

JEE MATHEMATICS

Topic: Definite Integration

Q.1 $\int_0^{2\pi} \sin^4 x \cos^6 x \, dx$ equals-

- (A) $3\pi/256$ (B) $3\pi/128$
 (C) $3\pi/64$ (D) None of these

Q.2 If $\int_0^{\pi} \log \sin x \, dx = k$, then the value of

$\int_0^{\pi/4} \log(1 + \tan x) \, dx$ is -

- (A) $-\frac{k}{4}$ (B) $\frac{k}{4}$
 (C) $-\frac{k}{8}$ (D) $\frac{k}{8}$

Q.3 $\int_0^{\pi} \log \sin x \, dx$ equals-

- (A) $(-\pi/2) \log 2$ (B) $(\pi/2) \log 2$
 (C) $-\pi \log 2$ (D) $\pi \log 2$

Q.4 $\int_0^a [f(x) + f(a-x)] \, dx$ equals-

- (A) $\int_0^a f(x) \, dx$ (B) $-\int_0^a f(x) \, dx$
 (C) $2 \int_0^a f(x) \, dx$ (D) None of these

Q.5 $\int_0^1 \frac{\log x}{\sqrt{1-x^2}} dx$ equals-

(A) $-\pi \log(1/2)$ (B) $\pi \log(1/2)$

(C) $\frac{\pi}{2} \log(1/2)$ (D) $-\frac{\pi}{2} \log(1/2)$

Q.6 $\int_{-1}^{3/2} |x \sin \pi x| dx$ equals-

(A) $(3/\pi) + 1/\pi^2$ (B) $(3/\pi) - 1/\pi^2$

(C) $1/\pi (\pi + 1)$ (D) None of these

Q.7 If $I = \int_0^{\pi/4} \sin^2 x dx$ and $J = \int_0^{\pi/4} \cos^2 x dx$ then I is equal to-

(A) $\pi/4 - J$ (B) $2J$

(C) J (D) $J/2$

Q.8 $\int_0^{\pi} \sin mx \sin nx dx$ equals ($m, n \in Z, m \neq n$)

(A) $m - n$ (B) 0 (C) $m + n$ (D) 1

Q.9 If $f(x+1) + f(x+7) = 0, \forall x \in R$ then possible value of 't' for which $\int_a^{a+t} f(x) dx$ independent of a, is

(A) 13 (B) 6

(C) 12 (D) None of these

Q.10 $\int_0^{\pi/4} \cos^{3/2} 2\theta \cos \theta d\theta$ equals-

(A) $\frac{3\pi}{16}$ (B) $\frac{3\pi}{16\sqrt{2}}$

(C) $\frac{3}{8\sqrt{2}}$ (D) None of these

Q.11 If $f(x) = |x| + |x - 1|$, then $\int_0^2 f(x)dx$ equals-

(A) 3 (B) 2 (C) 0 (D) -1

Q.12 $\int_0^{\log 5} \frac{e^x \sqrt{e^x - 1}}{e^x + 3} dx$ is equal to

(A) $3 + 2\pi$ (B) $4 - \pi$

(C) $2 + \pi$ (D) None of these

Q.13 $\int_0^1 e^{x^2} (x - \alpha) dx = 0$, then-

(A) $1 < \alpha < 2$ (B) $\alpha < 0$

(C) $0 < \alpha < 1$ (D) $\alpha = 0$

Q.14 If $I_1 = \int_e^{e^2} \frac{dx}{\log x}$ and $I_2 = \int_1^2 \frac{e^x}{x} dx$, then-

(A) $I_1 = I_2$ (B) $I_1 < I_2$

(C) $I_1 > I_2$ (D) None of these

Q.15 $\int_0^{\pi} \log (1 - \cos x) dx$ equals-

(A) $\pi \log 2$ (B) $-\pi \log 2$

(C) $(\pi/2) \log 2$ (D) $-(\pi/2) \log 2$

Q.16 $\int_0^{\pi} x \sin x \cos^4 x \, dx$ is equal to-

- (A) $3\pi/5$ (B) $2\pi/5$
(C) $\pi/5$ (D) None of these

Q.17 $\int_0^{\pi} \frac{dx}{a + b \cos x}$ is equal to-

- (A) $\pi/\sqrt{a^2 - b^2}$ (B) $\pi/\sqrt{a^2 + b^2}$
(C) π/ab (D) $(a + b)\pi$

