

Indices Exam Questions MS

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

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

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

(i)	$\frac{9}{25}$ or 0.36 isw	2	M1 for numerator or denominator correct or for squaring correctly or for inverting correctly
		[2]	
(ii)	27	2	M1 for $8^{\frac{1}{4}} = 3$ soi
		[2]	

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

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

Q4 (OCR MEI 4751, Jan 2012, Q2)

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

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)	$5 \times (2^2)^{\frac{2}{3}} + 3 \times (2^4)^{\frac{1}{3}}$ $= 5 \times 2^{\frac{4}{3}} + 3 \times 2^{\frac{4}{3}}$ or $10 \times 2^{\frac{4}{3}} + 6 \times 2^{\frac{4}{3}}$ $= 8 \times 2^{\frac{4}{3}}$ $= 2^{\frac{13}{3}}$	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 $\frac{1}{7^d 7^e} = (7^d 7^e)^{-1}$ [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