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JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-2

DATE & DAY: 23 January 2026 & Friday

PAPER-1

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

SUBJECT: MATHEMATICS

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MATHEMATICS

1. If $A=\begin{bmatrix}0 & 2 & -3\\ -2 & 0 & -1\\ 3 & 1 & 0\end{bmatrix}$ and if $B(l-A)=(l+A)$, where l is identity matrix of order 3, then trace of (BB^I) is

Ans. **(3)**

2. The area (in square units) between the curves $x^2+y^2=4$ and $x^2+(y-2)^2=4$ is

(1) $\frac{8\pi}{3}-2\sqrt{3}$ (2) $\frac{8\pi}{3}+\sqrt{3}$ (3) $\frac{4\pi}{3}-2\sqrt{3}$ (4) $\frac{4\pi}{3}+2\sqrt{3}$

Ans. **(1)**

3. Number of ways to distribute 6 identical oranges among 4 persons such that each gets atleast one orange is

(1) 8 (2) 10 (3) 12 (4) 13

Ans. **(2)**

4. The minimum value of $\cos^2\theta+6\sin\theta\cos\theta+3\sin^2\theta+3$ is

(1) -1 (2) 1 (3) $5+\sqrt{10}$ (4) $5-\sqrt{10}$

Ans. **(4)**

5. Let $A=\{1,2,3,\ldots,9\}; xRy$ iff $x-y$ is multiple of 3.

S_1 : Number of elements in R is 36

S_2: R is equivalence relation

(1) S_1&S_2 both are correct (2) S_1 is correct but S_2 is not correct

(3) S_2 is correct but S_1 is not correct (4) S_1&S_2 both are incorrect.

Ans. **(3)**

6. The sum of all the real solutions of equation $\log_{(x+3)}(6x^2+28x+30)=5-2\log_{(6x+10)}(x^2+6x+9)$ is equal to

(1) 2 (2) 4 (3) 1 (4) 0

Ans. **(4)**

7. If the points of intersection of the ellipses $x^2+2y^2-6x-12y+23=0$ and $4x^2+2y^2-20x-12y+35=0$ lie on a circle of radius **r** and centre (*a*, *b*) then the value of $ab+18r^2$ is

(1) 51 (2) 52 (3) 55 (4) 53

Ans. **(3)**

8. Let $\vec{a},\vec{b},\vec{c}$ be three vectors such that $\vec{a}\times\vec{b}=2(\vec{a}\times\vec{c})$. If $|\vec{a}|=1$, $|\vec{b}|=4$, $|\vec{c}|=2$, and the angle between $\vec{b}$ and $\vec{c}$ is 60°, then $|\vec{a}\cdot\vec{c}|$ is equal to

(1) 1 (2) 2 (3) 4 (4) 0

Ans. **(1)**

9. *S* = No. of 4-digit numbers *abcd* where product of digits is 20.

P = No. of 5-digit number *abcde* where product of digits is 20, then S + P is equal to

Ans. **(74)**

10. Let there are 2 bags A and B. Bag A has 9 white, 8 black balls and bag B has 6 white balls, 4 black balls. From a bag B, a ball is randomly selected and put into the bag A. Now, a ball is randomly selected from bag A. If the probability that selected ball is white is $\frac{p}{q}, gcd(p,q)=1$, then $p+q$ is equal to

(1) 21 (2) 23 (3) 22 (4) 24

Ans. **(2)**

11. The value of $\int \frac{dx}{(4x+6)\sqrt{4x^2+12x+7}}$ is equal to

(1) $\frac{\sqrt{2}}{8}\tan^{-1}\left(\frac{4x^2+12x+7}{\sqrt{2}}\right)+c$ (2) $\frac{\sqrt{2}}{8}\tan^{-1}(4x^2+12x+7)+c$

(3) $\frac{1}{2}\tan^{-1}\left(\frac{4x^2+12x+7}{2}\right)+c$ (4) $\frac{\sqrt{2}}{4}\tan^{-1}\left(\frac{4x^2+12x+7}{\sqrt{2}}\right)+c$

Ans. **(1)**

12. Let A and B are points on parabola $y^2=4x$ such that OAB is an equilateral triangle such that O is the vertex of parabola and AB is perpendicular to axis of parabola, then the minimum distance of circle is A and B as diametric points from the point O is

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

Ans. **(2)**

13. The mean and variance of following data is μ and 19, respectively.

Class interval	$4-8$	$8-12$	$12-16$	$16-20$
f (frequency)	3	λ	4	7

The value of $\lambda+\mu$ is

(1) 19 (2) 20 (3) 13 (4) 17

Ans. **(1)**

14. The system of linear equations $x+y+z=6, 2x+5y+az=36, x+2y+3z=b$ has

(1) infinitely many solutions for $a=8, b=16$

(2) unique solutions for $a=8, b=16$

(3) unique solutions for $a=8, b=14$

(4) infinitely many solutions for $a=8, b=14$

Ans. **(4)**

15. $Z=\frac{\sqrt{3}}{2}+\frac{i}{2}, i=\sqrt{-1}$ then $(Z^{201}-i)^8$ is equal to

Ans. **(256)**

16. Let $A(1,2)$ and $C(-3,-6)$ be two diagonally opposite vertices of a rhombus, whose sides AD and BC are parallel to the line $7x-y=14$. If $B(\alpha,\beta)$ and $D(\gamma,\delta)$ are the other two vertices, then $|\alpha+\beta+\gamma+\delta|$ is equal to:

(1) 6 (2) 1 (3) 9 (4) 3

Ans. **(1)**

17. Let S be the set defined as

$S=\{x: \int_0^x t^2\sin(t-x)dt = x^2$ and $x \in [0,1000]\}$, then number of elements in S is

Ans. **(1)**