CTQ - 2023

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

Topic : Definite Integration

1. $\int_0^a \sqrt{a^2 - x^2}\ dx$ is equal to
   (a) πa^2 (b) $\frac{1}{2}\pi a^2$
   (c) $\frac{1}{3}\pi a^2$ (d) $1/4\ \pi\ a^2$ Video Solution
2. $\int_0^{\pi} \cos^3 x\ dx\ is$ equal to
   (a) 0 (b) 1
   (c) -1 (d) $\frac{1}{2\sqrt{2}}$ Video Solution
3. The value of $\int_1^2 \frac{dx}{(x+1)\sqrt{x^2-1}}$ is
   (a) 1 (b) $1/\sqrt{3}$
   (c) $2/\sqrt{3}$ (d) $\frac{-2}{\sqrt{3}}$ Video Solution
4. The value of $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\cot x}$
   (a) π (b) $\pi/2$
   (c) $\pi/3$ (d) $\pi/4$ Video Solution
5. The value of the integral $\int_{-\frac{1}{2}}^{\frac{1}{2}} \left\{\left(\frac{x+1}{x-1}\right)^2 + \left(\frac{x-1}{x+1}\right)^2 - 2\right\}^{\frac{1}{2}} dx$, is
   (a) $\log\left(\frac{4}{3}\right)$ (b) $4\log\left(\frac{3}{4}\right)$
   (c) $4\log\left(\frac{4}{3}\right)$ (d) $\log\left(\frac{3}{4}\right)$ Video Solution
6. The value of $\int_{-1}^{1} x|x|\ dx$ is
   (a) 2 (b) 1
   (c) 0 (d) None of these Video Solution
7. The value of $\int_{1/e}^{e} \frac{|\log_e x|}{x^2} dx$, is
   (a) 2 (b) 2/e
   (c) 2(1-1/e) (d) 0 Video Solution
8. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \log_e \left\{\left(\frac{ax^2+bx+c}{ax^2-bx+c}\right)(a+b)|\sin x|\right\}$ dx is equal to
   (a) $\pi \log_e\ (a+b)$ (b) $\pi \log_e \left(\frac{a+b}{2}\right)$
   (c) $\frac{\pi}{2}\log_e(a+b)$ (d) None of these Video Solution
9. The value of the integral $\int_0^{\pi/2} \sin^5 x\ dx$ is

(a) 4/15 (b) 8/5
(c) 8/15 (d) 4/5 Video Solution

10. $\int_1^3 \frac{\cos(\log x)}{x}\, dx$ is equal to
(a) 1 (b) cos(log 3)
(c) sin(log 3) (d) π/4 Video Solution

11. The value of $\int_0^{\pi/2} \frac{\cos 3x+1}{2\cos x-1}\, dx$ is
(a) 2 (b) 1
(c) 1/2 (d) 0 Video Solution

12. For any integer n, the integral $\int_0^{\pi} e^{\cos^2 x}\ \cos^3(2n+1)x\, dx$ has the value
(a) π (b) 1
(c) 0 (d) None of these Video Solution

13. $\int_0^{\pi} |\cos x| dx$ is equal to
(a) 1/2 (b) -2
(c) 1 (d) 2 Video Solution

14. $\int_0^{1.5} [x^2] dx$ is
(a) $4+2\sqrt{2}$ (b) $2+\sqrt{2}$
(c) $2-\sqrt{2}$ (d) None of these Video Solution

15. The value of $\int_{\pi}^{2\pi} [2\sin x]\, dx$, where [ ] represents the greatest integer function, is
(a) $\frac{-5\pi}{3}$ (b) $-\pi$
(c) $\frac{5\pi}{3}$ (d) -2π Video Solution

16. The value of $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\tan^3 x}$ is:
(a) 0 (b) 1
(c) $\pi/4$ (d) $\pi/2$ Video Solution
[NIMCET 2008]

17. If $f: R \to R$ and $g: R \to R$ are continuous functions, then the value of the integral $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} [f(x)+f(-x)][g(x)-g(-x)]dx$ is:
(a) π (b) 1
(c) –1 (d) 0 Video Solution
[NIMCET 2008]

18. If $I\_1 = \int_0^1 2^{x^2} dx$, $I_2 = \int_0^1 2^{x^3}\, dx$, $I_3 = \int_1^2 2^{x^2}\, dx$ and $I_4 = \int_1^2 2^{x^3} dx$, then
(a) $I_3 = I_4$ (b) $I_3 > I_4$
(c) $I_2 > I_1$ (d) $I_1 > I_2$ Video Solution

19. The value of the integral $\int_0^{\frac{\pi}{4}} \frac{\sin x+\cos x}{3+\sin 2x}\, dx$ is:
(a) log 2 (b) log 3
(c) $\frac{1}{4}$log3 (d) $\frac{1}{8}$log3 Video Solution

20. The value of the integral $\int_3^6 \frac{\sqrt{x}}{\sqrt{9-x}+\sqrt{x}} dx$ is:

(a) 1 (b) 1/2
(c) 3/2 (d) 2 Video Solution

21. The value of the integral $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}$ is

(a) 0 (b) - π/4
(c) π/2 (d) π/4 Video Solution

[NIMCET 2013]

22. If $I_n = \int_0^{\pi/4} \tan^n \theta$, then $I_8 + I_6$ equals

(a) 1/4 (b) 1/5
(c) 1/6 (d) 1/7 Video Solution

[NIMCET 2013]

23. If [x] represents the greatest integer not exceeding x, then $\int_0^9 [x]\, dx$ is

(a) 32 (b) 36
(c) 40 (d) 28 Video Solution

24. The value of $\int_0^{\frac{\pi}{4}} \log(1+\tan x) dx$ is equal to

(a) $\frac{\pi}{4}\log_e 2$ (b) $\frac{\pi}{6}\log_e 2$
(c) $\frac{\pi}{8} log_e 2$ (d) $\frac{\pi}{2}\log 2$ Video Solution

[NIMCET 2014]

25. The value of $\int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \frac{x \sin x}{\cos^2 x} dx$ is

(a) $\frac{1}{3}(4\pi + 1)$
(b) $\frac{4\pi}{3} - 2\log\tan\frac{5\pi}{12}$
(c) $2\left(\frac{2\pi}{3} - \log\tan\frac{5\pi}{12}\right)$
(d) $4\pi/12 - \log\tan\frac{5\pi}{12}$ Video Solution

[NIMCET 2015]

Answer Key

Ques.	1	2	3	4	5	6	7	8	9	10
Ans.	D	A	B	D	C	C	C	B	C	C
Ques.	11	12	13	14	15	16	17	18	19	20
Ans.	B	C	D	C	A	C	D	D	C	C
Ques.	21	22	23	24	25					
Ans.	D	D	B	C	B, C					