JEE MAIN 24 JANUARY 2025 SHIFT 1

MATHEMATICS QUESTION PAPER WITH ANSWER KEY

Q.No.	Questions	Answers
1	If the 5th, 6th and 7th term of the binomial expansion of $(1 + x^2)^{n+4}$ are in A.P. Then the greatest binomial coefficient in the expansion of $(1 + x^2)^{n+4}$ is	35
2	The number of 3 digit numbers which is divisible by 2 and 3 but not divisible by 4 and 9.	125
3	If A is 3 x 3 matrix such that det(A) = 2. Then det(adj (adj(adj (adj))))	2^{16}
4	Evaluate $\lim (x \to 0) [\text{cosec}x. (2\cos^2 x + 3\cos x)^{1/2} - (\cos^2 x + \sin x + 4)^{1/2})$	$-1/2\sqrt{5}$
5	If a = i + 2j + 3k, b=3i + j - k and ĉ is coplanar with a and b. Also a - c = 5 and ĉ is perpendicular to b. Then | c | is	$(11/6)^{1/2}$
6	The area of the region bounded by S(x, v) such that S = {(x, y) : $x^2 + 4x + 2 \le y \le \|x + 2\|$} is (in sq. units)	20/3
7	If $dy/dx - (x/(1 + x^2))y = \sqrt{x} / \sqrt{(1 + x^2)}$ and y(0) = 0, then find the value of y(1).	$\sqrt{2}/3$
8	If α and β are real numbers such that $\sec^2(\tan^{-1}(\alpha)) + \csc 2(\cot^{-1}(\beta)) = 36$ and α + β = 8, then $(\alpha^2 + \beta)$ is (α > β)	28
9	Two persons A and B throws a pair of dice alternatively. For A to win he should throw sum of 5 before B throws sum of 8. If A throws first, then the probability that A wins, is	9/19
10	For a distribution of 10 observations, $\Sigma(i = 1 \text{ to } 10) x_i = 55$ and $\Sigma(i = 1 \text{ to } 10) x_i^2 = 328$. If the observations 4 and 5 are replaced by 6 and 8 respectively, then the new variance is	2.7
11	Find the product of all real roots of equation $(x2 - 9x + 11)^2 - (x - 4) (x - 5) = 2$ is	99

12	If S be the set of 10 distinct primes and let A be the set of product of two or more elements from the set S. If P = {(x, y) : x ∈ S and y ∈ A and y is divided by x}. Then n(P) is equal to	5110
13	If $I(m, n) = \int_0^1 x^{m-1}(1 - x)^{n-1}dx$, m, n > 0, then I(9, 14) + I(10, 13) is equal to	I(9, 13)
14	If Sn = 1/2 + 1/6 + 1/12 + ...n terms. The sum of first six terms in A.P. with first term equal to -p and common difference p is $(2026.S_{2025})^{1/2}$. The absolute value of difference between 20th and 15th term in A.P. is	25
15	If f(x) satisfies the functional equation f(x) + 6 f(1/x)) = 35/3x - 7/2, x ∈ R - {0} and if lim (x→0) (1/αx + f(x)) exist finitely and is equal to β, then (α - 2β) is	4