

Chapter

01

Basic Maths and Logarithm



TOPIC WISE QUESTIONS



Basic Maths

Q.1 For

$$x \neq 0, \left(\frac{x^l}{x^m}\right)^{(l^2+lm+m^2)} \left(\frac{x^m}{x^n}\right)^{(m^2+nm+n^2)} \left(\frac{x^n}{x^l}\right)^{(n^2+nl+l^2)}$$

=

- (1) 1 (2) x
(3) Does not exist (4) None of these

Q.2

$$\frac{2 \cdot 3^{n+1} + 7 \cdot 3^{n-1}}{3^{n+2} - 2(1/3)^{1-n}} =$$

- (1) 1 (2) 3 (3) -1 (4) 0

Q.3

The greatest number among $\sqrt[3]{9}, \sqrt[4]{11}, \sqrt[5]{17}$ is

- (1) $\sqrt[3]{9}$
(2) $\sqrt[4]{11}$
(3) $\sqrt[5]{17}$
(4) Can not be determined

Q.4

The value of $\frac{15}{\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}}$ is

- (1) $\sqrt{5}(5 + \sqrt{2})$ (2) $\sqrt{5}(2 + \sqrt{2})$
(3) $\sqrt{5}(1 + \sqrt{2})$ (4) $\sqrt{5}(3 + \sqrt{2})$

Q.5

The rationalizing factor of $a^{1/3} + a^{-1/3}$ is

- (1) $a^{1/3} - a^{-1/3}$ (2) $a^{2/3} + a^{-2/3}$
(3) $a^{2/3} - a^{-2/3}$ (4) $a^{2/3} + a^{-2/3} - 1$

Q.6

 $\sqrt{(3 + \sqrt{5})}$ is equal to

- (1) $\sqrt{5} + 1$ (2) $\sqrt{3} + \sqrt{2}$
(3) $(\sqrt{5} + 1) / \sqrt{2}$ (4) $\frac{1}{2}(\sqrt{5} + 1)$

Q.7

$$\sqrt[4]{(17 + 12\sqrt{2})} =$$

- (1) $\sqrt{2} + 1$ (2) $2^{1/4}(\sqrt{2} + 1)$
(3) $2\sqrt{2} + 1$ (4) None of these

Q.8

$$(x^5)^{1/3} (16x^3)^{2/3} \left(\frac{1}{4}x^{4/9}\right)^{-3/2} =$$

- (1) $(x/4)^3$ (2) $(4x)^3$
(3) $8x^3$ (4) None of these

Q.9

If $a^{1/x} = b^{1/y} = c^{1/z}$ and $b^2 = ac$ then $x + z =$

- (1) y (2) 2y
(3) 2xyz (4) None of these

Q.10

If $\frac{(2^{n+1})^m (2^{2n})^n}{(2^{m+1})^n 2^{2m}} = 1$, then $m =$

- (1) 0 (2) 1 (3) n (4) 2n

Q.11

If $a^x = b^y = (ab)^{xy}$, then $x + y =$

- (1) 0 (2) 1
(3) xy (4) None of these

Q.12

$$\frac{[4 + \sqrt{(15)}]^{3/2} + [4 - \sqrt{(15)}]^{3/2}}{[6 + \sqrt{(35)}]^{3/2} - [6 - \sqrt{(35)}]^{3/2}} =$$

- (1) 1 (2) 7/13
(3) 13/7 (4) None of these

Q.13

If $x = \frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}}, y = \frac{\sqrt{5} - \sqrt{2}}{\sqrt{5} + \sqrt{2}}$, then

$$3x^2 + 4xy - 3y^2 =$$

- (1) $\frac{1}{3}[56\sqrt{10} - 12]$ (2) $\frac{1}{3}[56\sqrt{10} + 12]$
(3) $\frac{1}{3}[56 + 12\sqrt{10}]$ (4) None of these

Q.14

$$\frac{\sqrt{(5/2)} + \sqrt{(7-3\sqrt{5})}}{\sqrt{(7/2)} + \sqrt{(16-5\sqrt{7})}} =$$

- (1) Rational (2) Surd
(3) Multiple of $\sqrt{7}$ (4) None of these

Q.15 $\frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}} + \frac{\sqrt{6}}{\sqrt{3}+\sqrt{2}} =$
 (1) $5\sqrt{2}$ (2) $3\sqrt{2}$ (3) $2\sqrt{3}$ (4) 0

