# JEE Main April 2026

## Question Paper With Text Solution

## 06 April | Shift-2

# MATHEMATICS

MATRIX

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

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# JEE MAIN APRIL 2026 | 6TH APRIL SHIFT-2

## SECTION – A

Question ID : 6911211201

1. Let $f : R \to R$ be defined as $f(x) = \frac{2x^2 - 3x + 2}{3x^2 + x + 3}$. Then f is :

(1) both one-one and onto
(2) one-one but not onto
(3) onto but not one-one
(4) neither one-one nor onto

**Ans.** Official answer NTA (4)

**Sol.**

Question ID : 6911211202

2. Consider the quadratic equation $(n^2 - 2n + 2)x^2 - 3x + (n^2 - 2n + 2)^2 = 0$, $n \in R$. Let $\alpha$ be the minimum value of the product of its roots and $\beta$ be the maximum value of the sum of its roots. Then the sum of the first six terms of the G.P., whose first term is $\alpha$ and the common ratio is $\frac{\alpha}{\beta}$ is :

(1) $\frac{61}{37}$
(2) $\frac{121}{81}$
(3) $\frac{364}{243}$
(4) $\frac{1093}{729}$

**Ans.** (3)

**Sol.**

Question ID : 6911211203

3. Let $S = \left\{z \in C : z^2 + \sqrt{6}iz - 3 = 0\right\}$. Then $\sum_{z \in S} z^8$ is equal to :

(1) 162
(2) 184
(3) 262
(4) 324

**Ans.** (1)

**Sol.**

Question ID : 6911211204

4. The sum of all possible values of $\theta \in [0, 2\pi]$, for which the system of equations :

$x\cos 3\theta - 8y - 12z = 0$

$x\cos 2\theta + 3y + 3z = 0$

$x + y + 3z = 0$

has a non-trivial solution, is equal to :

(1) $\pi$ (2) $2\pi$ (3) $3\pi$ (4) $4\pi$

**Ans.** (4)

**Sol.**

Question ID : 6911211205

5. Let $A = \begin{bmatrix} 1 & 0 & 0 \\ 3 & 1 & 0 \\ 9 & 3 & 1 \end{bmatrix}$ and $B = [b_{ij}], 1 \le i, j \le 3$. If $B = A^{99} - I$, then the value of $\frac{b_{31} - b_{21}}{b_{32}}$ is :

(1) 99 (2) 199 (3) 149 (4) 159

**Ans.** (3)

**Sol.**

Question ID : 6911211206

6. The sum $1 + \frac{1}{2}(1^2 + 2^2) + \frac{1}{3}(1^2 + 2^2 + 3^2) + \ldots$ upto 10 terms is equal to :

(1) 130 (2) 155 (3) $\frac{315}{2}$ (4) $\frac{325}{2}$

**Ans.** (3)

**Sol.**

Question ID : 6911211207

7. A building has ground floor and 10 more floors. Nine persons enter in a lift at the ground floor. The lift goes up to the $10^{th}$ floor. The number of ways, in which any 4 persons exit at a floor and the remaining 5 persons exit at a different floor, if the lift does not stop at the first and the second floors, is equal to :

(1) 2184 (2) 3064 (3) 7056 (4) 11340

**Ans.** (3)

**Sol.**

Question ID : 6911211208

8. Let the mean and the variance of seven observations 2, 4, $\alpha$, 8, $\beta$, 12, 14, $\alpha < \beta$, be 8 and 16 respectively. Then the quadratic equation whose roots are $3\alpha + 2$ and $2\beta + 1$ is :

(1) $x^2 - 35x + 306 = 0$ (2) $x^2 - 41x + 420 = 0$

(3) $x^2 - 45x + 506 = 0$ (4) $x^2 - 37x + 342 = 0$

**Ans.** (2)

**Sol.**

Question ID : 6911211209

9. A bag contains 6 blue and 6 green balls. Pairs of balls are drawn without replacement until the bag is empty. The probability that each drawn pair consists of one blue and one green ball is :

(1) $\frac{63}{925}$ (2) $\frac{17}{231}$ (3) $\frac{16}{231}$ (4) $\frac{64}{925}$

**Ans.** (3)

**Sol.**

Question ID : 6911211210

10. Let C be a circle having centre in the first quadrant and touching the x-axis at a distance of 3 units from the origin. If the circle C has an intercept of length $6\sqrt{3}$ on y-axis, then the length of the chord of the circle C on the line $x - y = 3$ is :

(1) 8 (2) 6 (3) $6\sqrt{2}$ (4) $8\sqrt{2}$

**Ans.** (3)

**Sol.**

Question ID : 6911211211

11. The eccentricity of an ellipse E with centre at the origin O is $\frac{\sqrt{3}}{2}$ and its directrices are $x = \pm\frac{4\sqrt{6}}{3}$. Let $H : \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ be a hyperbola whose eccentricity is equal to the length of semi-major axis of E, and whose length of latus rectum is equal to the length of minor axis of E. Then the distance between the foci of H is :

(1) $\frac{4\sqrt{2}}{\sqrt{7}}$ (2) $\frac{4\sqrt{2}}{7}$ (3) $\frac{4}{\sqrt{7}}$ (4) $\frac{8}{7}$

**Ans.** (4)

**Sol.**

Question ID : 6911211212

12. Let $x = 9$ be a directrix of an ellipse E, whose centre is at the origin and eccentricity is $\frac{1}{3}$. Let $P(\alpha, 0)$, $\alpha > 0$, be a focus of E and AB be a chord passing through P. Then the locus of the mid point of AB is :

