MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 100

Mathematics

1. The value of x for which for fourth term in the expansion of $\left(5^{\left(\frac{2}{5}\right)\log_5\sqrt{4^x+44}}+\frac{1}{5^{\log_5\sqrt[3]{2^{x-1}+7}}}\right)^8$ is 336 can be equal to

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

B. 1

C. 2

D. 3

Answer: A

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2. Let

$$\lim_{x \to 0} \frac{\sin 2x}{\tan\left(\frac{x}{k}\right)} = L_1 \text{ and } \lim_{x \to 0} \frac{e^{2x} - 1}{x} = L_2,$$

and the value of $L_1 L_2$ is 8, then k is

A. 4

B. 8

C. 6

D. 2

Answer: D

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3. The area (in sq. units) bounded between $y = 6\sin x$ and $y + 8\sin^3 x = 0$ from $x = 0$ to $x = \pi$ is

A. 10π

B. $\frac{34\pi}{3}$

C. 8

D. $\frac{68}{3}$

Answer: D

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4. If $\tan 25^\circ = a$, then the value of $\frac{\tan 205^\circ - \tan 115^\circ}{\tan 245^\circ + \tan 335^\circ}$ in terms of a is

A. $\frac{1-a^2}{1+a^2}$

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

C. $\frac{2a}{1+a^2}$

D. $\frac{1+a^2}{1-a^2}$

Answer: D

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5. The equation of the line which intersect each of the two lines $2x+y-1=0=x-2y+3z$ and $3x-y+z+2=0=4x+5y-2z-3=0$ and is parallel to $\frac{x}{1}=\frac{y}{2}=\frac{z}{3}$ is

A. $4x+7y-6z-1=0=2x-7y+4z+3$

B. $4x + 7y - 6z - 4 = 0 = 2x - 7y + 4z + 2$

C. $4x + 7y - 6z - 3 = 0 = 2x - 7y + 4z + 7$

D. $4x + 7y - 6z + 7 = 0 = 2x - 7y + 4z - 3$

Answer: C

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6. The locus of mid - points of all chords of parabola $y^2 = 4x,$ for which all cirlces drawn taking them as diameters passes through the vertex of the parabola is a conic whose length of the smallest focal chord is equal to

A. 1 units

B. 2 units

C. 3 units

D. 4 units

Answer: B

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7. An exam consists of 3 problems selected randomly from a collection of 10 problems. For a student to pass, he needs to solve correctly at least two of three problems. If the student knows to solve exactly

5 problems, then the probability that the students pass the exam is

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

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

C. $\frac{3}{4}$

D. $\frac{5}{6}$

Answer: A

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8. If the matrix $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$, then the value of $\frac{|A^{100} + A^{98}|}{|A^{20} + A^{18}|}$ is equal to

A. 0

B. 1

C. 2

D. 3

Answer: B

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9. Let $f(x) = \frac{x(3^x - 1)}{1 - \cos x}$ for $x \neq 0$. Then value of $f(0)$, which make f(x) continuous at x = 0, is

A. $\log 3$

B. $\frac{1}{2}\log 3$

C. $\frac{1}{2\log 3}$

D. $2\log 3$

Answer: D

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10. The total number of divisors of the number $N = 2^5.3^4.5^{10}.7^6$ that are of the form $4K + 2, \forall K \in N$ is equal to

A. 385

B. 384

C. 96

D. 77

Answer: B

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11. The value of $\sin^{-1}\sin 17 + \cos^{-1}\cos 10$ is equal to

A. 27

B. -27

C. $17 - 5\pi$

D. $9\pi - 27$

Answer: D

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12. For any two sets A and B, the values of $[(A-B)\cup B]^C$ is equal to

A. $A^C \cap B^C$

B. $A \cup B$

C. $A - B$

D. $B - A$

Answer: A

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13. Tangents are drawn to a unit circle with centre at the origin from each point on the line $2x + y = 4$. Then the equation to the locus of the middle point of the chord of contact is