Q.18 $\int_{-1/2}^{1/2} \cos x \log\left(\frac{1+x}{1-x}\right) dx$ is equal to

- (A) 0 (B) $1/2$
(C) $-1/2$ (D) None of these

Q.19 If $f(a-x) = f(x)$ and $\int_0^{a/2} f(x) dx = p$, then $\int_0^a f(x) dx$ is equal to-

- (A) $2p$ (B) 0
(C) p (D) None of these

Q.20 $\int_0^{2\pi} |\sin x| \, dx =$

- (A) 2 (B) 1
(C) 0 (D) 4

Q.21 $\int_{-\pi}^{\pi} (\cos px - \sin qx)^2 dx$, where p and q are integers, is equal to-

- (A) $-\pi$ (B) 0 (C) 2π (D) π

Q.22 $\int_1^5 (|x-3| + |1-x|) dx$ is equal to-

- (A) 21 (B) 5/6
(C) 10 (D) 12

Q.23 The value of α which satisfy $\int_{\pi/2}^{\alpha} \sin x dx = \sin 2\alpha$, ($\alpha \in [0, 2\pi]$) are equal to-

- (A) $7\pi/6$ (B) $3\pi/2$
(C) $\pi/2$ (D) all of these

Q.24 If $I_n = \int_0^{\infty} e^{-x} x^{n-1} dx$ then $\int_0^{\infty} e^{-\lambda x} x^{n-1} dx =$

- (A) λI_n (B) $\frac{1}{\lambda} I_n$ (C) $\frac{I_n}{\lambda^n}$ (D) $\lambda^n I_n$

Q.25 $\int_1^{e^{37}} \frac{\pi \sin(\pi \ln x)}{x} dx$ is equal to-

- (A) 1 (B) 2 (C) e (D) 37

Q.26 The value of integral $\int_0^1 e^{x^2} dx$ lies in the interval-

- (A) (0, 1) (B) (-1, 0)
(C) (1, e) (D) None of these

Q.27 $\lim_{n \rightarrow \infty} \left[\frac{1}{2n} + \frac{1}{\sqrt{4n^2-1}} + \frac{1}{\sqrt{4n^2-4}} + \dots + \frac{1}{\sqrt{3n^2+2n-1}} \right]$

is equal to-

- (A) $\pi/4$ (B) $\pi/3$
(C) $\pi/2$ (D) $\pi/6$

Q.28 $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n^2}\right)^{2/n^2} \cdot \left(1 + \frac{2^2}{n^2}\right)^{4/n^2} \left(1 + \frac{3^2}{n^2}\right)^{6/n^2}$

..... $\left(1 + \frac{n^2}{n^2}\right)^{2n/n^2}$ is equal to

- (A) 4/e (B) 3/e
 (C) 2/e (D) None of these

Q.29 Let $I_1 = \int_1^2 \frac{dx}{\sqrt{1+x^2}}$ and $I_2 = \int_1^2 \frac{dx}{x}$, then-

- (A) $I_1 = I_2$ (B) $I_2 > I_1$
 (C) $I_1 > I_2$ (D) $I_1 > 2 I_2$

Q.30 If [] denotes the greatest integer function, then $\int_0^{3/2} [x^2] dx$ is equal to-

- (A) $2 - \sqrt{2}$ (B) $2 + \sqrt{2}$
 (C) $1 - \sqrt{2}$ (D) $1 + \sqrt{2}$

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	B	C	C	C	C	A	A	B	C	B
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	A	B	C	A	B	C	A	A	A	D
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	C	D	D	C	B	C	D	A	B	A