MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 11

Math

1. if $\sum\limits_{r=0}^{25} .^{50}C_r\left(.^{50-r}C_{25-r}\right) = k\left(.^{50}C_{25}\right)$, then k equals:

A. 2^{25}

B. $2^{25} - 1$

C. 2^{24}

D. $(25)^2$

Answer: A

2. If $1, \log_3 \sqrt{3^{1-x} + 2}, \log_3(4 \cdot 3^x - 1)$ are in AP then x equals

   A. $\log_3 4$

   B. $1 - \log_3 4$

   C. $1 - \log_4 3$

   D. $\log_4 3$

Answer: B

3. The area (in square units) enclosed by $|y| - x^2 = 1$ and $x^2 + y^2 = 1$ is

   A. 2

   B. zero

C. infinite

D. None of these

Answer: B

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4. A computer producing factory has only two plants T_1 and T_2. Plant T_1 produces 20% and plant T_2 produces 80% of the total computers produced. 7% of computers produced in the factory turn out to be defective. It is known that P(computer turns out to bedefective, given that it is produced in plant T_1)=10P (computer turns out to be defective, given that it is produced in plant T_2), where P(E) denotes the probability of an event E.A computer produced in the factory is randomly selected and it does not turn out to be defective. Then, the probability that it is produced in plant T_2, is

A. $\dfrac{36}{73}$

B. $\dfrac{47}{79}$

C. $\dfrac{78}{93}$

D. $\dfrac{75}{83}$

Answer: C

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5. Set of values of b for which local extrema of the function f(x) are positive where $f(x) = \dfrac{2}{3}a^2x^3 - \dfrac{5a}{2}x^2 + 3x + b$ and maximum occurs at $x = \dfrac{1}{3}$ is -

A. $-\left(4, \infty\right)$

B. $\left(-\dfrac{3}{8}, \infty\right)$

C. $\left(-10, \dfrac{3}{8}\right)$

D. None of these

Answer: B

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6. If p and q are two statements, then $p \lor \sim(p \Rightarrow \sim q)$ is equivalent to

A. $p \land q$

B. P

C. q

D. $\sim p \land q$

Answer: B

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7. The coordinates of the orthocenter of the triangle that has the coordinates of midpoint of its sides as (0,0) , (1,2) and (- 6,3) is

A. (0,0)

B. (- 4,5)

C. (-5,5)

D. (-4,4)

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8. On differentiating $\tan^{-1}\left[\dfrac{\sqrt{1+x^2}-1}{x}\right]$ with respect to x, the result

would be

A. $\dfrac{1}{2} \cdot \dfrac{1}{1+x^2}$

B. $\dfrac{1}{1+x^2}$

C. $\dfrac{2}{1+x^2}$

D. $\dfrac{1}{2} \cdot \dfrac{1}{1+2x}$

Answer: A

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9. Sum of the squares of all integral values of a for which the inequality $x^2 + ax + a^2 + 6a < 0$ is satisfied for all $x \in (1, 2)$ must be equal to

A. 90

B. 89

C. 88

D. 91

Answer: D

10. If $f: (0, \infty) \to (0, \infty)$ and $f(x) = \dfrac{x}{1+x}$, then f is

A. one-one and onto

B. one-one but not onto

C. onto but not one-one

D. neither one-one nor onto

Answer: B

11. The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectively by a student who took by mistake 50 instead of 40 for one observation. What are the correct mean and standard deviation?

