Sampurna Jan 2026

Quantitative Aptitude

DPP: 3

Ratio and Proportion, Indices and Logarithm

Q1 The value of $\left(\frac{8}{125}\right)^{\frac{1}{3}}$ is
(A) $\frac{2}{5}$
(B) $\frac{5}{2}$
(C) $\frac{2}{25}$
(D) none of these

Q2 The value of $(10)^7 \div (10)^5$ is
(A) 1 (B) 10
(C) 20 (D) 100

Q3 The value of $(125)^{\frac{2}{3}} \times (625)^{\frac{3}{4}}$ is
(A) 150 (B) 625
(C) 3125 (D) none of these

Q4 $2^{\frac{1}{2}} \times 4^{\frac{3}{4}}$ is equal to
(A) a fraction
(B) a positive integer
(C) a negative integer
(D) none of these

Q5 $\frac{a^2 \times a^8 \times a \times b^4}{b^2 \times a^3} = ?$
(A) $a^5 \times b^2$
(B) $a^8 \times b^2$
(C) $\left(a^4 \times b\right)^2$
(D) Both (B) & (C)

Q6 The value of $\left(\frac{2p^2q^3}{3xy}\right)^0$ where p, q, x, y $\neq 0$ is equal to
(A) 0 (B) $\frac{2}{3}$
(C) 1 (D) none of these

Q7 Which is true ?
(A) $2^0 > \left(\frac{1}{2}\right)^0$
(B) $2^0 < \left(\frac{1}{2}\right)^0$
(C) $2^0 = \left(\frac{1}{2}\right)^0$
(D) none of these

Q8 Simplified value of $(125)^{\frac{2}{3}} \times \sqrt{25} \times \sqrt[3]{5^3} \times 5^{\frac{1}{2}}$ is
(A) 5 (B) $\frac{1}{5}$
(C) 1 (D) none of these

Q9 If $(8x)^{10} = 8^{30}$. Find the value of x.
(A) 128 (B) 256
(C) 64 (D) 32

Q10 The value of $\left(\frac{8}{27}\right)^{\frac{-1}{3}} \times \left(\frac{32}{243}\right)^{\frac{-1}{5}}$ *is*
(A) $\frac{9}{4}$ (B) $\frac{4}{9}$
(C) $\frac{2}{3}$ (D) none of these

Q11 The value of $\frac{1}{(216)^{-\frac{2}{3}}} + \frac{1}{(256)^{-\frac{3}{4}}} + \frac{1}{(32)^{-\frac{1}{5}}}$ is
(A) 102 (B) 105
(C) 107 (D) 109

Q12 If $2^x \times 3^y \times 5^z = 450$, find the value of $x + y + z$.
(A) 6 (B) 5
(C) 7 (D) None

Q13 The value of $\frac{1}{1 + a^{y-x}} + \frac{1}{1 + a^{x-y}}$ is given by
(A) -1 (B) 0
(C) 1 (D) None

Q14 If $m = b^x$, $n = b^y$ & $m^y n^x = b^2$ then the value of xy is given by
(A) -1 (B) 0
(C) 1 (D) None

Q15 If $\left(\frac{y^a}{y^b}\right)^{a^2+ab+b^2} + \left(\frac{y^b}{y^c}\right)^{b^2+bc+c^2} + \left(\frac{y^c}{y^a}\right)^{c^2+ca+a^2}$ is equal to
(A) y (B) -1
(C) 1 (D) None of these

Answer Key

Q1	(A)
Q2	(D)
Q3	(C)
Q4	(B)
Q5	(D)
Q6	(C)
Q7	(C)
Q8	(D)
Q9	(C)
Q10	(A)
Q11	(A)
Q12	(B)
Q13	(C)
Q14	(C)
Q15	(C)

Hints & Solutions

Q1 Text Solution:

We need to simplify $\left(\frac{8}{125}\right)^{\frac{1}{3}}$

$\left(\frac{8}{125}\right)^{\frac{1}{3}} = \left(\frac{2^3}{5^3}\right)^{\frac{1}{3}} = \left(\left(\frac{2}{5}\right)^3\right)^{\frac{1}{3}} \because \left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$

$= \left(\frac{2}{5}\right)^{3\times\frac{1}{3}} \because (x^m)^n = x^{mn}$

$= \frac{2}{5}$

Therefore, the value of $\left(\frac{8}{125}\right)^{\frac{1}{3}}$ is $\frac{2}{5}$.

