ELEMENTARY MATHS AND LOGARITHM DPP-1

Q.1 If $\frac{3+2\sqrt{2}}{3-\sqrt{2}} = a + b\sqrt{2}$, then a & b (a, b $\in$ Q) are respectively equal to-

(A) $\frac{13}{7}, \frac{9}{7}$ (B) $\frac{9}{7}, \frac{13}{7}$ (C) $\frac{13}{7}, \frac{7}{9}$ (D) $\frac{7}{9}, \frac{7}{13}$

Q.2 Consider the following statements

(i) The sum of a rational number with an irrational number is always irrational.

(ii) The product of two rational numbers is always rational

(iii) The product of two irrationals is always irrationals

(iv) The sum of two rational is always rational

(v) The sum of two irrational is always irrational

The correct order of True/False of above statements is-

(A) TFTFF (B) FFTTT (C) TTFTF (D) TTFFT

Q.3 If $y^2 + my + 2$ is divided by $y + 1$ or by $y - 1$, the remainder are equal. The value of m is

(A) 0 (B) 1 (C) 2 (D) –1

Q.4 The polynomials $P(x) = kx^3 + 3x^2 - 3$ and $Q(x) = 2x^3 - 5x + k$, when divided by $(x - 4)$ leave the same remainder. The value of k is

(A) 2 (B) 1 (C) 0 (D) –1

Q.5 The value of x, satisfying the $(2)^{(4^x)} = (4)^{(2^x)}$, is-

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) 1 (D) 3

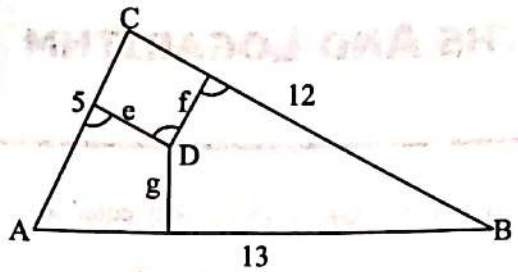
Q.6 The expression $\frac{1}{1+\frac{x}{1-\frac{x}{x+2}}} \div \frac{\frac{1}{1-x}+\frac{1}{1+x}}{\frac{1}{1-x}-\frac{1}{1+x}}$, when simplified reduces to-

(A) $\frac{2x}{x^2+2x+2}$ (B) $\frac{2x}{x^2-1}$ (C) 1 (D) $x^2 - 1$

Q.7 Let $x = \sqrt{2+\sqrt{2+\sqrt{2+.....\infty}}}$ and $y = \sqrt{2\sqrt{2\sqrt{2.....\infty}}}$ then which of the following hold good?

(A) $2x = y$ (B) $3x < y$ (C) $4x = 5y$ (D) $x = y$

Q.8 The sides of a triangle ABC are as shown in the given figure. Let D be any internal point of this triangle and let e, f and g denote the distance between the point D and the sides of the triangle. The sum $(5e + 12f + 13g)$ is equal to



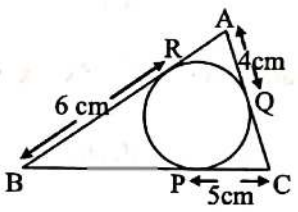
(A) 120 (B) 90 (C) 60 (D) 30

Q.9 Let $x = 2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{3+\cdots\cdots}}}}}$

Then x equals

(A) $1+\frac{1}{3}\sqrt{15}$ (B) $1-\frac{1}{3}\sqrt{15}$ (C) $\frac{1}{3}+\frac{1}{3}\sqrt{15}$ (D) $\frac{1}{3}+\sqrt{10}$

Q.10 In figure, the perimeter of ΔABC is



(A) 30 cm (B) 60 cm (C) 45 cm (D) 15 cm

ANSWER KEY

1. (A)	**2.** (C)	**3.** (A)	**4.** (B)	**5.** (C)	**6.** (A)	**7.** (D)
8. (C)	**9.** (A)	**10.** (A)				

