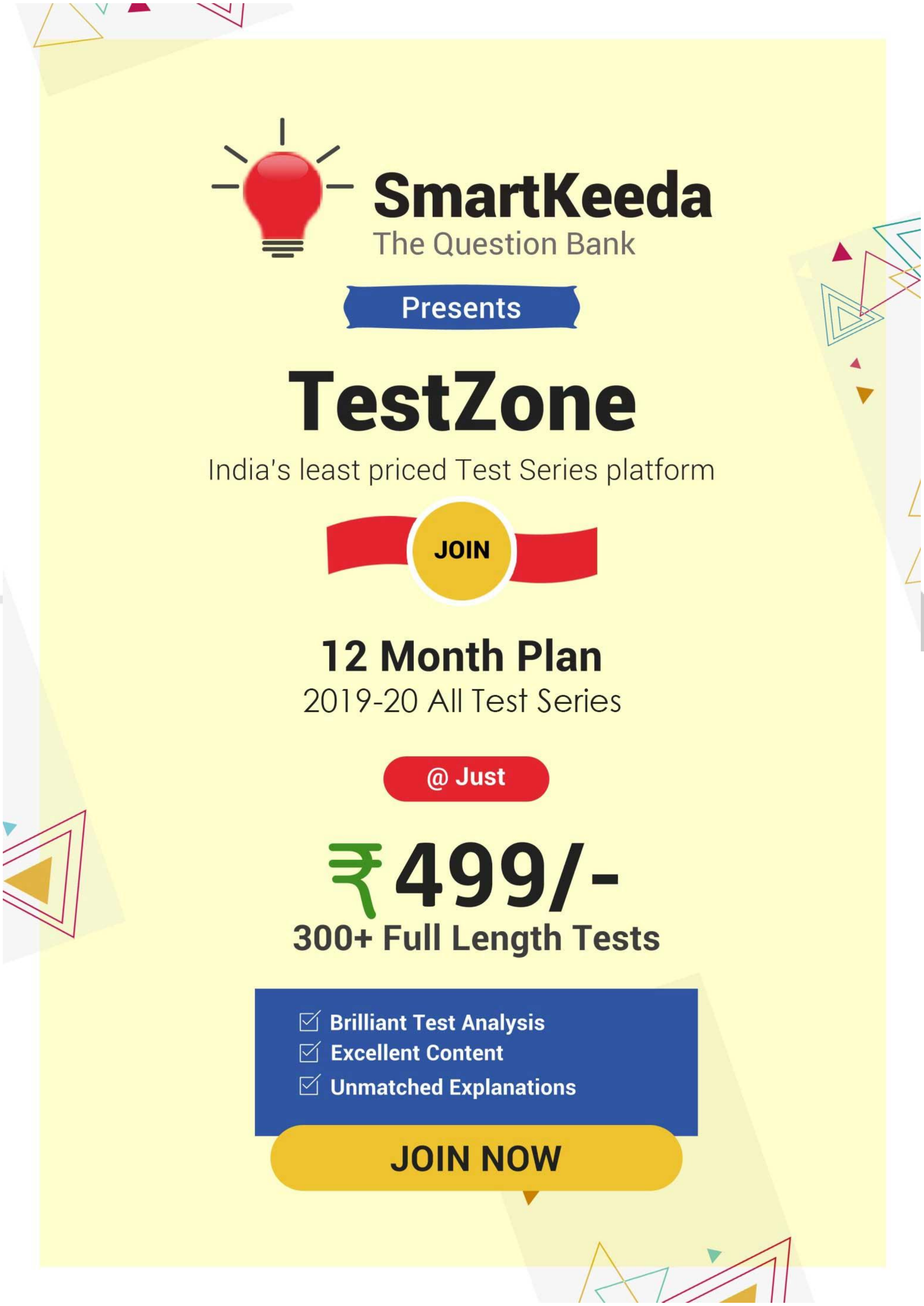
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Surds and indices questions of CGL Tier 2, CGL Tier 1 and SSC 10+2

