JEE Main 2 April 2025 Shift 1

Mathematics Question Paper with Answer Key

Q. No.	Question	Answers
1	Find the maximum value of n such that 50! is divisible by 3^n.	22
2	Let $P_n = \alpha^n + \beta^n$, $P_{10} = 123$, $P_9 = 76$, $P_8 = 47$ and $P_1 = 1$, the quadratic equation whose roots are $1/\alpha$ and $1/\beta$.	$x^2 + x - 1 = 0$
3	The total number of 10 digits sequences formed by only {0, 1, 2} where 1 should be used at least 5 times and 2 should be used exactly three times, is	2892
4	Let $a_1, a_2, a_3, \ldots$ is an A.P. and $\sum_{k=1}^{12} a2_{k-1} = -72/5\ a_1$ and $\sum_{k=1}^{n} a_k = 0$. Then the value of n is	11
5	Given the equation of a hyperbola H: $x^2/a^2 - y^2/b^2 = 1$ and its directrix is $x = \sqrt{10}/81$ with a focus at $(\sqrt{10},0)$, then find the value of $9(e + l^2)$, where I is length of latus rectum is	2587
6	If a twice differentiable function f satisfies $f'(x) = f(x)$ such that $f(0) = 1/2 = f'(0)$. Then find $f''(\pi/3)$.	$e^{\pi/3}/2$
7	Let the system of equations, $3x - y + ßz = 3$, $2x + \alpha y + z = -3$ and $x + y + 4z = 4$ has infinite solutions, then $22ß - 9\alpha$ equals to	164
8	Let $f(x) = 2x^3 + 9x^2a + 12a^2x + 1$. Local minima and local maxima occur at p & q respectively, such that $p^2 = q$. Then the value of f(3) is	37
9	If $\int_0^{e^3} [1/e^{x-1}]\, dx = \alpha - \log_e 2$, where [.] is Greatest Integer function, then α^3 equals to	8

10	If $\lim_{x\to 0}\frac{(\gamma-1)e^{x^2}+x^2\sin(\alpha x)}{\sin(2x)-\beta x}=3$, then $\alpha+2\beta+\gamma$ is equal to:	1
11	The term independent of x in the binomial expression of $\left(\frac{x+1}{x^{\frac{2}{3}}-x^{\frac{1}{3}}+1}-\frac{x-1}{x-x^{\frac{1}{2}}}\right)^{10}$ is:	210
12	Let E be an ellipse such that E: $x^2/18 + y^2/9 = 1$. Let point P lies on E such that S and S′ are foci of ellipse. Then, find the sum of min (PS.PS′) + max (PS.PS′).	27
13	The area enclosed by $\|4 - x^2\| \le y \le x^2$; $y \le 4$, $x \le 0$ equals to (in square units)	2/3(20√2 - 24)
14	Let $\theta \in [-2\pi, 2\pi]$ satisfying $2\cos^2\theta - \sin\theta - 1 = 0$. Then the number of solutions of equation is	6
15	If Q and R are two points on line L: x-1/-1 = y-2/3 = z-3/5 such that QR = 5. If P(0, 2, 3) be any point, then the area of ΔPQR is	√85/14
16	Let $\sin x \cos y\,(f(2x+2y) - f(2x-2y)) = \cos x \sin y\, f(2x+2y) + f(2x-2y))\ \forall\ x, y \in R$ and f′(0) = 1/2. If f(x) is differentiable function, then f‴ (2π/3) is -	-1/16
17	For a tetrahedron ABCD, the area of triangular face ABC, ACD and ABD is 5, 6 and 7 sq. units, respectively. If AB, AC and AD are mutually orthogonal, then the area of triangular face BCD is	√110 sq. units
18	If $2 + k^2z/k + k\bar{z} = z$, $k \neq 0$, such that $z = x + iy$ and $y \neq 0$ and $\|z - 1 + 2i\| = 1$, then find the maximum distance of point $(k + k^2i)$ from the given circle on which z lies	4

19	Let C_1 and C_2 are circle passing through (–9, 4), both are in contact with x + y = 3 nd x - y = 3 (tangent lines). If r_1 and r_2 are radius of C_1 and C_2 respectively, then $\|r^2_1 - r^2_2\|$ equals to	768
20	If (I + A) = $\begin{bmatrix} 1 & 0 & a \\ 1 & 1 & 0 \\ a & 2 & 2 \end{bmatrix}$, then find the value of det ((a + 1) adj ((a - 1)A))	$4a^2(a - 1)^3$ $(a^2 - 1)^3$
21	Given A = {1, 2 ..., 40}. Three numbers are randomly selected from set A. Then, the probability that the terms form an increasing G.P. is	1/494