MATHS

NTA MOCK TESTS ENGLISH

JEE MOCK TEST 7

Mathematics

1. If $u = x^2 + y^2$ and $x = s + 3t, y = 2s - t,$ then $\frac{d^2u}{ds^2}$ is equal to

A. 12

B. 32

C. 36

D. 10

Answer: D

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2. If N is the number of positive integral solutions of the equation $x_1x_2x_3x_4 = 770$, then the value of N is

A. 250

B. 252

C. 254

D. 256

Answer: D

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3. If one root of the equation $x^2 + px + q = 0$ is the square of the other then

A. $p^3 + q^2 - q(3p + 1) = 0$

B. $p^3 + q^2 + q(1 + 3p) = 0$

C. $p^3 + q^2 + q(3p - 1) = 0$

D. $p^3 + q^2 + q(1 - 3p) = 0$

Answer: D

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4. If $s_n = \sum_{r=0}^{n} \frac{1}{.^n C_r}$ and $t_n = \sum_{r=0}^{n} \frac{r}{.^n C_r}$, then $\frac{t_n}{s_n}$ is equal to

A. $n - 1$

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

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

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

Answer: C

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5. $\lim_{x \to 0} \frac{1 + \sin x - \cos x + \ln(1-x)}{x \cdot \tan^2 x}$ using LHospitals Rule

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

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

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

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

Answer: A

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6. The range of value of α such that $(0, \alpha)$ lies on or inside the triangle formed by the lines y + 3x + 2 = 0, 3y - 2x - 5 = 0, 4y + x - 14 =0 is

A. $0 < v\eta < \frac{5}{2}$

B. $0 < \beta < \frac{7}{2}$

C. $\frac{5}{3} \leq \beta \leq \frac{7}{2}$

D. None of these

Answer: C

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7. The value of $\int_0^{\pi} \left(\Sigma_{r=0}^{3} a_r \cos^{3-r} x \sin^r x\right) dx$ depends upon

A. a_1 and a_2

B. a_0 and a_3

C. a_2 and a_3

D. a_1 and a_3

Answer: D

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8. Solve the equation: $\tan^{-1}\sqrt{x^2+x}+\sin^{-1}\sqrt{x^2+x+1}=\frac{\pi}{2}$

A. $-1, 0$

B. $0, 1$

C. $-1, 1$

D. $-1, 2$

Answer: A

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9. Find the sum of the first n terms of the series:

$0.2 + 0.22 + 0.222 + ... \, n - terms$

A. $\left(\frac{2}{9}\right) - \left(\frac{2}{81}\right)(1 - 10^{-n})$

B. $n\left(\frac{1}{9}\right)(1 - 10^{-n})$

C. $\left(\frac{2}{9}\right)\left[n - \left(\frac{1}{9}\right)(1 - 10^{-n})\right]$

D. $\left(\frac{2}{9}\right)$

Answer: C

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10. If tangents at (1,2) to the circle $C_1 : x^2 + y^2 = 5$ intersects the circle $C_2 : x^2 + y^2 = 9$ at A and B and tangents at A and B to the second circle meet at point C, then the co-ordinates of C are given by

A. $(4, -5)$

B. $\left(\frac{3}{5}, \frac{6}{5}\right)$

C. $(4, 5)$

D. $\left(\frac{9}{5}, \frac{18}{5}\right)$

Answer: D

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11. The minimum distance of a point on the curve $y = x^2 - 4$ from origin ,

A. $\frac{\sqrt{15}}{2}$ units

B. $\sqrt{\frac{19}{2}}$ units

C. $\sqrt{\frac{15}{2}}$ units

D. $\frac{\sqrt{19}}{2}$ units

Answer: A

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12. The domain of the function $f(x) = \sqrt{1n_{(|x|-1)}\left(x^2+4x+4\right)}$ is $(-3,-1)\cup(1,2)$ $(-2,-1)\cup(2,\infty)$ $(-\infty,-3)\cup(-2,-1)\cup(2,\infty)$ none of these

A. $[-3,-1]\cup[1,2]$

B. $(-2,-1)\cup[2,\infty)$

C. $(-\infty,-3]\cup(-2.-1)\cup(2,\infty)$

D. $[-2,-1]\cup[2,\infty)$

Answer: C

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13. The expression $\left(1+\tan x+\tan^2 x\right)\left(1-\cot x+\cot^2 x\right)$ has the positive values of x, given by

