Surds and Indices Questions for CGL Tier 2, CGL Tier 1 and SSC 10+2

Surds and indices quiz 2

Direction: Study the following questions carefully and choose the right answer.

1. If $2^{2n-1} = \frac{1}{8^{n-3}}$, then the value of n is:

A. 3 B. 2

C. 0 D. –2

2. If $\frac{9^n \times 3^5 \times (27)^3}{3 \text{ x } (81)^4} = 27$, then the value of n is:

A. 0 B. 2

C. 3 D. 4

3. If $2^{n+4} - 2^{n+2} = 3$, then n is equal to:

A. 0 B. 2

C. −1 D. −2

4. If $2^{n-1} + 2^{n+1} = 320$, then n is equal to:

A. 6 B. 8

C. 5 D. 7

5. If $3^x - 3^{x-1} = 18$, then the value of x^x is:

A. 3 B. 8

C. 27 D. 216

6. $\frac{(7\,p^2q^9r^5)^2(4pqr)^3}{(56\,p^6q^{10}r^4)^2}$

A. $p^{-5}\,q\,r^3$

B. $p^{-5}\,q\,r^5$

C. $p^{-3}\,q\,r^5$

D. $p^{-2}\,q\,r^3$

7. $\frac{(5\,x^7)^3.(10\,x^2)^2}{(2\,x^6)^7}$

A. (5/2)5 x –17

B. (5/2)3 x –15

C. (5/2) x–17

D. (3/2)5 x–14

8. $5^x \times 25^{x-1} \div (5^{x-1} \times 25^{x-1})$

A. 2

B. 5

C. 7

D. 9

9. $2^5 \times 15^0 + (-3)^3 - \left(\frac{2}{7}\right)^{-2}$

A. – 21/5

B. – 11/5

C. – 29/4

D. –39/4

10. $\left(\frac{1}{4ab^{2c}}\right)^2 \div \left(\frac{3}{2a^2bc^2}\right)^4$

A. $\frac{(ac)^2}{81}$

B. $\frac{(ac)^6}{81}$

C. $\frac{(ac)^4}{81}$

D. $\frac{(ac)^7}{81}$

Correct answers:

1	2	3	4	5	6	7	8	9	10
B	C	D	D	C	B	A	B	C	B

Explanations:

1). 2^{2n-1}

$= \frac{1}{8^{n-3}}$

$= \frac{1}{(2^3)^{n-3}}$

$= \frac{1}{2^{3(n-3)}}$

$= \frac{1}{2^{(3n-9)}}$

$= 2^{(9-3n)}$

Let's take power from the equation:

$2n-1 = 9-3n$

$\Rightarrow 5n = 10$

$\Rightarrow \quad n = 2.$

Hence, option B is correct.

2). $\frac{9^n \times 3^5 \times (27)^3}{3 \times (81)^4}$

$= 27 \Leftrightarrow \frac{(3^2)^n \text{ x } 3^5 \text{ x } (3^3)^3}{3 \text{ x } (3^4)^4}$

$= 3^3 \Leftrightarrow \frac{3^{2n} \text{ x } 3^5 \text{ x } 3^{(3x3)}}{3 \text{ x } 3^{(4x4)}} = 3^3$

$\Leftrightarrow \frac{3^{2n+5+9}}{3 \times 3^{16}}$

$= 3^3 \Leftrightarrow \frac{3^{2n+14}}{3^{17}}$

$= 3^3 \Leftrightarrow 3^{(2n+14-17)} = 3^3$

$\Leftrightarrow 3^{2n-3} = 3^3$

From the equation powers:

$\Leftrightarrow 2n - 3 = 3 \Leftrightarrow 2n = 6 \Leftrightarrow n = 3.$

Hence, option C is correct.

3). Given expression:

$2^{n+4} - 2^{n+2} = 3 \Leftrightarrow 2^{n+2}(2^2 - 1) = 3 \Leftrightarrow 2^{n+2} = 1 = 2^0$

[Bcz 2^0 is equal to 1]

From the equation power:

$\Leftrightarrow n + 2 = 0 \Leftrightarrow n = -2$

Hence, option D is correct.

4). Given equation:

$2^{n-1} + 2^{n+1} = 320$

$\Leftrightarrow 2^{n-1}(1+2^2) = 320$

$\Leftrightarrow 5 \times 2^{n-1} = 320$

$\Leftrightarrow 2^{n-1} = 320 / 5$

$= 64 = 2^6$

From the equation power:

$\Leftrightarrow n-1 = 6 \Leftrightarrow n = 7.$

Hence, option D is correct.

5). From the given expression:

$3^x - 3^{x-1} = 18$

$\Leftrightarrow 3^{x-1}(3 - 1) = 18$

$\Leftrightarrow 3^{x-1} = 9 = 3^2$

From the equation power:

$\Leftrightarrow x - 1 = 2 \Leftrightarrow x = 3.$

$\therefore x^x = 3^3 = 27$

Hence, option C is correct.

6). $\frac{(7p^2q^9r^5)^2(4qpr)^3}{(56\,p^6q^{10}r^4)^2}$

$\frac{49\,p^4\,q^{18}\,r^{10} \times 64p^3\,q^3\,r^3}{3136\,p^{12}\,q^{20}\,r^8}$

$\frac{p^7\,q^{21}\,r^{13}}{p^{12}\,q^{20}\,r^8} = p^{-5}\,q\,r^5.$

Hence, option B is correct.

7). $(5\,x^7)^3 . \frac{(10x^2)^2}{(2x^6)^7}$

$\Rightarrow \frac{125\ x^{21}\ .\ 100\ x^4}{4\ .\ 2^5\ x^{42}}$

$\Rightarrow \frac{125 \times 25\ .\ x^{25-42}}{2^5}$

$\Rightarrow \frac{5^3\ .\ 5^2\ x^{-17}}{2^5} \Rightarrow (5/2)^5\ x^{-17}.$

Hence, option A is correct.

8). $5^x \times 25^{x-1} \div (5^{x-1} \times 25^{x-1})$

$\Rightarrow \frac{5^x \times 25^{x-1}}{5^{x-1} \times 25^{x-1}} = \frac{5^x}{5^{x-1}} = 5.$

Hence, option B is correct.

9). $2^5 \times 15^0 + (-3)^3 - \left(\frac{2}{7}\right)^{-2}$

$\Rightarrow 2^5 \times 1 + (-27) - (\frac{7}{2})^2$

$\Rightarrow\ 2^5 - 27 - \frac{49}{4}.$

$\Rightarrow 32 - 27 - \frac{49}{4} \Rightarrow 5 - \frac{49}{4}$

$\Rightarrow \frac{20-49}{4} \Rightarrow \frac{-29}{4}.$

Hence, option C is correct.

10). $\left(\frac{1}{4ab^2c}\right)^2 \div \left(\frac{3}{2a^{2bc^2}}\right)^4$

$\Rightarrow \frac{1}{16\, a^2\, b^4\, c^2} \times \frac{16a^8\, b^4\, c^8}{81}$

$\Rightarrow \frac{a^6\, c^6}{81} \Rightarrow \frac{(ac)^6}{81}$.

Hence, option B is correct.