Indices Exam Questions MS

Q1, (OCR MEI 4751, Jun 2013, Q3)

(i)		25	2 **[2]**	M1 for $\left(\frac{10}{2}\right)^2$ or $\left(\frac{1}{0.2}\right)^2$ oe soi or for $\frac{1}{0.04}$ oe
(ii)		$8a^9$	3 **[3]**	B2 for 8 or M1 for $16^{\frac{1}{4}} = 2$ soi and B1 for a^9

Q2, (OCR MEI 4751, Jan 2013, Q1)

(i)		$\frac{9}{25}$ or 0.36 isw	2 **[2]**	M1 for numerator or denominator correct or for squaring correctly or for inverting correctly
(ii)		27	2 **[2]**	M1 for $81^{\frac{1}{4}} = 3$ soi

Q3, (OCR MEI 4751, Jan 2013, Q2)

$4x^4y^{-3}$ or $\frac{4x^4}{y^3}$ as final answer	3 **[3]**	B1 each 'term'; or M1 for numerator = $64x^{15}y^3$ and M1 for denominator = $16x^{11}y^6$

Q4 (OCR MEI 4751, Jan 2012, Q2)

(i)		$\frac{1}{3}$ as final answer	2 [2]	allow $\pm\frac{1}{3}$ M1 for $\frac{1}{9^{\frac{1}{2}}}$ or for $9^{\frac{1}{2}} = \sqrt{9}$ or 3 soi
(ii)		$32x^{10}y^{-3}$ or $\frac{32x^{10}}{y^3}$ oe as final answer	3 [3]	B1 for each element if B0, allow M1 for $(4x^4)^3 = 64x^{12}$

Q5, (OCR 4721, Jun 2016, Q5)

(i)		$(2^{-2})^3$ or $2^{15} \div 2^{21}$ 2^{-6}	**B1** **B1** **[2]**	Valid attempt to simplify Correct answer. Accept $p = -6$.
(ii)		$5\times\left(2^2\right)^{\frac{2}{3}} + 3\times\left(2^4\right)^{\frac{1}{3}}$ $= 5\times 2^{\frac{4}{3}} + 3\times 2^{\frac{4}{3}} \text{ or } 10\times 2^{\frac{1}{3}} + 6\times 2^{\frac{1}{3}}$ $= 8\times 2^{\frac{4}{3}}$ $= 2^{\frac{13}{3}}$	**M1** **B1** **A1** **[3]**	Attempts to express both terms or a combined term as a power of 2 Correctly obtains $2^{\frac{4}{3}}$ or $2^{\frac{1}{3}}$ for **either** term Correct final answer

Q6 (OCR 4721, Jun 2015, Q3)

(i)		5^8	B1 **[1]**	**cao**
(ii)		$5^{-\frac{1}{4}}$	M1 A1 **[2]**	Fourth root $\equiv \frac{1}{4}$ soi **cao www**
(iii)		$5^{\frac{9}{2}}$	M1 A1 **[2]**	$(5^{\frac{3}{2}})^3$ or $5^3 \times 5^{\frac{3}{2}}$ or other correct product of two simplified powers of 5 oe **cao www**

Q7 (OCR 4721, Jan 2013, Q2)

(i)		$n = 0$	**B1** **[1]**	Allow 3^0	
(ii)		$\frac{1}{t^3} = 64$ (or 4^3) $t = \frac{1}{4}$	M1 A1 **[2]**	or $t^3 = \frac{1}{64}$ or $64t^3 = 1$ or $\left(\frac{1}{t}\right)^3 = 64$ 4^{-1} is **A0** $t = \pm\frac{1}{4}$ is **A0**	Allow embedded 4^{-1} **www** alone implies **M1 A0**
(iii)		$2p^2 = 8$ $p = 2$ or $p = -2$	M1 A1 A1 **[3]**	or $8p^6 = 8^3$. Allow $2p^{\frac{6}{3}} = 8$ for **M1** **www** **www**	If not 512, evidence of $8 \times 8 \times 8$ needed. **SC** Spotted **B1** for 2, **B1** for -2, **B1** for justifying exactly 2 solutions **SC** $8p^2 = 8, p = \pm 1$ **B1**

Q8 (OCR 4221, Jun 2012, Q2)

(i)		$\sqrt[4]{7} = 7^{\frac{1}{4}}$	B1 **[1]**	Allow $7^{0.25}$, $k = 0.25$ etc.	
(ii)		$\frac{1}{7\sqrt{7}} = 7^{-\frac{3}{2}}$	M1 A1 **[2]**	**Clear evidence** of **correct use** of $7^a \times 7^b = 7^{a+b}$ or a single term $\frac{1}{7^d} = 7^{-d}$ Allow -1.5, $k = -1.5$ etc.	Allow $\frac{1}{7^d 7^e} = (7^d 7^e)^{-1}$ [not $= 7^d 7^{-e}$]
(iii)		$7^4 \times 7^{20}$ $= 7^{24}$	M1 A1 **[2]**	7^{20} or 49^2 seen (or 49^{12}) Allow $k = 24$	$(7^2)^{10}$ is **not** good enough for M1