A. $\left[0, \frac{\pi}{2}\right]$

B. $[0, \pi]$

C. $R-\left\{x=\frac{n\pi}{2}, n \in I\right\}$

D. $[0, \infty]$

Answer: C

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14. the value of θ for which the system of equations $(\sin 3\theta)x-2y+3z=0, (\cos 2\theta)x+8y-7z=0$ and $2x+14y-11z=0$ has a non - trivial solution, is (here, $n \in Z$)

A. $n\pi$

B. $n\pi + (-1)^n \pi/3$

C. $n\pi + (-1)^n \pi/2$

D. None of these

Answer: A

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15. If both the mean and the standard deviation of 50 observatios $x_1, x_2, \ldots . x_{50}$ are equal to 16, then the mean of $(x_1 - 4)^2, (x_2 - 4)^2, \ldots . , (x_{50} - 4)^2$ is

A. 525

B. 480

C. 400

D. 380

Answer: C

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16. For an initial screening of an admission test, a candidate is given fifty problems to solve. If the probability that the candidate can solve any problem is $\frac{4}{5}$ then the probability that he is unable to solve less than two problem is :

A. $\frac{201}{5}\left(\frac{1}{5}\right)^{49}$

B. $\frac{164}{25}\left(\frac{1}{5}\right)^{48}$

C. $\frac{316}{25}\left(\frac{4}{5}\right)^{48}$

D. $\frac{54}{5}\left(\frac{4}{5}\right)^{49}$

Answer: D

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17. Let S be the set of all real numbers. Then , the relation $R = \{(a, b) : 1 + ab > 0\}$ on S is

A. reflexive and symmetric but not transitive

B. reflexive and transitive but not symmetric

C. reflexive, transitive and symmetric

D. None of the above

Answer: A

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18. The contrapositive of $(p \vee q) \rightarrow r$ is

A. $r \Rightarrow (p \vee q)$

B. $\sim r \Rightarrow (p \vee q)$

C. $\sim r \Rightarrow \sim p \wedge \sim q$

D. $r \Rightarrow (q \vee r)$

Answer: C

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19. The value of $\left(1+\frac{\cos\pi}{8}\right)\left(1+\frac{\cos(3\pi)}{8}\right)\left(1+\frac{\cos(5\pi)}{8}\right)\left(1+\frac{\cos(7\pi)}{8}\right)is$

1/4 (b) 3/4 (c) 1/8 (d) 3/8

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

B. $\frac{1}{4}$

C. $\frac{1}{8}$

D. $\frac{1}{16}$

Answer: C

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20. Tangents are drawn from the point $(\alpha, 2)$ to the hyperbola $3x^2 - 2y^2 = 6$ and are inclined at angles θ and ϕ to the x-axis . If $\tan\theta.\tan\phi = 2,$ then the value of $2\alpha^2 - 7$ is

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21. Let $f: R \to R$ be a differentiable function with f(0)=1 and satisfying the equation $f(x+y) = f(x)f'(y) + f'(x)f(y)$ for all $x, y \in R.$ Then, the value of $\log_e(f(4))$ is -

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22. If $\hat{a}, \hat{b}$ and $\hat{c}$ are three non-zero non-coplanar vectors and $\vec{p} = \vec{a} + \vec{b} - 2\vec{c}, \vec{q} = 3\vec{a} - 2\vec{b} + \vec{c}$ and $\vec{r} = \vec{a} - 4\vec{b} + 2\vec{c}$ are three vectors such that the volumes of the parallelopiped

formed by $\vec{a}, \vec{b}, \vec{c}$ and $\vec{p}, \vec{q}, \vec{r}$ as their conterminous edges are V_1 and V_2 respectively. Then $\frac{V_2}{V_1}$ is equal to :

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23. If a complex number z lie on a circle of radius $\frac{1}{2}$ units, then the complex number $\omega = -1 + 4z$ will always lie on a circle of radius k units, where k is equal to

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24. $\int (\sin(101x) . \sin^{99} x) dx$ equals

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