JEE Main April 2026

Question Paper With Text Solution

05 April | Shift-1

MATHEMATICS

MATRIX

JEE Main & Advanced | XI-XII Foundation| VI-X Pre-Foundation

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JEE MAIN APRIL 2026 | 5TH APRIL SHIFT-1

SECTION – A

Question ID : 695278301

1. Let $a, b \in C$. Let α, β be the roots of the equation $x^2 + ax + b = 0$. If $\beta - \alpha = \sqrt{11}$ and $\beta^2 - \alpha^2 = 3i\sqrt{11}$, then $(\beta^3 - \alpha^3)^2$ is equal to :

(1) 160 (2) 176 (3) 194 (4) 187

Ans. (2)

Sol.

Question ID : 695278302

2. Let the sum of the first n terms of an A.P. be $3n^2 + 5n$. Then the sum of squares of the first 10 terms of the A.P. is :

(1) 10220 (2) 12860 (3) 15220 (4) 19780

Ans. (3)

Sol.

Question ID : 695278303

3. Let A be a 3×3 matrix such that $A^T \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 5 \\ 2 \\ 2 \end{bmatrix}$, $A^T \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}$, $A \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 3 \\ 4 \\ 4 \end{bmatrix}$ and $A \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \\ 1 \end{bmatrix}$. If $\det(A) = 1$, then $\det(\text{adj}(A^2 + A))$ is equal to :

(1) 16 (2) 25 (3) 49 (4) 64

Ans. (4)

Sol.

Question ID : 695278304

4. Consider the system of linear equations in x, y, z : $x + 2y + tz = 0$, $6x + y + 5tz = 0$, $3x + t^2y + f(t)z = 0$, where $f : R \to R$ is a differentiable function. If this system has infinitely many solutions for all $t \in R$, then f :

(1) is a constant function (2) is strictly increasing on R

(3) is strictly decreasing on R (4) has two critical points

Ans. (2)

Sol.

Question ID : 695278305

5. $\sum_{n=1}^{10}\left(\frac{528}{n(n+1)(n+2)}\right)$ is equal to :

(1) 65 (2) 130 (3) 220 (4) 440

Ans. (2)

Sol.

Question ID : 695278306

6. Let tan A, tan B, where $A, B \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ be the roots of the quadratic equation $x^2 - 2x - 5 = 0$. Then $20\sin^2\left(\frac{A+B}{2}\right)$ is equal to :

(1) $10+\sqrt{10}$ (2) $10-2\sqrt{10}$ (3) $10-3\sqrt{10}$ (4) $10-\sqrt{10}$

Ans. (3)

Sol.

Question ID : 695278307

7. A letter is known to have arrived by post either from KANPUR or from ANANTPUR. On the envelope just two consecutive letters AN are visible. The probability, that the letter came from ANANTPUR, is :

(1) $\frac{7}{10}$ (2) $\frac{10}{17}$ (3) $\frac{12}{19}$ (4) $\frac{7}{19}$

Ans. (2)

Sol.

Question ID : 695278308

8. The mean deviation about the mean for the data in the following table :

x_i	5	7	9	10	12	15
f_i	8	6	2	2	2	6

is equal to :

(1) 40/13 (2) 42/13 (3) 44/13 (4) 46/13

Ans. (3)

Sol.

Question ID : 695278309

9. Let a focus of the ellipse $E : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ be S(4, 0) and its eccentricity be $\frac{4}{5}$. If the point P(3, α) lies on E and O is the origin, then the area of ΔPOS is equal to :

(1) 12/5 (2) 14/5 (3) 24/5 (4) 48/5

Ans. (3)

Sol.

Question ID : 695278310

10. Let P be a moving point on the circle $x^2 + y^2 - 6x - 8y + 21 = 0$. Then, the maximum distance of P from the vertex of the parabola $x^2 + 6x + y + 13 = 0$ is equal to :

(1) 8 (2) 10 (3) 12 (4) 9

Ans. (3)

Sol.

Question ID : 695278311

11. In an equilateral triangle PQR, let the vertex P be at (3, 5) and the side QR be along the line $x + y = 4$ If the orthocentre of the triangle PQR is (α, β), then $9(\alpha + \beta)$ is equal to :

(1) 16 (2) 27 (3) 36 (4) 48

Ans. (4)

Sol.

Question ID : 695278312

12. The sum of all the integral values of p such that the equation $3\sin^2 x + 12\cos x - 3 = p$, $x \in R$ has at least one solution, is :

(1) –54 (2) –60 (3) –75 (4) –84

Ans. (3)

Sol.

Question ID : 695278313

13. The square of the distance of the point P(5, 6, 7) from the line $\frac{x-2}{2} = \frac{y-5}{3} = \frac{z-2}{4}$ is equal to :

(1) 3 (2) 5 (3) 6 (4) 8

Ans. (3)

Sol.

