MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 24

Maths

1. The integral value of m for which the quadratic equation $(2m-3)x^2-4x+2m-3=0$ has both the roots negative is given by

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2. Let from a point A (h,k) chord of contacts are drawn to the ellipse $x^2+2y^2=6$ such that all these chords touch the ellipse

$x^2 + 4y^2 = 4$, then locus of the point A is

A. $4x^2 + 9y^2 = 36$

B. $x^2 + y^2 = 4$

C. $x^2 - y^2 = 9$

D. $x^2 + y^2 = 9$

Answer: D

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3. If $y(x)$ is the solution of the differential equation $\frac{dy}{dx} = -2x(y-1)$ with $y(0) = 1$, then $\lim_{x \to \infty} y(x)$ equals

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4. $\int \frac{\sin^2 x \cdot \sec^2 x + 2\tan x \cdot \sin^{-1} x \cdot \sqrt{1-x^2}}{\sqrt{1-x^2}(1+\tan^2 x)} dx$

A. $\left(\sin^{-1} x\right)\left(\cos^2 x\right) + C$

B. $\left(\sin^{-1} x\right)\left(\sin^2 x\right) + C$

C. $\left(\cos^{-1} x\right)\left(\sin^2 x\right) + C$

D. $-\sin^{-1} x\left(\sin^2 x\right) + C$

Answer: B

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5. The value of $\lim_{x \to 0} \frac{x \cot(4x)}{\tan^2(3x)\cot^2(6x)}$ is equal to

A. 0

B. 4

C. $\frac{2}{9}$

D. 1

Answer: D

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6. If n objects are arrange in a row, then the number of ways of selecting three of these objects so that no two of them are next to each other is

A. $.^{n-3}C_3$

B. $.^{n-3}C_2$

C. $.^{n-2}C_2$

D. $.^{n-2}C_3$

Answer: D

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7. Solve $\sin^{-1}(1-x) - 2s \in^{-1} x = \frac{\pi}{2}$

A. 0

B. $\frac{1}{2}$

C. $0, \frac{1}{2}$

D. $-\frac{1}{2}$

Answer: A

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8. If 1 , a, b and 4 are in harmonic progression , then the value of a + b is equal to

A. $\frac{5}{4}$

B. $\frac{10}{3}$

C. $\frac{3}{10}$

D. $\frac{4}{5}$

Answer: B

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9. fractional part of $\frac{2^{78}}{31}$ is:

A. $\frac{2}{31}$

B. $\frac{4}{31}$

C. $\frac{6}{31}$

D. $\frac{8}{31}$

Answer: D

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10. Let f (x) = 10 - |x-5| , $x \in R,$ then the set of all values of x at which f (f(x)) is not differentiable is

A. {0,5,10}

B. {5,10}

C. {0,5,10,15}

D. {5,10,15}

Answer: A

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11. If two tangents drawn from the point P (h,k) to the parabola $y^2 = 8x$ are such that the slope of one of the tangent is 3 times the slope of the other , then the locus of point P is

A. $3y^2 = 16x$

B. $3y^2 = 8x$

C. $y^2 = 32x$

D. $3y^2 = 32x$

Answer: D

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12. If $I_1 = \int_{1-x}^{k} x \sin\{x(1-x)\}dx$ and $I_2 = \int_{1-x}^{k} \sin\{x(1-x)\}dx$, then

A. 2

B. $\frac{1}{2}$

C. 1

D. $\frac{1}{3}$

Answer: B

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13. Let A is a matrix of order 3×3 defined as $A = [a_{ij}]3 \times 3,$ where $a_{ij} = \lim_{x \to 0} \frac{1 - \cos(ix)}{\sin(ix)\tan(jx)} (\forall 1 \leq i, j, \leq 3),$ then A^2 is equal to

A. A

B. $\frac{3}{2}A$

C. $\frac{2}{3}A$

D. $\frac{1}{4}A$

Answer: B

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14. If $\left[\left(\vec{a} + 2\vec{b} + 3\vec{c}\right) \times \left(\vec{b} + 2\vec{c} + 3\vec{a}\right)\right], . \left(\vec{c} + 2\vec{a} + 3\vec{b}\right)\Big] = 54$

where $\vec{a}, \vec{b}$ and $\vec{c}$ are 3 non - coplanar vectors, then the values of

$$\begin{vmatrix} \vec{a}.\vec{a} & \vec{a}.\vec{b} & \vec{a}.\vec{c} \\ \vec{b}.\vec{a} & \vec{b}.\vec{b} & \vec{b}.\vec{c} \\ \vec{c}.\vec{a} & \vec{c}.\vec{b} & \vec{c}.\vec{c} \end{vmatrix}$$ is equal to

A. 9

B. 3

C. 6

D. 12

Answer: A

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15. Let A be the point (1,2,3) and B be a point on the line $\frac{x-1}{-2} = \frac{y+1}{3} = \frac{z-5}{4} = k$ Then value of k such that line AB is perpendicular to the plane $4x + 9y - 18z = 6$ is

A. $-\frac{2}{5}$

B. $\frac{1}{5}$

C. $\frac{2}{5}$

D. no such value of k is possible

Answer: C

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16. Let the circumcentre of ΔABC is S (-1,0) and the midpoints of sides AB and AC are E(1,-2) and F(-2,1) respectively , then the equation of the circumcircle of ΔABC us

A. $(x+1)^2 + y^2 = 5$

B. $(x+1)^2 + y^2 = 10$

C. $(x+1)^2 + y^2 = 15$

D. $(x+1)^2 + y^2 = 1$

Answer: B

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17. If p and q are two statements , then which of the following statements is not equivalent to $p \Leftrightarrow (p \Rightarrow q)$?

A. $p \wedge q$

B. $(p \Leftrightarrow q) \wedge (p \vee q)$

C. $(p \Rightarrow q) \Leftrightarrow q$

D. $(-p \Rightarrow q) \wedge (p \vee \sim q)$

Answer: D

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18. Let $F(n) = (\sin 1) \times (\sin 2) \times .... \sin(n),\ \forall n \in N$ then number of elements in the set $A = \{f(1), f(2), ... , f(6)\}$ that are positive are

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19. $a, b, c, \in N$ and $d = \begin{vmatrix} a & b & c \\ c & a & b \\ b & c & a \end{vmatrix}$, then the least positive value of D is

A. 4

B. 6

C. 3

D. 8

Answer: A

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20. $F: R \to R, F(x) = \lambda x + \sin x$ is onto if λ is an element of the set P and f (x) is one- one if λ is an element of the set Q, then (given , λ is a real number)

A. P = Q

B. $P \subset Q$

C. $P - Q = \{0\}$

D. $Q \subset P$

Answer: D

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21. Consider circles $C_1 \& C_2$ touching both the axes and passing through (4,4) , then the product of radii of these circles is

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22. If P (z) is a variable point in the complex plane such that IM $\left(-\frac{1}{z}\right)=\frac{1}{4}$, then the value of the perimeter of the locus of P (z) is (use $\pi=3.14$)

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23. The probability of India winning a test match against Australia is $\frac{1}{4}$. Assuming the matches to be independent events, the probability that in a 7 match series India's second win occurs at 4^{th} test is P, then 256 P is equal to

A. 15

B. 12

C. 27

D. 40

Answer: C

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24. The number of solutions of the equation $|\cot x| = \cot x + \operatorname{cosec} x$ in $[0, 10\pi]$ is /are

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25. If α is the only real root of $x^3 + bx^2 + cx + 1 = 0 (b < c)$, then the value of $|[\alpha]|$ is (where,[.] represents the greatest integer function)

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