Surds and indices quiz 3

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

1. The number of prime factors in $6^{333} \times 7^{222} \times 8^{111}$

A. 1221

B. 1222

C. 1111

D. 1211

2. Simplify $\left(\frac{1}{64}\right)^{0} + (64)^{-\frac{1}{2}} + (-32)^{\frac{4}{5}}$

$A.\ 17\frac{1}{8}$

$B.\ 7\frac{1}{8}$

$C.\ 7\frac{1}{3}$

$D.\ 17\frac{1}{2}$

3. Simplify: $\left(\frac{256}{576}\right)^{\frac{1}{4}} \times \left(\frac{64}{27}\right)^{-\frac{1}{3}} \times \left(\frac{216}{8}\right)^{-1}$

$A.\ \frac{1}{3\sqrt{16}}$

$B.\ \frac{1}{18\sqrt{6}}$

$C.\ \frac{1}{2\sqrt{6}}$

$D.\ \frac{1}{3\sqrt{7}}$

4. Simplify the following $\left(\frac{a^4b^6}{c^8}\right)^{3} \times \left(\frac{b^8c^4}{a^{-6}}\right)^{-2} \times \left(\frac{c^6a^6}{b^4}\right)^{2}$

$A.\ \frac{a^{12}}{b^6.c^{20}}$

$B.\ \frac{a^{6}}{b^6.c^{22}}$

$C.\ \frac{a^{7}}{b^6.c^{20}}$

D. None of these

5. $\left(\frac{216}{1}\right)^{-\frac{2}{3}} \div \left(\frac{27}{1}\right)^{-\frac{4}{3}} = ?$

A. 4/9
B. 9/4
C. 9/2
D. 3/2

6. $(4^3)^4 \div (4^2)^3 \times (4^5)^0 = ?$

A. 23
B. 43
C. 46
D. 32

7. If m and n are whole numbers such that $m^n = 121$, then $(m - 1)^{n+1} = ?$

A. 100
B. 1000
C. 10000
D. 10

8. If $x = (\sqrt{2} + 1)^{-\frac{1}{3}}$ the value of $\left(x^3 - \frac{1}{x^3}\right)$ is

A. 0
B. −√2
C. −2
D. 3√2

9. The value of $\frac{(243)^{\frac{n}{5}} \times 3^{2n+1}}{9^n \times 3^{n-1}}$ is

A. 3
B. 9
C. 6
D. 12

10. The greatest among the numbers $3\sqrt{2}, 3\sqrt{7}, 6\sqrt{5}, 2\sqrt{20}$ is

A. 3√2
B. 3√7
C. 6√5
D. 2√20

Correct answers:

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

Explanations:

1). $(6)^{333} \times (7)^{222} \times (8)^{111}$

$\therefore$ $(2 \times 3)^{333} \times (7)^{222} \times (2^3)^{111}$

$\therefore$ $2^{333} \times 3^{333} \times 7^{222} \times 2^{333}$

$\therefore$ $2^{666} \times 3^{333} \times 7^{222}$

$\therefore$ Number of prime factors

= 666 + 333 + 222 = 1221.

Hence, option A is correct.

2). $\left(\frac{1}{64}\right)^0 + (65)^{-\frac{1}{2}} + (-32)^{\frac{4}{5}}$

$= 1 + (8^2)^{-1/2} + (-1 \times 32)^{4/5}$

$= 1 + \frac{1}{8} + [(-1^2)^{2/5} \times (2^5)^{4/5}]$

$= 1 + \frac{1}{8} + [2^4] = 17\frac{1}{8}$.

Hence, option A is correct.

3). As $256 = 2^8$; $576 = 24^2$; $64 = 2^6$; $27 = 3^3$

$(\frac{256}{576})^{1/4} \times (\frac{64}{27})^{-1/3} \times (\frac{216}{8})^{-1}$

$$\left(\frac{2^8}{24^2}\right)^{1/4} \times \left(\frac{3^3}{2^6}\right)^{1/3} \times \left(\frac{8}{216}\right)$$

$$= \frac{2^2}{\sqrt{24}} \times \frac{3}{4} \times \frac{1}{27} = \frac{1}{2\sqrt{6} \times 9} = \frac{1}{18\sqrt{6}}$$

Hence, option B is correct.

