^{-2}}{\frac{1}{2}}$ or $-\left(\dfrac{5x^2}{2}\right)$ or $\left(\dfrac{-5x^{-2}}{-2}\right)$ or $-\left(\dfrac{5x^{-2}}{2}\right)$ or $\dfrac{5x^{-2}}{2}$ • $\left(\dfrac{4}{25x^4}\right)^K$ or $\left(\dfrac{5x^2}{2}\right)^C$ where K, C are any powers including 1. **A1:** for either $\dfrac{2}{5x^2}$ or $\dfrac{2}{5}x^{-2}$ or $0.4x^{-2}$ or $\dfrac{0.4}{x^2}$. **Note:** $\left(\sqrt{\left(\dfrac{25x^4}{4}\right)}\right)^{-1}$ is not enough work by itself for the method mark. **Note:** A final answer of $\dfrac{1}{\frac{5}{2}x^2}$ or $\dfrac{1}{2\frac{1}{2}x^2}$ or $\dfrac{1}{2.5x^2}$ is A0. **Note**: Also allow $\pm\dfrac{2}{5x^2}$ or $\pm\dfrac{2}{5}x^{-2}$ or $\pm 0.4x^{-2}$ or $\pm\dfrac{0.4}{x^2}$ for A1.	

Question Number	Scheme	Marks
2.	$(8^{2x+3} = \left(2^3\right)^{2x+3}) = 2^{3(2x+3)}$ or 2^{ax+b} with $a = 6$ **or** $b = 9$	M1
	$= 2^{6x+9}$ *or* $= 2^{3(2x+3)}$ as **final** answer with no errors or $(y =) 6x + 9$ or $3(2x + 3)$	A1 **[2]**
		2 marks
	Notes	
	M1: Uses $8 = 2^3$, and **multiplies** powers $3(2x + 3)$. Does **not** add powers. (Just $8 = 2^3$ or $8^{\frac{1}{3}} = 2$ is M0) **A1:** Either 2^{6x+9} *or* $= 2^{3(2x+3)}$ or $(y =) 6x + 9$ or $3(2x + 3)$	
	Note: Examples: 2^{6x+3} scores M1A0 **:** $8^{2x+3} = \left(2^3\right)^{2x+3} = 2^{3+2x+3}$ gets M0A0 **Special case:** **:** $= 2^{6x}\,2^9$ without seeing as single power M1A0 **Alternative method using logs:** $8^{2x+3} = 2^y \Rightarrow (2x+3)\log 8 = y\log 2 \Rightarrow y = \dfrac{(2x+3)\log 8}{\log 2}$ **So** $(y =) 6x + 9$ or $3(2x + 3)$	**M1** **A1 [2]**

Question Number	Scheme		Marks
3(a)	$8^{\frac{1}{3}}=2$ or $8^5=32768$	A correct attempt to deal with the $\frac{1}{3}$ or the 5. $8^{\frac{1}{3}}=\sqrt[3]{8}$ or $8^5=8\times8\times8\times8\times8$	M1
	$\left(8^{\frac{5}{3}}=\right)$ 32	Cao	A1
	A correct answer with no working scores full marks		
	Alternative $8^{\frac{5}{3}}=8\times8^{\frac{2}{3}}=8\times2^2=$ M1 (Deals with the 1/3) = 32 A1		
			(2)
(b)	$\left(2x^{\frac{1}{2}}\right)^3=2^3x^{\frac{3}{2}}$	One correct power either 2^3 or $x^{\frac{3}{2}}$. $\left(2x^{\frac{1}{2}}\right)\times\left(2x^{\frac{1}{2}}\right)\times\left(2x^{\frac{1}{2}}\right)$ on its own is not sufficient for this mark.	M1
	$\dfrac{8x^{\frac{3}{2}}}{4x^2}=2x^{-\frac{1}{2}}$ or $\dfrac{2}{\sqrt{x}}$	M1: Divides coefficients of x **and** subtracts their powers of x. **Dependent on the previous M1**	dM1A1
		A1: Correct answer	
	Note that unless the power of x implies that they have subtracted their powers you would need to see evidence of subtraction. E.g. $\dfrac{8x^{\frac{3}{2}}}{4x^2}=2x^{\frac{1}{2}}$ would score dM0 unless you see some evidence that 3/2 – 2 was intended for the power of x.		
	Note that there is a misconception that $\dfrac{\left(2x^{\frac{1}{2}}\right)^3}{4x^2}=\left(\dfrac{2x^{\frac{1}{2}}}{4x^2}\right)^3$ - this scores 0/3		
			(3)
			[5]