Q2 Text Solution:

We know that,

$a^m \div a^n = a^{m-n}$

Thus, $(10)^7 \div (10)^5$

$= (10)^{7-5}$

$= (10)^2$

$= 100$

Therefore, $(10)^7 \div (10)^5 = 100$

Hence, the correct option is (D) i.e., 100.

Q3 Text Solution:

$(125)^{\frac{2}{3}} \times (625)^{\frac{3}{4}}$

$= \left(5^3\right)^{\frac{2}{3}} \times \left(5^4\right)^{\frac{3}{4}}$

$= 5^2 \times 5^3 \ (\because (x^m)^n = x^{mn})$

$= 25 \times 125$

$= 3125$

Therefore, the required value is 3125.

Hence, the correct option is (C) i.e., 3125.

Q4 Text Solution:

On simplifying the given expression, we get

$2^{\frac{1}{2}} \cdot 4^{\frac{3}{4}}$

$= 2^{\frac{1}{2}} \cdot \left(2^2\right)^{\frac{3}{4}}$

$= 2^{\frac{1}{2}} \cdot 2^{2\times\frac{3}{4}}$

$[\because (x^m)^n = x^{mn}]$

$= 2^{\frac{1}{2}} \cdot 2^{\frac{3}{2}}$

$= 2^{\frac{1}{2}+\frac{3}{2}}$

$= 2^{\frac{4}{2}}$

$= 2^2$

$= 4$

$[\because a^m \times a^n = a^{m+n}]$

Therefore, the value of $2^{\frac{1}{2}} \cdot 4^{\frac{3}{4}}$ is 4, which is a positive integer.

Hence, the correct option is (B) i.e., a positive integer.

Q5 Text Solution:

Given ; $\frac{a^2\times a^8\times a\times b^4}{b^2\times a^3}$

$= a^{2+8+1-3} \times b^{4-2}$

$= a^8 \times b^2$

$= \left(a^4 \times b\right)^2$

Hence, the correct answer is option (D)

Q6 Text Solution:

We know that,

By Law of indices, a^0 = 1 for a $\neq$0

Applying the above concept, we get

$\left(\frac{2p^2q^3}{3xy}\right)^0 = 1$

Therefore, the value of $\left(\frac{2p^2q^3}{3xy}\right)^0 \ is\ 1.$

Hence, the correct option is (C) i.e., 1.

Q7 Text Solution:

We know that,

By Law of indices, a^0 = 1 for a $\neq$ 0

$\therefore$ Applying the above concept, we have

$2^0 = \left(\frac{1}{2}\right)^0 = 1$

Clearly, $2^0 = \left(\frac{1}{2}\right)^0$

Hence, the correct option is (C) i.e., $2^0 = \left(\frac{1}{2}\right)^0$.

Q8 Text Solution:

$\therefore (125)^{\frac{2}{3}} \times \sqrt{25} \times \sqrt[3]{5^3} \times 5^{\frac{1}{2}}$

$= \left(5^3\right)^{\frac{2}{3}} \times 5 \times 5 \times 5^{\frac{1}{2}}$

$\left[\because \sqrt[n]{x^m} = x^{\frac{m}{n}}\right]$

$= 5^{3\times\frac{2}{3}} \times 5 \times 5 \times 5^{\frac{1}{2}}$

$[\because (x^m)^n = x^{mn}]$

$= 5^2 \times 5 \times 5 \times 5^{\frac{1}{2}}$

$= 5^{2+1+1+\frac{1}{2}}$

$[\because a^m \times a^n = a^{m+n}]$

$= 5^{\frac{9}{2}}$

Hence, the correct answer is option (D) i.e., none of these.

Q9 Text Solution:

Given ;

$(8x)^{10} = 8^{30}$

$\Rightarrow 8^{10} \times x^{10} = 8^{30}$

$\Rightarrow x^{10} = \frac{8^{30}}{8^{10}}$

$\Rightarrow x^{10} = 8^{30-10}$

$\Rightarrow x^{10} = 8^{20}$

$\Rightarrow x^{10} = (8^2)^{10}$

$\Rightarrow x = 8^2 = 64$

Hence, the correct option is (C).