4). $$\left(\frac{a^4b^6}{c^8}\right)^3 \times \left(\frac{b^8c^4}{a^{-6}}\right)^{-2} \times \left(\frac{c^6a^6}{b^4}\right)$$

$$= \left(\frac{a^{4\times3}\ b^{6\times3}}{c^{8\times3}}\right)$$

$$\times \left(\frac{b^{8\times(-2)}\ c^{4\times(-2)}}{a^{-6\times(-2)}}\right)$$

$$\times \left(\frac{c^{6\times2}\ a^{6\times2}}{b^{4\times2}}\right)$$

$$= a^{12-12+12}\ \ b^{18-16-8}\ c^{-8+12-24}$$

$$= \frac{a^{12}}{b^6 .\ c^{20}}$$

Hence, option A is correct.

5). Putting x for (?), we get

$$\left(\frac{216}{1}\right)^{-2/3} \div \left(\frac{27}{1}\right)^{-4/3} = x$$

$$x = \left(\frac{1}{6}\right)^2 \div \left(\frac{1}{3}\right)^4$$

$$= \frac{1}{36} \div \frac{1}{81} = \frac{1}{36} \times \frac{81}{1}$$

$\Rightarrow x = \frac{81}{36} = \frac{9}{4}$

Hence, option B is correct.

6). Put x for (?), Since all base are equal to 4, hence, put a = 4

$\Rightarrow x = (a^3)^4 \div (a^2)^3 \times (a^5)^0$

(Since $(a^5)^0 = 1$)

$\Rightarrow x = a^{12} \div a^6 \times 1 \Rightarrow x = a^{12-6}$

(Since $a^m \div a^n = a^{m-n}$)

$\Rightarrow x = a^6 = 4^6$.

Hence, option C is correct.

7). Given that $m^n = 121 \Rightarrow m^n = (11)^2$

Hencem m = 11 and n = 2

Putting these values, we get

$(m-1)^{n+1} = (11-1)^{2+1} = (10)^3 = 1000$.

Hence, option B is correct.

8). If $x = (\sqrt{2}+1)^{-1/3}$

$\Rightarrow x^{-3} = \sqrt{2} + 1$

$$\Rightarrow \frac{1}{x^3} = \sqrt{2} + 1$$

$$\text{and } x^3 = \frac{1}{\sqrt{2}+1} = \frac{1(\sqrt{2}-1)}{1(\sqrt{2}+1)1(\sqrt{2}-1)} = (\sqrt{2}-1)$$

$\therefore\ x^3 - \frac{1}{x^3}$

$= (\sqrt{2} - 1) - (\sqrt{2} + 1)$

$= \sqrt{2} -1 - \sqrt{2} - 1 = -2$

Hence, option C is correct.

9). Expression $= \frac{(243)^{\frac{n}{5}} \times 3^{2n+1}}{9^n \times 3^{n-1}}$

$= \frac{(3^5)^{n/5} \times 3^{2n+1}}{9^n \times 3^{n-1}} = \frac{3^n \times 3^{2n+1}}{3^{2n} \times 3^{n-1}}$

$= \frac{3^n \times 3^{2n+1}}{3^{2n} \times 3^{n-1}} = \frac{3^{3n+1}}{3^{3n-1}}$

$= 3^{3n+1-3n+1} = 3^2 = 9$

All the formulas used in the above solution given below.

$[a^m \times a^n = a^{m+n};\quad a^m \div a^n = a^{m-n};\quad (a^m)^n = a^{mn}]$

Hence, option B is correct.

10). $3.\sqrt{2} = 3 \times 1.4 = 4.2$

$3\sqrt{7} = 3 \times 2.6 = 7.8$

$6\sqrt{5} = 6 \times 2.2 = 13.2$

$2\sqrt{20} = 2 \times 4.5 = 9$

Hence, the greatest number is $6\sqrt{5}$.

Hence, option C is correct.