MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 5

Mathematics

1. If the value of

$(1+\tan 1^\circ)(1+\tan 2^\circ)(1+\tan 3^\circ)$..... Is

2^{λ}, then the sum of the digits of the number λ is

A. 3

B. 6

C. 5

D. 4

Answer: C

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2. If $\frac{5+9+13+.....nterms}{7+9+11+....(n+1)terms}=\frac{17}{16}$, then $n=$

A. 7

B. 12

C. 8

D. 15

Answer: A

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3. If $2f(xy) = (f(x))^y + (f(y))^x$ for all $x, y \in R$ and $f(1) = 3$, then the value of $\sum_{t=1}^{10} f(r)$ is equal to

A. $\frac{3}{2}(3^{10} - 1)$

B. $\frac{3}{2}(3^9 - 1)$

C. $\frac{3^{10} - 1}{2}$

D. $\frac{1}{2}(3^{10} - 1)$

Answer: A

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4. If $\frac{1}{6}\sin\theta, \cos\theta, \tan\theta$ are in $G.P.$ then θ is equal to $(n \in Z)$

A. $\left\{\theta : \theta = 2n\pi \pm \left(\frac{\pi}{6}\right), n \in I\right\}$

B. $\left\{\theta : \theta = 2n\pi \pm \left(\frac{\pi}{3}\right), n \in I\right\}$

C. $\left\{\theta : \theta = n\pi + (-1)^n \left(\frac{\pi}{3}\right), n \in I\right\}$

D. $\left\{\theta : \theta = n\pi + \frac{\pi}{3}, n \in I\right\}$

Answer: B

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5. The value of integral $\int_0^1 \sqrt{\frac{1-x}{1+x}}dx$ is

A. -1

B. 1

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

D. $\frac{\pi}{2}+1$

Answer: C

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6. If $p, r, s > 0$ then

$$\lim_{x \to \infty} \left(\frac{p^{\frac{1}{x}} + q^{\frac{1}{x}} + r^{\frac{1}{x}} + s^{\frac{1}{x}}}{4} \right)^{3x}$$

A. pqrs

B. $(pqrs)^3$

C. $(pqrs)^{\frac{3}{2}}$

D. $(pqrs)^{\frac{3}{4}}$

Answer: D

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7. If $(27)^{999}$ is divided by 7, then the remainder is .

A. 1

B. 2

C. 3

D. 6

Answer: D

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8. If $A = \begin{bmatrix} 1 & -3 \\ 2 & k \end{bmatrix}$ and $A^2 - 4A + 10I = A$, then k is equal to

A. 0

B. -4

C. 4

D. 1 or 4

Answer: C

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9. A piece of cheese is located at (12, 10) in a coordinate plane. A mouse is at (4, -2) and is running up the line $y = -5x + 18$. At the point (a, b), the mouse starts getting farther from the cheese rather than closer to it. The value of $(a + b)$ is :

A. 6

B. 10

C. 18

D. 14

Answer: B

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10. Two medians drawn from the acute angles of a right angled triangle intersect at an angle $\frac{\pi}{6}$. If the length of the hypotenuse of the triangle is $3units$, then the area of the triangle (in sq. units) is

A. $\sqrt{3}$

B. 3

C. $\sqrt{2}$

D. 9

Answer: A

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11. If Z is a non-real complex number, then find the minimum value of $\frac{Imz^5}{Im^5z}$

A. -2

B. -4

C. -5

D. -1

Answer: B

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12. If the coefficient of x^7 in $\left(ax^2 + \frac{1}{bx}\right)^{11}$ is equal to the coefficient of x^{-7} in $\left(ax - \frac{1}{bx^2}\right)^{11}$ then

A. $ab = 1$

B. $\frac{a}{b} = 1$

C. $a + b = 1$

D. $a - b = 1$

Answer: A

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13. The average of five consecutive odd number is 61. Then the difference between the highest and lowest numbers is

A. 2

B. 5

C. 8

D. Cannot be determined

Answer: C

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14. The abscissa of A and B are the roots of the equation $x^2 + 2ax - b^2 = 0$ and their ordinates are the roots of the equation

$y^2 + 2py - q^2 = 0$. The equation of the circle with AB as diameter is

A. $x^2 + y^2 + 2ax + 2py - b^2 - q^2 = 0$

B. $x^2 + y^2 + 2ax + py - b^2 - q^2 = 0$

C. $x^2 + y^2 + 2ax + 2py + b^2 + q^2 = 0$

D. None of these

Answer: A

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15. A tower T_1 of height 60 m is located exactly opposite to a tower T_2 of height 80 m on a straight road. From the top of T_1, if the angle of depression of the foot of T_2 is twice the angle of elevation of the top of T_2, then the width (in m) of the road between the feet of the towers T_1 and T_2 is

A. $20\sqrt{2}$

B. $10\sqrt{2}$

C. $10\sqrt{3}$

D. $20\sqrt{3}$

Answer: D

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16. The area between the curve $y = 2x^4 - x^2$, the x-axis, and the ordinates of the two minima of the curve is

A. $\frac{11}{60}$ sq. units

B. $\frac{7}{120}$ sq. units

C. $\frac{1}{30}$ sq. units

D. $\frac{7}{90}$ sq. units

Answer: B

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17. If a plane, intercepts on the coordinates axes at 8,4,4 then the length of the perpendicular from the origin to the plane is

A. $\frac{8}{3}$ units

B. $\frac{3}{8}$ units

C. 3 units

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

Answer: A

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18. If $f(x) = \begin{cases} \frac{\sqrt{4+ax}-\sqrt{4-ax}}{x} & -1 \leq x < 0 \\ \frac{3x+2}{x-8} & 0 \leq x \leq 1 \end{cases}$

continuous in $[-1, 1]$, then the value of a is

A. 1

B. -1

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

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

Answer: D

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19. Check whether the relation R defined on the set $A = \{1, 2, 3, 4, 5, 6\}$ as $R = \{(a, b) : b = a + 1\}$ is reflexive, symmetric or transitive.

A. R is neither reflexive nor symmetric nor transitive

B. R is neither reflexive nor symmetric but transitive

C. R is not reflexive but symmetric and transitive

D. R is reflexive, symmetric and transitive

Answer: A

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20. $\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} dx =$

A. $\frac{1}{2}\sin 2x + C$

B. $-\frac{1}{2}\sin 2x + C$

C. $-\frac{1}{2}\sin x + C$

D. $-\sin^2 x + C$

Answer: B

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21. Let $p(x) = x^2 + bx + c$, where b and c are integers. If p(x) is a factor of both $x^4 + 6x^2 + 25$ and $3x^4 + 4x^2 + 28x + 5$, find the value of p(1).

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22. There are eight rooms on the first floor of a hotel, with four rooms on each side of the corridor, symmetrical situated (that is each room is exactly opposite to one other room).

Four guests have to be accommodation In four of the eight rooms (that is, one in each) such that no two guests are in adjacent rooms or in opposite rooms. If N is the number of ways in which guests can be accommodated. Then the value of $\frac{N}{6}$ is

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23. Let $f[1, \infty) \to [2, \infty)$ be a differentiable function such that $f(1) = \frac{1}{3}$. If

$6\int_1^x f(t)dt = 3xf(x) - x^3$ for all $x \geq 1$,

then the value of $3f(2)$ is

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24. If $y = \tan^{-1}(\sec x - \tan x)$, then $\frac{dy}{dx}$ is

equal to

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25. The volume of a cube is increasing at the

rate of $18cm^3$ per second. When the edge of

the cube is 12 cm, then the rate in cm^2/s, at which the surface area of the cube increases, is

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