EXAM NO: 13   INTEGRATION & LPP   ①

SECTION: A   (ONE MARK)

Qn. 1 $\displaystyle\int_0^{\pi/4} \tan^2 x \, dx$ Ⓐ $\frac{\pi}{4}$ Ⓑ $1+\frac{\pi}{4}$ Ⓒ 1 Ⓓ $1-\pi/4$

Qn. 2 $\displaystyle\int_0^\pi \sin^3 x \, dx$ Ⓐ $\frac{3}{4}$ Ⓑ $\pi-\frac{y}{3}$ Ⓒ $\frac{+y}{3}$ Ⓓ $4/3$

Qn. 3 → $\displaystyle\int_0^{\pi/4} \sqrt{1-\sin(2x)} \, dx$ Ⓐ $\sqrt{2}+1$ Ⓑ $1-\sqrt{2}$ Ⓒ $\sqrt{2}-1$ Ⓓ none of them

Qns. 4 → $\displaystyle\int_0^{\pi/2} x\sin x \, dx$ Ⓐ -1 Ⓑ 2 Ⓒ 1 Ⓓ -2

Qn. 5 → $\displaystyle\int_0^\pi \frac{1}{1+\sin x} \, dx$ Ⓐ 3 Ⓑ 2 Ⓒ -2 Ⓓ -3

Qn. 6 → $\displaystyle\int_0^\pi \left(\sin^2\frac{x}{2} - \cos^2\frac{x}{2}\right) dx$ Ⓐ $-\frac{1}{2}$ Ⓑ Ⓞ Ⓒ 2 Ⓓ none of them.

Qn. 7 $\displaystyle\int_0^k \frac{1}{2+8x^2} \, dx = \frac{\pi}{16}$ then k equals to Ⓐ $\frac{1}{2}$ Ⓑ 2 Ⓒ $\frac{\pi}{4}$ Ⓓ $\frac{\pi}{2}$

Qn. 8 $\displaystyle\int_1^2 \log x \, dx$ Ⓐ $\log 4 - 1$ Ⓑ $\log 2 - 1$ Ⓒ $2\log 2$ Ⓓ $2\log 2 + 1$

Qn. 9 $\displaystyle\int_{-1}^1 e^{|x|} \, dx$ Ⓐ $2e$ Ⓑ $2e-1$ Ⓒ $e-2$ Ⓓ none of them

Qn. 10 → $\displaystyle\int_0^{\pi/2} \frac{\sin x - \cos x}{1+\sin x \cos x} \, dx$ Ⓐ $\frac{\pi}{4}$ Ⓑ $\frac{\pi}{2}$ Ⓒ 1 Ⓓ 0

Qn. 11 → $\displaystyle\int_0^\pi \frac{e^{\cos x}}{e^{\cos x}+e^{-\cos x}} \, dx$ Ⓐ $\frac{\pi}{4}$ Ⓑ π Ⓒ $\frac{\pi}{2}$ Ⓓ 0

Qn. 12 → $\displaystyle\int_0^1 \log\left(\frac{1}{x}-1\right) dx$ Ⓐ $\frac{\pi}{2}$ Ⓑ 1 Ⓒ 0 Ⓓ none of them

Qn. 13 → $\displaystyle\int_1^2 |x-3| \, dx$ Ⓐ $\frac{2}{3}$ Ⓑ $\frac{3}{2}$ Ⓒ 1 Ⓓ 3

Qn. 14 → $\displaystyle\int_0^{\pi/2} \log\left(\frac{4+3\sin x}{4+3\cos x}\right) dx$ Ⓐ $3/4$ Ⓑ 0 Ⓒ -1 Ⓓ 3

Q.No. 15 → $\int_0^3 [x] dx$ (A) 3   (B) 4   (C) 2   (D) 0

Q.No. 16 → $\int_0^{\pi/2} \cos x \cdot e^{\sin x} dx$ (A) e-1   (B) e   (C) 2e   (D) 2e-1

[SECTION: B] (2 Marks each)

Q.No. 17 $\int_0^{\pi/2} \sin^4 x \, dx$

Q.No. 18   If $\int_0^9 \sqrt{x} \, dx = 2a \int_0^{\pi/2} \sin^3 x \, dx$, find the value of

$$\int_a^{a+1} x \cdot dx$$

Q.No. 19 → $\int_{\pi/4}^{\pi/2} \cos(2x) \cdot \log(\sin x) dx$

Q.No. 20 → $\int_{\pi/2}^{\pi} e^x \left(\frac{1-\sin x}{1-\cos x} \right) dx$

Q.No. 21 → $\int_0^{\pi/4} \tan^3 x \, dx$

Q.No. 22 → $\int_0^{\pi/4} \frac{\sin x + \cos x}{9+16 \sin(2x)} dx$

Q.No. 23 → $\int_0^{\pi/2} \sin(2x) \tan^{-1}(\sin x) dx$

Q.No. 24 → $\int_0^{\pi/2} \frac{x + \sin x}{1+\cos x} dx$

Q.No. 25 → $\int_{-1}^2 |x^3 - x| dx$

Q.No. 26 $\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x} dx$

Q.No. 27 $\int_0^1 \frac{\log(1+x)}{1+x^2} dx$

QN 28 → $\int_{-a}^{a} \sqrt{\dfrac{a-x}{a+x}} \, dx$

QN 29 $\int_{0}^{\pi/2} \dfrac{x}{\sin x + \cos x} \, dx$

QN. 30 → Show that $\int_{0}^{\pi} \dfrac{x}{1-\cos x \cdot \sin x} \, dx = \dfrac{\pi(\pi-x)}{\sin x}$

QN. 31 → $\int_{0}^{\pi/2} \dfrac{\sin(2x)}{\sin^4 x + \cos^4 x} \, dx$

QN. 32 → $\int_{0}^{\pi/2} \sqrt{\tan x} + \sqrt{\cot x} \, dx$

SECTION: C (5 Marks each)

QN 33. $\int_{0}^{\pi} \log(1+\cos x) \, dx$

QN 34 $\int_{-1}^{3/2} |x \sin(\pi x)| \, dx$

QN. 35 $\int_{0}^{1} \cot^{-1}(1-x+x^2) \, dx$

QN. 36 → Minimize $Z = -50x + 20y$
Subject to constraints:

$2x - y \geq -5$
$3x + y \geq 3$
$2x - 3y \leq 12$
$x \geq 0, \, y \geq 0$

QN. 37 → Minimize $Z = x - 7y + 190$
Subject to $x + y \leq 8$
$x + y \geq 4$
$x \leq 5$
$y \leq 5$

$x \geq 0, \, y \geq 0$

QN 38
Minimize & Maximize
$Z = 5x + 2y$
Subject to
$-2x - 3y \leq -6$
$x - 2y \leq 2$
$3x + 2y \leq 12$
$-3x + 2y \leq 3$
$x \geq y \geq 0$