(1) $9y^2 = 8x(1 - x)$ (2) $3y^2 = 4x(1 - x)$ (3) $9y^2 = 8x(x - 1)$ (4) $3y^2 = 4x(x - 1)$

**Ans.** (1)

**Sol.**

Question ID : 6911211213

13. If $\sin\left(\tan^{-1}\left(x\sqrt{2}\right)\right) = \cot\left(\sin^{-1}\sqrt{1-x^2}\right)$, $x \in (0, 1)$, then the value of x is :

(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{2}{3}$ (4) $\frac{5}{8}$

**Ans.** (1)

**Sol.**

Question ID : 6911211214

14. The shortest distance between the lines $\frac{x-4}{1} = \frac{y-3}{2} = \frac{z-2}{-3}$ and $\frac{x+2}{2} = \frac{y-6}{4} = \frac{z-5}{-5}$ is :

(1) $\frac{5\sqrt{6}}{6}$ (2) $2\sqrt{5}$ (3) $3\sqrt{5}$ (4) $4\sqrt{5}$

**Ans.** (3)

**Sol.**

Question ID : 6911211215

15. Let $\vec{a} = 2\hat{i} + 3\hat{j} + 3\hat{k}$ and $\vec{b} = 6\hat{i} + 3\hat{j} + 3\hat{k}$. Then the square of the area of the triangle with adjacent sides determined by the vectors $(2\vec{a} + 3\vec{b})$ and $(\vec{a} - \vec{b})$ :

(1) 450 (2) 900 (3) 1800 (4) 2400

**Ans.** (3)

**Sol.**

Question ID : 6911211216

16. Let $\lim\limits_{x\to 2} \frac{(\tan(x-2))(rx^2 + (p-2)x - 2p)}{(x-2)^2} = 5$ for some r, $P \in R$. If the set of all possible values of q, such that the roots of the equation $rx^2 - px + q = 0$ lie in (0, 2), be the interval $(\alpha, \beta]$, then $4(\alpha + \beta)$ equals :

(1) 11 (2) 13 (3) 17 (4) 21

**Ans.** (3)

**Sol.**

Question ID : 6911211217

17. Let $A = \begin{bmatrix} 1 & 3 & -1 \\ 2 & 1 & \alpha \\ 0 & 1 & -1 \end{bmatrix}$ be a singular matrix. Let $f(x) = \int_0^x (t^2 + 2t + 3)dt, x \in [1, \alpha]$. If M and m are respectively the maximum and the minimum values of f in $[1, \alpha]$, then $3(M - m)$ is equal to :

(1) 64 (2) 68 (3) 72 (4) 76

**Ans.** (2)

**Sol.**

Question ID : 6911211218

18. Let $f : R \to R$ be such that $f(xy) = f(x)\, f(y)$, for all $x, y \in R$ and $f(0) \neq 0$. Let $g : [1, \infty) \to R$ be a differentiable function such that $x^2 g(x) = \int_1^x (t^2 f(t) - tg(t))dt$. Then $g(2)$ is equal to :

(1) $\frac{13}{8}$ (2) $\frac{11}{16}$ (3) $\frac{15}{32}$ (4) $\frac{17}{64}$

**Ans.** (3)

**Sol.**

Question ID : 6911211219

19. The area of the region $\{(x, y) : x^2 - 8x \leq y \leq -x\}$ is :

(1) $\frac{343}{6}$ (2) $\frac{637}{6}$ (3) $\frac{437}{6}$ (4) $\frac{523}{6}$

**Ans.** (1)

**Sol.**

Question ID : 6911211220

20. The value of the integral $\int_{-1}^{1} \left( \frac{x^3 + |x| + 1}{x^2 + 2|x| + 1} \right) dx$ is equal to :

(1) $3 \log_e 2$ (2) $2 \log_e 2$ (3) $5 \log_e 3$ (4) $3 \log_e 3$

**Ans.** (2)

**Sol.**

## SECTION – B

Question ID : 6911211221

21. Let $R = \{(x, y) \in N \times N : \log_e(x + y) \leq 2\}$. Then the minimum number of elements, required to be added in R to make it a transitive relation, is _____.

**Ans.** (15)

**Sol.**

Question ID : 6911211222

22. If $(1-x^3)^{10} = \sum_{r=0}^{10} a_r x^r (1-x)^{30-2r}$, then $\frac{9a_9}{a_{10}}$ is equal to: _____.

**Ans.** (30)

**Sol.**

Question ID : 6911211223

23. Let the line $x - y = 4$ intersect the circle $C : (x-4)^2 + (y+3)^2 = 9$ at the points Q and R. If $P(\alpha, \beta)$ is a point on C such that PQ = PR, then $(6\alpha + 8\beta)^2$ is equal to _____.

**Ans.** (18)

**Sol.**

Question ID : 6911211224

24. Let the image of the point P(0, –5, 0) in the line $\frac{x-1}{2} = \frac{y}{1} = \frac{z+1}{-2}$ be the point R and the image of the point $Q\left(0, \frac{-1}{2}, 0\right)$ in the line $\frac{x-1}{-1} = \frac{y+9}{4} = \frac{z+1}{1}$ be the point S. Then the square of the area of the parallelogram PQRS is _____.

**Ans.** (162)

**Sol.**

Question ID : 6911211225

25. Let $f(x) = \begin{cases} x^3 + 8; & x < 0, \\ x^2 - 4; & x \geq 0, \end{cases}$ and $g(x) = \begin{cases} (x-8)^{\frac{1}{3}}; & x < 0, \\ (x+4)^{\frac{1}{2}}; & x \geq 0. \end{cases}$ Then the number of points, where the function gof is discontinuous, is _____.

**Ans.** (3)

**Sol.**