Q10 Text Solution:

$\left(\frac{8}{27}\right)^{\frac{-1}{3}} \times \left(\frac{32}{243}\right)^{\frac{-1}{5}}$

$= \left(\frac{2^3}{3^3}\right)^{\frac{-1}{3}} \times \left(\frac{2^5}{3^3}\right)^{\frac{-1}{5}}$

$= \left(\frac{2}{3}\right)^{3\times\frac{-1}{3}} \times \left(\frac{2}{3}\right)^{5\times\frac{-1}{5}}$

$= \left(\frac{2}{3}\right)^{-1} \times \left(\frac{2}{3}\right)^{-1}$

$= \frac{3}{2} \times \frac{3}{2}$

$= \frac{9}{4}$

Therefore, the value of $\left(\frac{8}{27}\right)^{\frac{-1}{3}} \times \left(\frac{32}{243}\right)^{\frac{-1}{5}}$ is $\frac{9}{4}$.

Hence, the correct answer is option (A)

Q11 Text Solution:

We have,

$\frac{1}{(216)^{-\frac{2}{3}}} + \frac{1}{(256)^{-\frac{3}{4}}} + \frac{1}{(32)^{-\frac{1}{5}}}$

$= \frac{1}{(6^3)^{-\frac{2}{3}}} + \frac{1}{(2^8)^{-\frac{3}{4}}} + \frac{1}{(2^5)^{-\frac{1}{5}}}$

$= \frac{1}{6^{-2}} + \frac{1}{2^{-6}} + \frac{1}{2^{-1}} \left[\because (a^m)^n = a^{mn}\right]$

$= 6^2 + 2^6 + 2^1 \left[\because a^{-n} = \frac{1}{a^n}\right]$

$= 36 + 64 + 2$

$= 102$

Hence, the correct option is (A) i.e., 102.

Q12 Text Solution:

$2^x \times 3^y \times 5^z = 450$ .....(i)

Also, 450 = $2^1 \times 3^2 \times 5^2$ .....(ii)

Comparing (i) & (ii), we get

$x = 1,\ y = 2$ &

$z = 2$

Therefore, the value of $x + y + z = 1 + 2 + 2 = 5$

Hence, the correct option is (B).

Q13 Text Solution:

Simplifying the given expression, we get

$\frac{1}{1+a^{y-x}} + \frac{1}{1+a^{x-y}}$

$= \frac{1}{1+\frac{a^y}{a^x}} + \frac{1}{1+\frac{a^x}{a^y}} \left[\because \frac{x^p}{x^q} = x^{p-q}\right]$

$= \frac{a^x}{a^x+a^y} + \frac{a^y}{a^y+a^x}$

$= \frac{a^x+a^y}{a^x+a^y}$

$= 1$

Therefore, the value of $\frac{1}{1+a^{y-x}} + \frac{1}{1+a^{x-y}}$ is given by 1.

Hence, the correct option is (C) i.e., 1.

Q14 Text Solution:

Substituting the values of m and n in $m^y n^x = b^2$

$(b^x)^y \times (b^y)^x = b^2$

$\Rightarrow b^{xy} \times b^{xy} = b^2$

$\Rightarrow b^{2xy} = b^2$

$\Rightarrow 2xy = 2$

$\Rightarrow xy = 1$

Therefore, the value of xy is given by 1.

Hence, the correct answer is option (C).

Q15 Text Solution:

$\left(\frac{y^a}{y^b}\right)^{a^2+ab+b^2} + \left(\frac{y^b}{y^c}\right)^{b^2+bc+c^2} + \left(\frac{y^c}{y^a}\right)^{c^2+ca+a^2}$

$\Rightarrow \left(y^{a-b}\right)^{a^2+ab+b^2} + \left(y^{b-c}\right)^{b^2+bc+c^2}$

$+ \left(y^{c-a}\right)^{c^2+ca+a^2}$

$\Rightarrow y^{(a-b)(a^2+ab+b^2)} + y^{(b-c)(b^2+bc+c^2)}$

$+ y^{(c-a)(c^2+ca+a^2)}$

$\Rightarrow y^{a^3-b^3} + y^{b^3-c^3} + y^{c^3-a^3}$

$\Rightarrow y^{a^3-b^3+b^3-c^3+c^3-a^3}$

$\Rightarrow y^0$

$\Rightarrow 1$