

# JEE Main 2026 April 2 Shift 2 Mathematics

## Question Paper

Conducted by National Testing Agency (NTA)



### General Instructions

- (i) The test is of 3 hours duration.
- (ii) This test paper consists of 75 questions. Each subject (PCM) has 25 questions. The maximum marks are 300.
- (iii) This question paper contains Three Parts. Part-A is Physics, Part-B is Chemistry and Part-C is Mathematics. Each part has only two sections: Section-A and Section-B.
- (iv) Section - A : Attempt all questions.
- (v) Section - B : Attempt all questions.
- (vi) Section - A (01 – 20) contains 20 multiple choice questions which have only one correct answer. Each question carries +4 marks for correct answer and –1 mark for wrong answer.
- (vii) Section - B (21 – 25) contains 5 Numerical value based questions. The answer to each question should be rounded off to the nearest integer. Each question carries +4 marks for correct answer and –1 mark for wrong answer.

### Section - A

1. Let  $x_1, x_2, x_3, \dots, x_n$  be ' $n$ ' observations such that  $\sum_{i=1}^{n-1} x_i = 48$  and  $\sum_{i=1}^{n-1} x_i^2 = 496$ . If mean and variance of the distribution are 8 and 16 respectively then value of  $n$  is:

- (A) 7
- (B) 9

- (C) 8  
(D) 12
- 

2. Let  $f(x)$  be a polynomial of degree 5 having extreme values at  $x = 1$  and  $x = -1$ . If

$$\lim_{x \rightarrow 0} \frac{f(x)}{x^3} = -5,$$

then the value of  $f(2) - f(-2)$  is

- (A) 110  
(B) 112  
(C) 115  
(D) 118
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3. Let  $\vec{PS} = \hat{i} + \hat{j}$  and  $\vec{PQ} = -\hat{j} + \hat{k}$ . If  $\vec{PS}$  must be rotated by an angle  $\alpha$  such that  $\vec{PS}$  is perpendicular to  $\vec{PQ}$ , then  $(\sin^2 \frac{5\alpha}{2} - \sin^2 \frac{\alpha}{2})$  equals

- (A)  $\frac{1}{2}$   
(B) 1  
(C)  $\frac{\sqrt{3}}{2}$   
(D) 0
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4. If  $z_1$  lies on curve  $|z| = r$  and  $z_2$  lies on curve  $|z - 3 - 4i| = 5$ , if minimum of  $|z_1 - z_2| = 2$ , then the maximum of  $|z_1 - z_2|$  is

- (A) 12  
(B) 18  
(C) 20
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(D) 22

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5. Parabola  $y = x^2 + px + q$  is passing through  $(1, -1)$  and vertex of parabola is at minimum distance from x-axis then  $p^2 + q^2$  is

- (A) 1
  - (B) 2
  - (C) 3
  - (D) 4
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6. Let 'C' be a circle with radius '6' units centred at origin. Let  $A(3, 0)$  be a point. If  $B$  is a variable point in xy-plane such that circle drawn taking  $AB$  as diameter touches the circle  $C$ , then eccentricity of the locus of point 'B' is

- (A) 2
  - (B)  $\frac{1}{2}$
  - (C) 3
  - (D)  $\frac{3}{4}$
- 

7. Find sum up to 8 terms of the series

$$\frac{1^3}{1} + \frac{1^3 + 2^3}{1 + 3} + \frac{1^3 + 2^3 + 3^3}{1 + 3 + 5} + \dots$$

- (A) 84
- (B) 71
- (C) 61
- (D) 100

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8. If the system of equations  $x + 5y + 6z = 4$ ,  $2x + 2y + 4z = 1$  and  $x + y + az = b$  has infinite numbers of solutions then point  $(a, b)$  lies on-

- (A)  $x - 2y = 1$
- (B)  $x - y = 3$
- (C)  $x + y = 2$
- (D)  $y - x = 3$

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9. The value of  $\int_0^{20\pi} (\sin^4 x + \cos^4 x) dx$  is equal to