Question ID : 695278314

14. Let $\vec{a} = \sqrt{7}\hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = \hat{j} + 2\hat{k}$ If $\vec{r}$ is a vector such that $\vec{r} \times \vec{a} + \vec{a} \times \vec{b} = \vec{0}$ and $\vec{r} \times \vec{a} = \vec{0}$, then $|3\vec{r}|^2$ is equal to :

(1) 44 (2) 54 (3) 86 (4) 132

Ans. (1)

Sol.

Question ID : 695278315

15. The square of the distance of the point of intersection of the lines $\vec{r} = (\hat{i} + \hat{j} - \hat{k}) + \lambda(a\hat{i} - \hat{j}), a \neq 0$ and $\vec{r} = (4\hat{i} - \hat{k}) + \mu(2\hat{i} + a\hat{k})$ from the origin is :

(1) 5 (2) 10 (3) 17 (4) 26

Ans. (3)

Sol.

Question ID : 695278316

16. The area of the region $R = \{(x, y); xy \le 27, 1 \le y \le x^2\}$ is equal to :

(1) $78\log_e 3 - \frac{52}{3}$ (2) $54\log_e 3 - \frac{52}{3}$ (3) $54\log_e 3 - \frac{26}{3}$ (4) $54\log_e 3 + \frac{26}{3}$

Ans. (2)

Sol.

Question ID : 695278317

17. The product of all possible values of a, for which $\lim\limits_{x\to 0}\left(\frac{1-\cos(ax)\cos((a+1)x)\cos((a+2)x)}{\sin^2((a+1)x)}\right) = 2$, is :

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

Ans. (3)

Sol.

Question ID : 695278318

18. The value of the integral $\int_0^{\infty} \frac{\log_e(x)}{x^2+4}dx$ is :

(1) $\frac{\pi\log_e(2)}{2}$ (2) $\frac{\pi\log_e(2)}{4}$ (3) $1+\pi\log_e(2)$ (4) $2+\pi\log_e(2)$

Ans. (2)

Sol.

Question ID : 695278319

19. Let $f : R \to R$ be a differentiable function such that $f\left(\frac{x+y}{3}\right) = \frac{f(x)+f(y)}{3}$ for all $x, y \in R$ and $f'(0) = 3$ Then the minimum value of the function $g(x) = 3 + e^x f(x)$ is :

(1) $3\left(\frac{e+1}{e}\right)$ (2) $3\left(\frac{e-1}{e}\right)$ (3) $\frac{3-e}{e}$ (4) $3e$

Ans. (2)

Sol.

Question ID : 695278320

20. The value of the integral $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}}\left(\frac{4-\text{cosec}^2 x}{\cos^4 x}\right)dx$ is :

(1) $\frac{11}{\sqrt{3}}$ (2) $\frac{16}{\sqrt{3}}$ (3) $\frac{32}{3\sqrt{3}}$ (4) $\frac{64}{3\sqrt{3}}$

Ans. (3)

Sol.

SECTION – B

Question ID : 695278321

21. Let A = {1, 2, 3, 4, 5, 6}. The number of one-one functions $f : A \to A$ such that $f(1) \geq 3$, $f(3) \leq 4$ and $f(2) + f(3) = 5$, is _____.

Ans. (72)

Sol.

Question ID : 695278322

22. Two players A and B play a series of games of badminton. The player, who wins 5 games first, wins the series. Assuming that no game ends in a draw, the number of ways, in which player A wins the series is _____.

Ans. (126)

Sol.

Question ID : 695278323

23. If the sum of the coefficients of x^7 and x^{14} in the expansion of $\left(\frac{1}{x^3}-x^4\right)^n$ $x \neq 0$, is zero, then the value of n is _____.

Ans. (21)

Sol.

Question ID : 695278324

24. If $\frac{\pi}{4}+\sum_{p=1}^{11}\tan^{-1}\left(\frac{2^{p-1}}{1+2^{2p-1}}\right)=\alpha$ then $\tan\alpha$ is equal to _____.

Ans. Official answer NTA (2048)

Sol.

Question ID : 695278325

25. Let $y=y(x)$ be the solution of the differential equation $x\sin\left(\frac{y}{x}\right)dy=\left(y\sin\left(\frac{y}{x}\right)-x\right)dx, y(1)=\frac{\pi}{2}$ and let $\alpha=\cos\left(\frac{y(e^{12})}{e^{12}}\right)$. Then the number of integral value of p, for which the equation $x^2+y^2-2px+2py+a+2=0$ represents a circle of radius $r\le 6$, is _____.

Ans. (8)

Sol.