MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 17

Mathematics

1. The value of $I = \int_{-1}^{1} [x \sin(\pi x)] dx$ is (where [.] denotes the greatest integer function)

A. π

B. 2π

C. 0

D. $-\pi$

Answer:

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2. The area bounded by the curve $y^2 = 1 - x$ and the lines $y = \frac{[x]}{x}, x = -1,$ and $x = \frac{1}{2}$ is

A. $\left(\frac{3}{\sqrt{2}} - \frac{11}{6}\right)$ sq. units

B. $\left(3\sqrt{2} - \frac{11}{4}\right)$ sq. units

C. $\left(\frac{6}{\sqrt{2}} - \frac{11}{5}\right)$ sq. units

D. none of these

Answer: A

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3. The curve satisfying the differential equation $\frac{dx}{dy} = \frac{x + 2yx^2}{y - 2x^3}$ and passing through (1, 0) is given by

A. $x^2 + y^2 = 1$

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

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

D. $x^2 - y^2 = 1$

Answer: B

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4. The line $\frac{x}{a}+\frac{y}{b}=1$ touches the curve $y=be^{-x/a}$ at the point

A. (0,0)

B. (0,a)

C. (0,b)

D. (b,0)

Answer: C

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5. Six distinct numbers are chosen from the first 10 natural numbers. The probability that 6 is the third largest of those chosen number is

A. $\frac{2}{7}$

B. $\frac{5}{21}$

C. $\frac{10}{63}$

D. $\frac{16}{63}$

Answer: A

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6. A plane P = 0, which is perpendicular to line $\frac{x-2}{2}=\frac{y+2}{2}=\frac{z-1}{1}$ is passing through the point at which the above line meets the plane $x+y+z=21$, then the distance of plane P = 0 from origin is

A. $\frac{7}{3}$

B. 5

C. $\frac{32}{3}$

D. $\frac{37}{3}$

Answer: D

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7. If $A^2 = A$, then $(I + A)^4$ is equal to

A. $I + 15A$

B. $1 + 7A$

C. $1 + 8A$

D. $1 + 11A$

Answer: A

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8. The mean and variance of a data set comprising 15 observations are 15 and 5 respectively. If one of the observation 15 is deleted and two new observations 6

and 8 are added to the data, then the new variance of resulting data is

A. 10.3715

B. 11.8125

C. 13.25

D. 5.7516

Answer: B

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9. If $A = \{x : x = 6^n - 5n - 1, n \in N\}$ and $B = \{x : x = 25(n-1), n \in N\}$, then

A. A = B

B. $B \subset A$

C. $A \subseteq B$

D. $B \subseteq A$

Answer: C

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10. If $f(\tan x) = \cos 2x, x \neq (2n+1)\frac{\pi}{2}, n \in I$ then incorrect statement is

A. f(x) is an even function

B. f(x) is an odd function

C. Range of $f(x)$ is $[-1, 1]$

D. Domain of $f(x)$ is $x \in R$

Answer: A

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11. The value of $\lim_{x \to \pi} \frac{\tan\left(\pi \cos^2 x\right)}{\sin^2 x}$ is equal to

A. 1

B. π

C. $-\pi$

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

Answer: C

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12. If $f(x) = \left(\frac{2+x}{1+x}\right)^{1+x}$, then $f'(0)$ is equal to

A. 2 log 2

B. log 2

C. 3 log 2 - 1

D. 2 log 2 - 1

Answer: D

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13. Total number of lines touching atleast two circles of the family of four circles $x^2 + y^2 \pm 8x \pm 8y = 0$ is

A. 8

B. 10

C. 12

D. 14

Answer: D

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14. The locus of the middle points of the chords of the parabola $y^2 = 4ax$, which passes through the origin is :

A. $y^2 = ax$

B. $y^2 = 2ax$

C. $y^2 = 4ax$

D. $x^2 = 4ay$

Answer: B

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15. A flagstaff stands vertically on a pillar, the height of the flagstaff being double the height of the pillar. A man on the ground at a distance finds that both the pillar and the flagstaff subtend equal angles at his eyes. The

ratio of the height of the pillar and the distance of the man from the pillar is

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

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

C. $\frac{1}{\sqrt{3}}$

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

Answer: C

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16. If $z = 3 - 4i$ then $z^4 - 3z^3 + 3z^2 + 99z - 95$ is equal to

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17. If the roots of the equation $x^3 + bx^2 + cx + d = 0$ are in arithmetic progression, then b, c and d satisfy the relation

A. $2b^2 - 27d = 9bc$

B. $2b^3 - 27d = 9bc$

C. $2b^2 + 27d = 9bc$

D. $2b^3 + 27d = 9bc$

Answer: D

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18. In the expression of $\left(x^{\frac{4}{5}}+x^{-\frac{1}{5}}\right)^{n}$, the coefficient of the 8^{th} and 19^{th} terms are equal. The term independent of x is given by

A. $.^{27}C_{21}$

B. $.^{25}C_{20}$

C. $.^{25}C_{21}$

D. $.^{27}C_{22}$

Answer: B

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19. In the interval $(0, 2\pi)$, sum of all the roots of the equation $\sin\left(\pi \log_3\left(\frac{1}{x}\right)\right) = 0$ is

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

B. 4

C. $\frac{9}{2}$

D. $\frac{13}{3}$

Answer: C

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20. There are 3 oranges, 5 apples and 6 mangoes in a fruit basket. Number of ways in which at least one fruit

can be selected from the basket is

A. 168

B. 167

C. 125

D. 124

Answer: B

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21. If

$$\int \frac{x^{pq-p-1}}{(x^p+1)^q} dx = 2\frac{(1+x^{-p})^{1-q}}{\lambda p(q-1)} + c \qquad (p, q \in N - \{1\})$$

, then the value of λ is (here, c is an arbitary constant)

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22. The smallest possible natural number n, for which the equation $x^2 - nx + 2014 = 0$ has integral roots, is

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23. If $f(x) = \begin{cases} \lambda\sqrt{2x+3} & 0 \leq x \leq 3 \\ \mu x + 12 & 3 < x \leq 9 \end{cases}$ is differentiable at $x = 3$, then the value of $\lambda + \mu$ is equal to

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24. Let in ΔABC coordinates of vertex A is (0,0). Equation of the internal angle bisector of $\angle ABC$ is

$x + y - 1 = 0$ and mid-point of BC is (1,3). The ordinate of vertex C is

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25. Let the maximum and minimum value of the expression $2\cos^2\theta + \cos\theta + 1$ is M and m respectively, then the value of $\left[\frac{M}{m}\right]$ is (where [.] is the greatest integer function)

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