ELEMENTARY MATHS AND LOGARITHM DPP-2

Q.1 If $x + y = a$ and $x^2 + y^2 = b$, then the value of $(x^3 + y^3)$, is

(A) ab (B) $a^2 + b$ (C) $a + b^2$ (D) $\frac{3ab - a^3}{2}$

Q.2 The expression $3(a^2 + 1)^2 + 2(a - 1)(a^2 + 1) - 5(a - 1)^2 - 4(0.75a^4 + 3a - 1)$ when simplified reduces to -

(A) $2a^3 - a^2$ (B) $2a^2 - a^3$ (C) $2a^3$ (D) $2a^2$

Q.3 If $x = \sqrt[3]{7+5\sqrt{2}} - \frac{1}{\sqrt[3]{7+5\sqrt{2}}}$, then the value of $x^3 + 3x - 14$ is equal to-

(A) 1 (B) 0 (C) 2 (D) 4

Q.4 The solution set of the equation $|2x + 3| - |x - 1| = 6$, is

(A) $x \in (-10, 2)$ (B) $x \in [-10, 2)$ (C) $x \in [-10, 2]$ (D) $x \in \{-10, 2\}$

Q.5 Solve : $\frac{(x-5)^2(x+2)^3(x-4)}{(x-3)^4} \le 0$

Q.6 Solve the following inequalities :

(i) $(x - 1)(3 - x)(x - 2)^2 > 0$ (ii) $\frac{2x-3}{3x-7} > 0$ (iii) $\frac{x^2+2x-3}{x^2+1} < 0$

(iv) $x^4 - 2x^2 - 63 \le 0$ (v) $\frac{5x-1}{x^2+3} < 1$ (vi) $\frac{x^2-1}{x^2+x+1} < 1$ (vii) $\frac{14x}{x+1} - \frac{9x-30}{x-4} < 0$

Q.7 Solve : $-1 < \frac{x+2}{x-1} \le 2$

Q.8 What can be said about the numbers, $a_1, a_2, \ldots a_n$ if it is known that, $|a_1| + |a_2| + |a_3| + \ldots + |a_n| = 0$.

Q.9 Solve the following equations

(i) $|x| - 2x + 5 = 0$ (ii) $||x - 1| - 2| = 1$ (iii) $|x - 3| + 2|x + 1| = 4$

ANSWER KEY

1. (D) **2.** (A) **3.** (B) **4.** (D) **5.** $[-2, 3) \cup (3, 4] \cup \{5\}$

6. (i) $(1, 2) \cup (2, 3)$ (ii) $(-\infty; 3/2) \cup (7/3, \infty)$ (iii) $(-3, 1)$ (iv) $[-3, 3]$ (v) $(-\infty, 1) \cup (4, \infty)$ (vi) $(-2, \infty)$

(vii) $(-1, 1) \cup (4, 6)$ **7.** $x \in \left(-\infty, -\frac{1}{2}\right) \cup [4, \infty)$ **9.** (i) $x = 5$ (ii) $x = -2, 0, 2, 4$ (iii) $x = -1$

ELEMENTARY MATHS AND LOGARITHM DPP-3

Q.1 If $x + y = 1$ and $x^2 + y^2 = 2$ then the value of $(x^5 + y^5)$ equals.
(A) 7 (B) 6 (C) 23/4 (D) 19/4

Q.2 Let $n = \sqrt{6+\sqrt{11}} + \sqrt{6-\sqrt{11}} - \sqrt{22}$ then
(A) $n \geq 1$ (B) $0 < n < 1$ (C) $n = 0$ (D) $-1 < n < 0$

Q.3 Suppose that $w = 2^{1/2}$, $x = 3^{1/3}$, $y = 6^{1/6}$ and $z = 8^{1/8}$ from among these number list the biggest, second biggest, numbers are
(A) w, x (B) x, w (C) y, z (D) x, z

