Mark scheme

Indices in algebra

Mathematics 0580 · Questions from Paper 1, Paper 2 and Paper 4

Total marks

31

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
2	2	2	4	4	2	2	3	5	5	**31**

Question 1 [2]

1(a)	y^{15} cao	**1**	
1(b)	w^{9} cao	**1**	

Question 2 [2]

2	$4p^{7}q^{-1}$	**2**	**B1** for $4p^{7}q^{a}$ or $4p^{b}q^{-1}$ or $\frac{4p^{b}}{q}$

Question 3 [2]

3	$2t^{4}$	**2**	**B1** for $2t^{n}$ or kt^{4} $(n,k \neq 0)$

Question 4 [4]

4(a)	2^{-5}	**1**	
4(b)(i)	12	**1**	
4(b)(ii)	$48w^{15}$ final answer	**2**	**B1** for answer $48w^{k}$ or kw^{15} $(k \neq 0)$

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Question 5 **[4]**

5(a)	$15t^8$ final answer	**2**	**B1** for answer kt^8 or $15t^k$ $(k > 0)$ or correct answer seen
5(b)	$32u^{30}$ final answer	**2**	**B1** for answer ku^{30} or $32u^k$ $(k > 0)$ or correct answer seen

Question 6 **[2]**

6	$\frac{16}{x^4}$ or $16x^{-4}$	**2**	**M1** for $\left(\frac{x}{2}\right)^{-4}$ or $\left(\frac{8}{x^3}\right)^{\frac{4}{3}}$ or $\left(\frac{x^{12}}{4096}\right)^{-\frac{1}{3}}$ or better or **B1** for $\frac{16}{x^k}$ or $16x^k$ or $\frac{k}{x^4}$ or kx^{-4} final answer

Question 7 **[2]**

7	4	**2**	**M1** for $y^{\frac{2}{3}} = x^{\frac{1}{6}}$ or $y^2 = \sqrt{x}$ or $y^4 = x$

Question 8 **[3]**

8	$-\frac{8}{3}$ or $-2\frac{2}{3}$ oe	**3**	**M2** for $-x = 2(x + 4)$ oe or **M1** for $(3^{-1})^x$, 3^{-x}, $(3^2)^{x+4}$, $3^{2(x+4)}$ or $\left(\frac{1}{3}\right)^{-2(x+4)}$ oe

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Question 9 **[5]**

9(a)	x^{-2} or $\frac{1}{x^2}$ final answer	**1**	
9(b)	$\frac{2}{3}$	**1**	
9(c)	1 nfww	**3**	**M1** for $3^{-2(4-3x)}$ oe or better or $9^{\frac{3x}{2}} \times 9^{-(4-3x)} = 9^{\frac{1}{2}}$ oe or better **M1** for $3x + (their -2) \times (4-3x) = 1$ oe or better or $their\frac{3x}{2} - (4-3x) = their\frac{1}{2}$ oe or better

Question 10 **[5]**

10(a)	6	**2**	**B1** for 3^4 or 3^{x-2} or **M1** for $3^x = 81 \times 3^2$ or better
10(b)	8	**3**	**M2** for $x^{\frac{5}{3}} = 32$ or better or **M1** for $\frac{1}{x^{\frac{1}{3}}} = \frac{32}{x^2}$ or better or $x^{-\frac{1}{3}--2} = 32$ or better

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