- (A)  $15\pi$
- (B)  $\frac{15\pi}{2}$
- (C)  $25\pi$
- (D)  $\frac{25\pi}{2}$

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10. A regular polygon with  $n$  sides is given.  $P_n$  denotes number of triangles formed by joining any three points of given regular polygon. If  $P_{n+1} - P_n = 66$ , then the sum of all prime divisors of  $n$  is

- (A) 9
- (B) 5
- (C) 11
- (D) 23

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11. Let  $A = \{2, 3, 4, 5, 6\}$  be a set. Consider  $R$  be a relation on  $A \times A$  such that  $(x, y)R(a, b)$  implies  $x$  divides  $a$  and  $y \leq b$ , then total number of elements in  $R$  is:

- (A) 24
  - (B) 120
  - (C) 720
  - (D) 144
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12. Find number of points of discontinuity of the function  $f(x) = [x^2 - x + 2]$  in  $x \in [2, 4]$  (where  $[ \ ]$  denotes greatest integer function).

- (A) 9
  - (B) 11
  - (C) 8
  - (D) 10
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13. If  $I(x) = \int \frac{16x+24}{x^2+2x-15} dx$ ,  $I(D) = 14 \ln 3$  and  $I(7) = \ln(2^\alpha \cdot 3^\beta)$ , then  $(\alpha + \beta)$  is equal to

- (A) 39
  - (B) 33
  - (C) 36
  - (D) 42
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14. If the lines  $x + (k - 1)y + 3 = 0$  &  $2x + k^2y - 4 = 0$  are perpendicular and their point of intersection is the centre of a circle which passes through origin. If chord  $x - y + 2 = 0$  intersects this circle at  $A$  &  $B$  then  $(AB)^2 = ?$

- (A) 18
  - (B) 20
  - (C) 9
  - (D) 36
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15. Let  $x(y)$  be the solution of the given differential equation  $2y^2 \frac{dx}{dy} - 2xy + x^2 = 0$ . If  $x(e) = e$ , then  $\frac{3x(e^2)}{e^2}$  equals.

- (A) 1
- (B) 2
- (C) 3
- (D) 4

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16. If the area bounded by two curves  $\frac{x^2}{9} - \frac{y^2}{16} = 1$  and  $8x - 3y = 24$  is  $A - 6 \log_e 3$ , then  $A$  is equal to

- (A) 5
- (B) 6
- (C) 7
- (D) 8

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**Section - B**

1. Let  $P = \{\theta \in [0, 4\pi], \tan^2 \theta \neq 1\}$   
 $S = \{a \in \mathbb{Z} : (\cos^2 \theta - \sin^2 \theta) \sec 2\theta = a^2, \theta \in P\}$   
then  $n(S)$  equals

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2. If  ${}^{30}C_{30-r} + 3 \cdot {}^{30}C_{31-r} + 3 \cdot {}^{30}C_{32-r} + {}^{30}C_{33-r} = {}^n C_r$ , then value of  $n$  is

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3. If foot of the perpendicular from a point  $P(a, b, 0)$  on the line  $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-\alpha}{3}$  is  $A$  and mid-point of  $AP$  is  $\left(0, \frac{3}{4}, -\frac{1}{4}\right)$ , then the value of  $(a^2 + b^2 + \alpha^2)$  is -

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4. If matrices  $A = \begin{bmatrix} 2 & -2 \\ 4 & -2 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 3 \\ 3 & 9 \end{bmatrix}$  are such that  $PA = B$  and  $AQ = B$ , then  $\text{tr}(2(P+Q))$  is -

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5. Ram is tossing a coin. If head comes then 10 points will be given and if tail comes then 5 points will be given. If the probability of getting exactly 30 point is  $\frac{m}{n}$ , then  $(m+n)$  equals (Where  $m$  &  $n$  are co-prime numbers).

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