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

B. $\frac{\pi}{16}$

C. $\frac{\pi}{8}$

D. $\frac{\sqrt{2}\pi}{8}$

Answer: C

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14. A straight line L cuts the sides AB, AC, AD of a parallelogram ABCD at B_1, C_1, d_1 respectively. If $\overrightarrow{AB_1} = \lambda_1 \overrightarrow{AB}, \overrightarrow{AD_1} = \lambda_2 \overrightarrow{AD}$ and $\overrightarrow{AC_1} = \lambda_3 \overrightarrow{AC}$, then $\frac{1}{\lambda_3}$ equal to

A. $\frac{1}{\lambda_1} + \frac{1}{\lambda_2}$

B. $\frac{1}{\lambda_1} - \frac{1}{\lambda_2}$

C. $-\lambda_1 + \lambda_2$

D. $\lambda_1 + \lambda_2$

Answer: A

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15. If eccentricity of the ellipse $\frac{x^2}{a^2+1}+\frac{y^2}{a^2+2}=1$ is $\frac{1}{\sqrt{6}}$, then the ratio of the length of the latus rectum to the length of the major axis is

A. $\frac{5}{6}$

B. $\frac{3}{\sqrt{6}}$

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

D. $\frac{2}{\sqrt{6}}$

Answer: A

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16. If the cubic equation $z^3 + az^2 + bz + c = 0 \forall a, b, c \in R, c \neq 0$ has a purely imaginary root, then (where $i^2 = -1$)

A. $c = ab$

B. $b = ac$

C. the imaginary root is equal to $\pm ic$

D. the imaginary root is equal to $\pm ia$

Answer: A

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17. If the integral $I_n = \int_0^{\frac{\pi}{2}} \frac{\sin(2n-1)x}{\sin x} dx$,. Then the value of $[I_{20}]^3 - [I_{19}]^3$ is

A. 400

B. 200

C. 361

D. 0

Answer: D

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18. In an arithmetic progression the $(p+1)^{\text{th}}$ term is twice the $(q+1)^{\text{th}}$ term. If its $(3p+1)^{\text{th}}$ term is λ times the$(p+q+1)^{\text{th}}$ term, then λ is equal to

A. 2

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

C. 3

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

Answer: A

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19. If $f(x)$ is a differentiable function satisfying $|f'(x)| \leq 4 \forall x \in [0, 4]$ and $f(0) = 0$, then

A. $f(x) = 18$ has no solution in $x \in [0, 4]$

B. $f(x) = 18$ has nore than 2 solutions in $x \in [0, 4]$

C. $f(x) = 14$ has no solution in $x \in [0, 4]$

D. $f(x) = 20$ has 2 solution in $x \in [0, 4]$

Answer: A

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20. The equation of the curve satisfying the differential equation $\frac{dy}{dx} + 2\frac{y}{x^2} = \frac{2}{x^2}$ and passing through $\left(\frac{1}{2}, e^4 + 1\right)$ is

A. $y = e^{2x} + 1$

B. $y = e^{\frac{2}{x}} - 1$

C. $y = 1 + e^{\frac{2}{x}}$

D. $y = 1 + e^{-x}$

Answer: C

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21. The product of a 9×4 matrix and a 4×9 matrix contains a variable x in exactly two places. If D(x) is the determinant of the matrix product such that $D(0) = 1, D(-1) = 1$ and $D(2) = 7,$ then $D(-2)$ is equal to

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22. If the mean of 50 observation is 25 and their standard deviation is 4 and the sum of the squares of all the observations is λ, then $\frac{\lambda}{1000}$ is

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23. If the point $M(h, k)$ lie on the line $2x + 3y = 5$ such that $|MA - MB|$ is maximum where (1, 2) and B(2, 3), then the value of $(h + k)$ is

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24. The indefinite integral $I = \int \frac{\sec^2 x \tan x(\sec x + \tan x)dx}{(\sec^5 x + \sec^2 x \tan^3 x - \sec^3 x \tan^2 x - \tan^5 x)}$ simplifies to $\frac{1}{3}\ln|f(x)| + c$, where $f\left(\frac{\pi}{4}\right) = 2\sqrt{2} + 1$ and c is the constant of integration. If the value of $f\left(\frac{\pi}{3}\right)$ is $a + \sqrt{b}$, then the value of $b - 3a$ is equal to

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25. The total number of solutions of the equation $\sin x \tan 4x = \cos x$ for all $x \in (0, \pi)$ are

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