Manzil JEE (2025)

Maths

DPP: 2

Basic Maths

Q1 Number of positive integral values of x satisfying the inequality $\frac{(x-4)^{2017}\cdot(x+8)^{2016}(x+1)}{x^{2016}(x-2)^{3}\cdot(x+3)^{5}\cdot(x-6)(x+9)^{2018}} \leq 0$ is

(A) 0 (B) 1

(C) 2 (D) 3

Q2 The value of expression

$$\sqrt[3]{215-18\sqrt[3]{215-18\sqrt[3]{215-18\sqrt[3]{215-18.....}}}}$$

(A) 2 (B) 3

(C) 4 (D) 5

Q3 The number of integral solution of equation $\left(x^2-2x-4\right)^{\left(x^2+3x+2\right)}=1$ is/are

(A) One (B) Two

(C) Three (D) Four

Q4 Solution set of $x-4<\sqrt{x^2+4x-12}$ is

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

(B) $x \in (-\infty, -6] \cup [2, \infty)$

(C) $x \in R$

(D) $x \in (-8,-3] \cup [6,\infty) \cup \{4\}$

Q5 If $x=\frac{4\sqrt{6}}{\sqrt{2}+\sqrt{3}}$, then value of $\frac{x+2\sqrt{2}}{x-2\sqrt{2}}+\frac{x+2\sqrt{3}}{x-2\sqrt{3}}$ is equal to

(A) 0 (B) 1

(C) 2 (D) 4

Q6 If $x-\frac{1}{x}=3$ then value of $x^7-\frac{1}{x^7}$ equals

(A) 4287 (B) 4283

(C) 4285 (D) 4281

Q7 Solution of the quadratic equation $(3|x|-3)^2=|x|+7$, which belongs to the domain of the function $y=\sqrt{(x-4)x}$ is :

(A) $\pm\frac{1}{9}, \pm 2$

(B) $\frac{1}{9}, 8$

(C) $-2, -\frac{1}{9}$

(D) $-\frac{1}{9}, 8$

Q8 Number of real solution (x) of the equation $|x-3|^{3x^2-10x+3}=1$ is

(A) exactly four (B) exactly three

(C) exactly two (D) exactly one

Q9 The number of real values of x satisfying the equation $3|x-2|+|1-5x|+4|3x+1|=13$ is:

(A) 1 (B) 4

(C) 2 (D) 3

Q10 If $|f(x)+6-x^2|=|f(x)|+|4-x^2|+2$, then $f(x)$ is necessarily non-negaive for :

(A) $x \in [-2,2]$

(B) $x \in (-\infty,-2) \cup (2,\infty)$

(C) $x \in [-\sqrt{6}, \sqrt{6}]$

(D) $x \in [-5,-2] \cup [2,5]$

Q11 The set of values of $K(K \in R)$ for which the equation $x^2-4|x|+3-|K^2-1|=0$ will have exactly four real roots is

(A) $(-2,4)$

(B) $(-4,4)$

(C) $(-2,2)$

(D) $(-1,0)$

Q12 Consider the system of equations $\log_3(\log_2 x) + \log_{1/3}(\log_{1/2} y) = 1$ and $xy^2 = 9$. The value of x lies in the interval

(A) $(200, 300)$ (B) $(400, 500)$
(C) $(700, 800)$ (D) none of these

Q13 Let (x_0, y_0) be the solution of the following equations $(2x)^{\ln 2} = (3y)^{\ln 3}$
$3^{\ln x} = 2^{\ln y}$ Then x_0 is

(A) $\frac{1}{6}$
(B) $\frac{1}{3}$
(C) $\frac{1}{2}$
(D) 6

Q14 If the complete set of values of x satisfying the inequality

$\sqrt{\log_2^2 x - 5|\log_2 x| + 6} \le 2\sqrt{5}$ is $\left[\frac{1}{a}, \frac{1}{b}\right] \cup \left[\frac{1}{c}, c\right] \cup [b, a]$ (where $a, b, c \in N$), then value of $a + b + c$ is equal to

(A) 0 (B) 140
(C) 136 (D) 272

Q15 If $x = \log_{2a}\left(\frac{bcd}{2}\right)$, $y = \log_{3b}\left(\frac{acd}{3}\right)$, $z = \log_{4c}\left(\frac{abd}{4}\right)$ and $w = \log_{5d}\left(\frac{abc}{5}\right)$ and $\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1} + \frac{1}{w+1} = \log_{abcd} N + 1$, the value of N is