Q.16 The rationalizing factor of $2\sqrt{3}-\sqrt{7}$ is
 (1) $\sqrt{3}+\sqrt{7}$ (2) $2\sqrt{3}+\sqrt{7}$
 (3) $\sqrt{3}+2\sqrt{7}$ (4) None of these

Q.17 $\sqrt{3+\sqrt{5}} - \sqrt{2+\sqrt{3}} =$
 (1) $\sqrt{5/2} + \sqrt{3/2}$ (2) $\sqrt{5/2} - \sqrt{3/2}$
 (3) $\sqrt{5/2} - \sqrt{1/2}$ (4) $\sqrt{3/2} - \sqrt{1/2}$

Q.18 If $x + \sqrt{x^2+1} = a$, then $x =$
 (1) $\frac{1}{2}(a+1/a)$ (2) $\frac{1}{2}(a-1/a)$
 (3) $(a+a^{-1})$ (4) None of these

Q.19 If $x = \sqrt{7} + \sqrt{3}$ and $xy=4$, then $x^4+y^4 =$
 (1) 400 (2) 368 (3) 352 (4) 200

Q.20 If $x = 3 - \sqrt{5}$, then $\frac{\sqrt{x}}{\sqrt{2} + \sqrt{3x-2}} =$
 (1) 5 (2) $\sqrt{5}$ (3) $1/5$ (4) $1/\sqrt{5}$

Q.21 If $a = \sqrt{21} - \sqrt{20}$ and $b = \sqrt{18} - \sqrt{17}$, then
 (1) $a=b$ (2) $a+b=0$
 (3) $a>b$ (4) $a<b$

Q.22 Solution of the equation $\sqrt{x+10} + \sqrt{x-2} = 6$ are
 (1) 0 (2) 6
 (3) 4 (4) None of these

Q.23 $\sqrt{6+2\sqrt{3}+2\sqrt{2}+2\sqrt{6}} - 1/\sqrt{5+2\sqrt{6}} =$
 (1) 1 (2) -1
 (3) 0 (4) None of these

PROPERTIES OF LOG AND LOGARITHMIC EQUATION

Q.24 For $y = \log_a x$ to be defined 'a' must be
 (1) Any positive real number
 (2) Any number
 (3) $\geq e$
 (4) Any positive real number $\neq 1$

Q.25 Logarithm of $32\sqrt[5]{4}$ to the base $2\sqrt{2}$ is
 (1) 3.6 (2) 5
 (3) 5.6 (4) None of these

Q.26 The number $\log_2 7$ is
 (1) An integer
 (2) A rational number
 (3) An irrational number
 (4) A prime number

Q.27 $\log ab - \log |b| =$
 (1) $\log a$ (2) $\log |a|$
 (3) $-\log a$ (4) None of these

Q.28 If $\log_e \left(\frac{a+b}{2} \right) = \frac{1}{2}(\log_e a + \log_e b)$, then relation between a and b will be

(1) $a=b$ (2) $a = \frac{b}{2}$
 (3) $2a=b$ (4) $a = \frac{b}{3}$

Q.29 Which is the correct order for a given number α in increasing order

(1) $\log_2 \alpha, \log_3 \alpha, \log_e \alpha, \log_{10} \alpha$
 (2) $\log_{10} \alpha, \log_3 \alpha, \log_e \alpha, \log_2 \alpha$
 (3) $\log_{10} \alpha, \log_e \alpha, \log_2 \alpha, \log_3 \alpha$
 (4) $\log_3 \alpha, \log_e \alpha, \log_2 \alpha, \log_{10} \alpha$

Q.30 The value of $\sqrt{(\log_{0.5}^2 4)}$ is

(1) -2 (2) $\sqrt{-4}$
 (3) 2 (4) None of these

Q.31 The value of $\log_3 4 \log_4 5 \log_5 6 \log_6 7 \log_7 8 \log_8 9$ is

(1) 1 (2) 2 (3) 3 (4) 4

Q.32 $\log_7 \sqrt{7(\sqrt{7}\sqrt{7})} =$

(1) $3\log_2 7$ (2) $1-3\log_3 7$
 (3) $1-3\log_7 2$ (4) None of these

Q.33 The value of $81^{(1/\log_5 3)} + 27^{\log_9 36} + 3^{4/\log_7 9}$ is equal to

