MATHS

BOOKS - NTA MOCK TESTS

DEFINITE INTEGRATION TEST

Single Choice

1. The value of the integral $I = \int_0^1 x(1x)^n dx.$

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

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

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

D. $\frac{1}{n+1}$

Answer: B

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2. The value of $Lt_{n\to\infty}\sum_{r=1}^{r=n}\frac{1}{n}e^{\frac{r}{n}}$ is

A. $1-e$

B. $e-1$

C. e

D. $e+1$

Answer: B

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3. The value of the integral $\int_0^{2a}\frac{f(x)}{\{f(x)+f(2a-x)\}}dx$ is equal to

A. a

B. $2a$

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

D. $4a$

Answer: A

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4. The value of $\int_{\pi}^{2\pi} [2\sin x]dx$ is equal to (where [.] represents the greatest integer function)

A. $-\pi$

B. $\frac{5\pi}{3}$

C. $\frac{-5\pi}{3}$

D. -2π

Answer: C

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5. The value of integral $\int_{e^{-1}}^{e^2} \left| \frac{\log_e x}{x} \right| dx$ is

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

B. $\frac{5}{2}$

C. 3

D. 5

Answer: B

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6. Let $(x) = \int_1^2 \sqrt{2 - t^2} dt$. Then the real roots of the equation $x^2 - f'(x) = 0$ are

A. ± 1

B. $\pm \frac{1}{\sqrt{2}}$

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

D. 0 and 1

Answer: A

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7. Let $T > 0$ be a fixed real number, suppose f is a continuous function such that for all $x \in R$, $f(x+T) = f(x)$

$I = \int_0^T f(x)dx$, then the value of $\int_e^{3+3T} f(2x)dx$ is

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

B. $2I$

C. $3I$

D. $6I$

Answer: C

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8. The integral $\int_{1/2}^{1/2}\left([x]+In\left(\frac{1+x}{1-x}\right)\right)dx$ is equal to (where [.] denotes the greatest integer function)

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

B. 1

C. $2In\left(\frac{1}{2}\right)$

D. 0

Answer: A

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9. The $I(m,n)=\int_0^1 t^m(1+t)^n(dt)$, then the expressin for $I(m,n)$ in terms of $(m+1,n-1)$ where $m,n\in N$ is

A. $\frac{2^n}{m+1}-\frac{n}{m+1}I(m+1,n-1)$

B. $\frac{n}{m+1}I(m+1,n-1)$

C. $\frac{m}{n+1} I(m_1, n-1)$

D. $\frac{2^n}{m+1} + \frac{n}{m+1} I(m+1, n-1)$

Answer: A

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10. If the value of definite integral $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \frac{1+\cot x}{e^x \sin x} dx$ is equal to $ae^{-\frac{\pi}{6}} + be^{-\frac{\pi}{4}}$, then $(a+b)$ equals

A. $2-\sqrt{2}$

B. $2+\sqrt{2}$

C. $\sqrt{2}-2$

D. None of these

Answer: A

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11. Let $f(x) = \int_2^x \frac{dt}{\sqrt{1+t^4}}$ and be the inverse of f.Then the valueof g'(0) is

A. $\sqrt{20}$

B. $\sqrt{17}$

C. $\sqrt{15}$

D. $\sqrt{21}$

Answer: B

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12. The value of $\lim_{x \to o} \sum_{r=1}^{r=4n} \frac{\sqrt{n}}{\sqrt{r}\left(\sqrt{4}+4\sqrt{n}\right)^2}$ is equal to

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

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

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

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

Answer: B

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13. If $I_1 = \int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx, I_2 = \int_0^{\pi} \sin^4 x dx$ then $I_1 : I_2$ is equal to

A. $3:4$

B. $1:2$

C. $4:3$

D. $2:3$

Answer: C

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14. The value of the integral $\int_{3\pi/4}^{\pi} \left[\sin x + \left[\frac{4x}{\pi}\right]\right] dx$, is equal to (where [.] denote greatest integer function)

A. 0

B. $\frac{5\pi}{4}$

C. $\frac{7\pi}{4}$

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

Answer: D

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15. $\int_a^b \frac{|x|}{x} dx =$

A. $b - a$

B. $|a| - |b|$

C. $a - b$

D. $|b| = |a|$

Answer: D

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16. If [.] denotes the greatest integer function, then the integeral $\int_0^{\pi} [\cos x] dx$ is equal to

A. -1

B. 0

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

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

Answer: D

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17. The integral $\int_0^{\frac{1}{2}} \frac{In(1+2x)}{1+4^2}dx$, equals is