A. 4

B. 6

C. 3

D. 5

Answer: D

12. $\displaystyle\sum_{k=1}^{10}\left(\frac{\sin(2k\pi)}{11}+i\frac{\cos(2k\pi)}{11}\right)$

A. 1

B. -1

C. i

D. $-i$

Answer: C

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13. The value of $\displaystyle\lim_{n\to\infty}\sum_{r=1}^{r=4n}\frac{\sqrt{n}}{\sqrt{r}\left(3\sqrt{r}+4\right)\sqrt{n}^2}$ is equal to

A. $\dfrac{1}{8}$

B. $\dfrac{1}{10}$

C. $\dfrac{1}{6}$

D. $\dfrac{1}{9}$

Answer: B

14. The angle of elevation of a cloud from a point 250 m above a lake is $15°$ and angle of depression of its reflection in lake is $45°$. The height of the cloud is

A. $250\sqrt{3}m$

B. 250 m

C. $\dfrac{250}{\sqrt{3}}m$

D. None of these

Answer: A

15. Let P be the relation defined on the set of all real number such that $P = \left[(a, b) : \sec^2 a - \tan^2 b = 1\right]$. Then P is:

A. reflexive and symmetric but not transitive

B. symmetric and transitive but not reflexive

C. reflexive and transitive but not symmetric

D. an equivalence relation

Answer: D

16. The general solution of the differential equation $\left[2\sqrt{xy} - x\right]dy + ydx = 0$ is (Here x,y > 0)

A. $\log x + \sqrt{\dfrac{y}{x}} = c$

B. $\log y - \sqrt{\dfrac{x}{y}} = c$

C. $\log y + \sqrt{\dfrac{x}{y}} = c$

D. None of these

Answer: C

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17. Let $f:(-1, 1) \rightarrow R$ be a function defind by f(x) =max. $\left\{ -|x|, \ -\sqrt{1-x^2} \right\}$. If K is the set of all points at which f is not differentiable, then K has set of all points at which f is not differentible, then K has exactly

  A. two elements

  B. one element

  C. three elements

  D. five elements

Answer: C

18. The value of $2\sin^2\theta + 4\cos(\theta + \alpha)\sin\alpha\sin\theta + \cos 2(\alpha + \theta)$

A. $\cos\theta + \cos\alpha$

B. independent of θ

C. independent of α

D. independent of both θ and α

Answer: B

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19. If A = $\begin{bmatrix} 1 & 1 & 2 \\ 1 & 3 & 4 \\ 1 & -1 & 3 \end{bmatrix}$, B = adj A and C = 3A then $\dfrac{|adjB|}{|C|}$ is equal to

A. 8

B. 16

C. 72

D. 2

Answer: A

20. $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{\left[1 - \tan\left(\frac{x}{2}\right)\right]\left[1 - \sin x\right]}{\left[1 + \tan\left(\frac{x}{2}\right)\right]\left[\pi - 2x\right]^3}$

A. $\dfrac{1}{8}$

B. 0

C. $\dfrac{1}{32}$

D. ∞

Answer: C

21. From the string abacabababcdced, if 5 letters should be selected , then the number of ways in which this selection can be done is

A. 51

B. 91

C. 71

D. 42

Answer: C

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22. Let $\vec{a}$ and $\vec{b}$ be two unit vectors such that $\vec{a} \cdot \vec{b} = 0$ For some $x, y \in R$, let $\vec{c} = x\,\vec{a} + y\,\vec{b} + \left(\vec{a} \times \vec{b}\right)$ If $\left|\vec{c}\right| = 2$ and the vector $\vec{c}$ is inclined at same angle α to both $\vec{a}$ and $\vec{b}$ then the value of $8\cos^2 \alpha$ is

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23. Number of solution of $2^{\sin\,(\,|x\,|\,)} = 3^{|\cos x\,|}$ in $[-\pi, \pi]$, is equal to

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24. The point, which is at the shortest distance from the line $x + y = 7$ and lying on an ellipse $x^2 + 2y^2 = 6$, has coordinates (a, b) then the value of $\dfrac{a}{b}$ is

A.

B.

C.

D.

Answer: 2

25.   If

$$y = \tan^{-1}\left(\frac{1}{x^2 + x + 1}\right) + \tan^{-1}\left(\frac{1}{x^2 + 3x + 3}\right) + \tan^{-1}\left(\frac{1}{x^2 + 5x + 7}\right.$$

and $\left(\dfrac{dy}{dx}\right)_{x=0} = \dfrac{-k}{1+k}$ then the value of k is