(A) 40 (B) 80
(C) 120 (D) 160

Q16 Let $N = \left(\frac{81^{\frac{1}{\log_5 9}} + 3^{\frac{3}{\log_{\sqrt{6}} 3}}}{409}\right) \cdot \left((\sqrt{7})^{\frac{2}{\log_{25} 7}} - 125^{\log_{25} 6}\right)$, then value of $\log_2 N$ is equal to

(A) 0 (B) 1
(C) –1 (D) None of these

Q17 Let a, b and c be such that a + b + c = 0 and $P = \frac{a^2}{2a^2+bc} + \frac{b^2}{2b^2+ca} + \frac{c^2}{2c^2+ab}$ is defined. Then the value of P is

(A) 1 (B) 2
(C) 4 (D) 6

Q18 If a, b, c are distinct real number such that $a + \frac{1}{b} = b + \frac{1}{c} = c + \frac{1}{a}$, then evaluate abc.

(A) $\pm\sqrt{2}$ (B) $\sqrt{2} - 1$
(C) $\sqrt{3}$ (D) ± 1

Q19 The number of negative integral solutions of the equation
$x^2 2^{x+1} + 2^{|x-3|+2} = x^2 . 2^{|x-3|+4} + 2^{x-1}$ is

(A) 0 (B) 1
(C) 2 (D) 3

Q20 If a, b, c, x, y, z are non-zero real number and $\frac{x^2(y+z)}{a^3} = \frac{y^2(z+x)}{b^3} = \frac{z^2(x+y)}{c^3} = \frac{xyz}{abc} = 1$ then find the value of $a^3 + b^3 + c^3 + abc$.

(A) 0 (B) 1
(C) 2 (D) 3

Q21 Consider the equation where P, Q, $R \in$ real number
PQR + 3P + 3QR = 121
PQR + 3R + 3PQ = 59
PQR + 3Q + 3PR = 63
Find the value of (P + 1) (Q + 1) (R + 1)

(A) 192 (B) 82
(C) 108 (D) 68

Q22 Solution set of inequaiton $\sqrt{-x^2 + x + 2} + 2x + 1 > 0$, is

(A) $x \in \left(\frac{-(3+\sqrt{29})}{10}, 2\right]$
(B) $x \in \left[\frac{5-\sqrt{13}}{6}, \infty\right)$
(C) $x \in \left[\frac{16+\sqrt{7}}{2}, 10\right)$
(D) $x \in \left[\frac{\sqrt{13}-5}{2}, 1\right)$

Q23 Let $x = \sqrt{3 - \sqrt{5}}$ and $y = \sqrt{3 + \sqrt{5}}$. If the value of the expression $x - y + 2x^2y + 2xy^2 - x^4y + xy^4$ can be expressed in the form $\sqrt{p} + \sqrt{q}$ (where p, q ∈N), then find the value of (p + q)

(A) 320 (B) 430

(C) 570 (D) 610

Q24 If f(x) is a polynomial of degree 4 with leading coefficient 1 and f(1) =1, f(2) = 2, f(3) = 3, then the value of $\left[\frac{f(5)+f(-1)}{f(0)+f(4)}\right]$ equals (where [.] denotes greatest integer function)

(A) 0 (B) 5

(C) 7 (D) 9

Q25 The sum of all distinct real solutions of the equation $\left(x^2 - 3\right)^3 - (4x + 6)^3 + 216 = 18\,(4x + 6)\left(3 - x^2\right),$ is

(A) –3 (B) 4

(C) 1 (D) –7

Answer Key

Q1	(D)
Q2	(D)
Q3	(C)
Q4	(B)
Q5	(C)
Q6	(A)
Q7	(C)
Q8	(B)
Q9	(C)
Q10	(A)
Q11	(C)
Q12	(C)
Q13	(C)
Q14	(B)
Q15	(C)
Q16	(A)
Q17	(A)
Q18	(D)
Q19	(A)
Q20	(A)
Q21	(B)
Q22	(A)
Q23	(D)
Q24	(B)
Q25	(C)