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JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-1

DATE & DAY: 23 January 2026 & Friday

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. A rectangle is formed by lines $x = 0, y = 0, x = 3, y = 4$. A line perpendicular to $3x + 4y + 6 = 0$ divides the rectangle into two equal parts, then the distance of the line from $\left(-1, \frac{3}{2}\right)$ is

(1) 12 (2) $\frac{17}{10}$ (3) $\frac{6}{5}$ (4) $4\frac{8}{5}$

Ans. **(2)**

2. Let $A = \{-2, -1, 0, 1, 2, 3, 4\}$ and R be a relation R, such that $R = \{(x, y): (2x + y) \leq -2, x \in A, y \in A\}$.
Let
l = number of elements in R
m = minimum number of elements to be added in R to make it reflexive.
n = minimum number of elements to be added in R to make it symmetric, then $(l + m + n)$ is

(1) 10 (2) 17 (3) 11 (4) 14

Ans. **(2)**

3. Number of 4 letters words with or without meaning formed from the letters of the word PQRSSSTTUVV is

(1) 1232 (2) 1400 (3) 1422 (4) 1162

Ans. **(3)**

4. Find the value of $\frac{{}^{100}C_{50}}{51} + \frac{{}^{100}C_{51}}{52} + \cdots + \frac{{}^{100}C_{100}}{101}$

(1) $\frac{2^{100}}{100}$ (2) $\frac{2^{101}}{101}$ (3) $\frac{2^{100}}{101}$ (4) $\frac{2^{101}}{100}$

Ans. **(3)**

5. For given vectors $\vec{a} = -\hat{\imath} + \hat{\jmath} + 2\hat{k}$ and $\vec{b} = 2\hat{\imath} - \hat{\jmath} + \hat{k}$ where $\vec{c} = \vec{a} \times \vec{b}$ and $\vec{d} = \vec{c} \times \vec{b}$. Then the value of $(\vec{a} - \vec{b}) \cdot \vec{d}$ is

(1) –35 (2) 53 (3) –52 (4) 25

Ans. **(1)**

6. The line $y = x + 1$ intersects the ellipse $\frac{x^2}{2} + \frac{y^2}{1} = 1$ at A and B. Find the angle sub-stained by segment AB and centre of ellipse is:

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

Ans. **(1)**

7. Find $\int_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \frac{dx}{1+(\tan 2x)^{1/3}}$

(1) $\frac{\pi}{24}$ (2) $\frac{\pi}{12}$ (3) $\frac{\pi}{6}$ (4) $\frac{\pi}{48}$

Ans. **(2)**

8. Domain of $f(x) = \log_5 \log_7 \log_2(7x - x^2 - 10)$, is (m, n). If $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is a hyperbola whose eccentricity is $\frac{n}{3}$ and length of latus rectum is $\frac{8m}{3}$. then $b^2 - a^2 = ?$

Ans. **(–5.88)**

9. The number of solutions of $3\cos 2\theta + 8\cos\theta + 5 = 0$ if $\theta \in [-3\pi, 2\pi]$ is:

(1) 8 (2) 3 (3) 0 (4) 5

Ans. **(1)**

10. For the differential equation $x^4 dy + (4x^3 y + \sin x)dx = 0$ it is given that $y\left(\frac{\pi}{2}\right) = 0$. Then the value of $\pi^4 y\left(\frac{\pi}{3}\right)$ is equal to

(1) $\frac{9}{2}$ (2) $\frac{81}{2}$ (3) $\frac{27}{2}$ (4) $\frac{243}{2}$

Ans. **(2)**

11. The area (in square units) bounded by the curve $f(x) = \text{Max}\{\sin x, \cos x\}$ and x-axis between $x = 0$ and $x = \frac{3\pi}{2}$ is A. Then, the value of $A + A^2$ is

Ans. **(12)**

12. If coefficients of x, x^2 and x^3 are in arithmetic progression of the binomial expansion of $(1 + x^2)^2(1 + x)^n, n \in N$. Then sum of all values of n is:

(1) 9 (2) 7 (3) 8 (4) 10

Ans. **(1)**

13. The mean and variance of the 8 observations $-10, -7, -1, x, y, 16, 2, 9$ are $\frac{7}{2}$ and $\frac{293}{4}$ respectively. Then, the mean of $x, y, x + y + 1, |x - y|$ is:

Ans. **(11)**

14. Let $f(x) = \int \frac{e^x(2-x^2)}{\sqrt{1+x}(1-x)^{\frac{3}{2}}} dx$, with $f(0) = 0$, then $f\left(\frac{1}{2}\right)$ is

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

Ans. **(4)**

15. If A is matrix of order 3 and $x = |3\text{adj}(A^2) \cdot \text{adj}(2A)|$ and $|A| = 6$ and $x = 2^n \cdot 3^m$, then $m + n$ is

(1) 21 (2) 25 (3) 27 (4) 19

Ans. **(1)**

16. If point B and C lies on line $\frac{x}{1} = \frac{1-y}{-2} = \frac{z-2}{3}$ and point A is $(1,6,3)$. If $BC = 10$. Then, the area of $\triangle ABC$ is:

(1) $2\sqrt{13}$ (2) $5\sqrt{13}$ (3) $6\sqrt{13}$ (4) $4\sqrt{13}$

Ans. **(2)**