Q.4 The product of all the solutions of the equations $(x-2)^2 - 3|x-2| + 2 = 0$ is
(A) 2 (B) –4 (C) 0 (D) None of these

Q.5 Solve the equation : $|x+1| - |x| + 3|x-1| - 2|x-2| = x + 2$

Q.6 Find the logarithms of the following numbers to the base $\frac{1}{3}$.
(i) 81 (ii) $\sqrt[3]{3}$ (iii) $\frac{1}{\sqrt[7]{3}}$ (iv) $9\sqrt{3}$ (v) $\frac{1}{9\sqrt[4]{3}}$

Q.7 Find all values of x for which the following equalities hold true ?
(i) $\log_2 x^2 = 1$ (ii) $\log_3 x = \log_3 (2-x)$ (iii) $\log_4 x^2 = \log_4 x$ (iv) $\log_{1/2}(2x+1) = \log_{1/2}(x+1)$
(v) $\log_{1/3}(x^2+8) = -2$

Q.8 $\log_2[\log_4(\log_{10} 16^4 + \log_{10} 25^8)]$ simplifies to -
(A) an irrational (B) an odd prime (C) a composite (D) unity

Q.9 If $3\log_2 x + \log_2 27 = 3$ then the value of x is -
(A) $\frac{3}{2}$ (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{1}{2}$

Q.10 If $a^4.b^5 = 1$ then the value of $\log_a(a^5 b^4)$ equals -
(A) 9/5 (B) 4 (C) 5 (D) 8/5

ANSWER KEY

1. (D) **2.** (C) **3.** (B) **4.** (C) **5.** $x \in [2, \infty) \cup \{-2\}$ **8.** (D) **9.** (C)
10. (A)

ELEMENTARY MATHS AND LOGARITHM DPP-4

Note : All star marked Questions are multiple correct with more than one Answer.

Q.1 Let $x = \sqrt{2+\sqrt{2+\sqrt{2+...\infty}}}$ and $y = \sqrt{2\sqrt{2\sqrt{2...\infty}}}$ then which of the following hold good?
(A) $2x = y$ (B) $3x < y$ (C) $4x = 5y$ (D) $x = y$

Q.2 Suppose x and y are positive numbers such that $\log_2(x + y) = \log_2 y + 10$. Then the correct relation is -
(A) $x = 1023y$ (B) $y = 1024x$ (C) $x = 2^{10}$ (D) $x + y = 2^y + 10$

***Q.3** If $p, q \in N$ satisfy the equation $x^{\sqrt{x}} = (\sqrt{x})^x$ then p & q are
(A) relatively prime (B) twin prime
(C) coprime (D) If $\log_q p$ is defined the $\log_p q$ is not and vice versa

Q.4 The real value of x for which the statement $\log_6 9 - \log_9 27 + \log_8 x = \log_{64} x - \log_6 4$ holds true, is -
(A) 1/2 (B) 1/4 (C) 1/8 (D) 1/16

Q.5 The value of x satisfying the equation $2^{\log_3 x} + 8 = 3 \cdot x^{\log_9 4}$, is -
(A) irrational number (B) odd prime number
(C) relatively prime with 4 (D) rational number which is not an integer

Q.6 The value of 'a' for which $\frac{\log_a 7}{\log_6 7} = \log_\pi 36$ holds good, is -
(A) $1/\pi$ (B) π^2 (C) $\sqrt{\pi}$ (D) 2

Q.7 $\log_{10}(\log_2 3) + \log_{10}(\lg_3 4) + \log_{10}(\log_4 5) + ... + \log_{10}(\log_{1023} 1024)$ simplifies to -
(A) a composite (B) a prime number
(C) rational which is not an integer (D) an integer

Passage (Q.8 to 10)

Let A denotes the sum of the roots of the equation $\frac{1}{5-4\log_4 x} + \frac{4}{1+\log_4 x} = 3$.

