MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 15

Mcqs Math

1. If x, y and z are in AP and $\tan^{-1} x, \tan^{-1} y$ and $\tan^{-1} z$ are also in AP, then

A. x=y=z

B. x=y=-z

C. x=1,y=2,z=3

D. x=2,y=4,z=6

Answer: A

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2. If $\vec{r} \cdot \hat{i} = 2\vec{r} \cdot \hat{j} = 4\hat{r} \cdot \hat{k}$ and $\left|\vec{r}\right| = \sqrt{84}$, then the value of $\vec{r} \cdot \left(2\hat{i} - 3\hat{j} + \hat{k}\right)$ may be

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3. If

$A = \{x \in R : |x| < 2\}$ and $B = \{x \in R : |x - 2| \geq 3\}$

, then

A. $A \cap B = (-2, -1)$

B. $B - A = R - (-2, 5)$

C. $A \cup B = R - (2, 5)$

D. $A - B = [-1, 2)$

Answer: B

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4. On which of the following intervals is the function $x^{100} + \sin x - 1$ decreasing?

A. $\left(0, \frac{\pi}{2}\right)$

B. $(0, 1)$

C. $\left(\frac{\pi}{2}, \pi\right)$

D. none of these

Answer: D

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5. The area bounded by the graph y=[x-3], the X-axis and the lines x=-2 and x=3 is ([.] denotes the greatest integer function)

A. 7 sq. units

B. 15 sq. units

C. 21 sq. units

D. 28 sq. units

Answer: B

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6. $\lim_{n \to \infty} \frac{3.2^{n+1} - 4.5^{n+1}}{5.2^n + 7.5^n} =$

A. $\frac{3}{5}$

B. $-\frac{4}{7}$

C. $-\frac{20}{7}$

D. 0

Answer: C

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7. Let function F be defined as $f(x) = \int_1^x \frac{e^t}{t} dt x > 0$ then the vaiue of the

integral $\int_1^1 \frac{e^t}{t+a} dt$ where $a > 0$ is

A. $e^a[F(x) - F(1+a)]$

B. $e^{-a}[F(x+a) - F(a)]$

C. $e^a[F(x+a) - F(1+a)]$

D. $e^{-a}[F(x+a) - F(1+a)]$

Answer: D

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8. The sum of the squares of deviation of 10 observations from their mean 50 is 250,then coefficient of variation is

A. 25

B. 50

C. 10

D. 5

Answer: C

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9. 2.The number of ordered pair(s) (x,y) satisfying $y = 2\sin x$ and $y = 5x^2 + 2x + 3$ is equal to-

A. 0

B. 1

C. 2

D. infinite

Answer: A

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10. If $g(x) = x^2 + x + x - 1$ and $g(f(x)) = 4x^2 - 10x + 5$ then find $f\left(\frac{5}{4}\right)$

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

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

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

D. $-\frac{3}{2}$

Answer: B

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11. The tangents to $x^2 + y^2 = a^2$ having inclinations α and β intersect at P. If $\cot\alpha \cot\beta = 0$, then find the locus of P.

A. $x + y = 0$

B. $x - y = 0$

C. $xy = 0$

D. none of these

Answer: C

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12. Which of the following is logically equivalent to $\sim(\sim p \to q)$?

A. $p \wedge q$

B. $q \wedge \sim q$

C. $\sim p \wedge q$

D. $\sim p \wedge \sim q$

Answer: D

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13. The number of different terms in the expansion of $(1-x)^{201}\left(1+x+x^2\right)^{200}$ is

A. 200

B. 201

C. 202

D. 402

Answer: D

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14. The angle of elevation of an object on a hill is observed from a certain point in the horizontal plane through its base, to be 30°. After walking 120 m towards it on a level groud, the angle of elevation is found to be 60°. Then the height of the object (in metres) is

A. 120

B. $60\sqrt{3}$

C. $120\sqrt{3}$

D. 60

Answer: B

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15. If α, β are the roots of the equation $x^2 - 3x + 4 = 0$, then the equation whose roots are $\frac{\alpha - 2}{\alpha + 2}, \frac{\beta - 2}{\beta + 2}$ is

A. $7x^2 - 1 = 0$

B. $7x^2 + 1 = 0$

C. $7x^2 + 2 = 0$

D. $7x^2 - 2 = 0$

Answer: B

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16. If $y = A\cos(\log x) + B\sin(\log x)$ then prove that $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0.$

A. y

B. $-y$

C. 2y

D. $-2y$

Answer: B

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17. If z be a complex number satisfying $|z-4+8i|=4$, then the least and the greatest value of $|z+2|$ are respectively (where $i=\sqrt{-i}$)

A. 7 and 16

B. 8 and 17

C. 6 and 14

D. 5 and 13

Answer: C

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18. A perpendicular is drawn from a point on the line $\frac{x-1}{2}=\frac{y+1}{-1}=\frac{z}{1}$ to the plane $x+y+z=3$ such that plane $x-y+z=3$. Then, the coordinates of Q are

A. (2,0,1)

B. (-1,0,4)

C. (4,0,-1)

D. (1,0,2)

Answer: A

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19. The general solution of the differential equation $\frac{dy}{dx} + \frac{\sin(x+y)}{2} = \frac{\sin(x-y)}{2}$ is

A. $\ln \tan\left(\frac{y}{2}\right) = c - 2\sin x$

B. $\ln \tan\left(\frac{y}{4}\right) = c - 2\sin\left(\frac{x}{2}\right)$

C. $\ln \tan\left(\frac{y}{2} + \frac{\pi}{4}\right) = c - 2\sin x$

D. $\ln \tan\left(\frac{y}{4}+\frac{\pi}{4}\right)=c-2\sin\left(\frac{x}{2}\right)$

Answer: B

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20. The number of value of $x \in [0,2]$ at which $f(x)=\left|x-\frac{1}{2}\right|+|x-1|+\tan x$ is not differentiable at

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21. Find the number of ways in which four distinct balls can be kept into two identical boxes so that no box remains empty.

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22. A bag contains b blue balls and r red balls. If two balls are drawn at random, the probability drawing two red balls is five times the probability of drawing two blue balls. Furthermore, the probability of drawing one ball of each color is six times the probability of drawing two blue balls. Then

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23. If the maximum and minimum values of the determinant

$$\begin{vmatrix} 1+\sin^2 x & \cos^2 x & \sin 2x \\ \sin^2 x & 1+\cos^2 x & \sin 2x \\ \sin^2 x & \cos^2 x & 1+\sin 2x \end{vmatrix}$$

are α and β respectively, then $\alpha + 2\beta$ is equal to

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24. The equation of the common tangent to the curves $y^2 = 4x$ and $x^2 + 32y = 0$ is $x + by + c = 0$. the value of

$\left|\sin^{-1}(\sin 1)+\sin^{-1}(\sin b)+\sin^{-1}(\sin c)\right|$ is

equal to

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25. $I=\int\frac{dx}{\sqrt[4]{(x-1)^3(x+2)^5}}=k^4\sqrt{\frac{x-1}{x+2}}+C,$

then 'k is equal to:

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

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

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

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

Answer: D

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