A. $\frac{\pi}{4}In2$

B. $\frac{\pi}{16}In2$

C. $\frac{\pi}{8}In2$

D. $\frac{\pi}{32}In2$

Answer: B

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18. The $f(x)$ and $g(x)$ are continuous functions then $\int_{In\lambda}^{In\frac{1}{\lambda}} \frac{f\left(\frac{x^2}{4}\right)[f(x)-f(-x)]}{g\left(\left(\frac{x^2}{4}\right)[g(x)+g(-x)]\right)dx}$ is

A. Depends on λ

B. A non zero constant

C. zero

D. None of these

Answer: C

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19. Statement I: $\int_{\frac{\pi}{2}}^{\frac{3p}{2}} [2\pi x]dx = \frac{-\pi}{2}$, where $[x]$ represents G.I.F.

Statement II: $2\sin x$ is decreasing function in $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$.

A. Both Statement I and Statement II are true and the Statement Statement II is the correct explanation of the Statement I

B. Both Statement I and Statement II are true but the Statement II is not the correct explanation the Statement I

C. Statement I is true but Statement II is false

D. Statement I is false and Statement II is true

Answer: B

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20. If $\int_0^1 2^{x^2}dx, I_2 = \int_0^1 2^{x^3}dx, I_3 = \int_1^2 2^{x^2}dx, I_4 = \int_1^2 2^{x^3}dx$, then

A. $I_3 > I_4$

B. $I_3 = I_4$

C. $I_1 > I_2$

D. $I_2 > I_1$

Answer: C

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21. Evaluate $\int_0^\infty \frac{1}{1+x^4}dx.$

A. $\frac{\pi}{\sqrt{2}}$

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

C. $\frac{\pi}{2\sqrt{2}}$

D. $\frac{\pi}{4\sqrt{2}}$

Answer: A

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22. The value of $\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{(1-x^{2n})}}$ is $n \geq 1$

A. less than or equal to $\pi/6$

B. is less than or equal to $1/2$

C. is negative

D. None of these

Answer: A

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23. The value of $\int_{-\pi/2}^{\pi/2} \frac{\sin^2 x dx}{1+e^x}$

A. $\frac{\pi}{8}$

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

C. $\frac{\pi}{6}$

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

Answer: B

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24. Let $f(x) > 0 \forall x \in R$ and is bounded. If

$$\lim_{n \to \infty} \left[\int_0^a \frac{f(x)}{f(x) + f(a-x)} dx + a \int_a^{2a} \frac{f(x)}{f(x) + f(3x)} dx + a^2 \right.$$

$$\left. \int_{2a}^{3a} \frac{f(x)}{f(x) + f(5a-x)} dx + \ldots\ldots + a^{n-1} \int_{(n-1)a}^{na} \frac{f(x)}{f(x) + f[(2n-1) - \right.$$

$$= \frac{7}{5}$$

(modulus of $a < 1$), thena=

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

B. $\frac{1}{7}$

C. $\frac{14}{19}$

D. $\frac{9}{14}$

Answer: C

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25. The value of $\int_{-3}^{3}\{\sin\{x\}\}dx$ is equal to (where {.} denotes the fractional part function)

A. $1-\cos 1$

B. 0

C. $6(1-\cos 1)$

D. $6(\cos 1-1)$

Answer: C

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26. The integral $\int_2^4 \frac{\log x^2}{\log x^2 + \log(6-x)^2} dx$ is equal to

A. 6

B. 2

C. 4

D. 1

Answer: D

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27. Evaluate $\int_{-\frac{\pi}{3}}^{-\frac{\pi}{6}} \frac{dx}{1+\tan^{2n} x}, (n \in Z)$

A. $\frac{\pi}{6}$

B. $\frac{\pi}{12}$

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

D. None of these

Answer: B

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28. Given $\int_0^1 \frac{\sin t}{1+t} dt = \alpha$, then the value of $\int_{4\pi-2}^{4\pi} \frac{\sin\left(\frac{t}{2}\right)}{4\pi+2-t}$ in terms of α is

A. α

B. $-\alpha$

C. 2α

D. -2α

Answer: B

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29. $\lim_{n\to\infty} \left(\frac{(n+1)(n+2).....3n}{n^{2n}}\right)^{\frac{1}{n}}$ is equal to

A. $\frac{9}{e^2}$

B. $3\log 3 - 2$

C. $\frac{18}{e^4}$

D. $\frac{27}{e^2}$

Answer: D

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30. The slope of the tangent to the curve $y = \int_0^{\pi} \frac{dt}{1+t^3}$ at the point where x=1 is

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

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

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

D. 1

Answer: C

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