CTQ - 2023

CTQ : Concept Through Questions **Year : 2023**

Topic : Definite Integration II

1. If $I = \int_{-\pi}^{\pi} \frac{e^{\sin x}}{e^{\sin x}+e^{-sinx}} dx$, then I equals
   (a) π/2 (b) 2π
   (c) π (d) π/4 Video Solution
2. $\int_0^1 |\sin 2\pi x| \, dx$ is equal to
   (a) 0 (b) -1/π
   (c)1/π (d) 2/π Video Solution
3. If $I_1 = \int_0^{\pi/2} x \sin x \, dx$ and $I_2 = \int_0^{\pi/2} x \cos x \, dx$, then which one of the following is true?
   (a) $I_1 + I_2 = \frac{\pi}{2}$ (b) $I_2 - I_1 = \frac{\pi}{2}$
   (c) $I_1 + I_2 = 0$ (d) $I_1 = I_2$ Video Solution
4. The value of the integral $I = \int_1^{\infty} \frac{x^2-2}{x^3\sqrt{x^2-1}} dx$, is
   (a) 0 (b) 2/3
   (c) 4/3 (d) None of these Video Solution
5. $\lim_{n\to\infty} \left\{\frac{1}{na} + \frac{1}{na+1} + \frac{1}{na+2} + \cdots + \frac{1}{nb}\right\}$ is equal to
   (a) $\log\left(\frac{b}{a}\right)$ (b) $\log\left(\frac{a}{b}\right)$
   (c) log a (d) $log\ b$ Video Solution
6. $\int_{\pi}^{10\pi} |\sin x| dx$ is equal to
   (a) 20 (b) 8
   (c) 10 (d) 18 Video Solution
7. $\int_0^{\frac{\pi}{2}} \frac{\sin^2 x}{\sin x+\cos x} dx$ is equal to
   (a)π/2 (b) $\sqrt{2}\ \log(\sqrt{2}+1)$
   (c) $\frac{1}{\sqrt{2}}\log(\sqrt{2}+1)$ (d) None of these Video Solution
8. $\int_0^{\pi} [\cot x] dx$, where [·] denotes the greatest integer function, is equal to
   (a) π/2 (b) 1
   (c) – 1 (d) -π/2 Video Solution
   [NIMCET 2015]
9. Evaluate $\int_0^1 x(1-x)^n$ dx
   (a) $-\frac{1}{(n+1)(n+1)}$ (b) $\frac{+1}{(n+1)(n+2)}$
   (c) (n+1)(n+2) (d) (n-1)(n-2) Video Solution
   [NIMCET 2017]

10. The value of $\int_0^{\pi} x^3 \sin x \, dx$ is

(a) $\pi^3 - 6\pi$ (b) $-\pi^3 - 6\pi$

(c) $-\pi^3 + 6\pi$ (d) $\pi^3 + 6\pi$ Video Solution

[NIMCET 2017]

11. If $f(x) = \sin^5 x + \sin^3 x$ and $g(x) = \cos^6 x + \sin^3 x$, then the value of $\int_0^{\frac{\pi}{2}} [f(x) + f(-x)][g(x) + g(-x)]dx$ is

(a) 0 (b) >1

(c) 0 and 1 (d) less than 0 Video Solution

[NIMCET 2018]

12. Let $f: R \to R$ be defined by $f(x) = \begin{cases} x+2, & x < 0 \\ |x-2|, & x \geq 0 \end{cases}$. Find $\int_{-2}^{3} f(x)dx$

(a) 0.5 (b) 2.5

(c) 4.5 (d) 6.5 Video Solution

[NIMCET 2018]

13. $\int_0^{\pi} x\, f(\sin x)dx$ is equal to

(a) $\pi \int_0^{\pi} f(\sin x)dx$ (b) $\frac{\pi}{2} \int_0^{\pi/2} f(\sin x)dx$

(c) $\pi \int_0^{\frac{\pi}{2}} f(\cos x)dx$ (d) $\pi \int_0^{\pi} f(\cos x)dx$ Video Solution

[NIMCET 2018]

14. If $\int_{\log 2^x} \frac{1}{\sqrt{e^x - 1}} dx = \frac{\pi}{6}$, then x=

(a) $log\ 2$ (b) 2 log 4

(c) log 4 (d) 4 log 2 Video Solution

[NIMCET 2019]

15. The value of $\int_{-2}^{2} (ax^5 + bx^3 + c)dx$ depends on the

(a) Value of b (b) Value of c

(c) Value of a (d) Value of a and b Video Solution

[NIMCET 2020]

16. If $I\_n = \int_0^a (a^2 - x^2)^n dx$ where n is a positive integer, then the relation between I_n and I_{n-1} is

(a) $I\_n = \left(\frac{2na^2}{2n+1}\right) I_{n-1}$ (b) $I\_n = \left(\frac{2n^2a^2}{2n+1}\right) I_{n-1}$

(c) $I\_n = \left(\frac{2na^2}{2n-1}\right) I_{n-1}$ (d) $I\_n = \left(\frac{2n^2a^2}{2n-1}\right) I_{n-1}$ Video Solution

[NIMCET 2020]

17. If $a < b$, then $\int_a^b (|x-a| + |x-b|)$ is equal to

(a) $\frac{(b-a)^2}{2}$ (b) $\frac{b^2-a^2}{2}$

(c) $\frac{b^3-a^3}{2}$ (d) $(b-a)^2$ Video Solution

[NIMCET 2022]

Answer Key

Ques.	1	2	3	4	5	6	7	8	9	10
Ans.	C	D	A	A	A	D	C	D	B	A
Ques.	11	12	13	14	15	16	17			
Ans.	A	C	C	C	B	A	D			