(1) 49 (2) 625 (3) 216 (4) 890

Q.34 If $\log_4 5 = a$ and $\log_5 6 = b$, then $\log_3 2$ is equal to

(1) $\frac{1}{2a+1}$ (2) $\frac{1}{2b+1}$

(3) $2ab+1$ (4) $\frac{1}{2ab-1}$

Q.35 If $\log_5 a \cdot \log_a x = 2$, then x is equal to

- (1) 125 (2) a^2
(3) 25 (4) None of these

Q.36 If $\log_{10} x = y$, then $\log_{1000} x^2$ is equal to

- (1) y^2 (2) $2y$ (3) $\frac{3y}{2}$ (4) $\frac{2y}{3}$

Q.37 If $x = \log_a(bc)$, $y = \log_b(ca)$, $z = \log_c(ab)$, then which of the following is equal to 1

- (1) $x+y+z$
(2) $(1+x)^{-1} + (1+y)^{-1} + (1+z)^{-1}$
(3) xyz
(4) None of these

Q.38 If $a = \log_{24} 12$, $b = \log_{36} 24$ and $c = \log_{48} 36$, then $1+abc$ is equal to

- (1) $2ab$ (2) $2ac$ (3) $2bc$ (4) 0

Q.39 $\log_4 18$ is

- (1) A rational number
(2) An irrational number
(3) A prime number
(4) None of these

Q.40 The value of $(0.05)^{\log_{\sqrt{20}}(0.1+0.01+0.001+\dots)}$ is

- (1) 81 (2) $\frac{1}{81}$ (3) 20 (4) $\frac{1}{20}$

Q.41 If $\log_{12} 27 = a$, then $\log_6 16 =$

- (1) $2 \cdot \frac{3-a}{3+a}$ (2) $3 \cdot \frac{3-a}{3+a}$
(3) $4 \cdot \frac{3-a}{3+a}$ (4) None of these

LINEAR, MODULUS, RATIONAL AND SQUARE ROOT INEQUALITIES

Q.42 If $\frac{3x-4}{2} \geq \frac{x+1}{4} - 1$, then

- (1) $[1, \infty)$ (2) $(2, \infty)$
(3) $[1, 3]$ (4) none of these

Q.43 Solution of $0 < |3x+1| < \frac{1}{3}$ is

- (1) $(-4/9, -2/9)$
(2) $[-4/9, -2/9]$
(3) $(-4/9, -2/9) - \{-1/3\}$
(4) $[-4/9, -2/9] - \{-1/3\}$

Q.44 Solution of $|x-1| \geq |x-3|$ is

- (1) $x \leq 2$ (2) $x \geq 2$
(3) $[1, 3]$ (4) none of these

Q.45 The solution of $\left| \frac{1}{x} - 2 \right| < 4$ is

- (1) $(-\infty, -1/2)$
(2) $(1/6, \infty)$
(3) $(-1/2, 1/6)$
(4) $(-\infty, -1/2) \cup (1/6, \infty)$

Q.46 For $\frac{|x-1|}{x+2} < 1$, x lies in the interval

- (1) $(-\infty, -2) \cup \left(-\frac{1}{2}, \infty\right)$
(2) $(-\infty, 1) \cup [2, 3]$
(3) $(-\infty, -4)$
(4) $\left[-\frac{1}{2}, 1\right]$

Q.47 Solution of $|x-1| + |x-2| + |x-3| \geq 6$ is

- (1) $[0, 4]$
(2) $(-\infty, -2) \cup [4, \infty)$
(3) $(-\infty, 0] \cup [4, \infty)$
(4) None of these

Q.48 The set of admissible value of x such that $\frac{2x+3}{2x-9} < 0$ is

- (1) $\left(-\infty, -\frac{3}{2}\right) \cup \left(\frac{9}{2}, \infty\right)$
(2) $(-\infty, 0) \cup \left(\frac{9}{2}, \infty\right)$

