Resonance®
Educating for better tomorrow

JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-1

DATE & DAY: 28 January 2026 & Wednesday

PAPER-1

Duration: 3 Hrs.
Time: 09:00 – 12:00 IST

SUBJECT: MATHEMATICS

REGISTERED & CORPORATE OFFICE (CIN: U80302RJ2007PLC024029):
CG Tower, A-46 & 52, IPIA, Near City Mall, Jhalawar Road, Kota (Rajasthan) - 324005
0744-2777777 | 73400 10345 | contact@resonance.ac.in | www.resonance.ac.in | Follow Us: @ResonanceEdu | @Resonance_Edu

MATHEMATICS

1. Consider the 10 observations 2,3,5,10,11,13,15,21, a and b such that mean of observation in 9 and variance is 34.2. Then the mean deviation about median is

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

Ans. **(2)**

2. Let $\tan\left(\frac{\pi}{4}+\frac{1}{2}\cos^{-1}\frac{2}{3}\right)+\tan^{-1}\left(\frac{1}{2}\sin^{-1}\frac{2}{3}\right)$. Then number of solutions of the equation $\sin^{-1}(kx-1)=\sin^{-1}x-\cos^{-1}x$ is

Ans. **(1)**

3. Let $f(x)$ be a polynomial function such that $f(x^2+1)=x^4+5x^2+2$, then $\int_0^3 f(x)=$

Ans. $\left(\frac{33}{2}\right)$

4. If α,β are roots of quadratic equation $\lambda x^2-(\lambda+3)x+3=0$ and $\alpha<\beta$ such that $\frac{1}{\alpha}-\frac{1}{\beta}=\frac{1}{3}$, then find sum of all possible values of λ.

(1) 3 (2) 2 (3) 4 (4) 6

Ans. **(4)**

5. If unit vectors $\bar{a},\bar{b},\bar{c}$ then $|a-b|^2+|b-c|^2+|c-a|^2=9, |2a+kb+kc|=3$, then find the positive values of k.

Ans. **(5)**

6. If $g(x)=3x^2+2x-3, f(0)=-3, 4g\big(f(x)\big)=3x^2-32x+72$. Then $f\big(g(2)\big)$ is equal to

(1) $-\frac{25}{6}$ (2) $\frac{25}{6}$ (3) $-\frac{7}{2}$ (4) $\frac{7}{2}$

Ans. **(4)**

7. If 3 balls are taken from the box without replacement and found to be all black. If all configuration of red balls and black balls are equally likely then the probability that box contained 1 red and 9 black ball is $\frac{p}{q}$ for some coprime natural number p and q then, $p+q$ is

(1) 59 (2) 69 (3) 57 (4) 79

Ans. **(2)**

8. Find the value of $\sum_{k=1}^{\infty}\frac{(-1)^{k+1}\cdot k(k+1)}{k!}$

(1) $\frac{2}{e}$ (2) $\frac{3}{e}$ (3) $\frac{1}{e}$ (4) e

Ans. **(3)**

9. $\lim_{x\to 0}\frac{\ln\left(\sec(ex)\sec(e^2x)\sec(e^3x)\ldots\sec(e^{10}x)\right)}{e^2-e^2\cos x}$

(1) $\frac{e^{18}-1}{e^2-1}$ (2) $\frac{e^{20}-1}{e^2-1}$ (3) $\frac{e^{16}-1}{e^2-1}$ (4) $\frac{e^{22}-1}{e^2-1}$

Ans. **(2)**

10. Consider a circle C_1 passing through origin and lying in region $x \geq 0$ only, with diameter 10. Consider a chord PQ of C_1 with equation $x = y$ and another circle C_2 which has PQ as diameter. A chord is drawn to C_2 passing through $(2,3)$ such that distance of chord from centre of C_2 is maximum has equation $x + ay + b = 0$ then $(b - a)$ is equal to

(1) 4 (2) 2 (3) 3 (4) 5

Ans. (2)

11. If $y = f(x)$ satisfies the differential equation $x\frac{dy}{dx} - \sin 2y = x^3\cos^2 y$ and $y(1) = \frac{\pi}{4}$, then $y\left(\frac{\pi}{3}\right)$ is

(1) 1 (2) $\tan^{-1}\left(\frac{\pi}{4}\right)$ (3) $\tan^{-1}\left(\frac{\pi^3}{27}\right)$ (4) Zero

Ans. (3)

12. Product of first three term of G.P is 27, then the range of sum of these terms is $R - (a, b)$ then $a^2 + b^2$ is

Ans. (90)

13. Let z be a complex number lying in the first quadrant such that $|z - 6| = 5$ and $|z - 3i + 5| = 7$, then $z^3 - 7z^2 + 25z + 16$ is equal to

(1) 45 (2) 55 (3) 35 (4) 25

Ans. (2)

14. The common difference of AP $a_1, a_2, a_3 \ldots a_m$ is 13 times the common difference of AP $b_1, b_2, b_3 \ldots b_n$. Also $a_{78} = 327, b_{43} = -385, b_{31} = -277$, then a_1 is equal to

Ans. (9336)

15. Find possible no. of triplets (b, c, d), such that $x^2 + 2$ is divisor of $x^3 + bx^2 + cx + d \& b, c, d \leq 20 \& b, c, d \in N$:

(1) 8 (2) 6 (3) 5 (4) 10

Ans. (4)

16. Given conic $x^2 - y^2\sec^2\theta = 8$ whose eccentricity is ' e_1 ' & length of latus rectum ' ℓ_1 ' and for conic $x^2 + y^2\sec^2\theta = 6$, eccentricity is ' e_2 ' & length of latus rectum ' ℓ_2 '. If $e_1^2 = e_2^2(1 + \sec^2\theta)$ then value of $\frac{e_1\ell_1}{e_2\ell_2}\tan\theta$

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

Ans. (2)

17. Let $A = \begin{bmatrix} 12 & -5 \\ 10 & 6 \end{bmatrix}, B = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 12 \\ -6 \end{bmatrix}$ such that $B = (I + A)^{-1}$, then $x_1 - x_2$ is equal to

(1) 27 (2) 108 (3) 21 (4) 54

Ans. (2)

18. Let a line $L : x + 2\sqrt{2}y - 4 = 0$ cuts x-axis and y-axis at A and B respectively. Consider an equilateral triangle ABC, such that $(0,0)$ is the orthocentre of $\triangle ABC$. If $C \in (\alpha, \beta)$ then $|\alpha + \sqrt{2}\beta|$ is

(1) 6 (2) 4 (3) 3 (4) 2

Ans. (1)