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JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-2

DATE & DAY: 22 January 2026 & Thursday

PAPER-1

Duration: 3 Hrs.
Time: 03:00 PM – 06:00 PM

SUBJECT: MATHEMATICS

MATHEMATICS

1. If complex numbers $Z_1, Z_2, \ldots Z_n$ satisfy the equation $4Z^2 + \bar{Z} = 0$, then $\sum_{i=1}^{n} |Z_i|^2$ is equal to

(1) $\frac{3}{16}$ (2) $\frac{3}{64}$ (3) $\frac{9}{64}$ (4) $\frac{1}{16}$

Ans. **(1)**

2. Let α, β be the roots of quadratic equation $12x^2 - 20x + 3\lambda = 0, \lambda \in z$. If $1/2 \leq |\beta - \alpha| \leq 3/2$ then the sum of all possible valued of λ is ___

Ans. **(3)**

3. Area enclosed by $4x^2 + y^2 \leq 8$ and $y^2 \leq 4x$ (in square unit) is

(1) $(\pi + \frac{4}{3})$ sq. unit   (2) $(\pi - \frac{4}{3})$ sq. unit

(3) $(\pi + \frac{2}{3})$ sq. unit   (4) $(\pi - \frac{2}{3})$ sq. unit

Ans. **(3)**

4. The number of elements in the relation $R = \{(x, y) : 4x^2 + y^2 < 52, x, y \in z\}$ is

Ans. **(77)**

5. If the mean deviation about the median of the numbers $k, 2k, 3k \ldots 1000k$ is 500, then k^2 is equal to

(1) 4   (2) 9   (3) 16   (4) 1

Ans. **(1)**

6. $x - ny + z = 6$

$x - (n - 2)y + (n + 1)z = 8$

$(n - 1)y + z = 1$

Let $n =$ number on the dies when rolled randomly then P (that system equation has unique solution) $= \frac{k}{6}$, then sum of value of k and all possible value of n is

(1) 22   (2) 21   (3) 20   (4) 24

Ans. **(4)**

7. If $\lim_{x \to 0} \frac{e^{(a-1)x} + 2\cos bx + (c-2)e^{-x}}{x \cos x - \log_e(1+x)} = 2$, then $a^2 + b^2 + c^2$ is equal to?

(1) 12   (2) 7   (3) 6   (4) 8

Ans. **(2)**

8. Let the domain of function

$$f(x) = \log_3 \log 5\left(7 - \log_2\left(x^2 - 10x + 85\right)\right) + \sin^{-1}\left(\left|\frac{3x-7}{17-x}\right|\right)$$ be (α, β) Then $\alpha + \beta$ is qual

Ans. **(9)**

9. If $P(10, 2\sqrt{15})$ lies on hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and length of latus rectum $= 8$, then the square of area of ΔPS_1S_2 is [where $S_1 \& S_2$ are the focii of the hyperbola]

(1) 2700   (2) 2400   (3) 1750   (4) 3600

Ans. **(1)**

10. If a, b, c are in A. P where $a + b + c = 1$ and $a, 2b, c$ are in G. P. , then the value of $9(a^2 + b^2 + c^2)$ is equal to

(1) 3   (2) -3   (3) 1   (4) -1

Ans. **(2)**

11. If $f(x) = [x]^2 - [x + 3] - 3$, $[\ ]$ denotes G.I.F. then

(1) $f(x) = 0$ then finites many solutions   (2) $\int_0^2 f(x)dx = -6$

(3) $f(x) < 0$ only in $[-1,3)$ (4) $f(x) > 0$ only in $(-2,4)$

Ans. **(3)**

12. If $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ is a Solution of Systems of equation $AX = B$ where $\text{Adj}A = \begin{pmatrix} 4 & 2 & 2 \\ -5 & 0 & 5 \\ 1 & -2 & 3 \end{pmatrix}$ & $B = \begin{bmatrix} 4 \\ 0 \\ 2 \end{bmatrix}$

then $|x + y + z|$ is equal to

(1) 3   (2) 2   (3) 3/2   (4) 1

Ans. **(2)**

13. Let f and g be the functions satisfying $f(x + y) = f(x)f(y), f(1) = 7$ and $g(x + y) = g(x)g(y), g(1) = 1$ for all $x, y \in N$, if $\sum_{x=1}^n \left(\frac{f(x)}{g(x)}\right) = 19607, n = ?$

(1) 6   (2) 4   (3) 7   (4) 5

Ans. **(4)**

14. If $\int_0^{64} \left(x^{\frac{1}{3}} + \text{floor}\left(x^{1/3}\right)\right) dx = \alpha$ and $\int_0^{\frac{\pi}{2}} \frac{\sin^2 x}{\sin^6 x + \cos^6 x} dx = \pi\beta$, then the value of $\alpha\beta^2$ is equal to

(1) 87   (2) 77   (3) 67   (4) 57

Ans. **(1)**

15. let C_r denote the coefficient of x^r in the binomial expansion of $(1+x)^n, n \in N, 0 \leqslant r \leqslant n$.

If $P_n = C_0 - C_1 + \frac{2^2}{3}C_2 - \frac{2^3}{4}C_3 + \cdots \frac{(-2)^n}{n+1}C_n$ then the value of $\sum_{n=1}^{25} \frac{1}{p^{2n}}$ equals

(1) 650   (2) 675   (3)580   (4)525

Ans. **(2)**

16. Let L be line $\frac{x+1}{2} = \frac{y+1}{3} = \frac{z+3}{6}$ & let S be the set of all points (a, b, c) on L, whose distance from line

$\frac{x+1}{2} = \frac{y+1}{3} = \frac{z-9}{0}$ along the line L is 7. Then $\sum_{(a \cdot b \cdot c) \in S} (a + b + c)$ is equal to:

(1) 34   (2) 6   (3) 28   (4) 40

Ans. **(1)**

17. Among the statements

$\mathbf{S_1}$: If $A(5, -1)$ and $B(-2, 3)$ are two vertices of a triangle, whose orthocenter is $(0, 0)$, then its third vertex is $(-4, -7)$

$\mathbf{S_2}$: If positive numbers $2a, b, c$ are three consecutive, in terms of an A.P, then the lines $ax + by + c = 0$ are concurrent at $(2, -2)$

(1) both are correct   (2) only S_1 is correct

(3) both are incorrect   (4) only S_2 is correct

Ans. **(4)**