(3) $\left(-\frac{3}{2}, 0\right)$

(4) $\left(-\frac{3}{2}, \frac{9}{2}\right)$

Q.49 Number of integral solution of $\frac{x+2}{x^2+1} > \frac{1}{2}$ is

- (1) 0 (2) 1 (3) 2 (4) 3

Q.50 If x is real, the expression $\frac{x^2+2x-11}{x-3}$ takes all real values except those which lie between a and b , then a and b are :

- (1) -12, -4 (2) -12, 12
-
- (3) 4, 12 (4) -4, 4

Q.51 If $x^3 - 6x^2 + 11x - 6 > 0$ then x lies in the interval

- (1) [1, 4]
-
- (2)
- $(1, 2) \cup [3, \infty)$
-
- (3)
- $(-\infty, -1) \cup [4, \infty)$
-
- (4) None of these

Q.52 Solve the inequality if $f(x) =$

$$\frac{(x-2)^{10}(x+1)^3 \left(x - \frac{1}{2}\right)^5 (x+8)^2}{x^{24}(x-3)^3(x+2)^5} < 0.$$

- (1)
- $x \in (-1, 0) \cup \left(0, \frac{1}{2}\right) \cup (3, \infty)$
-
- (2)
- $x \in (-3, 0) \cup \left(0, \frac{1}{2}\right) \cup (3, 8)$
-
- (3)
- $x \in (-2, -1) \cup \left(\frac{1}{2}, 2\right) \cup (2, 3)$
-
- (4) None of these

Q.53 If $\sqrt{9x^2+6x+1} < (2-x)$, then

- (1)
- $x \in \left(-\frac{3}{2}, \frac{1}{4}\right)$
- (2)
- $x \in \left[-\frac{3}{2}, \frac{1}{4}\right]$
-
- (3)
- $x \in \left(-\frac{3}{2}, \frac{1}{4}\right]$
- (4)
- $x < \frac{1}{4}$

Q.54 If $\sqrt{x-4} \geq \sqrt{x-8}$, then

- (1)
- $x \in [4, \infty)$
- (2)
- $x \in (4, \infty)$

(3) $x \in (8, \infty)$

(4) $x \in [8, \infty)$

LOG INEQUALITIES, CHARACTERSTIC AND MENTISSA

Q.55 The set of real values of x satisfying

$$\log_{1/2}(x^2 - 6x + 12) \geq -2 \text{ is}$$

- (1)
- $(-\infty, 2]$
- (2)
- $[2, 4]$
-
- (3)
- $[4, +\infty)$
- (4) None of these

Q.56 The set of real values of x for which

$$2^{\log_{\sqrt{2}}(x-1)} > x+5 \text{ is}$$

- (1)
- $(-\infty, -1) \cup (4, +\infty)$
- (2)
- $(4, +\infty)$
-
- (3)
- $(-1, 4)$
- (4) None of these

Q.57 If $\log_{0.04}(x-1) \geq \log_{0.2}(x-1)$ then x belongs to the interval

- (1)
- $(1, 2]$
- (2)
- $(-\infty, 2]$
-
- (3)
- $[2, +\infty)$
- (4) None of these

Q.58 The set of real values of x for which

$$\log_{0.2} \frac{x+2}{x} \leq 1 \text{ is}$$

- (1)
- $\left(-\infty, -\frac{5}{2}\right] \cup (0, +\infty)$
-
- (2)
- $\left[\frac{5}{2}, +\infty\right)$
-
- (3)
- $(-\infty, -2) \cup (0, +\infty)$
-
- (4) None of these

Q.59 The least positive integer x , which satisfies the inequality $\log_{\log_2\left(\frac{x}{2}\right)}(x^2 - 10x + 22) > 0$ is equal to

- (1) 3 (2) 4 (3) 7 (4) 8

Q.60 Complete set of solution of equation

$$\frac{\log_{0.3}(x-2)}{|x|} \geq 0$$

- (1)
- $[1, 2) \cup (2, 3]$
- (2)
- $[1, 3]$
-
- (3)
- $(2, 3]$
- (4)
- $\{1\}$

ANSWER KEY

TOPIC WISE QUESTIONS

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	1	1	3	4	3	1	4	2	4	2	2	2	1	4
Qus.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	2	2	2	2	4	4	2	1	4	1	3	2	1	2	3
Qus.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	2	3	4	4	3	4	2	3	2	1	3	1	3	2	4
Qus.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	3	4	4	3	4	3	1	4	2	2	3	1	4	3