B denotes the value of the product of m and n, if $2^m = 3$ and $3^n = 4$.

C denotes the sum of the integral roots of the equation $\log_{3x}\left(\frac{3}{x}\right) + (\log_3 x)^2 = 1$.

Q.8 The value of A + B equals -
(A) 10 (B) 6 (C) 8 (D) 4

Q.9 The value of B + C equals -
(A) 6 (B) 2 (C) 4 (D) 8

Q.10 The value of A + C ÷ B equals -
(A) 5 (B) 8 (C) 7 (D) 4

ANSWER KEY

1. (D)	**2.** (A)	**3.** (A,C,D)	**4.** (C)	**5.** (C)	**6.** (C)	**7.** (D)
8. (C)	**9.** (A)	**10.** (B)				

ELEMENTARY MATHS AND LOGARITHM DPP-5

Q.1 Match the column:

Column-I	Column-II
(A) The value of K, where $\log(\log 4) + \log(\log 25) = \log K + \log(\log 2) + \log(\log 5)$ is	(P) 1
(B) Number of values of $x \in N$, for which $x^4 + 4$ is prime, is	(Q) 2
(C) If b is a positive real number different from 1, let $\log_b x$ denotes the base b logarithm of x. Let n be the number of solutions of x to the equation, $\log_b x = \log_x b$ where x is a positive real different from 1. Then n equals	(R) 3
(D) The expression $\sqrt{\log_{0.5}^2 8}$ has the value equal to	(S) 4

Q.2 If a, b, c and d are positive integers, then find the value of

$$\log_{10}\left(\frac{2a}{b}\right) - \log_{10}\left(\frac{c}{2b}\right) + \log_{10}\left(\frac{5c}{d}\right) - \log_{10}\left(\frac{a}{5d}\right)$$

Q.3 If $|x-1| + |x| + |x+1| \geq 6$; then x lies in

(A) $(-\infty, 2]$ (B) $(-\infty, -2] \cup [2, \infty)$ (C) R (D) ϕ

Q.4 Solution of $|2x-3| < |x+2|$ is:

(A) $(-\infty, 1/3)$ (B) $(1/3, 5)$ (C) $(5, \infty)$ (D) $(-\infty, 1/3) \cup (5, \infty)$

Q.5 The value of x, $\log_e(x-3) < 1$ is

(A) (0, 3) (B) (0, e) (C) (0, e + 3) (D) (3, 3 + e)

Q.6 The value of x, $\log_{1/2} x \geq \log_{1/3} x$ is

(A) (0, 1] (B) (0, 1) (C) [0, 1) (D) None of these

Q.7 The set of real values of x for which $\log_{0.2}\frac{x+2}{x} \leq 1$ is:

(A) $\left(-\infty, -\frac{5}{2}\right] \cup (0, +\infty)$ (B) $\left[\frac{5}{2}, +\infty\right)$

(C) $(-\infty, -2) \cup (0, +\infty)$ (D) none of these

Q.8 Solve the following inequalities:

(i) $\log_{1/3}(5x-1) > 0$

(ii) $\log_7 \frac{2x-6}{2x-1} > 0$

(iii) $\log_2(x^2-2x)-3 > 0$

(iv) $\frac{\log^2 x - 3\log x + 3}{\log x - 1} < 1$

(v) $\sqrt{x+2} > x$.

ANSWER KEY

1. A → S; B → P; C → Q; D → R **2.** 2 **3.** (B) **4.** (B) **5.** (D) **6.** (A)

7. (A) **8.** (i) $\left(\frac{1}{5}, \frac{2}{5}\right)$ (ii) $\left(-\infty, \frac{1}{2}\right)$ (iii) $(-\infty, -2) \cup (4, \infty)$ (iv) (0, 10) (v) [– 2, 2)